TENDER INVITED BY:

ENGINEERING PROJECTS (INDIA) LTD.

6A, 6th Floor, Bakhtawar
Nariman Point Mumbai-400021
Tel No: 022-22049230
Fax : 022 22882177
E-mail: wro-contracts@epi.gov.in

Construction of Residential Quarters (Type-II / 32 and Type-III /16 Nos at 29th Batalion, ITBP, Jabalpur, MP.

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NOTICE INVITING TENDER

Tender No. EPI/WRO/CON/ITBP/693B /0090 15.10.2015

1. Tender for Construction of Residential Quarters (Type-II / 32 and Type-III /16 Nos at 29th Battalion, ITBP, Jabalpur, MP.

Engineering Projects (India) Ltd invites the sealed Percentage rate tenders for Construction of Residential Quarters (Type-II / 32 and Type-III /16 Nos at 29th Battalion, ITBP, Jabalpur, MP .“in two bids( Techno commercial –Envelope 1 and Price bid- envelope-2, Both the envelopes shall be kept in Third envelope ) from the eligible and interested bidders who are well equipped, experience, financially sound Contractors / eligible Firms for the following works

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<th>Sr. No.</th>
<th>NAME OF WORK</th>
<th>ESTIMATED COST (Rs)</th>
<th>TIME OF COMPLETION</th>
<th>EMD (Rs)</th>
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<td>1</td>
<td>Construction of Residential Quarters (Type-II / 32 and Type-III /16 Nos at 29th Battalion, ITBP, Jabalpur, MP</td>
<td>Rs. 8,30,33,482/- (Rupees Eight Crores Thirty lacs Thirty Three thousand Four hundred Eighty Two )</td>
<td>15 (Fifteen) months from the date of issue of LOI/Work Order</td>
<td>Rs.16,61,000/- ( Rupees Sixteen Lakhs Sixty One Thousand only)</td>
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The brief scope of work included in this tender shall include (but not limited to) **Construction of Residential Quarters (Type-II / 32 and Type-III /16 Nos. at 29th Battalion, ITBP, Jabalpur, MP.** The detailed scope of work is given in the tender documents.

Apart from above, any other services not covered above but required as per direction of EPI are deemed to be included in the scope of work. The work is to be carried out on item rate basis as per bill of quantities and tender conditions. The detail scope of work is given in the tender document.

**The Bidders are required to quote at par or minus the estimated cost put to tender.**

**Time schedule of Tender activities:**

(i) Date & Time for sale/Downloading of tender documents: **15/10/2015 to 29/10/2015 upto 17:00 hrs.**

(ii) Last Date & Time of submission of Tenders: **30/10/2015 upto 14:00 hrs.**

(iii) Date & Time of opening tender (Techno-Commercial Bid): **30/10/2015 at 15:00 hrs.**

Contractors who fulfill the following criteria shall be eligible to apply. The Joint Ventures are not accepted.

a) Experience of having successfully completed similar works during the last 7 (Seven) years ending last day of month previous to the one in which application are invited should be either of the following:

- Three similar completed works costing not less than the amount equal to 40% of estimated cost.

  OR

- Two similar completed works costing not less than the amount equal to 50% of estimated cost.

Signature of the Bidder

2

EPIL
OR

One similar completed work costing not less than the amount equal to 80% of estimated cost.

AND

One work of any nature (either part of (i) or a separate one) costing not less than the amount equal to 40% of the Estimated cost put to tender with some Central/State Government Organization / Central Autonomous Body / Central Public Sector undertakings.

The ‘similar works’ shall mean “Civil Works for buildings of Residential, commercial/ Institutional area.”.

b) Should have average annual financial turnover during the last three years, ending on 31st March of the previous Financial Year, should be at least 30% of the estimated cost duly certified by a Chartered Accountant.

c) Should not have incurred any loss in more than two years during the immediate last five consecutive financial years, ending 31.03.2015, Copies of balance sheet/certificate from Chartered Accountant to be submitted.

d) Should have a solvency of 40% of estimated cost issued by his bankers. The Solvency certificate should not have been issued earlier than one year of last date of issue of tender.

e) Should have valid PAN (Permanent Account Number of Income Tax). Copies of PAN card to be submitted.

f) It is desirable that the bidder should have valid PF Registration No. In case, the bidders do not have PF Registration No, the same shall be obtained by successful bidder within one month from the date of LOI or before release of First RA Bill.

g) Bidder should have Valid Sale Tax/VAT Registration certificate and Service Tax Registration certificates. Copies of documentary evidence to be submitted.

h) Bid Capacity: The bidding capacity of the contractor should be equal to or more than the estimated cost of the work put to Tender.
The bidding capacity shall be worked out by the following formula:

\[ \text{Bidding Capacity} = [A \times N \times 2] - B \]

Where,

\[ A = \text{Maximum value of construction works executed in any one year during the last five years taking into account the completed as well as works in progress ending last day of the month previous to the one in which applications invited:} \]
\[ N = \text{Number of years prescribed for completion of work for which bids have been invited} \]
\[ B = \text{Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited. The Tenderers is requested to furnish the existing commitments on works under execution along with stipulated period for completion of remaining for each of the work should be furnished in an affidavit on non-judicial stamp paper of value of Rs. 100/- duly certified that the particulars furnished are correct as per the Proforma in Annexure -A} \]

Details to be provided in the enclosed formats.

Even though an applicant may satisfy the eligibility criteria, EPI reserves the right for not issuing the tender document if the applicant's has record of poor performance such as abandoning work, not properly completing the work, delay in completion of work, poor quality of work, financial failure / weakness etc.

2.0 EPI reserves the right to extend the date of submission of the tenders or cancel the tenders or annul this process without assigning any reason whatsoever.

3.0 Tenderers have to confirm whether they are registered under MSME Act or not, if so, relevant copy of the registration letter is to be attached at envelope I.
4.0 Tender documents comprising of the following are available on the website of EPI: www.epi.gov.in/ & CPP Portal: www.eprocure.gov.in

(i) Notice Inviting Tender
(ii) Instructions to Tenderers & General conditions of Contract, Addendum to GCC, Memorandum, Form of Tender, Letter of Undertaking, Technical specification
(iii) Additional Conditions of Contract, Bidders information
(iv) Drawings
(v) Price Bid/ Bill Of quantity.

6.0 The complete tender documents are available on the website and the same can be downloaded by the intending bidders directly from website www.epi.gov.in & CPP Portal: www.eprocure.gov.in. The tender fees of **Rs. 10,000.00 (Rupees Ten Thousand only)** (Non-Refundable) by the crossed Demand Draft favoring Engineering Projects (India) Limited, Mumbai, and shall be submitted by the bidder along with their bid in Envelope-1. Relevant experience certificates and other documents as mentioned above Cl 1.0(a) to 1.0 (h) duly attested by the Gazetted Officer not below the rank of Executive Engineer or equivalent or Notary Public fulfilling the qualifying criteria shall be enclosed in Envelope-1. Completion certificates from the clients shall be in the name of the company who is submitting the tender. The Contractor has to produce original documents for the verification as and when demanded. The tender of any tenderer shall be rejected if in the detailed scrutiny, documents submitted along with the tender are found to be unsatisfactory/forged. The decision of EPI in this regard shall be final and the binding the tenderer.

7.0 All tenders shall be accompanied by the Earnest Money Deposit (EMD) of **Rs. 16,61,000/-** in the form of DD/ Bank Guarantee of any Nationalized Bank/Scheduled Banks, in accordance with the prescribed Performa, favoring “Engineering Projects (India) Limited, Mumbai,” The EMD shall be valid for minimum period of **90 days (ninety)** from the last day of submission of tender. Tenders submitted without EMD or with inadequate amount of EMD shall be rejected.

Signature of the Bidder 5 EPIL
8.0  The Terms & Conditions contained in this NIT and tender documents shall be applicable. In case of any unscheduled holiday taken place on the last day of issue of tender/submission of tender, the next working day will be treated as scheduled day and time for issue/submission of Tender.

9.0  EPI reserves the right to accept any tender or reject any or all tenders or annul this tendering process without assigning any reason and liability whatsoever and to re-invite the tender at its sole discretion.

10.0  The corrigendum or addendum, extension, cancellation of this NIT, if any, shall be hosted on the EPI’s & CPP portal. The bidders are required to check EPI’s website & CPP Portal regularly for this purpose, to take into account before submission of tender. All Corrigendum and addendum are to be submitted duly signed & stamped. All bidders are advised to check especially website www.epi.gov.in/www.eprocure.gov.in regularly.

11.0  The price bid of those bidders whose bid has been technically accepted on the basis of documents submitted shall be opened with prior intimation to them. However, it is made clear that the offer of the L-1 bidders shall be accepted subject to the confirmation of authentically of the PQ documents/BG from the concerned department/bank.

12.0  The tender documents shall be issued by and submitted to:

Group General Manager (Contracts)
Engineering Projects (India) Ltd,
6A, 6th Floor, Bakhtawar, Nariman Point
Mumbai-400021
Tel No: 022 22049230
Fax: 022 22882177, e-mail: wro-contracts@epi.gov.in
**BID CAPACITY**

**Name of the Work**: Construction of Residential Quarters (Type-II / 32 and Type-III /16 Nos at 29th Batalion, ITBP, Jabalpur, MP

**NIT No**: EPI/WRO/CON/ITBP/693B/0090

**DTD**: 15.10.2015

**ESTIMATED COST PUT TO TENDER**: Rs. 8,30,33,482.00

**Bid Capacity**: The bidding capacity of the contractor should be equal to or more than the estimated cost of the work put to Tender. The bidding capacity shall be worked out by the following formula:

\[
\text{Bidding Capacity} = [A \times N \times 2] - B
\]

Where,

A = Maximum value of construction works executed in any one year during the last five years taking into account the completed as well as works in progress

N = Number of years prescribed for completion of work for which bids have been invited

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited **(Format enclosed)**
BID CAPACITY CALCULATION BY BIDDER

SIGN & STAMP OF BIDDER

ANNEXURE-A

AFFIDAVIT

(To be typed on Rs. 100/- non-judicial stamp paper)
I/We ....................................aged ..............years son of .............................................do hereby solemnly affirm and declare as follows for and on behalf of the Firm:

**LIST OF EXISTING COMMITMENT AND ONGOING WORKS**

<table>
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<tr>
<th>Sr. No.</th>
<th>Name of Works</th>
<th>Client Name &amp; Address</th>
<th>Work Order Value (in Rs)</th>
<th>Work Executed till Date (Rs)</th>
<th>Balance Amount of work to be completed (Rs)</th>
<th>Balance period to complete the works (Total months)</th>
<th>Work to be completed in 12 month (Rs)</th>
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</tbody>
</table>

Signature of the Bidder

EPIL
<table>
<thead>
<tr>
<th>Balance Commitments during 12 monthd as per NIT</th>
<th>Rs</th>
</tr>
</thead>
</table>

It is certify that the above particulars furnished are true and correct. If any information given is found to be concealed at a later date, the Contract will be terminated forthwith without prejudice to the rights thereon consequent on termination and the bidder will be blacklisted. I/We agree for debarring tendering for one year if any facts are suppressed.

SIGN AND STAMP OF BIDDER

Signature of Notary Public
INSTRUCTIONS TO TENDERERS

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<th>Two Bid System</th>
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<td><strong>Type of Bid</strong></td>
<td>Two Bid System</td>
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<tr>
<td></td>
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<td>Techno-commercial bid under a sealed cover – (Envelop ‘I’)</td>
</tr>
<tr>
<td></td>
<td><strong>2nd Part</strong></td>
<td>Price Bid - under a sealed cover – (Envelop ‘II’)</td>
</tr>
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</table>

1st Part Techno-commercial Bid :

Bidders are required to submit the following tender documents duly sealed and signed in Envelop 1 (techno-commercial)

1. Tender Fee, EMD
2. Notice Inviting Tender, Instruction to Tenderers, ACC
3. Documents for qualification
4. Price Bid Format (blank)

2nd Part Price Bid (under a sealed cover)

In this part bidder should enclose only Price bid as per price bid format enclosed in tender document. The form of Price Bid duly filled in the item rate basis format bill of quantities for Tender for Supply, installation, inspection, testing & commissioning of Passengers & Goods Lifts for Construction of Hangars & Utility Buildings & allied facilities, Package-II at HAL, Nasik, Maharashtra both in words and figures superscribed “Price Bid.” for NIT no, Due on, from (name & address of the bidder with contact no.) No other documents should be kept in this envelope.

**ENVELOPE-III**

Both the Envelopes I & II shall be put in another envelope which will be superscribed with the NIT No. mentioned above and submitted to the official address mentioned below.

<table>
<thead>
<tr>
<th></th>
<th>Address for collection &amp; submission of tender</th>
<th>Group General Manager (Contracts) Engineering Projects (India) Ltd., (A Govt. of India Enterprise) 6A, 6th Floor, BAKHTAWAR, Nariman Point, Mumbai – 400021 Tel No : 022 22049230 Fax : 022 22882177 e-mail : <a href="mailto:wro-contracts@epi.gov.in">wro-contracts@epi.gov.in</a></th>
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ENGINEERING PROJECTS (INDIA) LIMITED

(A Govt. of India Enterprise)

INSTRUCTIONS TO TENDERERS

AND

GENERAL CONDITIONS OF CONTRACT

DECEMBER, 2007

VOLUME-I

Issued to: M/s. ____________________________________________

_________________________________________

_________________________________________

_________________________________________
ENGINEERING PROJECTS (INDIA) LIMITED
(A Govt. of India Enterprise)

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ENGINEERING PROJECTS (INDIA) LIMITED
(A Govt. of India Enterprise)

INSTRUCTIONS TO TENDERERS
ENGINEERING PROJECTS (INDIA) LIMITED
(A Govt. of India Enterprise)

INSTRUCTIONS TO TENDERERS

1.0 MODE OF SUBMISSION

The Tender is to be submitted in two separate sealed covers marked as under:

ENVELOPE-1 :-

This ENVELOPE shall contain the following:

i) Earnest Money Deposit as per clause 2.0 of ‘Instructions to Tenderers’ (ITT).
ii) Letter of Undertaking for un-conditional acceptance of the tender conditions
    as per proforma given in ITT.
iii) Pre-Qualification Documents and Credentials as per clause 19.0 of ITT.
iv) Volume-I (ITT, General Conditions of Contract),
    Volume-II (Notice Inviting Tender, Additional Conditions of Contract,
    Specifications, Drawings) and Corrigendum/ Addendum, if any, duly filled in,
    signed and stamped on each page by tenderer. Cutting or over-writing, if any,
    shall be signed and stamped by the person signing the Tender. All pro-forma
    forming part of Tender Documents shall be filled in, signed and stamped by
    the tenderer.
v) Copy of power of attorney / partnership deed, duly attested by Notary Public
    authorizing the person who signs the Tender.
vi) Any other information as required to be submitted along-with the Tender.

This envelope shall be marked as:

ENVELOPE-1 “TECHNO-COMMERCIAL BID” FOR (Name of work as
mentioned in “Notice Inviting Tender”)

NIT No. : ______________________________________
DUE ON : ______________________________________
FROM : (Name of the Contractor)

ENVELOPE – 2 :-

This ENVELOPE shall contain only the Volume-III comprising of PRICE-BID.

This envelope shall be marked as:

ENVELOPE-2 : ‘PRICE-BID’ FOR (Name of Work as mentioned in
“Notice Inviting Tender”)

NIT No. : ______________________________________
DUE ON : ______________________________________
FROM : (Name of the Contractor)
Both the envelopes / packets shall be individually sealed and kept in an outer envelope marked as :

TENDER FOR (Name of Work as mentioned in “Notice Inviting Tender”)

NIT No. : __________________________________

DUE ON : __________________________________

FROM : (Name of the Contractor)

The outer envelope shall be duly sealed and shall be delivered at place of submission of Tender by the date and time fixed for receipt of Tender as mentioned in “Notice Inviting Tender”. The Tenders received after the date and time of Tender receipt shall not be considered and shall be returned to the tenderer unopened. EPI shall not be responsible for any postal or other delays, whatsoever and tenderer should take care to ensure the submission of Tender at place of receipt of Tender by due date and time fixed for Tender receipt. All the envelopes shall be addressed to the authority who has invited the Tender as mentioned in “Notice Inviting Tender”.

1.1 First the Envelope-1 of the tenderer shall be opened. Tenderers who unconditionally accept the tender conditions, deposit the required Earnest Money and whose Techno-Commercial Bid along with PQ Documents is found suitable shall be considered for the opening of their Price Bid and Envelope-2 of such tenderers shall only be opened. The Tenders not accompanied by requisite Earnest Money and / or not conveying un-conditional acceptance of tender conditions or whose Techno-Commercial Bid and PQ Documents are not found suitable, shall be rejected and such tenderer shall not be allowed to attend Price Bid opening i.e. opening of Envelope-2.

1.2 Once the tenderer has given an unconditional acceptance to the tender conditions in its entirety, he is not permitted to put any remark(s) / condition(s) (except unconditional rebate on price, if any) in / along with the ‘Price-Bid’ / Tender.

1.3 In case the condition 1.2 mentioned above is found violated at any time after opening of Tender, the Tender shall be summarily rejected and EPI shall, without prejudice to any other right or remedy, be at liberty to forfeit the full said Earnest Money absolutely.

2.0 EARNEST MONEY DEPOSIT

Earnest Money Deposit of amount as mentioned in “NIT/ITT/Memorandum” to “Form of Tender” required to be submitted alongwith the Tender shall be in the form of Demand Draft payable at place as mentioned in “NIT/ITT” in favour of EPI Limited from any Nationalized / Scheduled Bank or in the form of Bank Guarantee from any Nationalized / Scheduled Bank in enclosed format. The EMD Bank Guarantee shall be valid for a minimum period of 150 (One Hundred Fifty) days from last day of submission of Tender. The EMD shall be governed by Clause 7.0 of General Conditions of Contract.

3.0 EPI reserves the right to reject any or all the Tenders in part or full without assigning any reason whatsoever thereof. EPI does not bind themselves to
accept the lowest Tender. EPI reserves the right to award the work to a single party or to split the work amongst two or more parties as deemed necessary without assigning any reason thereof. The Contractor is bound to accept the portion of work as offered by EPI after split up at the quoted / negotiated rates.

4.1 **FOR ITEM RATE TENDERS**

4.1.1 The tenderers should quote the rates for items tendered by them in figures as well as in words and the amounts in figures only. The amount for each item should be worked out and the requisite totals and page totals given.

4.1.2 All corrections/cuttings should be signed by the tenderer. Each page of the Tender should be signed by the tenderer. In the event of discrepancy between rate in figures and words the rate quoted in words shall be treated as correct. In case there is discrepancy between rate and amount worked out, the rate quoted shall be taken as correct and not the amount.

4.1.3 Price shall be entered against each item in Bill of Quantities where quantities or LS (lump-sump) has been mentioned. The cost of item against which the Contractor has failed to enter a rate or price shall be deemed to be covered by rates and prices of other items in the Bill of Quantities and no payment shall be made for the quantities executed for items against which rate has not been quoted by Contractor. No rate is to be quoted against items for which no quantity is given. However, the Contractor has to quote rate against “LS” items.

4.2 **FOR PERCENTAGE RATE TENDERS**

4.2.1 In case of Percentage Rate Tenders, tenderer shall fill up in the Schedule / Bill of Quantities, percentage Below/Above/Par (in figures as well as in words) to total estimated cost given in Schedule / Bill of Quantities, he will be willing to execute the work. The tenderer should quote a unique single percentage plus / minus over the total estimated amount given in Schedule / Bill of Quantities. In case more than one schedule is given, stipulating quoting of separate percentages (plus or minus) over the estimated amount of each schedule, the tenderer can quote separate percentages for each such schedule. Under no circumstances, tenderer is allowed to quote separate percentages for individual items, trades or group of items. In case tenderer quotes separate percentages for individual items, trades or group of items instead of to the total amount of schedule(s), the Tender shall be rejected and earnest money of the tenderer shall be forfeited in totality.

4.2.2 In case of Percentage Rate Tenders, the tenderer shall also work out the total amount of his offer after adding percentage (plus or minus) over the total schedule amount and the same should be written in figures as well as in words in such a way that no interpolation is possible.

4.2.3 In case of Percentage Rate Tenders, only percentage quoted shall be considered. Any tender containing item rates is liable to be rejected. Percentage quoted by the tenderer in Percentage Rate Tender shall be accurately filled in figures and words. All corrections/cuttings should be signed by the tenderer. Each page of the Tender should be signed by the tenderer. In the event of discrepancy between percentage rate in figures and words, the percentage rate
quoted in words shall be treated as correct. In case there is discrepancy between percentage rate and amount worked out the percentage rate quoted shall be taken as correct and not the amount. For any other discrepancy, the decision of Tender Scrutiny Committee of EPI shall be final & binding on the tenderer including rejection of Tender and forfeiture of EMD.

5.0 The Tenders shall be strictly as per the conditions of contract. Tenders with any additional condition(s)/modification(s) shall be rejected.

6.0 The witnesses to the Tender / Contract Agreement shall be other than the tenderer / tenderers competing for this work and must indicate full name, address, status/occupation with dated signatures.

7.0 The acceptance of Tender will rest with EPI. Tenders in which any of the prescribed conditions are not fulfilled or found incomplete in any respect are liable to be rejected.

8.0 Canvassing whether directly or indirectly in connection with Tenders is strictly prohibited and the Tenders submitted by the Contractors who resort to canvassing will be liable to rejection.

9.0 On acceptance of Tender, the name of the accredited representative(s) of the Contractor who would be responsible for taking instructions from Engineer-In-Charge or its authorised representative shall be intimated by the Contractor within 07 days of issue date of telegram / letter / telex / fax of Intent by EPI.

10.0 The tenderer shall not be permitted to Tender for works if his near relative is posted as an Assistant Manager or any higher ranks in the concerned Regional Office of EPI. The Contractor shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any of the officers in EPI. Any breach of this condition by the tenderer would render him liable to the withdrawal of the work awarded to him and forfeiture of Earnest Money and Security Deposit. This may also debar the Contractor from tendering for future works under EPI.

11.0 No employee of EPI of the rank of Assistant Manager and above is allowed to work as a Contractor or as an employee of a Contractor having interest in EPI for a period of two years after his retirement/relief from the service of EPI, without the prior permission of EPI in writing. This contract is liable to be cancelled if either the Contractor or any of his employee is found at any time to be such a person who had not obtained the permission of EPI as aforesaid before submission of the Tender or engagement in the Contractor’s service.

12.0 The time of completion of the entire work, as contained in contract shall be as mentioned in “Memorandum” to “Form of Tender”, which shall be reckoned from the 10th day from issue of the Letter / Telex / Telegram / Fax of Intent by the EPI.

13.0 The Tender award, execution and completion of work shall be governed by Tender Documents consisting of (but not limited to) Letter of Intent / Letter of work Order, Bill of Quantities, Additional Conditions of Contract, General Conditions of Contract, Specifications, Drawings, etc. The tenderers shall be
Instructions to Tenderers
Engineering Projects (India) Limited

deeemed to have gone through the various conditions and clauses of the Tender and visited the Site and satisfied itself with Site conditions including sub-soil water conditions, topography of the land, drainage and accessibility etc. or any other condition which in the opinion of Contractor will affect his price / rates before quoting their rates. No claim whatsoever against the foregoing shall be entertained by EPI.

14.0 The Drawings given with the Tender Documents are TENDER DRAWINGS and are indicative only.

15.0 Transfer of bid documents purchased by one intending bidder to another is not permissible.

16.0 Tenders must be duly signed with date and sealed. An attested copy of power of attorney/affidavit/Board Resolution executed as under shall accompany the ‘Tender Documents’.

a) In case of Sole Proprietorship, an affidavit of Sole Proprietorship and if the Tender is signed by any other person Power of Attorney by the Sole Proprietor in favour of signatory.

b) In case of Partnership firm, if Tender is not signed by all the partners, Power of Attorney by the Partner/person signing the tender/documents by all the partners authorizing him to sign the tender/documents.

c) In case of Company, copy of the Board Resolution authorizing the signatory to sign on behalf of the Company.

17.0 Tenders with following discrepancies are liable for rejection:-

a) Tenders with over-written or erased rates, percentages, amounts or rates, percentages not written in both figures and words.

b) Tender that is incomplete, ambiguous, and not accompanied by the documents asked for or submitted without EMD or with inadequate EMD.

c) Tender received after specified date/time whether due to postal or other delays.

d) Tender in respect of which canvassing in any form is resorted to by the tenderer whatsoever.

e) If the tenderer deliberately gives wrong information in his tender or resorts to unfair methods in creating circumstances for the acceptance of his tender, EPI reserves the right to reject such tender at any stage.

18.0 Submission of a tender by the tenderer implies that he has read the complete contract documents and has made himself aware of the scope, terms & conditions and specifications of the work to be done and of conditions at which stores, tools, plant, etc. will be issued to him by EPI (if any), local conditions and
political situations and other factors having bearing on the execution of the works. No claim of Contractor whatsoever, within the purview of this clause, shall be entertained at any stage of the project.

19.0 Tenderer shall submit the following documents along with their Tenders in the first envelope (Techno-Commercial Bid):

- **a)** List of works executed during the last 5 years indicating name of the Client, value, date of start and completion.
- **b)** List of works under execution indicating name of the Client, Total Contract Value, Value of balance work in hand, date of start and completion.
- **c)** Details of similar works executed.
- **d)** Audited balance sheets and profit and loss accounts alongwith schedules for the last 3 years.
- **e)** Copy of latest income-tax returns filed along with PAN.
- **f)** Details of manpower available.
- **g)** Details of equipments, tools and plant available.
- **h)** Credentials and completion certificates.
- **i)** Registration Certificate/Memorandum and Articles of Association/Partnership Deed/Affidavit.
- **j)** Copy of Provident Fund Number allotted by PF authorities.
- **k)** Copy of letters of registration with various authorities like CPWD, State PWD, MES and Public Sector Undertakings, etc.
- **l)** Latest Solvency certificate from Nationalised/Scheduled Bank.
- **m)** Latest Sales Tax Registrar and Clearance Certificate.
- **n)** Any other document as stipulated above and in “Tender Documents”

20. Purchase Preference may be granted to the Central Public Sector Enterprises as per the applicable guidelines in force in this regard issued by the Government of India.
LETTER OF UNDERTAKING

(TO BE ENCLOSED IN ENVELOPE-1 ALONGWITH EMD)

ENGINEERING PROJECTS (INDIA) LIMITED
(Address of submission as mentioned in “Notice Inviting Tender”)

REF. : TENDER FOR (Name of Work as mentioned in “Notice Inviting Tender”)

NIT No. : ______________________________

Sir,

UNDERTAKING FOR ACCEPTANCE OF TENDER CONDITIONS

1. The Tender Documents for the work as mentioned in “Memorandum” to “Form of Tender” have been issued to me / us by ENGINEERING PROJECTS (INDIA) LIMITED and I / We hereby unconditionally accept the tender conditions and Tender Documents in its entirety for the above work.

2. The contents of clause 1.2 and 1.3 of the Tender Documents (Instructions to Tenderers) have been noted wherein it is clarified that after unconditionally accepting the tender conditions in its entirety, it is not permissible to put any remark(s) / condition(s) (except unconditional rebate on price, if any) in the ‘Price-Bid’ enclosed in “Envelope-2” and the same has been followed in the present case. In case this provision of the Tender is found violated at any time after opening “Envelope-2”, I / We agree that my/our tender shall be summarily rejected and EPI shall, without prejudice to any other right or remedy be at liberty to forfeit the full said Earnest Money absolutely.

3. The required Earnest Money for this work is enclosed herewith.

Yours faithfully,

(Signature of the Tenderer)

Seal of Tenderer

Dated : ____________________________

Signature of Contractor
FORM OF TENDER

To,

Engineering Projects (India) Limited
(Address of submission as mentioned in “Notice Inviting Tender”)

REF. : TENDER FOR (Name of Work as mentioned in “Notice Inviting Tender”)

NIT No. : _________________________________

1. I/We hereby tender for execution of work as mentioned in “Memorandum” to this “Form of Tender” as per Tender Documents within the time schedule of completion of work as per separately signed and accepted rates in the Bill of Quantities quoted by me / us for the whole work in accordance with the Notice Inviting Tender, Conditions of Contract, Specifications of materials and workmanship, Bill of Quantities Drawings, Time Schedule for completion of jobs, and other documents and papers, all as detailed in Tender Documents.

2. It is agreed that the time stipulated for jobs and completion of works in all respects and in different stages mentioned in the “Time Schedule for completion of jobs” and signed and accepted by me/us is the essence of the contract. I/We agree that in case of failure on my/our part to strictly observe the time of completion mentioned for jobs and the final completion of works in all respects according to the schedule set out in the said “Time Schedule for completion of jobs” and stipulations contained in the contract, the recovery shall be made from me/us as specified therein. In exceptional circumstances extension of time which shall always be in writing may, however be granted by EPI at its entire discretion for some items, and I/We agree that such extension of time will not be counted for the final completion of work as stipulated in the said “ Time schedule of completion of jobs”.

3. I/We agree to pay the Earnest Money, Security Deposit cum Performance Guarantee, Retention Money and accept the terms and conditions as laid down in the “Memorandum” to this “Form of Tender”.

4. Should this Tender be accepted, I/We agree to abide by and fulfill all terms and conditions referred to above and as contained in Tender Documents elsewhere and in default thereof, allow EPI to forfeit and pay EPI, or its successors or its authorized nominees such sums of money as are stipulated in the Tender Documents.

5. I/We hereby pay the earnest money amount as mentioned in the “Memorandum” to this “Form of Tender” in favour of Engineering Projects (India) Limited payable at place as mentioned in the “NIT/ITT”.

______________________________
Signature of Contractor

______________________________
EPI
6. If I/we fail to commence the work within 10 days of the date of issue of Letter of Intent and / or I/We fail to sign the agreement as per Clause 84 of General Conditions of Contract and/or I/We fail to submit Security Deposit cum Performance Guarantee as per Clause 9.0 & 9.1 of General Conditions of Contract, I/We agree that EPI shall, without prejudice to any other right or remedy, be at liberty to cancel the Letter of Intent and to forfeit the said earnest money as specified above.

7. I/We are also enclosing herewith the Letter of Undertaking on the prescribed pro-forma as referred to in condition of NIT.

Date the __________________________ day of _______________________________

SIGNATURE OF TENDERER
NAME (CAPITAL LETTERS) : _________________________________________
OCCUPATION _________________________________________
ADDRESS  _______________________________________
_______________________________________

SEAL OF TENDERER
**MEMORANDUM**

(ENCLOSURE TO FORM OF TENDER)

REF. : TENDER FOR (Name of Work as mentioned in “Notice Inviting Tender”)

NIT No. : ________________________________

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<th>Description</th>
<th>Cl. No.</th>
<th>Values / Description to be applicable for relevant clause(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>Name of work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii)</td>
<td>Owner/Client / Employer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii)</td>
<td>Type of Tender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv)</td>
<td>Earnest Money Deposit</td>
<td>NIT</td>
<td>Rs.________ (Rupees__________________________________________ only).</td>
</tr>
<tr>
<td>v)</td>
<td>Estimated Cost</td>
<td>NIT</td>
<td>Rs.________ (Rupees__________________________________________ only).</td>
</tr>
<tr>
<td>vi)</td>
<td>Time for completion of work</td>
<td>NIT</td>
<td>Total work to be completed in _____________________________ (____________________) in accordance with the time schedule of completion of work in the Tender Documents.</td>
</tr>
<tr>
<td>vii)</td>
<td>Mobilization Advance</td>
<td>8.0</td>
<td>______ % (_______________ Percent) of Contract Value.</td>
</tr>
<tr>
<td>viii)</td>
<td>Interest Rate on Mobilization Advance</td>
<td>8.0</td>
<td>Simple Interest Rate of <em><strong><strong>%(</strong></strong></em>____ percent only) per annum.</td>
</tr>
<tr>
<td>ix)</td>
<td>Number of Instalments for recovery of Mobilisation Advance</td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>x)</td>
<td>Schedule of Rates applicable</td>
<td>69.0</td>
<td>Civil Works : ____________________________________________ Sanitary Works : ____________________________________________ Electrical Works : ____________________________________________</td>
</tr>
<tr>
<td>xi)</td>
<td>Validity of Tender</td>
<td>4.0</td>
<td>90 (Ninety) Days</td>
</tr>
<tr>
<td>xii)</td>
<td>Security Deposit cum Performance Guarantee</td>
<td>9.0</td>
<td>5.00% (Five Percent only) of Contract Value within 10 days from the date of issue of telegram / letter / telex / FAX of Intent of acceptance of Tender.</td>
</tr>
</tbody>
</table>

Signature of Contractor
xiii) Retention Money 10.0 5.00% (Five percent only) of the contract amount, which shall be deducted in the manner set out in this contract.

xiv) Time allowed for starting the work 43.0 The date of start of contract shall be reckoned 10 days from the date of issue of telegram / letter / telex / FAX of Intent of acceptance of Tender.

xv) Defect Liability Period 74.0 12 (Twelve) Months from the date of taking over of works.

xvi) Arbitration 76 Arbitration shall be as per provisions of Clause no.76 of GCC. The Venue of Arbitration shall be ………………………………

xvii) Jurisdiction 76.3 Courts in -------------------------------

SIGNATURE OF TENDERER

NAME (CAPITAL LETTERS) : _________________________________________

OCCUPATION _________________________________________

ADDRESS                         _________________________________________

________________________________________

SEAL OF TENDERER

Signature of Contractor
ENGINEERING PROJECTS (INDIA) LIMITED
(A Govt. of India Enterprise)

GENERAL CONDITIONS OF CONTRACT
AND
LABOUR SAFETY PROVISIONS, MODEL RULES
CONTRACTOR’S LABOUR REGULATIONS
& PRESCRIBED PROFORMAS
GENERAL CONDITIONS OF CONTRACT

1.0 GENERAL

The Contract means the documents forming the Tender and acceptance thereof and the formal agreement executed between the competent authority on behalf of EPI and the Contractor, together with the documents referred to therein, including these conditions, the Specifications, Designs, Drawings and Instructions issued from time to time by the Engineer-In-Charge and all these documents taken together, shall be deemed to form one contract and shall be complementary to one another.

1.1 In the contract, the following expressions shall, unless the context otherwise requires, have the meanings, hereby respectively assigned to them.

1.2 Engineering Projects (India) Limited, hereinafter called 'EPI' proposes to get the works executed as mentioned in the Contract on behalf of Owner/Client.

1.3 The work will be executed as per Drawings “GOOD FOR CONSTRUCTION” to be released by EPI unless otherwise specified elsewhere in the Tender Documents.

1.4 OTHER DEFINITIONS

a) ENGINEER-IN-CHARGE means the Regional Office In-Charge of EPI himself or an engineer of EPI nominated by the Regional Office In-Charge for supervision and/or project management of the project from time to time.

b) WORKS OR WORK The expression works or work shall unless there be something either in the subject or context repugnant to such construction, be construed and taken to mean the works by or by virtue of the contract contracted to be executed whether temporary or permanent, and whether original, altered, substituted or additional.

c) CONTRACTOR The Contractor shall mean the individual, firm or company, whether incorporated or not, undertaking the works and shall include the legal personal representative of such individual or the persons composing such firm or company, or the successors of such firm or company and the permitted assignees of such individual, firm or company.

d) DRAWINGS mean the Drawings referred to in the Bill of Quantities, specifications and any modifications of such Drawings or such other Drawings as may from time to time be approved or furnished by EPI.

e) SITE means the lands and other places on, under, in or through which the works are to be executed or carried out and any other lands or places provided by EPI or used for the purpose of the agreement.

f) APPROVAL means approved in writing including subsequent written confirmation of previous verbal approval.
g) WRITING means any manuscript typed, written or printed statement under or over signature and/or seal as the case may be.

h) MONTH means English Calendar month. ‘Day’ means a Calendar day of 24 Hrs each.

i) CONTRACT VALUE means the sum for which the Tender is accepted as per the Agreement/ Letter of Acceptance/ Letter of Intent.

j) LANGUAGE: All documents and correspondence in respect of this contract shall be in English Language. In case of any discrepancy between the English version and the Hindi version of these documents, the provisions contained in the English version shall be applicable.

k) BILL OF QUANTITIES or SCHEDULE OF QUANTITIES means the priced and completed Bill of Quantities or Schedule of Quantities forming part of the Tender.

l) OWNER/ CLIENT / EMPLOYER means the Government, Organization, Authority, Company, Ministry, Department, Society, Cooperative etc. who has awarded the work/ project to EPI and/ or appointed EPI as Implementing / Executing Agency/ Project Manager and/ or for whom EPI is acting as an agent and on whose behalf EPI is entering into the contract and getting the work executed.

m) IMPLEMENTING/ EXECUTING AGENCY means EPI

n) TENDER means the Contractor's priced offer to EPI for the execution and completion of the work and the remedying of any defects therein in accordance with the provisions of the Contract, as accepted by the Letter of Intent or Award letter. The word TENDER is synonymous with Bid and the word TENDER DOCUMENTS with “Bidding Documents” or “offer documents”.

o) The headings in the clauses/ conditions of Tender Documents are for convenience only and shall not be used for interpretation of the clause/ condition.

p) Words imparting the singular meaning only also include the plurals and vice versa where the context requires. Words imparting persons or parties shall include firms and corporations and organizations having legal capacities.

q) APPROVED INSURANCE COMPANY means any Insurance Company registered with ‘Insurance Regulatory & Development Authority’ (IRDA) of India and meeting insurance needs of the projects of EPI.

2.0 SITE VISIT AND COLLECTING LOCAL INFORMATION

Before tendering, the tenderer is advised to visit the Site, its surroundings to assess and satisfy themselves about the local conditions such as the working and other constraints at Site, approach roads to the Site, availability of water & power supply, applicability of taxes, duties and levies etc., nature of ground, soil and sub-soil condition, underground water table level, accommodations they may
require etc., river regime, river water levels, other details of river, streams & any other relevant information required by them to execute the complete scope of work. The tenderer may obtain all necessary information as to risks, weather conditions, contingencies & other circumstances (insurgencies etc.) which may influence or affect their tender prices. Tenderer shall be deemed to have considered Site conditions whether he has inspected it or not and to have satisfied himself in all respects before quoting his rates and no claim or extra charges whatsoever in this regard shall be entertained / payable by EPI at a later date.

2.1 ACCESS BY ROAD

Contractor, if necessary, shall build temporary access roads to the actual Site of construction for the works at his own cost to make the Site accessible. The Contractor shall maintain the same in motorable condition at all times as directed by Engineer-In-Charge at his own cost. The Contractor shall be required to permit the use of any roads so constructed by him for vehicles of EPI or any other agencies/ Contractors who may be engaged on the project Site, free of cost.

Non-availability of access roads or approach to Site, for the use of the Contractor shall in no case condone any delay in the execution of work nor be the cause for any claim for compensation.

2.2 HANDING OVER & CLEARING OF SITE

2.2.1 The Contractor should note that area for construction may be made available in phases as per availability and in conjunction with pace of actual progress of work at Site. The work may be required to be carried out in constrained situations. The work is to be carried out in such a way that the traffic, people movement, if any, is kept operative and nothing extra shall be payable to the Contractor due to this phasing / sequencing of the work. The Contractor is required to arrange the resources to complete the entire project within total stipulated time. Traffic diversion, if required, is to be done and maintained as per specification by the Contractor at his own cost and the Contractor shall not be entitled for any extra payment, whatsoever, in this regard.

2.2.2 Efforts will be made by EPI to handover the Site to the Contractor free of encumbrances. However, in case of any delay in handing over of the Site to the Contractor, EPI shall only consider suitable extension of time for the execution of the work. It should be clearly understood that EPI shall not consider any revision in contract price or any other compensation whatsoever viz. towards idleness of Contractor’s labour, equipment etc.

2.2.3 The Contractor shall be responsible for removal of all over-ground and under-ground structures (permanent, semi-permanent and temporary) and constructions from the Site. The cost to be incurred in this regard shall be deemed to be included in the quoted rates of Bill of Quantities items and Contractor shall not be entitled for any extra payment whatsoever, in this regard. Old structures on the proposed Site, if required, shall be demolished by the Contractor properly. The useful material obtained from demolition of structures &
services shall be the property of the Owner/EPI and these materials shall be stacked in workmanship like manner at the place specified by the Engineer-in-charge.

2.2.4 If required, the Contractor has to do site clearance, enabling work, barricading, diversion of Roads, shifting/ realignment of existing utility services, drains, nallahs etc. at his own cost as per direction of Engineer-In-Charge and the Contractor shall not be entitled for any extra payment whatsoever in this regard.

2.2.5 Necessary arrangements including its maintenance are to be made by the Contractor for temporary diversion of flow of existing drain and road, as the case may be. The existing drain, road would be demolished, wherever required, with the progress of work under the scope of proposed project. The existing Road and Drain, which are not in the alignment of the said project but are affected and/or need to be demolished during execution for smooth progress of the project, shall be restored to its original status and condition (including black topping) by the Contractor at his own. The cost to be incurred by Contractor in these regards shall be deemed to be included in the quoted rates of the Bill of Quantities items and Contractor shall not be entitled for any extra payment whatsoever, in these regards.

2.2.6 The Contractor shall be responsible to co-ordinate with service provider/concerned authorities for cutting of trees, shifting of utilities and removal of encroachments etc. and making the Site unhindered for completion of work. This shall include initial and frequent follow up meetings/actions/discussions with each involved service provider/concerned authorities. The Contractor shall not be entitled for any additional compensation for delay in cutting of trees, shifting of utilities and removal of encroachments by the service provider/concerned authorities.

2.2.7 The information about the public utilities (whether over ground or underground) like electrical/ telephone/ water supply lines, OFC Cables, sewer lines, open drains etc. is the responsibility of Contractor who has to ascertain the utilities that are to be affected by the works through the site investigation and collection of information from the concerned utility Owners.

2.2.8 The Contractor shall be responsible to obtain necessary approval from the respective authorities for shifting/re-alignment of existing public utilities. EPI shall only provide necessary letters required for liaisoning by the Contractor in obtaining the approval from the concerned authorities.

2.2.9 Any services affected by the works must be temporarily supported by the Contractor who must also take all measures reasonably required by the various bodies to protect their services and property during the progress of works. It shall be deemed to be the part of the contract and no extra payment shall be made to the Contractor for the same. Shifting/re-alignment of public utilities should be done without disturbing the existing one. New service lines should be laid and connected before dismantling the existing one.

2.2.10 Shifting/re-alignment of existing public utilities shall be done by the Contractor as per technical requirement of respective bodies or as per direction of Engineer-In-Charge. Shifting/re-alignment of public utilities includes all materials, labours,
tools and plants and any other expenses whatsoever for the same. The cost to be incurred in this regard shall be deemed to be included in his quoted rates of BOQ items and the Contractor shall not be entitled for any extra payment, whatsoever, in this regard. In case any of these services are shifted by the State Govt/ local authorities themselves for which deposit as per their estimates is to be made to them, the Contractor shall deposit the same and the Contractor shall be paid only at the rates quoted by him in BOQ for quantity specified in the BOQ, if such items are included in the BOQ irrespective of amount paid by him to the State Govt./ local authorities for execution of these works. In case such provision is not made in the BOQ or the quantity exceeds those specified in the BOQ, the same is deemed to be included in the rates quoted by him for other items in BOQ and nothing extra shall be payable to Contractor on this account.

3.0 SCOPE OF WORK

3.1 The scope of work covered in this Tender shall be as per the Bill of Quantities, Specifications, Drawings, Instructions, Orders issued to the Contractor from time to time during the pendency of work. The Drawings for this work, which may be referred for tendering, provide general idea only about the work to be performed under the scope of this contract. These may not be the final drawings and may not indicate the full range of the work under the scope of this contract. The work will be executed according to the Drawings to be released as “GOOD FOR CONSTRUCTION” from time to time by the Engineer-In-Charge of EPI and according to any additions/ modifications/ alterations/deletions made from time to time, as required by any other drawings that would be issued to the Contractor progressively during execution of work. It shall be the responsibility of the Contractor to incorporate the changes that may be in the scope of work, envisaged at the time of tendering and as actually required to be executed.

3.2 The quantities of various items as entered in the “BILL OF QUANTITIES” are indicative only and may vary depending upon the actual requirement. The Contractor shall be bound to carry out and complete the stipulated work irrespective of the variation in individual items specified in the Bill of Quantities. The variation of quantities will be governed as per clause No.69 of GCC.

4.0 VALIDITY OF TENDER

The Tender for the works shall remain open for acceptance for a period of ninety days from the date of opening of Price Bid of Tenders. The earnest money will be forfeited without any prejudice to any right or remedy, in case the Contractor withdraws his Tender during the validity period or in case he changes his offer to his benefits, which are not acceptable to EPI. The validity period may be extended on mutual consent.

5.0 ACCEPTANCE OF TENDER

EPI reserves to itself the authority to reject any or all the Tenders received without assigning any reason. The acceptance of a Tender shall be effective w.e.f. the date on which the telegram/ letter of intent or acceptance of the Tender is put in the communication by EPI. EPI also reserves the right to split the work
among two or more parties at lowest negotiated rate without assigning any reason thereof. The Contractor is bound to accept the portion of work as offered by EPI after split up at the quoted/negotiated rates.

6.0 SET OF TENDER DOCUMENTS:

The following documents will complete a set of Tender Documents.

A) VOLUME I:
   a) Instructions to tenderers
   b) General Conditions of Contract

B) VOLUME II:
   a) Notice Inviting Tenders
   b) Additional Conditions of Contract
   c) Technical Specifications (General, Additional & Technical specifications)
   d) Tender Drawings

C) VOLUME III:
   a) Schedule of Rates/ Bills of quantities (Price-Bid)

7.0 EARNEST MONEY DEPOSIT

Earnest Money Deposit (EMD) of amount as mentioned in “Memorandum” to “Form of Tender” required to be submitted along with the Tender shall be in the form of Demand Draft payable at place as mentioned in “Notice Inviting Tender”/“Instructions to Tenderers” in favour of ‘Engineering Projects (India) Limited’ from any Nationalised bank / Scheduled Bank or in the form of Bank Guarantee from any Nationalised bank / Scheduled Bank as per the enclosed format. The EMD shall be valid for minimum period of 150 days (One hundred fifty Days) from last day of submission of Tender.

7.1 EMD shall accompany the offer and placed in the sealed envelope cover of the offer as detailed in Instructions to Tenderer. Any tender not accompanied with the requisite Earnest Money Deposit alongwith ‘Letter of Undertaking’ shall be rejected and such tenderer(s) will not be allowed to attend the opening of bids.

7.2 The EMD of all unsuccessful tenderers (i.e. except evaluated lowest tenderer) shall be returned within Seven (7) days of the opening of price bids by EPI. Subject to clause 7.6 herein below, EMD of successful tenderer shall be refunded after submission of Security Deposit cum Performance Guarantee by him.

7.3 Once the tenderer has given an unconditional acceptance to the tender conditions in its entirety, he is not permitted to put any remark(s)/conditions(s) (except unconditional rebate on price, if any) in/along-with the Tender.

7.4 In case the condition 7.3 mentioned above is found violated at any time after opening of Tender, the Tender shall be summarily rejected and EPI shall, without
prejudice to any other right or remedy, be at liberty to forfeit the full said Earnest Money absolutely.

7.5 No interest will be payable by EPI on the said amount covered under EMD/Other security documents.

7.6 EMD of successful tenderer, if deposited in the form of Demand Draft, shall be treated as part of Retention Money.

7.7 At any time after the due date of the Tender, if any tenderer alters /modifies/withdraws his tender within the validity period (or the extended validity period) of his tender or fails to furnish the “Security Deposit cum Performance Guarantee” or the “Additional Performance Guarantee” or fails to execute the “Contract Agreement” within the prescribed time period after the placement of LOI on him, EPI without prejudice to any other rights or remedies shall be at liberty to forfeit the Earnest Money deposited by the tenderer. In the event of re-tender, such tenderer shall not be allowed to submit tender.

8.0 MOBILIZATION ADVANCE

8.1 Mobilization advance up to maximum of amount as mentioned in the “Memorandum” to the “Form of Tender” shall be paid to the Contractor on submission of non-revocable and unconditional Bank Guarantee of an equivalent amount in case of interest free Mobilization Advance or for an amount equal to 110% of the Mobilization Advance in case of interest bearing Mobilization Advance, from a Nationalized Bank / Scheduled Bank as per the enclosed Perforama subject to conditions given hereunder. The Mobilization Advance shall be at the Interest Rate as mentioned in the “Memorandum” to the “Form of Tender”. This advance shall be paid in three installments as follows:

i) First Installment of fifty percent of total mobilization advance shall be paid after fulfillment of the following conditions:

   a) Signing of the agreement.
   b) Submission of Security Deposit cum Performance Guarantee as per Clause No. 9.

ii) Second installment of twenty five percent of total mobilization advance will be paid after the setting up of site office and providing facilities to EPI as per contract, and completion of enabling works required for taking up the construction. These include construction of store, labour hutmterns, etc.

iii) The balance twenty five percent of total mobilization advance shall be paid on mobilization of manpower, plant & equipment etc. to the satisfaction of Engineer-In-Charge of EPI.

8.2 The Advance shall be recovered on monthly installment basis. The installments shall commence when 20% of the scheduled contract period has elapsed and fully recovered when 80% of the scheduled contract period is over, both from
date of start. (The month of start & completion of recovery of mobilization advance to be rounded off to nearest full month).

8.3 Part ‘Bank Guarantees’ (BGs) against mobilization advance shall be furnished in as many numbers as the number of recovery installments as given in “Memorandum” to the “Form of Tender” and should be equivalent to the amount of each recovery installment. At any point of time, if the Contractor's payable amount on account of work done is not available with EPI or the amount payable is less than the recovery installment, recovery of such advance shall be effected by encashing the BG of equivalent recovery amount. The decision of EPI in this regard shall be final and binding on the Contractor. The validity period for the part BGs shall be till three months after the end of the month in which instalment is due to be recovered with further three months claim period.

8.4 In case recovery of Mobilization Advance is delayed, interest shall be charged @12% (Twelve percent) per annum on delayed recoveries due to late submission of bills by the Contractor or due to delayed encashment of Bank Guarantee, as stated above or due to any other reasons whatsoever.

8.5 Contractor is required to furnish the Utilization Certificate for each installment of mobilization advance to the satisfaction of Engineer-In-Charge. Subsequent installments of mobilization advance shall be released only after getting satisfactory utilisation certificate from the Contractor for the earlier released installment.

8.6 Notwithstanding what is contained in aforesaid clauses, no mobilization advance whatsoever shall be payable, if payment of mobilization advance is not mentioned in the “Memorandum” to the “Form of Tender”.

9.0 SECURITY DEPOSIT CUM PERFORMANCE GUARANTEE

“Within 10 (ten) days from the date of issue of letter of Intent or within such extended time as may be granted by EPI in writing, the Contractor shall submit to EPI a Security Deposit cum Performance Bank Guarantee in the form appended, from any Nationalised bank / Scheduled Bank equivalent to 5% (five percent only) of the Contract Value for the due and proper execution of the contract. This bank guarantee shall remain valid up to 90 (ninety) days after the end of defects liability period.

In case the Contractor fails to submit the Security Deposit cum Performance Guarantee of the requisite amount within the stipulated period or extended period, letter of intent will stand withdrawn and EMD of Contractor shall be forfeited.

9.1 ADDITIONAL PERFORMANCE GUARANTEE FOR EXISTING CONTRACTORS

In case bidder is a working Contractor of EPI at the time of issuance of Letter of Intent (LOI) for the work, the bidder has to furnish an additional Performance Guarantee of 1% (One Percent) of the Contract Value of the work, in case working capacity of the bidder is less than the aggregate of balance work-load of all the works of the bidder with EPI as on date of placement of LOI for this work. The balance workload shall also include the value of work awarded but not yet
started and finally approved value of this work. This additional Performance Guarantee shall be in addition to the Security Deposit cum Performance Guarantee of the works to be furnished by the bidder as specified in the clause no. 9 of General Conditions of Contract. Further, no relaxation in Security Deposit cum Performance Guarantee as in clause no. 9 of General Conditions of Contract shall be made in case working capacity works-out to be more than the balance value of works as mentioned above. The working capacity of the Contractor shall be calculated as under:

WORKING CAPACITY = 2.5 X (Average Turnover of the party as per latest three audited Balance Sheets).

NOTE: The decision of amount of additional Performance Guarantee as above shall be taken by EPI and shall be final & binding to the Contractor.

In case the Contractor fails to submit the additional performance guarantee of the requisite amount within 10 days from the date of issue of letter of Intent or within such extended time as may be granted by EPI in writing, the letter of intent will stand withdrawn and EMD of the Contractor shall be forfeited.

9.2  ABNORMALLY HIGH AND LOW RATED ITEMS

For item rate tenders if, the rates quoted by the lowest bidder for certain items of the Bill of Quantities of the Tender are found to be abnormally high or low in comparison to the Market Rate analysis of the item done by EPI and/or in comparison to EPI’s method of working out market rate justification for the items, the same shall be governed as under: -

For Abnormally High Rated items (AHR), the progressive payment shall be 80% (Eighty percent) of the payment due to the Contractor against execution of the AHR items. The balance withheld 20% (twenty percent) payment shall be released after 80% of total value of the original contract is completed in financial terms in order to ensure that the Abnormally Low Rated (ALR) items identified at the time of Award of work have been executed as per requirement of project and as per terms of Contract. Further, deviation limit for AHR items shall be nil on plus side and 100% on minus side. The provision of deviation limit of clause 69.1(v) shall not apply to AHR items. In case of deviation of quantities given in schedule of quantities for AHR items on plus side, the same shall be governed by clause 69.2. The decision of Engineer-In-Charge of EPI in this regard shall be final and binding on the Contractor.

The provision of para 9.2 shall not be applicable on tenders invited on Percentage Rate/lump Sum basis.
The decision of EPI on identification/marking of AHR and ALR items is final and binding on the Contractor. In case the Contractor does not agree to the identified AHR and ALR items, at the time of award of works, the EMD/Security Deposit cum Performance Guarantee of the Contractor shall be forfeited and decision of EPI in this regard shall be final & binding on the Contractor.

10.0 RETENTION MONEY

The Retention Money shall be deducted from each running bill of the Contractor at 5% (five percent only) of the gross value of the Running Account bill. The Earnest Money Deposited by the tenderer in the form of Demand Draft will be treated as part of the Retention Money. The Retention Money shall be refunded to the Contractor after expiry of defects liability period (referred to in Clause No. 74) or on payment of the amount of the final bill whichever is later. If the amount of Retention Money deduction in cash is more than Rs.10.00 lakhs (Rupees Ten lakhs only), the excess amount can be refunded to Contractor against submission of Bank Guarantee of equivalent amount from a Nationalised bank / Scheduled Bank in the prescribed proforma of Performance Guarantee of EPI.

11.0 MOBILIZATION OF MEN, MATERIALS AND MACHINERY:

11.1 All expenses towards mobilization at Site and de-mobilization including bringing in equipment, work force, materials, dismantling the equipments, clearing the Site etc. shall be deemed to be included in prices quoted and no separate payment on account of such expenses shall be entertained.

11.2 It shall be entirely the Contractor’s responsibility to provide, operate and maintain all necessary construction equipments, scaffoldings and safety gadget, lifting tackles, tools and appliances to perform the work in a workman like and efficient manner and complete all jobs as per the specifications and within the schedule time of completion of work. Further, Contractor shall also be responsible for obtaining temporary electric and water connection for all purposes. The Contractor shall also make standby arrangement for water & electricity to ensure un-interrupted supply.

11.3 It shall be the responsibility of the Contractor to obtain the approval for any revision and/or modification desired by him from EPI before implementation. Also such revisions and/or modifications if accepted / approved by EPI shall be carried at no extra cost to EPI.

11.4 The procurement and supply in sequence and at the appropriate time of all materials and consumable shall be entirely the Contractor’s responsibility and his rates for execution of work shall be inclusive of supply of all these items.
11.5 It is mandatory for the Contractor to provide safety equipments and gadgets to its all workers, supervisory and Technical staff engaged in the execution of the work while working. The minimum requirement (but not limited to) shall be gumboots, safety helmets, Rubber hand gloves, facemasks, safety nets, belts, goggles etc. as per work requirements. Sufficient nos. of these equipments and gadgets shall also be provided to EPI by the Contractor at his own cost for use of EPI Officials and/ or workforce while working/ supervision at Site. No staff/ worker shall be allowed to enter the Site without these equipments/ gadgets. The cost of the above equipments/ gadgets are deemed to be included in the rates quoted by the Contractor for the items & works as per Bill of Quantities and Contractor shall not be entitled for any extra cost in these regard. The above norm is to be strictly complied with at Site. In case the Contractor is found to be deficient in providing Safety Equipments/ Gadgets in the opinion of Engineer-In-Charge, the Engineer-In-Charge at his option can procure the same at the risk & cost of Contractor and provide the same for the use of worksite and shall make the recoveries from the bills of the Contractor for the same. The decision of the Engineer-In-Charge shall be final and binding on Contractor in this regard.

11.6 All Designs, Drawings, Bill of Quantities, etc. (except Bar Bending Schedule, Shop & Fabrication Drawings) for all works shall be supplied to the Contractor for all buildings services and development works by EPI in phased manner as the works progress. However it shall be the duty and responsibility of the Contractor to bring to the notice of EPI in writing as to any variation, discrepancy or any other changes required and to obtain revised drawings and designs and / or approval of EPI in writing for the same.

11.7 One copy of contract documents including Drawings furnished to the Contractor shall be kept at the Site and the same shall at all reasonable times be available for inspection.

11.8 All materials, construction plants and equipments etc. once brought by the Contractor within the project area, will not be allowed to be removed from the premises without the written permission of EPI. Similarly all enabling works built by the Contractor for the main construction undertaken by him, shall not be dismantled and removed without the written authority of EPI.

11.9 Contractor shall have to prepare the Bar Bending Schedule, Shop and Fabrication Drawings free of cost, if required for any of the items of work. Five copies of these Drawings each including for revision will be submitted to EPI for approval. Before executing the item, Bar Bending Schedule, Shop & Fabrication Drawings should be got approved from EPI.

12.0 **INCOME TAX DEDUCTION**

Income tax deductions shall be made from all payments made to the Contractor including advances against work done, in accordance with the Income Tax act prevailing from time to time.
13.0 TAXES AND DUTIES

13.1 The Contractor shall be responsible for the payment, wherever payable, at his own cost of all taxes such as excise duty, custom duty, sales tax, including the purchase tax, consignment tax, work contract tax, service tax, VAT or any other similar tax in the state concerned, turnover tax, toll tax, octroi charges, royalty, cess, levy and other tax (es) or duty (ies) which may be specified by local/ state/ central government from time to time on all materials, articles which may be used for this work. The rates quoted by him in the Tender in Bill of Quantities shall be inclusive of all such taxes, duties, etc. The imposition of any new and/or increase in the aforesaid taxes, duties, levies (including fresh imposition of Work Contract Tax, Turnover Tax, Sales Tax on Work Contract, VAT or any other similar Tax) etc. during the currency of the contract shall be borne by Contractor and shall not be paid or reimbursed to the Contractor by EPI. In the event of non-payment/default in payment of any octroi, royalty, cess, turnover tax, sales tax, including the purchase tax, consignment tax, work contract tax, VAT, Service Tax or any other similar tax in the state concerned, customs, excise or any other levy/tax including labour dues etc. by Contractor, EPI reserves the right to withhold the dues/ payments of Contractor and make payment to local/state/ Central Government authorities or to labourers as may be applicable. The Contractor should submit along with the Tender Registration Certificates with Sales Tax on works contract authority etc. otherwise appropriate recovery shall be made from his bills.

13.2 The rate quoted by the Contractor shall be deemed to be inclusive of all Taxes and duties as mentioned in clause no.13.1 given above or any other tax as applicable and the same shall not be reimbursed by EPI. Tax deductions at source shall be made as per laws prevalent in the State.

13.3 The stamp duty and registration charges, if any, on the contract agreement levied by the Government or any other statutory body, shall be paid by the Contractor.

13.4 It will be incumbent upon the Contractor to obtain a registration certificate as a dealer under the Local Sales Tax Act and the Central Sales Tax Act, Service Tax, etc. and necessary evidence to this effect shall be furnished by the Contractor to EPI. Sales Tax on the transactions between the Contractor and his Sub-Contractor/Vendors etc. shall be borne by the Contractor. The Contractor shall be responsible for any taxes that may be levied hereunder on the transaction between Contractor and EPI.

13.5 The bidder shall quote his rates inclusive of Turnover Tax/ Sales Tax on Works Contract payable to State Govt. along-with other taxes, duties, levies etc. in conjunction with other terms and conditions. In case, the Turnover Tax/ Sales Tax on Works Contract on execution of works is waived off by the State Govt. at later stage for this project, the equivalent amount from the date of waiver of such tax (as per prevailing rate as on the date of waiver of Turnover Tax/ Sales Tax on Works Contract) shall be deducted from the amount payable to the Contractor from subsequent RA Bills.
13.6 **VALUE ADDED TAX (VAT)**

The consideration agreed for the execution of said contract shall include the taxes, duties, cess, etc. such as excise duty, service tax, VAT, which is leviable or may be levied in future under any State Law or the Central Law on execution of said contract, such taxes shall be borne by the Contractor and shall not be reimbursed by EPI. Further, if due to any variance in such tax, duties, cess etc. there is any increase in the taxes, the same shall also be borne by the Contractor. Where under any of the State or the Central Law, there is requirement of deduction of tax at source, the same shall be deducted from the amount paid or payable to the Contractor pursuant to this contract and shall be deposited to the Government authorities by EPI. EPI shall issue the documents/forms/ certificate as prescribed under the relevant law, in respect of the amount so deducted from the amount paid or payable to the Contractor. EPI shall have full rights to withhold the amount payable to the Contractor in pursuant to this contract, if Contractor does not fulfill his obligation under any State or Central Law relating to execution of said contract, in case the amount has already been paid by EPI, EPI has the right to recover such payments from the Contractor.

14.0 **ROYALTY ON MATERIALS:**

The Contractor shall deposit royalty and obtain necessary permit for supply of bajri, stone, kankar, sand, etc. from the local authorities and quoted rates shall be inclusive of royalty.

15.0 **RATES TO BE FIRM**

15.1 The rates quoted by the tenderer shall be firm and fixed for the entire period of completion and till handing over of the work. No revision to rates or any escalation shall be allowed on account of any increase in prices of materials, labour, POL and Overheads etc or any other statutory increase during the entire contract period or extended contract period.

15.2 The Contractor shall be deemed to have inspected the Site, its surrounding and acquainted itself with the nature of the ground, accessibility of the Site and full extent and nature of all operations necessary for the full and proper execution of the contract, space for storage of materials, construction plant, temporary works, restrictions of working time, restrictions on the plying of heavy vehicles in area, supply and use of labour, materials, plant, equipment and laws, rules and regulations, if any, imposed by the local authorities.

15.3 The rates and prices to be tendered in the Bill of Quantities are for completed and finished items of works complete in all respects. It will be deemed to include all construction plant, labour, supervision, materials, transport, all temporary works, erection, maintenance, Contractor’s profit and establishment/ overheads, together with preparation of designs & drawings pertaining to casting yard, shop drawing, fabrication drawing (if required), staging form work, stacking yard, etc. all general risk, taxes, royalty, duties, cess, octroi and other levies, insurance,
liabilities and obligations set out or implied in the Tender Documents and contract.

15.4 Unless otherwise specified in the Bill of Quantities (BOQ), the Contractor has to make his own arrangement for dewatering/ bailing out of water, effluent including strutting, shoring etc at every stage of work wherever required (including Tunnel work) including working under foul condition as per direction of Engineer-In-Charge at his own cost and the Contractor shall not be entitled for any extra payment, whatsoever, in this regard.

15.5 If required to make work site suitable for execution, Contractor shall have to clear jungle including of rank vegetation, grass, trees etc., clear & clean existing drains/ canals (including strutting, shoring and packing cavities) and dispose them out of the Site up-to any lead and lift as per direction of Engineer-In-Charge. The Contractor should inspect the Site of work from this point of view. Unless otherwise specified in the Bill of Quantities, the cost to be incurred in this regard shall be deemed to be included in his quoted rates of BOQ items and the Contractor shall not be entitled for any extra payment in this regard.

15.6 If any temporary/ permanent structure is encountered or safety of such structure in the vicinity is endangered due to execution of the project, the Contractor has to protect the structures by any means as per direction of Engineer - in – Charge. If any damage caused to any temporary or permanent structure(s) in the vicinity is caused due to execution of the project, the Contractor has to make good the same by any means as per direction of Engineer - in – Charge. The Contractor should inspect the Site of work from this point of view. The cost to be incurred in this regard shall be deemed to be included in his quoted rates of BOQ items and the Contractor shall not be entitled for any extra payment in this regard.

16.0 ESCALATION / PRICE VARIATION

No claim on account of any Price Variation / Escalation on whatsoever ground shall be entertained at any stage of works. All rates as per Bill of Quantities (BOQ)/Price-Bid quoted by Contractor shall be firm and fixed for entire contract period as well as extended period for completion of the works. No escalation/price variation clause shall be applicable on this contract.

17.0 INSURANCE OF WORKS ETC.

Contractor is required to take Contractor’s All Risk Policy or Erection All Risk Policy (as the case may be) including Marine Insurance from an Approved Insurance Company in the joint name with EPI and bear all costs towards the same for the full period of execution of works including the defect liability period for the full amount of contract against all loss or damage from whatever cause arising for which he is responsible under the terms of the contract and in such manner that EPI and the Contractor are covered during the period of construction of works and/or also covered during the period of defect liability for the loss or damage as under:

a. The work and the temporary works to the full value of such works.
b. The materials, construction plant, centering, shuttering and scaffolding materials and other things brought to the Site for their full value. Whenever required by EPI, the Contractor shall produce the policy or the policies of insurance and the receipts for payment of the current premiums.

18.0 INSURANCE UNDER Workmen’s Compensation ACT

Contractor is required to take insurance cover as per requirement of the Workmen’s Compensation Act, 1923 amended from time to time from an Approved Insurance Company and pay premium charges thereof. Wherever required by EPI the Contractor shall produce the policy or the policies of Insurance and the receipt of payment of the current premiums.

19.0 THIRD PARTY INSURANCE

Contractor is required to take third party insurance cover for an amount of 5% (five percent) of Contract Value from an Approved Insurance Company for insurance against any damage, injury or loss which may occur to any person or property including that of EPI, arising out of the execution of the works or temporary works. Wherever required by EPI the Contractor shall produce the policy or the policies of Insurance and the receipt of payment of the current premiums.

In case of failure of the Contractor to obtain insurance for works, insurance under Workman Compensation Act and Third Party insurance as described above within one month from the date of commencement of work, running account payments of the Contractor shall be withheld till such time the aforesaid insurance covers are obtained by the Contractor.

20.0 INDEMNITY AGAINST PATENT RIGHTS

The Contractor shall fully indemnify EPI from and against all claims and proceedings for or on account of any infringement of any patent rights, design, trademark or name or other protected rights in respect of any construction plant, machine, work or material used for in connection with the works or temporary works.

21.0 LABOUR LAWS TO BE COMPLIED WITH BY THE CONTRACTOR

The Contractor shall obtain a valid licence under the contract labour (Regulation & Abolition) Act 1970 and the Contract Labour Act (R&A) Central Rules 1971 and amended from time to time, and continue to have a valid licence until the completion of the work including defect liability period. The Contractor shall also abide by the provision of the child labour (Prohibition and Regulation) Act. 1986 and as amended from time to time. Any failure to fulfill this requirement shall attract the penal provisions of this contract arising out of the resultant non-execution of the work.
The Contractor shall comply with the provisions of the payment of Wages Act, 1936, Minimum Wages Act, 1948, Employer's Liability Act, 1938, Workmen's Compensation Act, 1923, Maternity Benefit Act, 1961 and Mines Act -1932, Industrial Disputes Act, 1947 or any modifications thereof or any other law relating thereto and rules made there under from, time to time.

21.1 No labour below the age of 18 years shall be employed on the work.

22.0 LABOUR SAFETY PROVISION

The Contractor shall be fully responsible to observe the labour safety provisions.

23.0 OBSERVANCE OF LABOUR LAWS

23.1 The Contractor shall be fully responsible for observance of all labour laws applicable including local laws and other laws applicable in this matter and shall Indemnify and keep indemnified EPI against effect of non observance of any such laws. The Contractor shall be liable to make payment to all its employees, workers and sub-Contractors and make compliance with labour laws. If EPI or the Client/ Owner/ Employer is held liable as "Principal Employer" to pay any amount or contributions etc. under legislation of Govt. or Court decision in respect of the employees of the Contractor, then the Contractor would reimburse the amount of such payments, contribution etc. to EPI and/ or same shall be deducted from the payments, Retention Money etc. of the Contractor.

23.2 The Contractor shall submit proof of having valid EPF registration certificate. In absence of the said certificate payment to the extent of 4.70% (four point seven percent) of the value of all the Running Account bills may be withheld by EPI and shall be released only after the production of the EPF registration certificate from the concerned authorities. If it is incumbent upon EPI to deposit withheld amount with EPF authorities, the withheld amount shall be deposited by EPI with EPF authorities. In such a case EPI shall not refund this withheld amount to the Contractor even after the production of EPF registration certificate.

23.3 The Contractor shall be liable to pay cess levied under the Building and other Construction Workers Welfare Cess Act, 1996, at such rates as may be notified by the Government from time to time. EPI shall deduct at source from every Running Account Bill of the Contractor, the said cess, at such rates for the time being prevailing, which shall not exceed 2% (two percent) but not be less than 1% (one percent) of the cost of construction incurred by EPI.

24.0 LAWS GOVERNING THE CONTRACT

This contract shall be governed by the Indian Laws for the time being in force and amended from time to time.

25.0 LAWS, BYE LAWS RELATING TO THE WORK

The Contractor shall strictly abide by the provisions, for the time being in force, of law relating to works or any regulations and bye laws made by any local authority or any water & lighting agencies or any undertakings within the limits of the
jurisdiction of which the work is proposed to be executed. The Contractor shall be bound to give to the authorities concerned such notices and take all approvals as may be provided in the law, regulations or bye laws as aforesaid, and to pay all fees and taxes payable to such authorities in respect thereof.

26.0 EMPLOYMENT OF PERSONNEL

26.1 The Contractor shall employ only Indian Nationals as his representatives, servants and workmen after verifying their antecedents and loyalty. He shall ensure that no personnel of doubtful antecedents & integrity and any other nationality in any way are associated with the works.

26.2 EPI shall have full power to get removed immediately any representative, agent, servant and workmen or employees of the Contractor on account of misconduct, negligence or incompetence or whose continued employment may in the opinion of the Engineer-In-Charge be undesirable without assigning any reason for the removal. The Contractor shall not be allowed any compensation on this account whatsoever.

27.0 TECHNICAL STAFF FOR WORK

27.1 The Contractor shall employ at his cost the adequate number of technical staff during the execution of this work depending upon the requirement of work. For this purpose the numbers to be deployed, their qualification, experience as decided by EPI shall be final and binding on Contractor. The Contractor shall not be entitled for any extra payment in this regard. The technical staff should be available at Site, whenever required by EPI to take instructions.

27.2 Within 15 days from the date of letter of intent, the Contractor shall submit a site organizational chart and Resume including details of experience of the Project-in-Charge and other staff proposed by him and shall depute them on the Project after getting approval from Engineer-In-Charge. If desired by the Contractor at later date, the Project-in-Charge and other staff whose resume is approved by EPI can be replaced with prior written approval of EPI and replacement shall be with equivalent or superior candidate only. Decision of Engineer-In-Charge shall be final and binding on the Contractor.

Even after approving the site organizational chart, the Engineer-In-Charge due to nature and exigency of work can direct the Contractor to depute such additional staff as in view of Engineer-In-Charge is necessary and having qualification and experience as approved by the Engineer-In-Charge. The removal of such additional staff from the Site shall only be with the prior written approval of Engineer-In-Charge. The Contractor shall not be paid anything extra whatsoever on account of deployment of additional staff and decision of the Engineer-In-Charge shall be final and binding on the Contractor.

27.3 In case the Contractor fails to employ the staff as aforesaid, he shall be liable to pay a reasonable amount not exceeding a sum of Rs. 25,000 (Rupees Twenty Five Thousand only) for each month of default in the case of each person. The
decision of the Engineer-In-Charge as to number of Technical Staff to be adequate for the project and the period for which the required technical staff was not employed by the Contractor and as to the reasonableness of the amount to be deducted on this account shall be final and binding on the Contractor.

28.0 LAND FOR LABOUR HUTS/ SITE OFFICE AND STORAGE ACCOMMODATION

28.1 The Contractor shall arrange the land for temporary office, storage accommodation and labour huts at his own cost and get the clearance of local authorities for setting up of labour camp and cost of same is deemed to be included in the rates quoted by the Contractor for the works. The Contractor shall ensure that the area of labour huts is kept clean and sanitary conditions are maintained as laid down by the local authorities controlling the area. The labour huts shall be so placed that it does not hinder the progress of work or access to the worksite. The vacant possession of the land used, for the purpose shall be given back by Contractor after completion of the work. The Retention Money of the Contractor shall be released only after Contractor demolishes all structures including foundations and gives back clear vacant possession of this land.

28.2 In the event the Contractor has to shift his labour camp at any time during execution of the work on the Instructions of local authorities or as per the requirement of the work progress or as may be required by EPI, he shall comply with such instructions at his cost and no claim whatsoever shall be entertained on this account.

28.3 FURNISHED OFFICE ACCOMMODATION & MOBILITY AND COMMUNICATION TO BE PROVIDED BY CONTRACTOR TO EPI

On acceptance of Tender, the Contractor at his own cost will construct a suitable furnished office at Site equipped with basic facilities such as telephone(s), fax, internet, photocopier, computer(s) & printer(s) alongwith operator(s), regular electricity & drinking water supply and vehicles for staff etc. as per the requirement of the project. The Contractor shall provide consumable as required and maintain the aforesaid facilities intact/operational during the currency of the contract including the defects liability period. The Contractor shall also make sufficient arrangement for photography/ videography preferably by maintaining a camera/video camera at Site so that photographs video can be taken of any specific activity at any point of time. The Contractor shall also provide software like MS Project etc. for the purpose of preparing progress report, etc.

28.4 The Contractor shall make all arrangements for ground breaking ceremony/ inaugural function etc for the project as required and the cost towards it is deemed to be included in his rates/offer. Any expenditure already incurred/to be incurred by EPI, shall be recovered from the Contractor.

28.5 PROTECTION OF TREES

Trees designated by the Engineer-In-Charge shall be protected from damage during the course of the works and earth level within one meter of each such tree shall not
be changed. Where necessary, such trees shall be protected by providing temporary fencing.

29.0 WATCH & WARD AND LIGHTING

The Contractor shall at his own cost take all precautions to ensure safety of life and property by providing necessary barriers, lights, watchmen etc. during the progress of work as directed by Engineer-In-Charge.

30.0 HEALTH & SANITARY ARRANGEMENTS

In case of all labour directly or indirectly employed in work for the performance on the Contractor’s part of this contract, the Contractor shall comply with all rules and regulations framed by Govt. from time to time for the protection of health and sanitary arrangements for workers.

31.0 WORKMEN’S COMPENSATION ACT

The Contractor shall at all times indemnify EPI and Owner against all claims for compensation under the provision of Workmen’s Compensation Act, 1923 or any other law in force, for any workmen employed by the Contractor or his sub-Contractor in carrying out the contract and against all costs and expenses incurred by EPI therewith.

32.0 MINIMUM WAGES ACT

The Contractor shall comply with all the provisions of the Minimum Wages Act, 1948, Contract Labour Act (R&A) 1970, and rules framed thereunder and other labour laws/local laws affecting contract labour that may be brought into force from time to time.

33.0 LABOUR RECORDS

The Contractor shall submit by the 4th & 19th of every month to the Engineer-In-Charge of EPI a true statement, showing in respect of the second half of the preceding month and the first half of the current month, respectively, of the following data :-

a) The number of the labour employed by him (category-wise).

b) Their working hours.

c) The wages paid to them.

d) The accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused.
e) The number of female workers who have been allowed Maternity Benefits under the Maternity Benefit Act, 1962 and the amount paid to them.

f) Any other information required by Engineer-In-Charge.

34.0 RELEASE OF RETENTION MONEY AFTER LABOUR CLEARANCE

Retention Money of the work shall not be refunded till the Contractor produces a clearance certificate from the concerned Labour Officer. As soon as the work is virtually complete, the Contractor shall apply for the clearance certificate to the concerned Labour Officer under intimation to the Engineer-In-Charge. The Engineer-In-Charge, on receipt of the said communication, shall write to the Labour Officer to intimate if any complaint is pending against the Contractor in respect of the work. If no complaint is pending, on record till three months after completion of the work and/or no communication is received from the Labour Officer to this effect till six months after the date of completion, it will be deemed to have received the clearance certificate and the Retention Money will be released if otherwise due.

35.0 SECURED ADVANCE AGAINST NON-PERISHABLE MATERIALS

Interest free secured advance up to a maximum of 75% (seventy five percent) of the Market Value of the materials or the cost of materials as derived from the tendered item rate of the Contractor, whichever is less, required for incorporation in the permanent works and brought to Site and duly certified by EPI Site Engineer shall be paid to the Contractor for all non-perishable items as per CPWD/MORTH (as the case may be) norms. The advance will be paid only on submission of Indemnity Bond in the prescribed pro-forma. The advance shall be recovered in full from next Running Account bill and fresh advance paid for the balance quantities of materials. The Contractor shall construct suitable godown at the Site of work for safe storage of the materials against any possible damages due to sun, rain, dampness, fire, theft etc. at his own cost. He shall also employ necessary watch & ward establishment for the purpose at his costs and risks. Such secured advance shall be payable on other items of perishable nature, fragile and combustible with the approval of the Engineer-In-Charge provided the Contractor provides a comprehensive insurance cover for the full cost of such materials. The decision of the Engineer-In-Charge shall be final and binding on the Contractor in this matter. No secured advance shall however, be paid on high-risk materials such as ordinary glass, sand, petrol, diesel etc.

36.0 MEASUREMENTS OF WORKS

36.1 Unless otherwise mentioned in the Bill of Quantities the measurements of works shall be done as per CPWD/MORTH specifications (as specified in Technical Specification of the Tender) and if the same is not given in the CPWD/MORTH Specifications, the same shall be measured as per latest relevant BIS codes in force. The quantity of steel reinforcement and the structural steel sections incorporated in the work shall be measured & paid on the basis of standard coefficients of sections as per BIS Codes of practice.
36.2 The Engineer-In-Charge shall except as otherwise stated ascertain and determine by measurement the value of work done in accordance with the contract.

36.3 All items having financial value shall be entered in Measurement Book, level book, etc. prescribed by EPI so that a complete record is obtained of all work performed under the contract. Items of non-financial value (which are not payable) may also be entered in Measurement Book at the sole discretion of the Engineer-In-Charge.

36.4 Measurements shall be taken jointly by the Engineer-In-Charge or his authorized representative and by the Contractor or his authorized representative.

36.5 Before taking measurements of any work the Engineer-In-Charge or the authorized person deputed by him for the purpose shall give a reasonable notice to the Contractor. If the Contractor fails to attend or send an authorized representative for measurement after such a notice or fails to countersign or to record the objection within a week from the date of measurement, then in any such event measurement taken by the Engineer-In-Charge or by the person deputed by him shall be taken to be correct measurements of the work.

36.6 The Contractor shall, without extra charge provide assistance with every appliance, labour and other things necessary for measurement.

Measurements shall be signed and dated by both parties each day on the Site on completion of measurement.

37.0 PAYMENTS

37.1 The bill shall be submitted by Contractor each month on or before the date fixed by the ENGINEER-IN-CHARGE for all works executed in previous months. The Contractor shall prepare computerized bills using the program as approved by Engineer-In-Charge as per prescribed format/pro-forma. The Contractor shall submit five numbers of hard copies and one soft copy of floppy/CD for all bills. Subject to clause 37.3 herein below, the payment due to the Contractor shall be made within fifteen days of getting the measurements verified from the Engineer-In-Charge or his subordinate/representative and certification of bill by the Engineer-In-Charge.

37.2 All running payments shall be regarded as ‘on account’ payments against the final payment only and not as payments for work actually done and completed and/or accepted by EPI and shall not preclude the recovery for bad, unsound and imperfect or unskilled work to be removed and taken away and re-erected or be considered as an admission of the due performance of the Contract, or any part thereof, in this respect, or the accruing of any claim, nor shall it conclude, determine or affect in any way the powers of EPI under these conditions or any of them as to the final settlement and adjustments of the accounts or otherwise, or in any other way vary/affect the contract. The final bill shall be submitted by the Contractor within three months of
the completion of work, otherwise EPI’s certificate of the measurement and of the total amount payable for the work accordingly shall be final and binding on Contractor. Each Running Bill should be accompanied by two sets of at-least 20 (twenty) photographs as per direction of Engineer-In-Charge taken from various points depicting status of work as on Report/ Bill date along with Monthly Progress Report for the concerned month in the pro-forma to be given/ approved by Engineer-In-Charge. Intermittent progress photographs as and when required shall also be provided by the Contractor at his own cost as per direction of Engineer-In-Charge. No payment of running account bill shall be released unless it is accompanied by progress photographs and Monthly Progress Report as above.

37.3 It is clearly agreed and understood by the Contractor that notwithstanding anything to the contrary that may be stated in the agreement between EPI and the Contractor, the Contractor shall become entitled to payment only after EPI has received the corresponding payment(s) from the Client/ Owner for the work done by the Contractor. Any delay in the release of payment by the Client/ Owner to EPI leading to delay in the release of the corresponding payment by EPI to the Contractor shall not entitle the Contractor to any compensation/ interest from EPI.

37.4 All payments shall be released by EPI by Account Payee Cheque from any of its offices in India directly at the address notified by the Contractor (Postage charges shall be charged to the Contractor’s account). In case of Payments is made by Demand Draft at the request of the Contractor, Bank Commission charges shall be debited to the account of Contractor.

38.0 WORK ON SUNDAYS, HOLIDAYS AND DURING NIGHT

For carrying out work on Sunday and Holidays or during night, the Contractor will approach the Engineer-In-Charge or his representative at least two days in advance and obtain his permission. The Engineer-In-Charge at his discretion can refuse such permission. The Contractor shall have no claim on this account whatsoever. If work demand, the Contractor shall make arrangements to carry out the work on Sundays, Holidays and in two, three shifts with the approval of Engineer-in-Charge at no extra cost to EPI.

39.0 NO IDLE CHARGES TOWARDS LABOUR OR PLANT & MACHINERY ETC.

No idle charges or compensation shall be paid for idling of the Contractor’s labour, staff or Plant & Machinery etc. on any ground or due to any reason whatsoever. EPI will not entertain any claim in this respect.

40.0 WORK TO BE EXECUTED IN ACCORDANCE WITH SPECIFICATIONS, DRAWINGS, ORDERS, ETC.

The Contractor shall execute the whole and every part of the work in the most substantial and workman like manner both as regards materials and otherwise in every respect in strict accordance with the specifications. The Contractor shall also conform exactly, fully and faithfully to the Design, Drawings and Instructions
in writing in respect of the work assigned by the Engineer-In-Charge and the Contractor shall be furnished free of charge one copy of the Contract Documents together with Specifications, Designs, Drawings.

The Contractor shall comply with the provisions of the contract and execute the works with care and diligence and maintain the works and provide all labour and materials, tools and plants including for measurements and supervision of all works, structural plans and other things of temporary or permanent nature required for such execution and maintenance in so far as the necessity for providing these is specified or is reasonably inferred from the contract. The Contractor shall take full responsibility for adequacy, suitability and safety of all the works and methods of construction.

41.0 DIRECTION FOR WORKS

41.1 All works to be executed under the contract shall be executed under the direction and subject to approval in all respect of the Engineer-In-Charge of EPI who shall be entitled to direct at what point or points and in what manner works are to be commenced and executed.

41.2 The Engineer-In-Charge and his representative shall communicate or confirm their instructions to the Contractor in respect of the execution of work during their Site inspection in a ‘Works Site Order Book’ maintained at the site office of Engineer-In-Charge. The Contractor or his authorized representative shall confirm receipt of such instructions by signing against the relevant orders in the book. The Contractor shall be bound to sign the site order book as and when required by Engineer-In-Charge and carry out compliance of instructions promptly to the satisfaction of Engineer-In-Charge.

42.0 ORDER OF PRECEDENCE OF DOCUMENTS

42.1 In case of difference, contradiction, discrepancy, dispute with regard to Conditions of Contract, Specifications, Drawings, Bill of Quantities and Rates quoted by the Contractor and other documents forming part of the contract, the following shall prevail in order of precedence.

i) Contract Agreement
ii) Fax, Telegram or Letter of Intent, detailed letter of Work Order along with statement of agreed variations and its enclosures.
iii) Description in Bill of Quantity / Schedule of Quantities
iv) Additional Conditions of Contract.
v) Technical specifications (General / Special Technical Specification) as given in the Tender Documents.
vi) General Conditions of Contract.
vii) Drawings
viii) CPWD/ MORTH specifications (as specified in Technical Specification of the Tender) update with correction slips issued up to last date of receipt of Tenders.
ix) Relevant B.I.S. Codes.

42.2 If there are varying or conflicting provisions made in any one document forming part of the contract, the Engineer-In-Charge shall be the deciding authority with regard to the intention of the document which shall be final and binding on the Contractor.

42.3 Any error in description, quantity or rate in the Schedule of Quantities/items or Bill of Quantities or any omission there from shall not vitiate the contract or release the Contractor from the execution of the whole or any part of the works comprised therein according to the Drawings and Specifications or from any of his obligations under the contract.

**43.0 TIME SCHEDULE & PROGRESS**

43.1 Time allowed for carrying out all the works as entered in the Tender shall be as mentioned in the “Memorandum” to the “Form of Tender” which shall be reckoned from the 10th day from the date on which the letter/telegram of Intent is issued to the Contractor. Time shall be the essence of the contract and Contractor shall ensure the completion of the entire work within the stipulated time of completion.

43.2 The Contractor shall also furnish within 10 days from the date of letter/telegram of Intent, a CPM network/PERT chart/Bar Chart for completion of work within stipulated time. This will be duly got approved from EPI. This approved Network/PERT Chart shall form a part of the agreement. Achievement of milestones as well as total completion has to be within the time period allowed.

43.3 Contractor shall mobilize and employ sufficient resources for completion of all the works as indicated in the agreed BAR CHART/Network. No additional payment will be made to the Contractor for any multiple shift work or other incentive methods contemplated by him in his work schedule even though the time schedule is approved by the Engineer-In-Charge.

43.4 During the currency of the work the Contractor is expected to adhere to the time schedule on milestone and total completion and this adherence will be a part of Contractor’s performance under the contract. During the execution of the work Contractor is expected to participate in the review and updating of the Network/BAR CHART undertaken by EPI. These reviews may be undertaken at the discretion of EPI either as a periodical appraisal measure or when the quantum of work order on the Contractor is substantially changed through deviation orders or amendments. The review shall be held at Site or any of the offices of EPI/Owner or Consultant of EPI/Owner at the sole discretion of EPI.

43.5 If at any time, it appears to the Engineer-In-Charge that the actual progress of work does not conform to the approved programme referred above, the Contractor shall produce a revised programme showing the modifications to the approved programme by additional inputs to ensure completion of the work within the stipulated time. The Contractor will adhere to the revised schedule thereafter. The approval to the revised schedule resulting in a completion date beyond the
stipulated date of completion shall not automatically amount to a grant of extension of time to the Contractor.

43.6 Contractor shall submit fortnightly/ Monthly (as directed by Engineer-In-Charge) progress reports (5 copies) on a computer based program (program and software to be approved by Engineer-In-Charge) highlighting status of various activities and physical completion of work.

43.7 The Contractor shall send completion report along with as built drawings and maintenance schedule to the office of Engineer-In-Charge, of EPI in writing within a period of 30 days of completion of work.

44.0 WATER AND ELECTRICITY

The Contractor shall make his own arrangement for Water & Electrical power for construction and other purposes at his own cost and pay requisite electricity and water charges. The Contractor shall also make standby arrangement for water & electricity to ensure un-interrupted supply.

45.0 MATERIALS TO BE PROVIDED BY THE CONTRACTOR

The Contractor shall, at his own expense, provide all materials, required including Cement & Steel for the works.

The Contractor shall at his own expense and without delay, supply to the Engineer-in-Charge samples of materials to be used on the work and shall get the same approved in advance. All such materials to be provided by the Contractor shall be in conformity with the specifications laid down or referred to in the contract. The Contractor shall, if requested by the Engineer-in-Charge furnish proof, to the satisfaction of the Engineer-In-Charge that the materials so comply.

The Contractor shall at his risk and cost submit the samples of materials to be tested or analyzed and bear all charges and cost of testing unless specifically provided for otherwise elsewhere in the contract or specifications. The Engineer-In-Charge or his authorized representative shall at all times have access to the works and to all workshops and places where work is being prepared or from where materials, manufactured articles or machinery are being obtained for the works and the Contractor shall afford every facility and every assistance and cost in obtaining the right and visit to such access.

The Engineer-In-Charge shall have full powers to require the removal from the premises of all materials which in his opinion are not in accordance with the specifications and in case of default, the Engineer-In-Charge shall be at liberty to employ at the expense of the Contractor, other persons to remove the same without being answerable or accountable for any loss or damage that may happen or arise to such materials. The Engineer-In-Charge shall also have full power to require other proper materials to be substituted thereof and in case of default, the Engineer-In-Charge may cause the same to the supplies and all
costs which may require such removal and substitution shall be borne by the Contractor.

45.1 CEMENT AND CEMENT GODOWN

Cement shall be procured by Contractor of 43 Grade conforming to BIS : 8112 Specification latest edition or higher Grade as directed by the Engineer-In-Charge. The cement shall be procured directly from the reputed manufacturers/stockist, which will have to be got approved from EPI in advance. Relevant vouchers and test certificates will be produced as and when required. The cement shall be stored by the Contractor in such suitable covered and lockable stores, well protected from climate and atmospheric effect. The cement godown shall be constructed by the Contractor as per CPWD specifications at his own cost. The cement will remain under double lock, one from EPI and other from Contractor. The cement in bags shall be stored in godowns in easy countable position. Cement bags shall be used on first in first out basis. Cement stored for beyond 90 days will be required to be tested at Contractors cost, before use in works.

45.2 STEEL & STEEL STOCKYARD

Steel conforming to BIS specifications (latest edition) shall be procured by the Contractor directly from reputed manufacturers/producers as approved by EPI. The manufacturer has to give a certificate that the material supplied is not a re-rolled product. Relevant vouchers & test certificates will be produced by the Contractor. Re-rolled sections will not be allowed.

Reinforcement steel, structural steel shall be stored and stacked in such manner so as to facilitate easy identification, removal etc. The Contractor shall take proper care to prevent direct contact between the steel and the ground/ water for which he shall provide necessary arrangement at his own cost including ensuring proper drainage of area to prevent water logging as per directions of the Engineer-In-Charge. If required, the reinforcement steel shall also be protected, by applying a coat of neat cement slurry over the bars for which no extra payment shall be made.

Test certificates for each consignment of steel shall be furnished and tests to be got carried out by the Contractor at his own cost from the authorized laboratory as per the directions of Engineer-In-Charge, before incorporating the materials in the work.

46.0 SCHEDULE OF QUANTITIES / BILL OF QUANTITIES

46.1 The quantities shown against the various items of work are only approximate quantities, which may vary as per the actual requirement at Site.

46.2 All items of work in the Bill of Quantities/ schedule of quantities shall be carried out as per the CPWD/ MORTH (as the case may be) specifications, drawings and instructions of the ENGINEER-IN-CHARGE of EPI and the rates shall include for supply of required materials including proper storage, consumables, skilled & unskilled labour, supervision, tools, tackles, plant & machinery complete
as called for in the detailed specifications and conditions of the contract. No item, which is not covered in the Bill of Quantities, shall be executed by the Contractor without the approval of EPI. In case any Extra/Substituted item is carried out without specific-approval, the same will not be paid.

47.0 ANTI-TERMITE TREATMENT & WATER PROOF TREATMENT

47.1 Pre-construction treatment shall be carried out in co-ordination with the building work and shall be executed in such a manner that the civil works are not hampered or delayed by the anti-termite treatment. The treatment shall be carried out as detailed in BIS: 6313 (Part-II) latest revision. The waterproof treatment shall be of type and specifications as given in the schedule of quantities.

47.2 The treatment against water-proofing of basement, roofs, water retaining areas and termite infestation shall be and remain fully effective for a period of not less than 10(Ten) years to be reckoned from the date of expiry of the Defect Liability period, prescribed in the contract. At any time during the said guarantee period if EPI finds any defects in the said treatment or any evidence of re-infestation, dampness, leakage in any part of buildings or structure and notifies the Contractor of the same, the Contractor shall be liable to rectify the defect or give re-treatment at his own cost and shall commence the work or such rectification or re-treatment within seven days from the date of issue of such letter to him. If the Contractor fails to commence such work within the stipulated period, EPI may get the same done by another agency at the Contractor’s cost and risk and the decision of the Engineer-In-Charge of EPI for the cost payable by the Contractor shall be final and binding upon him.

47.3 Re-treatment if required shall be attended to and carried out by the Contractor within seven days of the notice from Engineer-In-Charge of EPI.

47.4 EPI reserves the right to get the quality of treatment checked in accordance with recognized test methods and in case it is found that the chemicals with the required concentration and rate of application have not been applied, or the water proof treatment is not done as per specifications, the Contractor will be required to do the re-treatment in accordance with the required concentration & specifications at no extra cost failing which no payment for such work will be made. The extent of work thus rejected shall be determined by EPI.

47.5 Water proofing and anti-termite treatment shall be got done through approved / specialized agencies only with prior approval of Engineer-In-Charge.

47.6 The Contractor shall make such arrangement as may be necessary to safeguard the workers and residents of the building against any poisonous effect of the chemicals used during the execution of the work.

47.7 During the execution of work, if any damage shall occur to the treatment already done, either due to rain or any other circumstances, the same shall be rectified and made good to the entire satisfaction of Engineer-In-Charge by the Contractor at his cost.
47.8 The Contractor shall make his own arrangement for all equipments required for the execution of the job.

47.9 The Contractor shall execute Guarantee Bond in the prescribed form as appended for guaranteeing the anti-termite treatment and waterproof treatment.

48.0 INDIAN STANDARDS

Wherever any reference is made to any IS in any particular specifications, Drawings or Bill of Quantities, it means the Indian Standards editions with the amendments current at the last date of receipt of Tender Documents.

49.0 CENTERING & SHUTTERING

Marine plywood only or steel plates of minimum thickness as approved by Engineer-In-Charge shall be used for formwork. The shuttering plates shall be cleaned and oiled after every repetition and shall be used only after obtaining approval of EPI's Engineers at Site. The number of repetitions allowed for plywood and steel shuttering shall be at the discretion of Engineer-In-Charge of EPI depending upon the condition of shuttering surface after each use and the decision of ENGINEER-IN-CHARGE in this regard shall be final and binding on the Contractor. No claim whatsoever on this account shall be admissible.

50.0 CONTROLLED MATERIALS

50.1 The following Controlled materials shall be brought to Site after the approval of EPI.
   a) Water proofing compound.
   b) Cement
   c) Steel
   d) Primer/ Paints/ Varnish etc.
   e) Bitumen
   f) Chemical for anti termite treatment
   g) Any other materials as per discretion of EPI.

50.2 The quantity of Controlled materials shall be measured and recorded in the Measurement books and signed by the Contractor and the Engineer-In-Charge as a check to ensure that the required quantities as required for execution of works as per specifications have been brought to Site for incorporation in the work.

50.3 Controlled materials brought at Site shall be stored as directed by EPI and those already recorded in Measurement book, shall be suitably marked for identification.

50.4 The Contractor shall ensure that the Controlled materials are brought to Site in original sealed containers or packing bearing manufacturer’s markings and
brands (except where the quantity required is a fraction of the smallest packing). Materials not complying with this requirement shall be rejected. The empty containers of such Controlled materials shall not be destroyed/ disposed-off without the written permission of EPI.

50.5 The Contractor shall produce receipted vouchers showing quantities of the materials to satisfy Engineer-In-Charge that the materials comply with the specifications. These vouchers shall be endorsed, dated and initialed by Engineer-In-Charge giving the contract number and name of work and a certified copy of each such voucher signed both by EPI and the Contractor shall be kept on record.

50.6 When the cost of each category of materials is less than Rs.5000/- production of vouchers may not be insisted upon if EPI is otherwise satisfied with the quality and quantity of materials.

51.0 RECORDS OF CONSUMPTION OF CEMENT & STEEL

51.1 For the purpose of keeping a record of cement and steel received at Site and consumption in works, the Contractor shall maintain a properly bound register in the form approved by EPI, showing columns like quantity received and used in work and balance in hand etc. This register shall be signed daily by the Contractor’s representative and EPI’s representative.

51.2 The register of cement & steel shall be kept at Site in the safe custody of EPI’s Engineer during progress of the work. This provision will not, however, absolve the Contractor from the quality of the final product.

51.3 In case cement or steel quantity consumed is lesser as compared to the theoretical requirement of the same as per CPWD/MORTH (as the case may be) specifications/ norms, the work will be devalued and/ or a penal rate (i.e. double the rate at which cement/ steel purchased last) recovery for lesser consumption of cement/ steel shall be made in the item rates of the work done subject to the condition that the tests results fall within the acceptable criteria as per CPWD/MORTH (as the case may be) specifications otherwise the work shall have to be dismantled and redone by the Contractor at no extra cost. In case of cement, if actual consumption is less than 98% of the theoretical consumption, a recovery shall be effected from the Contractor’s dues at the penal rate for the actual quantity that is lower than 98% of theoretical consumption.

52.0 MATERIALS AND SAMPLES

52.1 The materials/ products used on the works shall be one of the approved make/ brands out of list of manufacturers/ brands/ makes given in the Tender Documents. The Contractor shall submit samples/ specimens out of approved makes of materials/ products to the Engineer-In-Charge for prior approval. In
exceptional circumstances Engineer-In-Charge may allow alternate equivalent makes/brands of products/materials at his sole discretion. The final choice of brand/make shall remain with the Engineer-In-Charge, whose decision in this matter shall be final and binding and nothing extra on this account shall be payable to the Contractor.

In case single brand/make is mentioned, other equivalent makes/brands may be considered by the Engineer-In-Charge with prior approval. In case of variance in CPWD/IS/BIS Specifications from approved products/makes specification, the specification of approved product/make shall prevail for which nothing shall be paid extra to the Contractor.

In case no make or brand of any materials, articles, fittings and accessories etc. is specified, the same shall comply with the relevant Indian Standard Specifications and shall bear the ISI/BIS mark. The Engineer of EPI and the Owner shall have the discretion to check quality of materials and equipments to be incorporated in the work, at source of supply or site of work and even after incorporation in the work. They shall also have the discretion to check the workmanship of various items of work to be executed in this work. The Contractor shall provide the necessary facilities and assistance for this purpose.

52.2 The above provisions shall not absolve the Contractor from the quality of final product and in getting the material and workmanship quality checked and approved from the Engineer-In-Charge of EPI.

52.3 The Contractor shall well in advance, produce samples of all materials, articles, fittings, accessories etc. that he proposes to use and get them approved in writing by EPI. The materials/articles etc. as approved shall be labelled as such and shall be signed by EPI and the Contractor's representative.

52.4 The approved samples shall be kept in the custody of the Engineer-in-Charge of EPI till completion of the work. Thereafter the samples except those destroyed during testing shall be returned to the Contractor. No payment will be made to the Contractor for the samples or samples destroyed in testing.

52.5 The brands of all materials, articles fittings etc. approved together with the names of the manufacturers and firms from which supplies have been arranged shall be recorded in the Site Order Book.

52.6 The Contractor shall set up and maintain at his cost, a field testing laboratory for all day-to-day tests at his own cost to the satisfaction of the Engineer-In-Charge. This field testing laboratory shall be provided with equipment and facilities to carry out all mandatory field tests as per CPWD/MORTH (as the case may be) specifications. The laboratory building shall be constructed and installed with the appropriate facilities; Temperature and humidity controls shall be available wherever necessary during testing of samples.

All equipments shall be provided by the Contractor so as to be compatible with the testing requirements specified. The Contractor shall maintain all the equipments in good working condition for the duration of the contract.
The Contractor shall provide approved qualified personnel to run the laboratory for the duration of the Contract. The number of staff and equipment available must at all times be sufficient to keep pace with the sampling and testing programme as required by the Engineer-In-Charge.

The Contractor shall fully service the site laboratory and shall supply everything necessary for its proper functioning, including all transport needed to move equipment and samples to and from sampling points on the Site, etc.

The Contractor shall re-calibrate all measuring devices whenever so required by the Engineer-In-Charge and shall submit the results of such measurements without delay.

All field tests shall be carried out in the presence of EPI’s representative. All costs towards samples, materials, collection, transport, manpower, testing, including concrete mix-design etc. shall be borne by the Contractor and are deemed to be included in the rates quoted by him in the Bill of Quantities.

53.0 TESTS AND INSPECTION

53.1 The Contractor shall carry out the various mandatory tests as per specifications and the technical documents that will be furnished to him during the performance of the work. All the tests on materials, as recommended by CPWD, MORTH (as the case may be) and relevant Indian Standard Codes or other standard specifications (including all amendments current at the last date of submission of Tender Documents) shall be got carried out by the Contractor at the field testing laboratory or any other recognized institution/ laboratory, at the direction of EPI. All testing charges, expenses etc. shall be borne by the Contractor. All the tests, either on the field or outside laboratories concerning the execution of the work and supply of materials shall be got carried out by the Contractor or EPI at the cost of the Contractor.

53.2 WORKS TO BE OPEN TO INSPECTION

All works executed or under the course of execution in pursuance of this contract shall at all times be open to inspection and supervision of EPI. The work during its progress or after its completion may also be inspected, by Chief Technical Examiner of Government of India (CTE) and/or an inspecting authority of State Government of State in which work is executed and/or by third party checks by Owner/ Clients. The compliance of observations/ improvements as suggested by the inspecting officers of EPI/CTE/ State authorities/ Owners shall be obligatory on the part of the Contractor at the cost of Contractor.

54.0 BORROW AREAS

The Contractor shall make his own arrangements for borrow pits and borrow disposal areas including their approaches and space for movement of men, machinery, other equipments as required for carrying out the works. The Contractor shall be responsible for taking all safety measures, getting approval,
making payment of royalties, charges etc. and nothing extra shall be paid to the Contractor on this account and unit rates quoted by the Contractor for various items of Bill of Quantities shall be deemed to include the same.

55.0 BITUMEN WORK

The Contractor shall be responsible for arranging Bitumen/Tar of required grade from source to be approved by the Engineer-In-Charge. No Bitumen work shall be carried out on wet surface or in rainy conditions.

56.0 CARE OF WORKS

From the commencement to the completion of works and handing over, the Contractor shall take full responsibility for care of all the works and in case of any damage/loss to the works or to any part thereof or to any temporary works due to lack of precautions or due to negligence on part of Contractor, the same shall be made good by the Contractor at his own cost.

57.0 WORK IN MONSOON AND DEWATERING

The execution of the work may entail working in the monsoon also. The Contractor must maintain labour force as may be required for the job and plan and execute the construction and erection according to the prescribed schedule. No special/ extra rate will be considered for such work in monsoon. The Contractor’s rate shall be considered inclusive of cost of dewatering required, if any and no extra rate shall be payable on this account.

58.0 NO COMPENSATION FOR FORECLOSURE/CANCELLATION/ REDUCTION OF WORKS

If at any time after the commencement of the work EPI shall for any reason whatsoever is required to abandon the work or does not require the whole work thereof as specified in the Tender to be carried out, the Engineer-In-Charge shall give notice in writing of the fact to the Contractor, who shall have no claim to any payment of compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full, but which he did not derive in consequence of the full amount of the work not having been carried out or on foreclosure, neither shall he have any claim for compensation by reason of any alterations having been made in the original Specifications, Drawings, Designs and Instructions which shall involve any curtailment of the work as originally contemplated.

Provided that the Contractor shall be paid the charges on the cartage only of materials actually and bonafide brought to the Site of the work by the Contractor and rendered surplus as a result of the abandonment or curtailment of the work or any portion thereof and then taken back by the Contractor, provided however, that the Engineer-In-Charge shall have in all such cases the option of taking over all or any such materials at their purchase price or at local current rates whichever may be less. In the case of such stores having been issued by EPI
and returned by the Contractor to EPI, credit will be given to him by the Engineer-In-Charge at rates not exceeding those at which they were originally issued to him after taking into consideration any deduction for claims on account of any deterioration or damage while in the custody of the Contractor and in this respect the decision of the Engineer-In-Charge shall be final.

59.0  RESTRICTION ON SUBLETTING

59.1 The Contractor shall not sublet or assign the whole or part of the works except where otherwise provided, by the contract and even then only with the prior written consent of EPI and such consent if given shall not relieve the Contractor from any liability or obligation under the contract and he shall be responsible for the acts, defaults or neglects of any sub-Contractor, his agents, servants or workmen as full as if they were the acts, defaults or neglects of the Contractor, his agent, servants or workmen provided always that the provision of labour on piece work basis shall not be deemed to be a subletting under this clause.

59.2 The Contractor may entrust specialist items of works to the agencies specialized in the specific trade. The Contractor shall give the names and details of such firm whom he is going to employ for approval of EPI. These details shall include the expertise, financial status, technical manpower, equipment, resources and list of works executed and on hand of the specialist agency. Specialist agency shall be engaged only after obtaining written approval of the Engineer-In-Charge.

60.0  PROHIBITION OF UNAUTHORISED CONSTRUCTION & OCCUPATION

No unauthorized buildings, structures should be put up by the Contractor anywhere on the project Site, neither any building built by him shall be unauthorisedly occupied by him or his staff.

61.0  CO-ORDINATION WITH OTHER AGENCIES

Work shall be carried out in such a manner that the work of other Agencies operating at the Site is not hampered due to any action of the Contractor. Proper Co-ordination with other Agencies will be Contractor's responsibility. In case of any dispute the decision of EPI shall be final and binding on the Contractor. No claim whatsoever shall be admissible on this account.

62.0  SETTING OUT OF THE WORKS

62.1 The Contractor shall be responsible for the true and proper setting out of the works and for the correctness of the position, levels, dimensions and alignment of all parts of the works. If at any time during the progress of works, shall any error appear or arise in the position, levels, dimensions or alignment of any part of the works, the Contractor shall at his own expenses rectify such error to the satisfaction of Engineer-in-charge. The checking of any setting out or of any line or level by the engineers of EPI shall not in any way relieve the Contractor of his responsibility for the correctness.
62.2 Contractor shall provide permanent bench marks, flag tops and other reference points for the proper execution of work and these shall be preserved till the end of work. All such reference points shall be in relation to the levels and locations, given in the Architectural, Plumbing and other services Drawings.

63.0 **NOTICE BEFORE COVERING UP THE WORK**

The Contractor shall give not less than seven days notice before covering up or otherwise placing beyond the reach of measurement any work, to the Engineer-In-Charge in order that the same may be inspected and measured. If any work is covered up or placed beyond the reach of Inspection/measurement without such notice to the Engineer-In-Charge or his consent being obtained, the same shall be uncovered at the Contractors expenses and he shall have to make it good at his own expenses.

64.0 **SITE CLEARANCE**

64.1 The Contractor shall ensure that the working Site is kept clean and free of obstructions for easy access to job Site and also from safety point of view. Before handing over the work to EPI the Contractor shall remove all temporary structures like the site offices, cement godown, stores, labour hutments etc., scaffolding rubbish, left over materials tools and plants, equipments etc., clean and grade the Site to the entire satisfaction of the Engineer-In-Charge. If this is not done the same will be got done by EPI at his risk and cost.

64.2 The Contractor shall clean all floors, remove cement/lime/paint drops and deposits, clean joinery, glass panes etc., touching all painter’s works and carry out all other necessary items of works to make the premises clean and tidy before handing over the building, and the rates quoted by the Contractor shall be deemed to have included the same.

65.0 **VALUABLE ARTICLES FOUND AT SITE**

All gold, silver and other minerals of any description and all precious stones, coins, treasure, relics, antiques and all other similar things which shall be found in, under or upon the Site, shall be the property of the Owner/Government and the Contractor shall duly preserve the same to the satisfaction of Engineer-In-Charge and shall from time to time deliver the same to such person or persons indicated by EPI.

66.0 **MATERIALS OBTAINED FROM DISMANTLEMENT TO BE OWNER’S PROPERTY**

All materials like stone, boulders and other materials obtained in the work of dismantling, excavation etc. will be considered Owner/government property and may be issued to the Contractor by the Owner/EPI, if required for use in this work at rates approved by EPI or the Contractor may be asked to dispose off these items at his cost.

67.0 **SET-OFF OF CONTRACTOR’S LIABILITIES**

EPI shall have the right to deduct or set off the expenses incurred or likely to be incurred by it in rectifying the defects and/or any claim under this agreement.
against the Contractor from any or against any amount payable to the Contractor under this agreement including Retention Money and proceeds of Security Deposit cum Performance Guarantee and from any other contract being executed by the Contractor for EPI.

68.0 MATERIALS PROCURED WITH THE ASSISTANCE OF EPI

If any material for the execution of this contract is procured with the assistance of EPI either by issue from its stores or purchase made under orders or permits or licences obtained by EPI, the Contractor shall hold and use the said materials economically and solely for the purpose of this contract and shall not dispose them without the written permission of Engineer-In-Charge. The Contractor, if required by EPI, shall return all such surplus or unserviceable materials that may be left with him after the completion of the contract or at its termination on whatsoever reason, on being paid or credited such price as EPI shall determine having due regard to the conditions of materials.

69.0 ALTERATION IN SPECIFICATION, DESIGN & DRAWING

69.1 The Engineer-In-Charge shall have power to make any alterations in, omissions from, additions to or substitutions for, the original Specifications, Drawings, Designs and Instructions that may appear to him to be necessary during the progress of the work, and the Contractor shall carry out the work in accordance with any instructions which may be given to him in writing signed by the Engineer-In-Charge and such alterations, omissions, additions, or substitutions shall not invalidate the contract and any altered, additional or substituted work which the Contractor may be directed to do in the manner above specified as part of the work shall be carried out by the Contractor on the same conditions in all respects on which he agreed to do the main work.

The time for the completion of the work shall be extended in the proportion that the altered, additional or substituted work price bears to the original contract work price, and the certificate of the Engineer-In-Charge shall be conclusive as to such proportion. Over and above this, a further period to the extent of 25 percent of such extension shall be allowed to the Contractor.

The rates for such additional, altered or substituted work under this clause shall be worked out in accordance with the following provisions in their respective order:

i) If the rates for the additional, altered or substituted work are specified in the contract for the work, the Contractor is bound to carry out the additional, altered or substituted work at the same rates as are specified in the contract for the work.

ii) If the rates for the additional, altered or substituted work are not specifically provided in the contract for the work, the rates will be derived from the rates for a nearest similar item of work as are specified in the contract for the work. In case of composite tenders where two or more
iii) If the altered, additional or substituted work includes any work for which no rate is specified in the contract for the work and which cannot be derived in the manner specified in sub para (i) and (ii) above from the similar class of work in the contract then such work shall be carried out at the rates entered in the Schedule of Rates (as mentioned in “Memorandum” to the “Form of Tender” for Civil/ Sanitary Works) minus/plus the percentage which the tendered amount of scheduled items bears with the estimated amount of schedule items based on the Schedule of Rates (as mentioned in “Memorandum” to the “Form of Tender” for Civil/ Sanitary Works). The scheduled items mean the items appearing in the Schedule of Rates (as mentioned in “Memorandum” to the “Form of Tender” for Civil/ Sanitary Works), which shall be applicable in this clause. This clause will apply mutatis mutandis to electrical work except that Electrical Schedule of Rates as mentioned in “Memorandum” to the “Form of Tender” will be considered in place of Civil/ Sanitary works Schedule of rates as mentioned in “Memorandum” to the “Form of Tender”.

iv) If the rates for the altered, additional or substituted work cannot be determined in the manner specified in sub-clauses (i) to (iii) above, then the Contractor shall, within 7 days of the date of receipt of order to carry out the work, inform the Engineer-In-Charge the rates which he intends to charge for such class of work, supported by analysis of the rate or rates claimed, and the Engineer-In-Charge shall determine the rate or rates on the basis of prevailing market rates of the material, Labour, T&P etc. plus 10% (Ten percent) to cover the Contractor's supervision, overheads and profit and pay the Contractor accordingly. The opinion of the Engineer-In-Charge as to the current market rates of materials and quantum of labour involved per unit of measurements will be final and binding on the Contractor.

However, the Engineer-In-Charge, by notice in writing, will be at liberty to cancel his order to carry out such class of work and arrange to carry it out in such manner, as he may consider advisable. But under no circumstances, the Contractor shall suspend the work on the plea of non-settlement of rates of items falling under the clause.

v) Except in case of items relating to foundations, provisions contained in sub clauses (i) to (iv) above shall not apply to contract, altered or substituted items as individually exceed the ‘deviation limit’ of plus/minus 25% (Twenty Five Percent) subject to the following:-

(a) Deviation limit shall apply to individual items.
(b) The value of additions of items, of any individual trade not already included in the contract, shall not exceed 20% of the Tendered value of work, subject to overall deviation limit as given above.

Provided further that in case where the original item is substituted, the Substituted Item shall be deemed to have replaced the original item in the contract itself to that extent and above provisions pertaining to the deviations shall apply with respect to such Substituted Item and not the original item.

NOTE: Individual trade means the trade section to which Bill of Quantities annexed to the agreement has been divided or in the absence of any such division the individual section of the MORTH/C.P.W.D. (as the case may be) Scheduled of rates specified above, such as excavation and earthwork, Concrete, wood work and joinery, etc.

The rate of any such work except the items relating to foundations which is in excess of the deviation limit and deviation in quantities of AHR items on plus side as contained in Clause 9.2(i) shall be determined in accordance with the provisions contained in Clause 69.2.

69.2 In the case of contract items, substituted items, Contract cum substituted items or additional items which exceed the limits laid down in sub para (v) of condition 69.1 above (except the items relating to foundation work, which the Contractor is required to do under Clause 69.1 above and deviation in quantities of AHR items on plus side as contained in clause 9.2 (i) ), the Contractor may within fifteen days of receipt of order or occurrence of the excess, claim revision of the rates, supported by proper analysis, for the work in excess of the above mentioned limits, provided that if the rates so claimed are in excess of the rates specified in the schedule of quantities or those derived in accordance with the provisions of sub para (i) to (iii) of condition 69.1 by more than five percent, the Engineer-In-Charge shall within three months of receipt of the claims supported by analysis, after giving consideration to the analysis of the rates submitted by the Contractor, determine the rates on the basis of the market rates and if the rates so determined exceed the rates specified in the schedule of quantities or those derived in accordance with the provisions of sub paras (i) to (iii) of condition 69.1 by more than five percent, the contract shall be paid in accordance with the rates determined. In the event of the Contractor failing to claim revision of rates within the stipulated period, or if the rates determined by the Engineer-In-Charge within the period of three months of receipt of the claims supported by analysis are within five percent of the rates specified in the schedule of quantities or of those determined in accordance with the provisions of sub-para (i) to (iii) of condition 69.1, the Engineer-In-Charge shall make payment at the rates as specified in the schedule of quantities or those already determined under sub para (i) to (iii) of condition 69.1 for the quantities in excess of the limits laid down in sub para (v) of condition 69.1.

69.3 The provisions of the proceeding paragraph shall apply to the decrease in the rates of items for the work in excess of the limits laid down in sub para (v) of
condition 69.1 provided that such decrease is more than five percent of rates specified in the schedule of quantities or those derived in accordance with the provisions of sub para (i) to (iii) of condition 69.1 and the Engineer-In-Charge may after giving notice to the Contractor within two months of receipt of order by the Contractor or occurrence of the excess and after taking into consideration any reply received from him within fifteen days of receipt of the notice revise the rates for the work in question within two months of expiry of the said period of fifteen days having regard to the market rates.

69.4 The Contractor shall send to the Engineer-In-Charge once every three months an up to date account giving complete details of all claims for additional payments to which the Contractor may consider himself entitled and of all additional work ordered by the Engineer-In-Charge which he has executed during the preceding quarter failing which the Contractor shall be deemed to have waived his right.

69.5 For the purpose of operation of clause 69.1 (v) the following works shall be treated as works relating to foundation:-

i) For buildings, compound walls plinth level or 1.2 meters (4 feet) above ground level whichever is lower excluding items of flooring and D.P.C. but including base concrete below the floors.

ii) For abutments, piers, retaining walls of culverts and bridges, walls of water reservoirs the bed of floor level.

iii) For retaining walls where floor level is not determinate 1.2 meters above the average ground level or bed level.

iv) For Roads all items of excavation and filling including treatment of sub base and soiling work.

v) For water supply lines, sewer lines, under-ground storm water drains and similar works. All items of work below ground level except items of pipe work, masonry work.

vi) For open storm water drains, all items of work except lining of drains.

70.0 **ACTION AND COMPENSATION PAYABLE IN CASE OF BAD WORK**

If it shall appear to the Engineer-In-Charge or his authorized subordinate in charge of the work or to the Chief Technical Examiner or to any other inspecting agency of Government/ State Government/ Owner where the work is being executed, that any work has been executed with unsound, imperfect, or unskillful workmanship or with materials of any inferior description, or that any materials or articles provided by him for the execution of the work are unsound or of a quality inferior to that contracted for or otherwise not in accordance with the contract, the Contractor shall on demand in writing which shall be made within six months of the completion of the work from the ENGINEER-IN-CHARGE specifying the work, materials or articles complained of notwithstanding that the same may have been passed, Certified and paid for forthwith rectify, or remove and
reconstruct the work so specified in whole or in part as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own proper charge and cost, and in the event of his failing to do so within a period to be specified by the Engineer-In-Charge in his demand aforesaid, then the Contractor shall be liable to pay compensation at the rate of one percent of the estimated amount put to tender for every day not exceeding ten days, while his failure to do so shall continue and in the case of any such failure, the Engineer-In-Charge may rectify or remove and re-execute the work or remove and replace with others, the material or articles complained of as the case may be at the risk and expense in all respects of the Contractor.

71.0 POSSESSION PRIOR TO COMPLETION

71.1 EPI shall have the right to take possession of or use any completed or partially completed work or part of the work. Such possession or use shall not be deemed to be any acceptance of any work not completed in accordance with the contract agreement. If such prior possession or use by EPI delays the progress of work an equitable adjustment in the time of completion will be made and the contract agreement shall be deemed to be modified accordingly. The decision of EPI in this case shall be final binding and conclusive.

71.2 When the whole of the works or the items or the groups of items of work for which separate periods of completion have been specified have been completed the Contractor will give a notice to that effect to the Engineer in writing. The Engineer shall within 15 days of the date of receipt of such notice inspect the works and either the Engineer-In-Charge issues to the Contractor a completion certificate stating the date on which in his opinion the works were completed in accordance with the contract or gives instructions in writing to the Contractor specifying the balance items of work which are required to be done by the Contractor before completion certificate could be issued. The Engineer-In-Charge shall also notify the Contractor of any defect in the works affecting completion.

71.3 The Contractor shall during the course of execution prepare and keep updated a complete set of ‘as built’ drawings to show each and every change from the Contract Drawings, changes recorded shall be countersigned by the Engineer-In-Charge and the Contractor. Four copies of ‘as built’ drawings shall be supplied to EPI by the Contractor within 30 days of the completion. All costs incurred in this respect shall be borne by the Contractor only.

72.0 COMPENSATION FOR DELAY AND REMEDIES

72.1 If the Contractor fails to maintain the required progress in terms of clause 72.4 or relevant clause of Additional Conditions of Contract, to complete the work and clear the Site on or before the completion date or extended date of completion, he shall, without prejudice to any other right or remedy available under the law to EPI on account of such breach, pay as agreed compensation the amount calculated at the rates stipulated below or such smaller amount as the Engineer in charge (whose decision in writing shall be final and binding) may decide on the amount of tendered value of the work for every completed day / week (as
applicable) that the progress remains below that specified in Clause 72.4.1 or the relevant clause in Additional Conditions of Contract or that the work remains incomplete. This will also apply to items or group of items for which a separate period of completion has been specified.

i) For works with completion period not exceeding 3 month (as originally stipulated) @ 1% per day

ii) For works with completion period exceeding 3 months (as originally stipulated) @ 1% per week or part thereof

Provided always that the total amount of compensation for delay to be paid under this Condition shall not exceed 10% of the Tendered Value of work or of the Tendered Value of the item or group of items of work for which a separate period of completion is originally given.

The amount of compensation may be adjusted or set-off against any sum payable to the Contractor under this or any other contract with EPI even after completion of the work.

72.2 CANCELLATION / DETERMINATION OF CONTRACT IN FULL OR PART

Subject to other provisions contained in this clause, the Engineer-In-Charge may, without prejudice to his any other rights or remedy against the Contract in respect of any delay, inferior workmanship, any claims for damages and / or any other provisions of this contract or otherwise, and whether the date of completion has or has not elapsed, by notice in writing absolutely determine the contract in full or in part in any of the following cases:

i) If the Contractor having been given by the Engineer-In-Charge a notice in writing to rectify, reconstruct or replace any defective work or that the work is being performed in an inefficient or otherwise improper or un-workmanlike manner shall omit to comply with the requirement of such notice for a period of seven days thereafter; or

ii) If the Contractor has, without reasonable cause, suspended the progress of the work or has failed to proceed with the work with due diligence so that in the opinion of the ENGINEER-IN-CHARGE (which shall be final and binding) he will be unable to secure completion of the work by the date for completion and continues to do so after a notice in writing of seven days from the Engineer-In-Charge; or

iii) If the Contractor fails to complete the work within the stipulated date or items of work with individual date of completion, if any stipulated, on or before such date(s) of completion and does not complete them within the period specified in a notice given in writing in that respect by the Engineer-In-Charge; or

iv) If the Contractor persistently neglects to carry out his obligations under the contract and / or commits default in complying with any of the terms
and conditions of the contract and does not remedy it or take effective steps to remedy it within 7 days after a notice in writing is given to him in that respect by the Engineer-In-Charge; or

v) If the Contractor shall offer or give or agree to give to any person in EPI service or to any other person on his behalf any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any action in relation to the obtaining or execution of this or any other contract for EPI; or

vi) If the Contractor shall enter into a contract with EPI in connection with which commission has been paid or agreed to be paid by him or to his knowledge, unless the particulars of any such commission and the terms of payment thereof have been previously disclosed in writing to the Engineer-In-Charge; or

vii) If the Contractor shall obtain a contract with EPI as a result of wrong tendering or other non-bona-fide methods of competitive tendering; or

viii) If the Contractor being an individual, or if a firm, any partner thereof shall at any time be adjudged insolvent or have a receiving order or order for administration of his estate made against him or shall take any proceedings for liquidation or composition (other than a voluntary liquidation for the purpose of amalgamation or reconstruction) under any Insolvency Act for the time being in force or make any conveyance or assignment of his effects or composition or arrangement for the benefit of his creditors or purport so to do, or if any application be made under any Insolvency Act for the time being in force for the sequestration of his estate or if a trust deed be executed by him for benefit of his creditors; or

ix) If the Contractor being a company, shall pass a resolution or the Court shall make an order for the winding up of the company, or a receiver or manager on behalf of the debenture holders or otherwise shall be appointed or circumstances shall arise which entitle the Court or debenture holders to appoint a receiver or manager; or

x) If the Contractor shall suffer an execution being levied on his goods and allow it to be continued for a period of 21 days; or

xi) If the Contractor assigns, transfers, sublets (engagement of labour on a piece-work basis or of the labour with materials not to be incorporated in the work, shall not be deemed to be subletting) or otherwise parts with or attempts to assign, transfer sublet or otherwise parts with the entire works or any portion thereof without and prior written approval of the Engineer-In-Charge.

When the Contractor has made himself liable for action under any of the clauses aforesaid, the Engineer-In-Charge may without prejudice to any other right or remedy which shall have accrued or shall accrue hereafter to EPI, by a notice in
writing to cancel the contract as a whole or only such items of work in default from the Contract.

The Engineer-In-Charge shall on such cancellation by EPI have powers to:

a) Take possession of Site and any materials, Construction Plant & machinery, implements, stores, etc. thereon; and/or

b) Carry out the incomplete work by any means at the risk and cost of the Contractor; and/or

c) To determine or rescind the contract as aforesaid (of which termination or rescission notice in writing to the Contractor under the hand of the Engineer-In-Charge shall be conclusive evidence). Upon such determination or rescission the full Retention Money recovered by EPI under the contract and Security Deposit cum Performance Guarantee shall be liable to be forfeited and un-used materials, construction plant & machinery, implements, temporary buildings, etc. shall be taken over and shall be absolutely at the disposal of EPI. If any portion of the Retention Money has not been received or recovered by EPI from RA Bills, it would be called for and forfeited; and/or

d) To employ labour and to supply materials, equipment to carry out the work or any part of the work debiting the Contractor with the cost of the labour and the price of the materials, equipment rentals (of the amount of which cost and price certified by the Engineer-In-Charge shall be final and conclusive) against the Contractor and crediting him with the value of the work done in all respects in the same manner and at the same rates as if it had been carried out by the Contractor under the terms of his contract. The certificate of the Engineer-In-Charge as to the value of the work done shall be final and conclusive against the Contractor provided always that action under the sub-clause shall only be taken after giving notice in writing to the Contractor. Provided also that if the expenses incurred by the EPI are less than the amount payable to the Contractor at his agreement rates, the difference shall not be paid to the Contractor; and/or

e) After giving notice to the Contractor to measure up the work of the Contractor and to take such whole, or the balance or part thereof as shall be un-executed or delayed with reference to the General Conditions of Contract clause no. 72.4.1 and/or relevant clause of Additional Conditions of Contract, out of his hands and to give it to another Contractor to complete in which case any expenses which may be incurred in excess of the sum which would have been paid to the original Contractor if the whole work had been executed by him (of the amount of which excess the certificate in writing of the Engineer-In-Charge shall be final and conclusive) shall be borne and paid by the original Contractor and may be deducted from any money due to him by EPI under his contract or on any other account whatsoever or from his Retention Money, Security Deposit cum Performance Guarantee or the proceeds of sales of unused materials, construction plants & machinery, implements temporary buildings etc. thereof or a sufficient part thereof as
the case may be. If the expenses incurred by EPI are less than the amount payable to the Contractor at his agreement rates, the difference shall not be paid to the Contractor; and/ or

f) By a notice in writing to withdraw from the Contractor any items or items of work as the Engineer-In-Charge may determine in his absolute discretion and get the same executed at the risk and cost of the Contractor.

Any excess expenditure incurred or to be incurred by EPI in completing the works or part of the works or the excess loss or damages suffered or may be suffered by EPI as aforesaid after allowing such credit shall without prejudice to any other right or remedy available to EPI in law be recovered from any moneys due to the Contractor on any account, and if such moneys are not sufficient the Contractor shall be called upon in writing and shall be liable to pay the same within 30 days.

If the Contractor shall fail to pay the required sum within the aforesaid period of 30 days, the Engineer-In-Charge shall have the right to sell any or all of the Contractors unused materials, Construction Plant, machinery, implements, temporary buildings, etc. and apply the proceeds of sale thereof towards the satisfaction of any sums due from the Contractor under the contract and if thereafter there be any balance outstanding from the Contractor, it shall be recovered in accordance with the provisions of the contract and law.

Any sums in excess of the amounts due to EPI and unsold materials, Construction Plant etc. shall be returned to the Contractor, provided always that if cost or anticipated cost of completion by EPI of the works or part of the works is less than the amount which the Contractor would have been paid had he completed the works or part of the works, such benefit shall not accrue to the Contractor.

In the event of anyone or more of the above courses being adopted by the Engineer-In-Charge the Contractor shall have no claim to compensation whatsoever for any loss sustained by him by reasons of his having purchased or procured any materials or entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of the contract. And in case action is taken under any of the provision aforesaid the Contractor shall not be entitled to recover or be paid any sum for any work thereof or actually performed under this contract unless and until the Engineer-In-Charge has certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified. Provided further that if any of the recoveries to be made, while taking action as per (d) and/or (e) above, are in excess of the Retention Money & Security Deposit cum Performance Guarantee forfeited, these shall be limited to the amount by which the excess cost incurred by the EPI exceeds the Retention Money & Security Deposit cum Performance Guarantee so forfeited.
72.3 CONTRACTOR LIABLE TO PAY COMPENSATION EVEN IF ACTION NOT TAKEN

In any case in which any of the powers conferred upon the Engineer-In-Charge by relevant clause thereof, shall have become exercisable and the same are not exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall notwithstanding be exercisable in the event of any future case of default by the Contractor and the liability of the Contractor for compensation shall remain unaffected. In the event of the Engineer-In-Charge putting in force all or any of the powers vested in him under the preceding clause he may, if he so desires after giving a notice in writing to the Contractor, take possession of (or at the sole discretion of the Engineer-In-Charge which shall be final and binding on the Contractor) use as on hire (the amount of the hire money being also in the final determination of the Engineer-In-Charge) all or any tools, plant, machinery, materials and stores, in or upon the works, or the site thereof belonging to the Contractor, or procured by the Contractor and intended to be used for the execution of the work / or any part thereof, paying or allowing for the same in account at the contract rates, or in the case of these not being applicable, at current market rates to be certified by the Engineer-In-Charge, whose certificate thereof shall be final, and binding on the Contractor and/or direct the Contractor, clerk of the works, foreman or other authorized agent to remove such tools, machinery, plant, materials, or stores from the premises (within a time to be specified in such notice) in the event of the Contractor failing to comply with any such requisition, the Engineer-In-Charge may remove them at the Contractor's expense or sell them by auction or private sale on account of the Contractor and his risk in all respects and the certificate of the Engineer-In-Charge as to the expenses of any such removal and the amount of the proceeds and expenses of any such sale shall be final and conclusive against the Contractor.

72.4 TIME ESSENCE OF CONTRACT & EXTENSION FOR DELAY

The time allowed for execution of the Works as specified in the terms of contract or the extended time in accordance with these conditions shall be the essence of the contract. The execution of the works shall commence from the 10th Day or such time period as mentioned in letter of Intent after the date on which the Engineer-In-Charge issues written orders to commence the work. If the Contractor commits default in commencing the execution of the work as aforesaid, the Executing Agency shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the earnest money absolutely.

72.4.1 Within 10 (Ten) days of Letter of Intent, the Contractor shall submit a Time and Progress Chart (CPM/ PERT/ Quantified Bar Chart) and get it approved by the Engineer-In-Charge. The Chart shall be prepared in direct relation to the time stated in the contract documents for completion of items of the works. It shall indicate the forecast (mile-stones) of the dates of commencement and completion of various items, trades, sections of the work and may be amended as necessary by agreement between the Engineer-In-Charge and the Contractor within the limitations of time stipulated in the Contract documents, and further to ensure good progress during the execution of the work, the Contractor shall in all cases in which the time allowed for any work exceeds one month (save for
special jobs for which a separate program has been agreed upon) complete 1/8th of the whole of work before 1/4th of the whole time allowed in the contract has elapsed, 3/8th of the work before one half of such time has elapsed and 3/4th of the work before 3/4th of such time has elapsed. The physical report including photographs shall be submitted by the Contractor on the prescribed format & the intervals (not exceeding a month) as decided by the Engineer in Charge. The compensation for delay as per clause 72.1 shall be leviable at intermediate stages also, in case the required progress is not achieved to meet the above time deadlines of the completion period and/or milestones of time and progress chart, provided always that the total amount of Compensation for delay to be paid under this condition shall not exceed 10% (Ten Percent) of the tendered value of work”.

72.4.2 If the work(s) be delayed by:

i) force-majeure or
ii) abnormally bad weather, or
iii) serious loss or damage by fire, or
iv) civil commotion of workmen, strike or lockout, affecting any or the trades employed on the work, or
v) delay on the part of other Contractors or tradesmen engaged by Engineer-In-Charge in executing work not forming part of the Contract, or
vi) non-availability of stores, which are responsibility of EPI or,
 vii) non-availability or break down of tools and plant to be supplied or supplied by EPI or,
 viii) any other cause which, in the absolute discretion of EPI, is beyond the Contractor’s control,

then, upon the happening of any such event causing delay, the Contractor shall immediately give notice thereof in writing to the Engineer-In-Charge but shall nevertheless use constantly his best endeavors to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-In-Charge to proceed with the works.

72.4.3 Request for extension of time, to be eligible for consideration, shall be made by the Contractor in writing within fourteen days of the happening of the event causing delay on the prescribed form. The Contractor may also, if practicable, indicate in such a request the period for which extension is desired. In any such case EPI may give a fair and reasonable extension of time for completion of work. Such extension shall be communicated to the Contractor by the Engineer-In-Charge in writing, within 3 months of the date of receipt of such request. Non-application by the Contractor for extension of time shall not be a bar for giving a fair and reasonable extension by the Engineer-In-Charge and the extension of time so given by the Engineer-In-Charge shall be binding on the Contractor.

73.0 WITHHOLDING AND LIEN IN RESPECT OF SUMS DUE FROM CONTRACTOR

73.1 Whenever any claim or claims for payment of a sum of money arises out of or under the contract or against the Contractor, EPI shall be entitled to withhold and also have a lien to retain such sum or sums in whole or in part from the security,
if any, deposited by the Contractor and for the purpose aforesaid, EPI shall be
entitled to withhold the Retention Money, if any, furnished as the case may be
and also have a lien over the same pending finalization or adjudication of any
such claim. In the event of the security being insufficient to cover the claimed
amount or amounts or if no security has been taken from the Contractor, EPI
shall be entitled to withhold and have a lien to retain to the extent of such claimed
amount or amounts referred to above, from any sum or sums found payable or
which may at any time thereafter become payable to the Contractor under the
same contract or any other contracts pending finalization or adjudication of any
such claim.

73.2 It is an agreed term of the contract that the sum of money or moneys so withheld or
retained under the lien referred to above by the Engineer-In-Charge or EPI will be
kept withheld or retained as such by the Engineer-In-Charge or EPI till the claim
arising out of or under the contract is determined by the Arbitrator / Competent Court
and that the Contractor will have no claim for interest or damages whatsoever on any
account in respect of such withholding or retention under the lien referred to above
and duly notified as such to the Contractor. For the purpose of this clause, where the
Contractor is a sole proprietor or a partnership firm or a limited company, etc. the
Engineer-In-Charge or EPI shall be entitled to withhold and also have a lien to retain
towards such claimed amount or amounts in whole or in part from any sum found
payable to proprietor /partnership firm/limited company, as the case may be whether
in his individual capacity or otherwise.

EPI shall have the right to cause an audit and technical examination of the works
and the final bills of the Contractor including all supporting vouchers, abstract, etc, to
be made after payment of the final bill and if as a result of such audit and technical
examination any sum is found to have been overpaid in respect of any work done by
the Contractor under the contract or any work claimed to have been done by him
under the contract and found not to have been executed, the Contractor shall be
liable to refund the amount of over-payment and it shall be lawful for EPI to recover
the same from him in the manner prescribed in sub-clause (I) of this clause or in any
other manner legally permissible; and if it is found that the Contractor was paid less
than what was due to him under the contract in respect of any work executed by him
under it, the amount of such under payment shall be duly paid by EPI to the
Contractor, without any interest thereon whatsoever.

73.3 LIEN IN RESPECT OF CLAIMS IN OTHER CONTRACTS

Any sum of money due and payable to the Contractor (including the Retention
Money & Security deposit returnable to him) under the contract may be withheld
or retained by way of lien by the Engineer-In-Charge or by EPI against any claim
of the Engineer-In-Charge or EPI in respect of payment of a sum of money
arising out of or under any other contract made by the Contractor with the
Engineer-In-Charge or EPI.

It is an agreed term of the contract that the sum of money so withheld or retained
under this clause by the Engineer-In-Charge or EPI will be kept withheld or
retained as such by the Engineer-In-Charge or EPI till his claim arising out of
the same contract or any other contract is either mutually settled or determined
by the Arbitrator or Competent court as the case may be, and that the Contractor
shall have no claim for interest or damages whatsoever on this account or on any
other ground in respect of any sum of money withheld or retained under this clause and duly notified as such to the Contractor.

74.0  DEFECTS LIABILITY PERIOD

The Contractor shall be responsible for the rectification of defects in the works for a period of twelve months from the date of taking over of the works by the Owner/Client. Any defects discovered and brought to the notice of the Contractor forthwith shall be attended to and rectified by him at his own cost and expense. In case the Contractor fails to carry out these rectifications, the same may without prejudice to any other right or remedy available, be got rectified by EPI at the cost and expense of the Contractor.

75.0  FORCE MAJEURE

Any delay or failure of the performance of either party hereto shall not constitute default hereunder to give rise to any claims for damages, if any to the Extent such delay or failure of performance is caused by occurrences such as Acts of God or the public enemy, expropriation, compliance with any order or request of Government authorities/Courts, acts of war, rebellions, sabotage fire, floods, illegal strikes, or riots (other than Contractor's employees). Only extension of time shall be considered for Force Majeure conditions as accepted by EPI. No adjustment in contract price shall be allowed for reasons of force majeure.

76.0  ARBITRATION

76.1 Before resorting to arbitration as per the clause given below, the parties if they so agree may explore the possibility of conciliation as per the provisions of Part-III of the Arbitration and Conciliation Act. 1996. When such conciliation has failed, the parties shall adopt the following procedure for arbitration:

i) Except where otherwise provided for in the contract, any disputes and differences relating to the meaning of the Specifications, Design, Drawings and Instructions herein before mentioned and as to the quality of workmanship or materials used in the work or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the Contract, Designs, Drawings, Specifications, Estimates, Instructions, or these conditions, or otherwise concerning the works or the execution or failure to execute the same whether arising during the progress of the work or after the completion or abandonment thereof shall be referred to the Sole Arbitration of the Chairman and Managing Director (CMD) of Engineering Projects (India) Limited (EPI), or any other person discharging the functions of CMD of EPI and if CMD or such person discharging the functions of CMD of EPI is unable to act, to the sole Arbitration of some other person appointed by CMD of EPI or such other person discharging the functions of CMD of EPI. There will be no objection if the arbitrator so appointed is an employee of Engineering Projects (I) Ltd. However, such an employee shall not have directly dealt with the said Contract or the works there under on behalf of EPI. Such Arbitrator shall be appointed within 30 days of the receipt of letter of invocation of arbitration duly satisfying the requirements of this clause.
ii) If the arbitrator so appointed resigns or is unable or unwilling to act due to any reason whatsoever, or dies, the Chairman & Managing Director aforesaid or in his absence the person discharging the duties of the CMD of EPI may appoint a new arbitrator in accordance with these terms and conditions of the contract, to act in his place and the new arbitrator so appointed may proceed from the stage at which it was left by his predecessor.

iii) It is a term of the contract that the party invoking the arbitration shall specify the dispute / differences or questions to be referred to the Arbitrator under this clause together with the amounts claimed in respect of each dispute.

iv) The Arbitrator may proceed with the arbitration ex-parte, if either party, in spite of a notice from the arbitrator, fails to take part in the proceedings.

v) The work under the contract shall continue as directed by the Engineer-In-Charge, during the arbitration proceedings.

vi) Unless otherwise agreed, the venue of arbitration proceedings shall be at the venue given in the ‘Memorandum’ to the ‘Form of Tender’.

vii) The award of the Arbitrator shall be final, conclusive and binding on both the parties.

viii) Subject to the aforesaid, the provisions of the Arbitration and Conciliation Act, 1996 or any statutory modifications or re-enactment thereof and the Rules made there under and for the time being in force shall apply to the arbitration proceedings and Arbitrator shall publish his Award accordingly.

NOTE

NOTWITHSTANDING ANYTHING CONTAINED HEREINABOVE, THIS CLAUSE SHALL NOT BE APPLICABLE WHERE THE DISPUTE IS BETWEEN EPI AND ANOTHER CENTRAL PUBLIC SECTOR ENTERPRISE OR GOVT. OF INDIA DEPARTMENT, FOR WHICH A SEPARATE ARBITRATION CLAUSE IS PROVIDED VIDE CLAUSE NO. 76.2 GIVEN BELOW:

76.2 ARBITRATION BETWEEN CENTRAL PUBLIC SECTOR ENTERPRISES INTER SE / GOVERNMENT OF INDIA DEPARTMENTS/ MINISTRIES

i) In the event of any dispute or difference relating to the interpretation and application of the provisions of the contract, such dispute or difference shall be referred by either party to the arbitration as per the instructions (Office Memorandums / Circulars) issued by Govt. of India from time to time with regard to arbitration between one Government Department and another, one Government Department and a Public Sector Enterprise and Public Sector Enterprise inter se.

ii) Subject to any amendment that may be carried out by the Government of India from to time, the procedure to be followed in the arbitration shall be as is
contained in D.O. No. DPE/4(10)/2001-PMA-GL-I dated 22.01.2004 of Department of Public Enterprises, Ministry of Heavy Industries and Public Enterprises, Government of India or any modification issued in this regard.

76.3 JURISDICTION

The courts mentioned in the ‘Memorandum’ to the ‘Form of Tender’ alone will have jurisdiction to deal with matters arising from the contract, to the exclusion of all other courts.

77.0 SUSPENSION OF WORKS

(a) The Contractor shall, on receipt of the order in writing of the Engineer-In-Charge, suspend the progress of the works or any part thereof for such time and in such manner, as the Engineer-In-Charge may consider necessary for any of the following reasons:

i) On account of any default on part of the Contractor, or

ii) For proper execution of the works or part thereof for reason other than the default of the Contractor, or

iii) For safety of the works or part thereof.

The Contractor shall, during such suspension, properly protect and secure the works to the extent necessary and carry out the instructions given in that behalf by the Engineer-In-Charge.

(b) If the suspension is ordered for reasons (ii) and (iii) in sub-para (a) above, the Contractor shall be entitled to an extension of the time equal to the period of every such suspension plus 25%. No adjustment of contract price will be allowed for reasons of such suspension.

(c) In the event of the Contractor treating the suspension as an abandonment of the contract by EPI, he shall have no claim to payment of any compensation on account of any profit or advantage which he may have derived from the execution of the work in full but which he could not derive in consequence of the abandonment.

(d) The Contractor shall resume work in all earnestness after suspension has been lifted by EPI.

78.0 TERMINATION OF CONTRACT ON DEATH OF CONTRACTOR

If the Contractor is an individual or a proprietorship concern and the individual or the proprietor dies then unless the Engineer-In-Charge is satisfied that the legal representatives of the individual Contractor or of the proprietor of the proprietary concern and in the case of partnership firm, the surviving partners, are capable of carrying out and completing the contract, the Engineer-In-Charge shall be entitled to cancel the contract as to its incompleted part without EPI being in any
way liable to payment of any compensation to the estate of the deceased Contractor and/or to surviving partners of the Contractor's firm on account of cancellation of the contract. Such cancellation of Contract shall be without prejudice to any of the rights & remedies available to the Engineer-In-Charge under the contract. The decision of the Engineer-In-Charge that the legal representatives of the deceased Contractor or the surviving partners of the Contractor's firm cannot carry out and complete the contract shall be final and binding on the parties.

79.0 CLARIFICATION AFTER TENDER SUBMISSION

Tenderer's attention is drawn to the fact that during the period, the bids are under consideration, the bidders are advised to refrain from contacting by any means, EPI and/or his employees/ representatives on matters related to the bid under consideration and that if necessary, EPI will obtain clarifications in writing or as may be necessary. The Tender evaluation and process of award of works is done by duly authorized Tender Scrutiny Committee and this committee is authorized to discuss and get clarification from the tenderers.

80.0 ADDENDA/ CORRIGENDA

Addenda/Corrigenda to the Tender Documents may be issued prior to the date of opening of the Tender to clarify or effect modification in specification and/or contract terms included in various Tender Documents. The tenderer shall suitably take into consideration such Addenda/Corrigenda while submitting his tender. The tenderer shall return such Addenda/ Corrigenda duly signed and stamped as confirmation of its receipt and submit alongwith the Tender Document. All Addenda/ Corrigenda shall be signed and stamped on each page by the tenderer and shall become part of the Tender and contract documents.

81.0 QUALITY ASSURANCE PROGRAMME

To ensure that the works/services under the scope of this contract are in accordance with the specifications, the Contractor shall adopt Quality Assurance Programme to control such activities at the necessary points. The Contractor shall prepare and finalize such Quality Assurance Programme within 15 days from letter of intent. EPI shall also carryout quality audit and quality surveillance of systems and procedures of Contractor’s quality control activities. A Quality Assurance Programme of Contractor shall generally cover the following:

a) His organization structure for the management and implementation of the proposed Quality Assurance Program.
b) Documentation control system.
c) The procedure for procurement of materials and source inspection.
d) System for site controls including process controls.
e) Control of non-conforming items and systems for corrective actions.
f) Inspection and test procedure for site activities.
g) System for indication and appraisal of inspection status.
h) System for maintenance of records.
i) System for handling, storage and delivery.
j) A quality plan detailing out quality practices and procedures, relevant standards and acceptance levels for all types of work under the scope of this contract.

All the quality reports shall be submitted by the Contractors in the formats appended hereto. Checklist enclosed here in this document shall be followed while carrying out Construction activities (items). If any item is not covered by the Checklist/ Formats appended hereto, the Format for the same may be developed and submitted to Engineer-In-Charge for approval and the same shall be adopted. These filled in formats shall be prepared in two copies and duly signed by representatives of Contractor and EPI. All the costs associated with printing of Formats and testing of materials required as per technical specifications or by Engineer-In-Charge shall deemed to be included in the Contractor’s quoted rates of various items of work in the Schedule/ Bill of Quantities.

82.0 APPROVAL OF TEMPORARY / ENABLING WORKS

The setting and nature of all offices, huts, access road to the work areas, and all other temporary works as may be required for the proper execution of the works shall be subject to the approval of the Engineer-In-Charge.

All the equipments, labour, material including cement, reinforcement and the structural steel required for the enabling/ temporary works associated with the entire Contract-shall have to be arranged by the Contractor only. Nothing extra shall be paid to the Contractor on this account and the unit rates quoted by the Contractor for various items in the Bill of Quantities shall be deemed to include the cost of enabling works.

83.0 CONTRACT COORDINATION PROCEDURES, COORDINATION MEETINGS AND PROGRESS REPORTING

The Contractor shall prepare and finalize in consultation with EPI, a detailed contract coordination procedure within 15 days from the date of issue of Letter of Intent for the purpose of execution of the Contract.

The Contractor shall have to attend all the meetings at any place in India at his own cost with EPI, Owners/ Clients or Consultants of EPI/ Owner/ Client during the currency of the Contract, as and when required and fully cooperate with such persons and agencies involved during these discussions. The Contractor shall not deal in any way directly with the Clients/ Owners or Consultants of EPI/ Owner/ Clients and any dealing/ correspondence if required at any time with Clients/ Owners/ Consultants shall be through EPI only.

During the execution of the work, Contractor shall submit at his own cost detailed Monthly progress report to the Engineer-In-Charge of EPI by 5th of every month. The format of monthly progress report shall be as approved by Engineer-In-Charge of EPI.

84.0 CONTRACT AGREEMENT
The Contractor shall enter into a Contract Agreement with EPI within 10 days of the date of Letter of Intent or within such extended time, as may be granted by EPI. The cost of stamp papers, stamp duty, registration, if applicable on the contract, shall be borne by the Contractor. In case, the Contractor does not sign the agreement as above or does not start the work within 10 days of the issue of letter/telegram of intent, his earnest money is liable to be forfeited and letter of intent consequently will stand withdrawn.

85.0 MANNER OF EXECUTION OF AGREEMENT

i. The agreement as per prescribed Performa as enclosed to the Additional Conditions of Contract shall be signed at the office of EPI within 10 days from the date of issue of Letter of Intent. The Contractor shall provide for signing of the Contract, appropriate Power of Attorney in favour of the authorised representative duly attested by notary Public and the requisite documents/materials. Till a formal contract is prepared and executed, the Letter of Intent read in conjunction with the Bidding Documents will constitute a binding contract.

ii. The agreement will be signed in two originals and three more copies, EPI shall retain the ‘Original’, the Contractor shall be provided with the other signed original and the remaining three copies will be retained by EPI. In case of a dispute of any kind whatsoever, the ‘Original” retained by EPI alone shall be treated as the ‘Original Agreement’.

iii. The Contractor shall provide free of cost to EPI all the Engineering data, drawings and descriptive materials submitted along with the bid, in at least five (5) copies to form an integral part of the Agreement within seven 7 days after issuing of Letter of Intent.

iv. Subsequent to signing of the Agreement, the Contractor at his own cost shall provide to EPI with at least five (5) true hard bound copies of Agreement alongwith all the enclosures viz. letter of intent, Tender Documents etc. within thirty (30) days of its signing.

86.0 PURCHASE PREFERENCE TO PUBLIC SECTOR ENTERPRISES

EPI reserves its right to extend Purchase Preference to Central Public Sector Enterprises (CPSEs) as per policy of Government of India, if any, as applicable on this work. The tenderers are requested to go through latest instructions of Government of India on its Purchase Preference Policy for CPSEs before quoting for the Tender.

87.0 CHANGE IN FIRM’S CONSTITUTION TO BE INTIMATED

Where the Contractor is a partnership firm, prior approval in writing of EPI shall be obtained before any change is made in the constitution of the firm. Where the Contractor is an individual or a Hindu undivided family business concern such approval as aforesaid shall likewise be obtained before the Contractor enters into any partnership agreement whereunder the partnership firm would have the right to carry out the works hereby undertaken by the Contractor. If prior approval as aforesaid is not obtained, the contract shall be deemed to have been assigned in
contravention of Clause 59.1 hereof and EPI shall be entitled to take action under Clause 72.2 (xi).

88.0 COMPLIANCE WITH ISO PROCEDURES

EPI is an ISO-9001 and ISO-14001 Company. The conditions of the ISO as applicable shall be followed by the Contractor for implementation & maintaining the established procedures of EPI.
LABOUR SAFETY PROVISIONS

1.0 Suitable scaffolds should be provided for workmen for all works that cannot safely be done from the ground, or from solid construction except such short period work as can be done safely from ladders. When a ladder is used an extra mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable footholds and handholds shall be provided on the ladder and the ladder shall be given an inclination not steeper than 1/4 to 1 (1/4 horizontal and 1 vertical).

2.0 Scaffolding or staging more than 3.6m (12 feet) above the ground or floor, swung or suspended from an overhead support or erected with stationery support shall have a guard rail properly attached or bolted, braced and otherwise secured at least 90 cm. (3 feet) high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

3.0 Working platforms, gangways, and stairways should be so constructed that they should not sag unduly or unequally, and if the height of the platform or the gangway or the stairway is more than 3.6m (12 feet) above ground level or floor level, they should be closely boarded, should have adequate width & should be suitable fastened as described in (2.0) above.

4.0 Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 90 cm (3 feet).

5.0 Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9m. (30 feet) in length while the width between side rails in rung ladder shall in no case be less than 29 cm. for ladder up to and including 3m (10 feet) in length. For longer ladders this width should be increased at least 1/4" for each additional 30 cm (1 ft.) of length. Uniform step spacing shall not exceed 30 cm (12"). Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites of the work shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The Contractor shall provide all necessary fencing and lights to protect the public from accident, and shall be bound to bear the expenses of defence of every suit, action or other proceeding at law that may be brought by an person for injury sustained owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any such suit, action or proceedings to any such person or which may, with the consent of the Contractor, be paid to compensate any claim by any such person.

6.0 EXCAVATION AND TRENCHING

All trenches, 1.2mts.(four feet) or more in depth, shall at all times be supplied with at least one ladder for each 30m. (100 feet) in length or fraction thereof. Ladder shall be extended from bottom of the trench to at least 90 cm (3feet) above the surface of the ground. The sides of the trenches, which are 1.5m. (5feet) or more in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger or sides to collapsing. The excavated materials shall not be placed within 1.5m (5 feet) of the edges of the
trench or half of the depth of the trench whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or undercutting shall be done.

7.0 Demolition - Before any demolition work is commenced and also during the progress of the work:

7.1 All roads and open areas adjacent to the work Site shall either be closed or suitably protected.

7.2 No electric cable or apparatus which is likely to be a source of danger or a cable or apparatus used by the operator shall remain electrically charged.

7.3 All practical steps shall be taken to prevent danger to persons employed from risk or fire or explosion or flooding. No floor, roof or other part of the building shall be overloaded with debris or materials as to render it unsafe.

8.0 All necessary personal safety equipments as considered adequate by the Engineer-In-Charge should be kept available for the use of persons employed on the Site and maintained in a condition suitable for immediate use, and the Contractor should take adequate step to ensure proper use of equipment by those concerned- The following safety equipment shall be invariably provided.

8.1 Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective goggles.

8.2 Those engaged in white washing and mixing or stacking of cement bags or any materials which are injurious to the eye shall be provided with protective goggles.

8.3 Those engaged in welding works shall be provided with welder’s protective eye shields.

8.4 Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe interval.

8.5 When workers are employed in sewers and manholes, which are in active use, the Contractors shall ensure that the manhole covers are opened and ventilated at-least for an hour before the workers are allowed to get into the manholes, and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident the public. In addition, the Contractor shall ensure that the following safety measures are adhered to:

a. Entry for workers into the line shall not be allowed except under supervision of the JE or any other higher officer.

b. At least 5 to 6 manholes upstream and down stream should be kept open for at least 2 to 3 hours before any man is allowed to enter into the manholes for working inside.

C. Before entry, presence of Toxic gases should be tested by inserting wet lead acetate paper which changes colour in the presence of such gases and gives indication of their presence.

d. Presence of Oxygen should be verified by lowering a detector lamp into the manhole. In case, no Oxygen is found inside the sewer line, workers should be sent only with Oxygen kit.
e. Safety belt with rope should be provided to the workers. While working inside the manholes such rope should be handled by two men standing outside to enable him to be pulled out during emergency.

f. The area should be barricaded or cordoned of by suitable means to avoid mishaps of any kind. Proper warning signs should be displayed for the safety of the public whenever cleaning works are undertaken during night or day.

g. No smoking or open flames shall be allowed near the blocked manhole being cleaned.

h. The malba obtained on account of cleaning of blocked manholes and sewer lines should be immediately removed to avoid accidents on account of slippery nature of the malba.

i. Workers should not be allowed to work inside the manhole continuously. He should be given rest intermittently. The Engineer In-charge may decide the time up to which a worker may be allowed to work continuously inside the manhole.

j. Gas masks with Oxygen Cylinder should be kept at Site for use in emergency.

k. Air-blowers should be used for flow of fresh air through the manholes. Whenever called for, portable air-blowers are recommended for ventilating the manholes. The Motors for these shall be vapour proof and of totally enclosed type. Non-sparking gas engines also could be used but they should be placed at-least 2 meters away from the opening and on the leeward side protected from wind so that they will not be a source of friction on any inflammable gas that might be present.

l. The workers engaged for cleaning the manholes/ sewers should be properly trained before allowing them to work in the manhole. m. The workers shall be provided with Gumboots or non-sparking shoes, bump helmets and gloves non-sparking tools, safety lights and gas masks and portable air blowers (when necessary). They must be supplied with barrier cream for anointing the limbs before working inside the sewer lines.

n. Workmen descending a manhole shall try each ladder step or rung carefully before putting his full weight on it to guard against insecure fastening due to corrosion of the rung fixed to manhole well.

o. If a man has received a physical injury, he should be brought out of the sewer immediately and adequate medical aid should be provided to him.

p. The extent to which these precautions are to be taken depend on individual situation but the decision of the Engineer-In-Charge regarding the steps to be taken in this regard in an individual case will be final.

8.6 The Contractor shall not employ men and women below the age of 18 years on the work of painting with products containing lead in any form Wherever men above the age of 18 are employed on the work of lead painting the following precautions should be taken.

8.6.1 No paint containing lead or lead products shall be used except in the form of paste or readymade paint.

8.6.2 Suitable facemasks should be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint is dry rubbed and scrapped.
8.6.3 Overalls shall be supplied by the Contractor to the workmen and adequate facilities shall be provided to enable the working painters to wash during the cessation of work.

8.6.4.1 a. White lead, sulphate or lead work products containing those pigments shall not be used in painting operation except in the form of paste or of paints ready for use.

b. Measures shall be taken whenever required in order to prevent danger arising from the application of paint in the form of spray.

c. Measures shall be taken, whenever practicable to prevent danger arising out of dust caused by dry rubbing down and scrapping.

8.6.4.2 a. Adequate facilities shall be provided to enable working painter to wash during and on cessation of work.

b. Suitable arrangements shall be made to prevent clothing put off during working hours being spoiled by painting materials.

8.6.4.3 a) Cases of lead poisoning and of suspected lead poisoning shall be notified and shall be subsequently verified by a medical man appointed by the competent authorities of the Consultant.

b) EPI may require when necessary a medical examination of workers.

c) Instructions with regard to the special hygienic precautions to be taken in the painting trade shall be distributed to working painters.

9.0 When the work is done near any place where there is risk of drowning, all necessary equipments should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provisions should be made for prompt first aid treatment of all injuries likely to be obtained during the course of the work.

10.0 Use of hoisting machines and tackle including their attachment encourage and supports shall conform to the following standard of conditions.

10.1 a. These shall be of good mechanical construction, sound material and adequate strength and free from patent, defects and shall be kept required in good working order.

b) Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength, and free from patent defects.

10.2 Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years should be in-charge of any hoisting machine including any scaffolding, winch or giving signals to operator.
10.3 In case of every hoisting machine and of every chain ring hook, shackle swivel and pulley block used in hoisting or as means of suspension the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load. In case of a hoisting machine having a variable safe working load, each safe working load and the conditions under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.

10.4 In case of EPI machines, the safe working load shall be notified by the Engineer-In-Charge. As regards Contractor’s machines the Contractor shall notify the safe working load of the machine to the Engineer-In-Charge whenever he brings any machinery to Site of work and get verified by the Engineer-In-Charge.

11.0 Motors gearing, transmission electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguard, hosting appliances should be provided with such means as will reduce to the minimum the risk of accidental descent of the load. Adequate precautions should be taken to reduce the minimum the risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations, which are already energized, insulating mats, wearing apparel, such as gloves sleeves and boots as may be necessary, be provided. The worker should not wear any rings, watches and carry keys or other materials, which are good conductors of electricity.

12.0 All scaffold, ladders, and other safety devices mentioned or described herein shall be maintained in safe condition and no scaffold ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near places of work.

13.0 These safety provisions should be brought to the notice of all concerned by display on a notice board at a prominent place of work spot. The person responsible for compliance of the safety codes shall be named therein by the Contractor.

14.0 To ensure effective enforcement of the rules and regulations relating to safety precautions the arrangements made by the Contractor shall be open to inspection by the or their representatives.

15.0 Notwithstanding the above Clauses from (i) to (xiv) there is nothing in these to exempt the Contractor from the operations of any other Act or Rule in force in the Republic of India.
MODEL RULES FOR THE PROTECTION OF HEALTH AND SANITARY ARRANGEMENTS FOR WORKERS

1.0 APPLICATION

These rules shall apply to all building and construction works in which 20 (twenty) or more workers are ordinarily employed or are proposed to be employed in any day during the period during which the Contractor work is in progress.

2.0 DEFINITION

Work place means a place where twenty or more workers are ordinarily employed or are proposed to be employed in connection with construction work on any day during the period during which the Contractor work is in progress.

3.0 FIRST-AID FACILITIES

3.1 At every work place first aid facilities shall be provided and maintained, so as to be easily accessible during working hours, First-Aid boxes at the rate of not less than one box per 150 contract labour or part thereof ordinarily employed.

3.2 The First-Aid box shall be distinctly marked with a red cross on white ground and shall contain the following equipments:-

3.2.1 a) For work places in which number of contract labour employed does not exceed 50, Each First-Aid box shall contain the following equipments:

   i)  6 small sterilized dressings.
   ii) 3 medium size sterilized dressings.
   iii) large size sterilized dressings.
   iv) 3 large sterilized burn dressings.
   v) 1 (30 ml) bottle containing a two percent alcoholic solution of iodine.
   vi) 1 (30 ml) bottle containing sal volatile having the dose and mode of administration indicated on the label.
   vii) 1 snake-bite lancet.
   viii) 1 (30 gms) bottle of potassium permanganate crystals.
   ix) 1 pair of scissors.
   x) 1 copy of the First-Aid leaf-let issued by the Director General, Factory Advise Service & Labour Institutes, Government of India.
   xi) 1 bottle containing 100 tablets (each of 5 grams) of aspirin.
   xii) Ointment for burns.
   xiii) A bottle of suitable surgical antiseptic solution.
3.2.2 For work places in which the number of contract labour exceed 50. Each First-Aid box shall contain the following equipments:

i) 12 small sterilized dressings.
ii) 6 medium size sterilized dressings.
iii) 6 large size sterilized dressings.
iv) 6 large size sterilized burn dressings.
v) 6 (15 gms) packet sterilized cotton wool.
vi) 1 (60 ml.) bottle containing a two percent iodine alcoholic solution.
vii) 1 (60 ml.) bottle containing salvolatile having the dose and mode of administration indicated on the label.
viii) 1 roll of adhesive plaster.
ix) 1 snake – bite lancet.
x) 1 (30 gms.) bottle of potassium permanganate crystals.
xi) 1 pair of scissors.
xii) 1 copy of the First-Aid leaflet issued by the Director General, Factory Advice Service and Labour Institutes, Government of India.
xiii) A bottle containing 100 tablets (each of 5 grams) of aspirin.
xiv) Ointment for burns.
xv) A bottle of suitable surgical antiseptic solution.

3.3 Adequate arrangements shall be made for immediate recoupment of the equipment when necessary.

3.4 Nothing except the prescribed contents shall be kept in the First Aid box.

3.5 The First Aid box shall be kept in charge of a responsible person who shall always be readily available during the working hours of the work place.

3.6 A person in charge of the First-Aid box shall be a person trained in First-Aid treatment, in work places where the number of labour employed is 150 or more.

3.7 In work places where the number of labour employed is 500 or more and hospital facilities are not available within easy distance of the works, first-Aid Posts shall be established and run by a trained Compounder. The Compounder shall be on duty and shall be available at all hours when the workers are at work.

3.8 Where work places are situated in places, which are not towns of cities, a suitable motor transport shall be kept readily available to carry injured person or persons suddenly taken ill to the nearest hospital.

4.0 DRINKING WATER

4.1 In every work place, there shall be provided and maintained at suitable places, easily accessible to labour, a sufficient supply of cold water fit for drinking.

4.2 Where drinking water is obtained from an intermittent public water supply, each work place shall be provided with storage where such drinking water shall be stored.

4.3 Every water supply of storage shall be at a distance of not less than 50 feet from any latrines drain or other source of pollution, Where water has to be drawn from
an existing well which is within such proximity of latrine, drain or any other source of pollution, the well shall be properly chlorinated before water is drawn from it for drinking. All such wells shall be entirely closed in and be provided with a trap-door which shall be dust and waterproof.

4.4 A reliable pump shall be fitted to each covered well, trap-door shall be kept locked and opened only for cleaning or inspection which shall be done at least once a month.

5.0 WASHING FACILITIES

5.1 In every work place adequate and suitable facilities for washing shall be provided and maintained for the use of labour employed herein.

5.2 Separate and adequate screening facilities shall be provided for the use of male and female workers.

5.3 Such facilities shall be conveniently accessible and shall be kept clean and hygienic condition.

6.0 LATRINES AND URINALS

6.1 Latrines shall be provided in every work place on the following scale, namely:

a) Where females are employed there shall be at least one latrine for every 25 females.

b) Where males are employed, there shall be at least one latrine for every 25 males.

Provided that where the number of males or females exceeds 100, it shall be sufficient if there is one latrine for 25 males or females, as the case may be, up to the first 100, and one for every 50 thereafter.

6.2 Every latrine shall be under cover and so partitioned off as to secure privacy, and shall has a proper door and fastenings.

6.3 Construction of Latrines: The inside walls shall be constructed of masonry or some suitable heat resisting non-absorbent materials and shall be cement washed inside and outside at least once a year. Latrine shall not be a standard lower than borehole system.

6.4 (a) Where workers of both sexes are employed, there shall be displayed outside each block of latrine and urinal, a notice in the language understood by the majority of the workers “For Men only” or “For Women only” as the case may be.

(b) The notice shall also bear the figure of man or of a women, as the case may be.
6.5 There shall be at least one urinal for male workers up to 50 and one for female workers up to 50 employed at a time. Provided that where the number of male or female workmen, as the case may be, exceeds 500, it shall be sufficient if there is one urinal for every 50 males or females up to the first 500 and one for every 100 or part thereof, thereafter.

6.6 a) The latrines and urinals shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times.

b) Latrines and urinals other than those connected with a flush sewerage system shall comply with the requirements of the Public Health Authorities.

6.7 Water shall be provided by means of a tap or otherwise so as to be conveniently accessible in or near the latrines and urinals.

6.8 DISPOSAL OF EXCRETA

Unless otherwise arranged for by the local sanitary authority arrangements for proper disposal of excreta by incineration at the work place shall be made by means of a suitable incinerator. Alternatively excreta may be disposed off by putting a layer of night soil at the bottom of a pucca tank prepared for the purpose and covering it with a 15 cm layer of waste or for refuse and then covering it with a layer of earth for fortnight (when it will turn into manure).

6.9 The Contractor shall, at his own expense, carry out all instruction issued to him by the Engineer-In-Charge to effect proper disposal of night soil and other conservancy work in respect of the Contractor's workmen or employees on the Site. The Contractor shall be responsible for payment of any charges, which may be levied by Municipal or Cantonment Authority for execution of such work on his behalf.

7.0 PROVISION OF SHELTER DURING REST

At every place there shall be provided, free of cost four suitable sheds, two for males and the other two for rest separately for the use of man and women labour. The height of each shelter shall not be less than 3 meters from the floor level to the lowest part of the roof. These shall be kept clean and the space provided shall be on the basis of 0.6 sqm. Per head.

Provided that the Engineer-In-Charges may permit, subject to his satisfaction, a portion of the building under construction or other alternative accommodation to be used for the purpose.

8.0 CRECHES

8.1 A every work place, at which 20 or more women workers are ordinarily employed, there shall be provided two rooms of reasonable dimensions for the use of their children under the age of six years. One room shall be used as a playroom for the children and the other as their bedrooms.

The rooms shall be constructed on standard not lower than the following:
8.2 The rooms shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision of sweepers to keep the places clean.

8.3 The Contractor shall supply adequate number of toys and games in the playroom and sufficient number of cots and beddings in the bedroom.

8.4 The Contractor shall provide one Ayaa to look after the children in the creche when the number of women workers does not exceed 50 and two when the number of women workers exceed 50.

8.5 The use of the rooms/earmarked as ealize shall be restricted to children, their attendant and mother of the children.

9.0 CANTEENS

9.1 In every work place where the work regarding the employment of contract labour is likely to continue for six months and wherein contract labour numbering one hundred or more are ordinarily employed, an adequate canteen shall be provided by the Contractor for the use of such labour.

9.2 The canteen shall be maintained by the Contractor in an efficient manner.

9.3 The canteen shall consist of at least a dining hall, kitchen, storeroom, pantry and washing places separately for workers and utensils.

9.4 The canteen shall be sufficiently lighted at all times when any person has access to it.

9.5 The floor shall be made of smooth and impervious material and inside walls shall be lime washed or colour washed at least once in each year.

Provided that the inside walls of the kitchen shall be lime-washed every four months.

9.6 The premises of the canteen shall be maintained in a clean and sanitary condition.

9.7 Waste Water shall be carried away in suitable covered drains and shall not be allowed to accumulate so as to cause a nuisance.

9.8 Suitable arrangements shall be made for the collection and disposal of garbage.

9.9 The dinning hall shall accommodate at a time 30 persons of the labour working at time.
9.10 The floor area of the dinning hall, excluding the area occupied by the service counter and any furniture except tables and chair shall not be less than one square meter per dinner to be accommodated.

9.11 a) A portion of the dinning hall, and service counter shall be partitioned off and reserved for women workers in proportion to their number.

b) Washing places for women shall be separate and screened to secure privacy.

9.12 Sufficient tables, stool, chairs or benches shall be available for the number of dinners to be accommodated.

9.13.1 a) There shall be provided and maintained sufficient utensils, crockery, furniture and any other equipment necessary for the efficient running of the canteen.

b) The furniture, utensils and other equipment shall be maintained in a clean and hygienic condition.

9.13.2 a) Suitable clean clothes for the employees serving in the canteen shall be provided and maintained.

b) A service counter, if provided, shall have top of smooth and impervious material.

c) Suitable facilities including an adequate supply of hot water shall be provided for the cleaning of utensils and equipment.

9.14 The foodstuffs and other items to be served in the canteen shall be in conformity with the normal habits of the labour.

9.15 The charge for food stuffs, beverages and any other items served in the canteen shall be based on ‘No profit No loss’ and shall be conspicuously displayed in the canteen.

9.16 In arriving at price of foodstuffs, and other articles served in the canteen, the following items shall not be taken into consideration as expenditure, namely:

a) The rent of land building.

b) The depreciation and maintenance charges for the building and equipment provided for the canteen.

c) The cost of purchase, repair and replacement of equipment including furniture, crockery, cutlery and utensils:

d) The water charges and other charges incurred for lighting and ventilation:

e) The interest and amounts spent on the provision and maintenance and equipment provided for in the canteen.
9.17 The accounts pertaining to the canteen shall be audited once every 12 months by registered accountants and auditors.

10.0 ANTI MALARIAL PRECAUTIONS

The Contractor shall at his own expense, conform to all anti-malarial instructions given to him by the Engineer-In-Charge including the filling up of any borrow pits which may have been dug by him.

11.0 AMENDMENTS

EPI may from time to time, add to or amend these rules and issue such directions as it may consider necessary for the purpose of removing any difficulty which may arise in the administration hereof.
CONTRACTOR’S LABOUR REGULATIONS

1.0 SHORT TITLE

These regulations may be called the Contractor “Labour Regulations”.

2.0 DEFINITIONS

2.1 “Workman” means any person employed by EPI or its Contractor directly or indirectly through a sub-Contractor, with or without the knowledge, of EPI to do any skilled, semi-skilled, unskilled, manual, supervisory, technical or clerical work for hire or reward, whether, the terms of employment are expressed or implied but does not include any person-

a) Who is employed mainly in a managerial or administrative capacity; or

b) Who being employed in a supervisory capacity draws wages exceeding Rupees Two thousand Five hundred per person or exercises either by the nature of the duties attached to the office or by reason of powers vested to him, functions mainly of managerial nature.

c) Who is an out worker, that is to say, a person to whom any articles or materials are given out by or on behalf of the principal Employer to be made up cleaned, washed, altered, ornamental finished, repaired, adopted or otherwise processed for sale for the purpose of the trade or business of the principal Employer and the process is to be carried out either in the home of the out worker or in some other premises, not being premises under the control and management of the principal Employer.

2.2 “Fair Wages” means wages whether for time or piecework fixed and notified under the provisions of the minimum Wages Act from time to time.

2.3 “Contractor” shall include every person who undertake to produce a given result other than a mere supply of goods or articles of manufacture through labour or who supplies labour for any work and includes a sub-Contractor.

2.4 “Wages” shall have the same meaning as defined in the Payment of Wages Act.

2.4.1 Normally working hours of an adult employee should not exceed 9 hours a day. The working day shall be so arranged that inclusive of interval for rest, if any, it shall not spread over more than 12 hours on any day.

2.4.2 When an adult worker is made to work for more than 9 hours on any day or for more than 48 hours in any week he shall be paid overtime for the extra hours put in by him at double the ordinary rate of wages.
2.4.3.1 Every worker shall be given a weekly holiday on a Sunday, in accordance with the provisions of the Minimum Wages (Central) Rules 1960 as amended from time to time, irrespective of whether such worker is governed by the Minimum Wages Act or not.

2.4.3.2 Whether the Minimum Wages prescribed by the Government under the Minimum Wages Act are not inclusive of the wages for the weekly day of rest, the worker shall be entitled to rest day wages at the rate applicable to the next preceding day, provided he has worked under the same Contractor for a continuous period of not less than 6 days.

2.4.3.3 Here a Contractor is permitted by the Engineer-In-Charge to allow a worker to work on a normal weekly holiday, he shall grant a substitute holiday to him for the whole day on one of the five days immediately before or after the normal weekly holidays and pay wages to such worker for the work performed on the normal weekly holiday at overtime rate.

3.0 DISPLAY OF NOTICE REGARDING-WAGES, ETC.

The Contractor shall before he commences his work on contract, display and correctly maintain and continue to display and correctly maintain in a clean and legible condition in conspicuous places on the work, notices in English and in the local Indian languages spoken by the majority of the workers, giving the minimum rates of wages fixed under the Minimum Wages Act, the actual wages being paid, the hours of work for which such wages are earned, wage period, dates of payment of wages and other relevant information as per Appendix ‘A’.

4.0 PAYMENT OF WAGES

4.1 The Contractor shall fix wage periods in respect of which wages shall be payable.

4.2 No wage period shall exceed one month.

4.3 The wages of every person employed as labour in an establishment or by a Contractor where less than one thousand, such persons are employed shall be paid before the expiry of the seventh day and in other cases before the expiry of tenth day after the last day of the wage period in respect of which the wages are payable.

4.4 Where the employment of any worker is terminated by or on behalf of the Contractor the wages earned by him shall be paid before the expiry of the second working day from the date on which his employment is terminated.

4.5 All payments of wages shall be made on a working day at the work premises and during the working time and on a date notified in advance and in case the work is completed before the expiry of the wage period, final payment shall be made within 48 hours of the last working day.
4.6 Wages due to every worker shall be paid to him direct or to other person authorized by him in this behalf.

4.7 All wages shall be paid in current coin or currency or in both.

4.8 Wages shall be paid without any deductions of any kind except those specified by the Central Government by general or special order in this behalf or permissible under the Payment of Wages Act 1956.

4.9 A notice showing the wage period and the place and time of disbursement of wages shall be displayed at the place of work and a copy sent by the Contractor to the Engineer-In-Charge under acknowledgment.

4.10 It shall be the duty of the Contractor to ensure the disbursement of wages in the presence of the Engineer or any other authorized representatives of the Engineer-In-Charge who will be required to be present at the place and time of disbursement of wages by the Contractor to workmen.

4.11 The Contractor shall obtain from the Engineer or any other authorized representative of the Engineer-In-Charge as the case may be, a certificate under his signature at the end of the entries in the “Register of Wages” or the “Wage-cum-Muster Roll” as the case may be in the following form:

“Certified that the amount shown in column No............ has been paid to the workmen concerned in my presence on............. at ............”

5.0 FINES AND DEDUCTIONS, WHICH MAY BE MADE FROM WAGES

5.1 The wages of a worker shall be paid to him without any deduction of any kind except the following:

a) Fines

b) Deductions for absence from duty i.e. from the place or the places where by the terms of his employment he is required to work. The amount of deduction shall be in proportion to the period for which he was absent.

c) Deduction for damage to or loss of goods expressly entrusted to the employed persons for custody, or from loss of money or any other deduction which he is required to account where such damage or loss is directly attributable to his neglect or default.

d) Deduction for recovery of advances or for adjustment of over payment of wages, advances granted shall be entered in a register.

e) Any other deduction, which the Central Government may from time to time allow.

5.2 No fines should be imposed on any worker save in respect of such acts and omissions on his part as have been approved by the Chief Labour Commissioner.
NOTE: An approved list of Acts and Omissions for which fines can be imposed is enclosed at Appendix-I.

5.3 No fine shall be imposed on a worker and no deduction for damage or loss shall be made from his wages until the worker has been given an opportunity of showing cause against such fines or deductions.

5.4 The total amount of fine which may be imposed in any one-wage period on a worker shall not exceed an amount equal to three paise in a Rupee of the total wages, payable to him in respect of that wage period.

5.5 No fine imposed on any worker shall be recovered from him in installment, or after the expiry of sixty days from the date on which it was imposed.

5.6 Every fine shall be deemed to have been imposed on the day of the act or omission in respect of which it was imposed.

6.0 LABOUR RECORDS

6.1 The Contractor shall maintain a “Register of persons employed” on work on contract in form XIII of the CL (R&A) Central Rules 1971 (Appendix-B).

6.2 The Contractor shall maintain a “Muster Roll” register in respect of all workmen employed by him on the work under contract in from XVI of the CL (R&A) Rules 1971 (Appendix-C).

6.3 The Contractor shall maintain a “Wage Register” in respect of all workmen employed by him on the work in form (Appendix-D).

6.4 Register of accidents – The Contractor shall maintain a register of accidents in such form as may be convenient at the work place but the same shall include the following particulars:

   a) Full particulars of the labourers who met with accident.
   b) Rate of wages
   c) Sex
   d) Age
   e) Nature of accident and cause of accident.
   f) Time and date of accident.
   g) Date and time when he/she admitted in Hospital
   h) Date of discharge from the Hospital
   i) Period of treatment and result of treatment
   j) Percentage of loss of earning capacity and disability as assessed by Medical Officer.
   k) Claim required to be paid under Workmen’s Compensation Act.
   l) Date of payment of compensation.
   m) Amount paid with details of the person to whom the same was paid.
   n) Authority by whom the compensation was assessed.
   o) Remarks.
6.5 Register of Fines – The Contractor shall maintain a “Register of Fines” in the form (Appendix-H).

The Contractor shall display in a good condition and in a conspicuous place of work the approved list of Acts and Omission for which fines can be imposed (Appendix-I).

6.6 Register of Deductions-The Contractor shall maintain a “Register of Deductions” for damage or loss in form (Appendix-J).

6.7 Register of Advances-The Contractor shall maintain a “Register of Advances” in form (Appendix-K).

6.8 Register of Overtime-The Contractor shall maintain a “Register of Overtime” in form (Appendix-L).

7.0 ATTENDANCE CARD-CUM WAGE SLIP:

7.1 The Contractor shall issue an attendance card-cum-wage slip to each workman employed by him in the specimen form at (Appendix-E).

7.2 The card shall be valid for each wage period.

7.3 The Contractor shall mark the attendance of each workman on the card twice each day, once at the commencement of the day and again after the rest interval, before he actually starts work.

7.4 The card shall remain in possession of the worker during the wage period under reference.

7.5 The Contractor shall complete the wage slip portion on the reverse of the card at least a day prior to the disbursement of wages in respect of the wage period under reference.

7.6 The Contractor shall obtain the signature or thump impression of the worker on the wage slip at the time of disbursement of wages and retain the card with himself.

8.0 EMPLOYMENT CARD

The Contractor shall issue an Employment Card in form to each worker within three days of the employment of the worker (Appendix-F).

9.0 SERVICE CERTIFICATE

On termination of employment for any reason whatsoever the Contractor shall issue to the workman whose services have been terminated, a service certificate in from Appendix-G.
10.0 PRESERVATION OF LABOUR RECORDS

All records required to be maintained under Regulations Nos. 6 and 7 shall be preserved in original for a period of three years from the date of last entries made in them and shall be made available for inspection by the Engineer-In-Charge, Labour Officer.

11.0 POWER OF LABOUR OFFICERS TO MAKE INVESTIGATIONS INQUIRY

The Labour Officer or any other person authorized by EPI on its behalf shall have power to make inquiries with a view to ascertaining and enforcing due and proper observance of the Fair Wage Clauses and the Provisions of Regulations. He shall investigate into any complaint regarding the default made by the Contractor or sub-Contractor in regard to such provision.

12.0 INSPECTION OF BOOK AND SLIPS

The Contractor shall allow inspection of all the prescribed labour records to any of his workers or to his agent at a convenient time and place after due notice is received or to the Labour officer or any other person, authorized by the Central Government on his behalf.

13.0 SUBMISSION OF RETURNS

The Contractor shall submit periodical returns as may be specified from time to time.

14.0 AMENDMENTS

EPI may from to time, add or amend the regulations and on any question as to the application, interpretation or effect of these regulations the decision of the Zonal Chief concerned shall be final.
## LABOUR BOARD

Name of work

Name of Contractor

Address of Contractor

Name and Address of Unit

Name of Labour Enforcement Officer

Address of Labour Enforcement Officer

Date:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Category</th>
<th>Minimum wage fixed</th>
<th>Actual wages paid</th>
<th>Number present</th>
<th>Remarks</th>
</tr>
</thead>
</table>

Weekly Holiday

Wage Period

Date of Payment of wages

Working hours

Rest interval
## FORM 13

**SEE RULE 75**

**REGISTER OF WORKMEN EMPLOYED BY CONTRACTOR**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name and surname of workman</th>
<th>Age &amp; sex</th>
<th>Father’s Husbands Name</th>
<th>Nature of employment / designation</th>
<th>Permanent home address of the workman (village and Tehsil Taluk and District)</th>
<th>Local address</th>
<th>Date of commencement of employment</th>
<th>Signature or thumb impression of the workman</th>
<th>Date of termination of employment</th>
<th>Reasons for termination</th>
<th>Remarks</th>
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**Date of termination of employment**

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*Signature of Contractor*
FORM XVI

(See Rule 78(2) (193)

MUSTER ROLL

Name and address of Contractor

Name and address of establishment in/under which contract is carried on

Nature and location of work

Name and Address of Principal Employer

For the month / fortnight

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the workman</th>
<th>Sex</th>
<th>Father's / Husband's Name</th>
<th>Dates</th>
<th>Remarks</th>
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FORM XVII

[SEE RULE 78(2) (03)]

REGISTER OF WAGES

Name and address of Contractor

Name and address of establishment in/under which contract is carried on

Nature and location of work

Name and Address of Principal Employer

Wage period: per month/ fortnightly

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of Workman</th>
<th>Serial No. in the register of workman</th>
<th>Designation nature of work done</th>
<th>Nos. of days worked</th>
<th>Units of work done</th>
<th>Daily rate of wages/piece rate</th>
<th>Basic Wages</th>
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</table>

Dearness allowance  Overtime Other cash payments (Nature of payments to be indicated)  Total  Duration if any (indicate)  Net Amt paid  Signature thumb impression of the workman  Initial Contractor or his representative

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Appendix – ‘E’

FORM XIX

[SEE RULE 78 (2) (B)]

WAGESLIP

Name and address of Contractor

Name and Father’s/Husband's Name of workman

Nature and location of work

For the Week/Fortnight/Month ending

1. No. of days worked

2. No. of Units worked in case of piece rate workers

3. Rate of daily wages/piece rate

4. Amount of overtime wages

5. Gross wages payable

6. Deductions if any

7. Net amount of wages paid

Sign of the Contractor
## WAGE CARD

<table>
<thead>
<tr>
<th>WAGE CARD NO.</th>
<th>NAME AND ADDRESS OF CONTRACTOR</th>
<th>DATE OF ISSUE</th>
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<tbody>
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<td>NATURE OF WORK WITH LOCATION</td>
<td>DESIGNATION</td>
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<tr>
<td></td>
<td>NAME OF WORKMAN</td>
<td>MONTH/FORTNIGHT</td>
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<td>RATE OF WAGES</td>
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**SIGNATURE**

THE WAGE CARD IS VALID FOR ONE MONTH FROM THE DATE OF ISSUE.
Appendix – ‘F’

FORM XIV

(SEE RULE 76)

EMPLOYMENT CARD

Name and address of Contractor

Name and address of establishment under which

The contract is carried out

Nature and location of work

Name and address of Principal Employer

1. Name of the workman

2. S. Name in the register of workman employed

3. Nature of Employment/Designation

4. Wage rate (with particulars of unit in case of piece work)

5. Wage Period

6. Tenure of employment

7. Remarks

Signature of Contractor
FORM XV

(SEE RULE 77)

SERVICE CERTIFICATE

Name and address of Contractor
Nature and location of work
Name and address of workman
Age or date of birth
Identification Marks
Father’s/Husband’s Name
Name and address of establishment in under which contract is carried on
Name and address of Principal Employer
Total period of which employed

<table>
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<tr>
<th>S.No.</th>
<th>From</th>
<th>To</th>
<th>Nature of work</th>
<th>Rate of wages (with particular s of unit In case of piece work)</th>
<th>Remarks</th>
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Signature
FORM XII

[SEE RULE 78 (2) (D)]

REGISTER OF FINES

Name and address of Contractor

Name and address of establishment in/ under which contract is carried on

Nature and location of work

Name and address of workman

Name and address of Principal Employer

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of workman</th>
<th>Father’s/Husband Name</th>
<th>Designation/nature of employment</th>
<th>Act/Omission for which fine imposed</th>
<th>Date of offence</th>
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Whether workman showed causes against fine

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<tr>
<th>Whether workman showed causes against fine</th>
<th>Name of person in whose presence employees explanation was heard</th>
<th>Wage period and wages payable</th>
<th>Amount of fine Imposed</th>
<th>Date on which fine realized</th>
<th>Remarks</th>
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Signature of Contractor
LIST OF ACTS AND OMISSIONS FOR WHICH FINES CAN BE IMPOSED

In accordance with rule of Labour Regulations, to be displayed prominently at the Site of work both in English and local language.

1. Willful insubordination or disobedience, whether alone or in combination with other.
2. Theft, fraud or dishonestly in connection with Contractors beside a business or property of EPI.
3. Taking or giving bribes or any illegal gratifications.
4. Habitual late attendance.
5. Drunk-ness fighting riotous or disorderly or indifferent behaviour.
6. Habitual negligence.
7. Smoking near or around the area where combustible or other materials are locked.
8. Habitual indiscipline.
9. Causing damage to work in the progress or to property of EPI or of the Contractor.
10. Sleeping on duty.
11. Malingering or slowing down work.
12. Giving the false information regarding name, age, fathers name etc.
13. Habitual loss of wage cards supplied by the Employer.
14. Unauthorized use of Employers property or manufacturing or making of unauthorized articles at the work place.
15. Bad workmanship in construction and maintenance by skilled workers, which is not approved by EPI for which the Contractors are compelled to undertake rectifications.
16. Making false complaints and/or misleading statements.
17. Engaging on trade within the premises of the establishment.
18. Any unauthorized divulgence of business affairs of the employees.
19. Collection or canvassing for the collection of any money within the premises of an establishment unless authorized by the Employer.
20. Holding meeting inside the premises without previous sanction of the Employers.
21. Threatening or intimidating any workman or employee during the working hours within the premises.
FORM XX

[SEE RULE 78 (2) (D)]

REGISTER OF DEDUCTION FOR DAMAGES OR LOSS

Name and address of Contractor

Name and address of establishment in/ under which contract is carried on

Nature and location of work

Name and address of Principal Employer

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of workman</th>
<th>Father’s/Husband Name</th>
<th>Designation/nature of employment</th>
<th>Particulars of damage or loss</th>
<th>Date of damage/loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Whether workman showed cause against deductions</th>
<th>Name of person in whose presence employees explanation was heard</th>
<th>Amount of deduction Imposed</th>
<th>No. of installment</th>
<th>First Installment</th>
<th>Last Installment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
</tr>
</tbody>
</table>
FORM XXII

[SEE RULE 78(2)]

REGISTER OF ADVANCES

Name and address of Contractor

Name and address of establishment in/ under which contract is carried on

Nature and location of work

Name and address of Principal Employer

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of workman</th>
<th>Father’s/Husband Name</th>
<th>Designation/nature of employment</th>
<th>Wages period and wages payable</th>
<th>Date and amount of advance given</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

Purpose / for which advance made
No. of installments by which advance is to be paid
Date and amount of each installment repaid
Date on which last installment was repaid
Remarks

<table>
<thead>
<tr>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
</table>

Signature of Contractor
FORM XXIII

[See Rule 78(2) (E)]

REGISTER OF OVERTIME

Name and address of Contractor

Name and address of establishment in/ under which contract is carried on

Nature and location of work

Name and address of Principal Employer

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of workman</th>
<th>Father’s/Husband Name</th>
<th>Sex</th>
<th>Designation/ nature of employment</th>
<th>Date on which overtime worked</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total overtime worked or production in case of piece rated

<table>
<thead>
<tr>
<th>Total overtime worked or production in case of piece rated</th>
<th>Normal rate of wages</th>
<th>Overtime rate of wages</th>
<th>Overtime earning</th>
<th>Rate on which overtime wages paid</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>
APPLICATION FOR EXTENSION OF TIME

(To be completed by the Contractor)

PART –I

1. Name of Contractor
2. Name of the work as given in the Agreement
3. Agreement No.
4. Estimated amount put to Tender
5. Date of commencement work as per agreement
6. Period allowed for completion of work as per agreement
7. Date of completion stipulated as per agreement
8. Period for which extension of time has been given previously
   Extension granted
   a) First extension vide Engineer-in-charge letter No… ……date Months Days
   b) 2nd extension vide Engineer-in-charge letter No………. date Months Days
   c) 3rd extension vide Engineer-in-charge letter No………. date Months Days
   d) 4th extension vide engineer-in-charge letter No………. date Months Days

Total extension previously given

9. Reasons for which extension have been previously given (copies of the previous application should be attached)

10. Period for which extension is applied for:

11. Hindrances on account of which extension is applied for with dates on which hindrances occurred, and the period for which these are likely to last.
   a) Serial No.
   b) Nature of hindrance
c) Date of Occurrence

d) Period for which it is likely to last

e) Period for which extension required for this particular hindrance.

f) Overlapping period, if any, with reference to item

g) Net extension applied for

h) Remarks, if any

Total period for which extension is now applied for on account of
hindrances mentioned above ............ Month/ days.

12. Extension of time required for extra work.

13. Details of extra work and on the amount involved:

   a) Total value of extra work
   b) Proportionate period of extension of time based on estimated amount put
to tender on account of extra work.

14. Total extension of time required for 11 & 12
Submitted to the Engineer-In-Charges office.

SIGNATURE OF CONTRACTOR

DATE
APPLICATION FOR EXTENSION OF TIME

(PART – II)

1. Date of receipt of application from Contractor for the work in the Engineer-In-Charge office.

2. Acknowledgement issued by Engineer-In-Charge vide his letter No dated

3. Engineer-In-Charge remarks regarding hindrances mentioned by the Contractor.
   i) Serial No.
   ii) Nature of hindrance
   iii) Date of occurrence of hindrance
   iv) Period for which hindrance, is likely to last
   v) Extension of time period applied for by the Contractor
   vi) Overlapping period, if any, giving reference to items which overlap
   vii) Net period for which extension is recommended.
   viii) Remarks as to why the hindrance occurred and justification for extension recommended.

4. Engineer-In-Charge recommendations.

(The present progress of the work should be stated and whether the work is likely to be completed by the date upto which extension has been applied for. If extension of time is not recommended, what compensation is proposed to be levied under the agreement.

SIGNATURE OF ENGINEER-IN-CHARGE

APPROVAL OF ZONAL HEAD
PROFORMA FOR EXTENSION OF TIME

PART – III

To

NAME

ADDRESS OF THE CONTRACTOR

SUBJECT:

Dear Sir(s)

Reference your letter No __________ dated __________, in connection with the grant of extension of time for completion of the work.....

The date of completion for the above mentioned work, is ........ ................. as stipulated in the agreement, dated ...........

Extension of time for completion of the above mentioned work is granted upto __________, without prejudice to the right of EPI to recover compensation for delay in accordance with the provision made in the relevant Clause (s) of the said agreement dated the ___/ ___/ ___. It is also clearly understood that EPI shall not consider any revision in contract price or any other compensation whatsoever due to grant of this extension.

Provided that notwithstanding the extension hereby granted, time is and shall still continue to be the essence of the said agreement.

Yours faithfully,

FOR EPI LTD.
PROFORMA FOR BANK GURANTEE IN LIEU OF EARNEST MONEY DEPOSIT

In consideration of Chairman & managing Director, Engineering Projects (India) Limited, (A Govt. of India Enterprise), Core-3, Scope Complex, Lodhi Road, New Delhi Pin-110003. (hereinafter called the EPI) having agreed to accept bank Guarantee of Rs......................... in lieu of EARNEST MONEY DEPOSIT from ................................................................... (hereinafter called the Supplier/ Contractor/Sub-Contractor, which expression shall include its heirs, successors and assignees) in respect of the Tender for ..................................................................................................................

We, ........................................ bank having its registered/head office at ................................... (hereinafter referred to as the Bank) do hereby agree and undertake to pay to EPI without demur or protest an amount not exceeding Rs............................. on demand by EPI.

We the above said Bank further agree and undertake to pay the said amount of Rs.......................... without any demur on demand within 48 hours. Any demand made on the Bank by EPI shall be conclusive as regards the amount due and payable by the Bank under this guarantee.

We the above said Bank further agree that the guarantee herein contained shall be in full force and in effect until ............................................................... date ..................................

Unless a demand or claim under this guarantee is made on us in writing on or before ................................................ date ......................... , we shall be discharged from all liabilities under this guarantee thereafter.

We, the above said Bank, further agree that EPI shall have full liberty, without our consent and without affecting in any manner our obligation to verify, modify or delete any of the conditions.

We, the above said Bank, lastly undertake not to revoke this guarantee during its currency except with the prior consent of EPI in writing.

Dated................................this day of.............200.

For and on behalf of the Bank

NOTE: on a Non-Judicial stamp paper of Rs. 100/- (Rupees One hundred only)
SECURITY DEPOSIT CUM PERFORMANCE BANK GUARANTEE

The Chairman & Managing Director
(A Govt. of India Enterprise),
Engineering Projects (India) Ltd.
Core-3, SCOPE Complex
7, Institutional Area, Lodhi road
New Delhi – 110 003

Dear Sir,

In consideration of the Chairman & Managing Director, Engineering Projects (India) Ltd. (A Govt. of India Enterprise), Core-3, Scope Complex, 7 Institutional Area, Lodhi Road, New Delhi – 110 003 (hereinafter called ‘EPI’ which expression shall unless repugnant to the subject or context includes its successors and assigns) having agreed under the terms and conditions of Supply Contract/Contract/Sub-Contract no. ___________ Dated ___________ made between M/s ___________ (hereinafter referred to as the said Supplier/Contractor/Sub-Contractor) which expression shall unless repugnant to the subject or context includes its successors and assigns) and EPI in connection with ___________ (hereinafter called ‘The said Supply Contract/Contract/Sub-Contract) to accept a Deed Security Deposit-cum-Performance Bank Guarantee as herein provided for in lieu of:

a) The Security Deposit to be made by the said Supplier/Contractor/Sub-Contractor for the due fulfillment by the said Supplier/Contractor/Sub-Contractor of the terms and conditions contained in the said Supply Contract/Contract/Sub-contract, and

b) Fulfillment of the conditions of the said Supply Contract /Contract/Sub-Contract by furnishing a security for the performance of the works and/or equipment/materials supplied in accordance with conditions of the said Supply Contract/ Contract/ Sub-Contract.

1. We ___________ (hereinafter referred to as “the said bank which expression shall unless repugnant to the subject or context includes its successors and assigns) and having our registered office at ___________ do hereby unconditionally and irrevocably undertake and agree to indemnify and keep indemnified EPI from time to time to the extent of (__________________________) Only against any loss, damages, costs, charges and expenses caused to or suffered by or that may be caused or suffered by EPI [I by reason of any breach or breaches by the said Supplier/Contractor/Sub-Contractor of any of the terms and conditions contained in the said Supply Contract/Contract/Sub-Contract and or any amount becoming due for non-
performance and/or penalty as assessed by EPI and top unconditionally pay the amount claimed by EPI on demand and without demur and protest.

2. We the said Bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Supply Contract/Contract/Sub-Contract and till all the dues of EPI under the said Supply Contract/Contract/Sub-Contract or by virtue of any of the terms and conditions governing the said Supply Contract/Contract/Sub-Contract have been fully paid and its claims satisfied or discharged and till EPI certifies that the terms and conditions of the said Supply Contract/Contract/Sub-Contract have been fully and properly carried out by the said Supplier/Contractor/Sub-Contractor and accordingly discharge this guarantee subject, however, that EPI shall have no claim under this guarantee after 6 months from the date of expiry of the guarantee unless a notice of the claim under this guarantee has been served on the Bank before the expiry of the said period of 6 months.

3. EPI shall have the fullest liberty without affecting in any way the liability of the said Bank under this Guarantee or indemnity from time to time to vary any of the terms and conditions of the said Supply Contract/Contract/Sub-Contract to extend time of performance of the said Supply Contract/Contract/Sub-Contract or to postpone for any time and from time to time any power’s exercisable by it against the said Supplier/Contractor/Sub-Contractor and either to enforce or forbear from enforcing any of the terms and conditions governing the said Supply Contract/Contract/Sub-Contract or securities available to EPI and the said Bank shall not be released from its liability under these presents by any exercise by EPI of the liberty with reference to the matters aforesaid or by reason of time being given to the said Supplier/Contractor/Sub-Contractor or of any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of so releasing the said Bank from its such liability.

4. We, the said Bank, further agree that EPI shall be the sole judge of and as to whether the said Supplier/Contractor/Sub-Contractor has committed any breach or breaches of any of the terms and conditions of the said Supply Contract/Contract/Sub-Contract and the extent of loss, damage, cost, charges and expenses caused to or suffered by or that may be caused to or suffered by EPI on account thereof and the decision of EPI that the said Supplier/Contractor/Sub-Contractor has committed such breach or breaches and as to the amount or amounts of loss, damages, costs, charges and expenses caused to or suffered by EPI from time to time shall be final and binding on the Bank.

5. This guarantee shall be a continuing guarantee and shall remain valid and irrevocable for all claims of EPI and liabilities of the said Supplier/Contractor/Sub-Contractor arising up to and until mid night of ________________, subject the claim period as mentioned in para ______________.

6. This guarantee shall be in addition to any other guarantee or security whatsoever that EPI may now or at any time anywise may have in relation to the said Supplier/Contractor/Sub-Contractor obligation/liabilities under and/or in connection with the said Supply Contract/Contract/Sub-Contract and EPI shall have full authority to take recourse to or enforce this guarantee in preference to any other guarantee or
security which EPI may have or obtain and there shall be no forbearance on the part of EPI IN ENFORCING OR REQUIRING ENFORCEMENT OF ANY OTHER SECURITY AND shall not have the effect of releasing the said Bank from its full liability hereunder:

7. EPI shall be at liberty without reference to the said Bank and without effecting the full liability of the said Bank hereunder to take any other security in respect of the said supplier's/Contractor's/sub-Contractor's obligations and/or liabilities under or in connection with the said Supply Contract/ Contract/ Sub-Contract.

8. This guarantee shall not be determined or affected by the liquidation or winding up, dissolution, or change of constitution or insolvency of the said Supplier/Contractor/Sub-Contractor, but shall in all respects and for all purposes be binding and operative until payment of all moneys paid to EPI in terms thereof.

9. The said Bank hereby waives all rights at any time inconsistent with the terms of this guarantee and the obligations of the said Bank in terms hereof shall not be anywise affected or suspended by reasons of any dispute or disputes having been raised by the said Supplier/Contractor/Sub-Contractor (whether or not pending before any arbitrator, tribunal or court) of any denial or liability by the said Supplier/ Contractor/ Sub-Contractor stopping or preventing or purporting to stop or prevent any payment by the said Bank to EPI in terms hereof. The amount stated in any notice of demand addressed by EPI to the Guarantor Bank as liable to be paid to EPI by the Supplier/ Contractor/ Sub-Contractor on account of any losses or damages or costs, charges and/or expenses shall as between the said bank and EPI be conclusive evidence of the amount so liable to be paid to EPI or suffered or incurred by EPI as the case may be and payable by the said Bank to EPI in terms hereof. We, the said Bank further undertake that we shall pay forthwith the amount stated in the notice of demand to EPI without demur and protest.

10. We, the said bank undertake not to revoke this guarantee during its currency except with the consent of EPI in writing and agree that any change in the constitution of the said Supplier/Contractor/Sub-Contractor or the said Bank shall not discharge our liabilities hereunder.

11. It shall not be necessary for EPI to proceed against the said Supplier/Contractor/Sub-Contractor before proceeding against the Bank and the guarantee herein contained shall be enforceable against the Bank notwithstanding any security which EPI may have obtained or obtain from the Supplier/Contractor/Sub-Contractor shall at the time when proceedings are taken against the said Bank hereunder be outstanding or unrealized.

12. Our liability under this guarantee shall be restricted to ________________ and this guarantee shall remain in force until midnight of ________________ unless a claim to enforce this guarantee is filed with us within six months from ________________. (which is date of expiry of this guarantee), we shall be discharged from all liabilities under this guarantee thereafter.

DATED ---------------------------- THIS day of -----------------------200...

FOR AND ON BEHALF OF BANK
PROFORMA FOR ADVANCE BANK GUARANTEE

To

The Chairman & Managing Director,
Engineering Projects (India) Ltd.,
(A Govt.of India Enterprise),
Core-3, Scope Complex,
7, Institutional Area,
Lodhi Road,
New Delhi—110 003.

Dear Sir,

1. In consideration of the Chairman & Managing Director, Engineering Projects (India) Limited, (A Govt. of India Enterprise), Core-3, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi – 110 003 (hereinafter called 'EPI' which expression shall includes its successors and assigns) having agreed under the terms and conditions of Supply Contract/ Contract/ Sub-Contract No.………………………dated…(hereinafter referred to as the said Supply Contract/ Contract/ Sub-Contract) made between EPI and………………………(hereinafter called the Supplier/ Contractor/ Sub-Contractor) which expression shall include its successors and assigns to make at the request of the Supplier/ Contractor/ Sub-Contractor a lump sum advance of Rs…………..for utilising it only for the purposes of the said Supply Contract/ Contract/ Sub-Contract on his furnishing a guarantee acceptable to EPI.

2. We, the..........................Bank (hereinafter referred to as ‘the said Bank) a Company under the Companies Act 1956 and having our registered office at…………………………do hereby guarantee the recovery of the said advance and interest thereon as provided according to the terms and conditions of the said Supply Contract/ Contract/ Sub-Contract. If the Supplier/ Contractor/ Sub-Contractor fails to utilise the said advance for the purposes of the said Supply Contract/ Contract/ Sub-Contract and/or the said advance together with interest thereon as aforesaid is not fully recovered by EPI, we. …………Bank hereby unconditionally and irrevocably undertake to pay the EPI on demand and without demur or protest to the extent of the said sum of Rs………………any claim made by EPI on us against non-utilisation / misutilisation of the said advance and/or by reason of EPI not being able to recover in full the sum of Rs………………. with interest as aforesaid.

3. We..............................Bank further agree that EPI shall be the sole judge of and as to whether the said Supplier/ Contractor/ Sub-Contractor has utilised or not utilised the said advance or any part thereof for the purposes of the said Supply Contract/ Contract/ Sub-Contract and/or as to whether the advance or any part thereof with
interest has been recovered or not and the finding of the EPI in this regard shall be final and binding on us.

4. We, the said Bank further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Supply Contract/ Contract/ Sub-Contract and till the said advance with interest has been fully recovered and its claims satisfied or discharged and till EPI certifies that the said advance with interest has been fully recovered from the Supplier/ Contractor/ Sub-Contractor.

5. EPI shall have the fullest liberty without affecting in any way the liability to the said Bank under this guarantee or indemnity from time to time to vary any of the terms and conditions of the said Supply Contract/ Contract/ Sub-Contract, or the advance or to extend time of performance by the said Supplier/ Contractor/ Sub-Contractor or to postpone for any time and from time to time any powers exercisable by it against the said Supplier/ Contractor/ Sub-Contractor and either to enforce or forbear from enforcing any of the terms and conditions governing the said Supply Contract/ Contract/ Sub-Contract or securities available to EPI and the said Bank shall not be released from its liability under these presents by any exercise by EPI of the liberty with reference to the matters aforesaid or by reason of time being given to the said Supplier/ Contractor/ Sub-Contractor or any other forbearance, act or omission on the part of the EPI or any indulgence by EPI to the said Supplier/ Contractor/ Sub-Contractor or of any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of so releasing the said Bank from its such liability.

6. The Bank hereby waives all rights at any time inconsistent with the terms of this guarantee/Undertaking and the obligations of the Bank in terms hereof shall not be anywise affected or suspended by reasons of any dispute or disputes having been raised by the Supplier/ Contractor/ Sub-Contractor (whether or not pending before any arbitrator, Tribunal or court) or any denial or liability by the Supplier/ Contractor/ Sub-Contractor stopping or preventing or purporting to stop or prevent any payment by the Bank to EPI in terms hereof.

7. The amount stated in any notice of demand addressed by EPI to Bank as liable to be paid to EPI by the Supplier/ Contractor/ Sub-Contractor, shall be conclusive evidence of the amount so liable to be paid to EPI by the Bank.

8. This guarantee/undertaking shall be in addition to any other guarantee or security whatsoever that EPI may now or any time anywise may have in relation to the Supplier’s/ Contractor’s/ Sub-Contractor’s obligations of liabilities under and/or in connection with the said Supply Contract/ Contract/ Sub-Contract, and EPI shall have full authority to take recourse to or enforce this security in preference to any other guarantee or security which EPI may have or obtain and there shall be no forbearance on the part of EPI in enforcing or requiring enforcement of any other security and shall not have the effect of releasing the Bank from its full liability hereunder.

9. It shall not be necessary for EPI to proceed against the said Supplier/ Contractor/ Sub-Contractor before proceeding against the Bank and the guarantee herein contained shall be enforceable against the Bank notwithstanding any security which EPI may have obtained or obtain from the Supplier/ Contractor/ Sub-Contractor, shall at the time
when proceedings are taken against the said Bank hereunder be outstanding or unrealised.

10. We, ..................................... the said Bank further undertake that we shall pay forthwith the amount stated in the notice of demand without demur and protest notwithstanding any dispute/difference pending between the parties before the arbitrator Tribunal or Court and/or dispute is being referred to arbitrator.

11. We, the said Bank undertake not to revoke this Guarantee during its currency except with the consent of EPI in writing and agree that any change in the Constitution of the said Supplier/ Contractor/ Sub-Contractor or the said Bank shall not discharge our liability hereunder.

12. This guarantee/undertaking shall be a continuing guarantee/undertaking and shall remain valid and irrevocable for all claims of EPI and liabilities of the Supplier/ Contractor/ Sub-Contractor arising up to and until midnight of...........

13. Notwithstanding anything contained herein above, our liability under this guarantee shall be restricted to Rs………………. (Rs……………………………….) and this guarantee shall remain in full force till……………. unless a claim is made on us within 3 months from the date of expiry of this guarantee i.e. before all the claims under this guarantee shall be forfeited and we shall be relieved of and discharged from our liabilities hereunder.

Dated.........................................................day of......................................... 200

For and on behalf of Bank
PROFORMA FOR PERFORMANCE BANK GUARANTEE

To

The Chairman & Managing Director,
Engineering Projects (India) Ltd.,
(A Govt. of India Enterprise),
Core-3, Scope Complex,
7, Institutional Area,
Lodhi Road,
New Delhi—110 003.

Dear Sir,

In consideration of the Chairman & Managing Director, Engineering Projects (India) Limited, (A Govt. of India Enterprise), Core-3, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi – 110 003 (hereinafter called ‘EPI’ which expression shall include its successors and assigns) having awarded to ……………… (hereinafter referred to as ‘the Supplier/ Contractor/ Sub-Contractor’ which expression shall wherever the subject or context so permits include its successors and assigns) a Supply Contract/Contract / Sub-Contract No. ……………… in terms inter alia, of EPI Letter No. ……………… dated… and the General Conditions of Contract/ General Purchase Conditions of EPI and upon the condition of the Supplier’s/ Contractor’s/ Sub-Contractor’s furnishing security for the performance of the Supplier’s/ Contractor’s/ Sub-Contractor’s obligations and/or discharge of the Supplier’s/ Contractor’s/ Sub-Contractor’s liability under and/or in connection with the said Supply Contract/ Contract/ Sub-Contract up to a sum of Rs…………(Rupees……………………………. only) amount to ………. percent of the total Supply Contract/ Contract/ Sub-Contract Value.

1. We…………………………………………………………………………………………(hereinafter called ‘the Bank’ which expression shall include its successors and assigns) hereby jointly and severally undertake the guarantee to payment to EPI in rupees forthwith on demand in writing and without protest or demur or any and all monies anywise payable by the Supplier/ Contractor/ Sub-Contractor to EPI under in respect of or in connection with the said Supply Contract/ Contract/ Sub-Contract inclusive of all EPI’s losses and damages and costs, charges and expenses and other moneys anywise payable in respect to the above as specified in any notice of demand made by the EPI to the Bank with reference to this guarantee up to and aggregate limit of Rs…………………..(Rupees…………………………………………………………only).
2. We................. Bank further agree that EPI shall be sole judge of and as to whether the said Supplier/ Contractor/ Sub-Contractor has committed any breach or breaches of any of the terms and conditions of the said Supply Contract/ Contract/ Sub-Contract and the extent of loss, damage, cost, charges and expenses caused to or suffered by or that may be caused to or suffered by EPI on account thereof and the decision of EPI that the said Supplier/ Contractor/ Sub-Contractor has committed such breach or breaches and as to the amount or amounts of loss, damage, costs, charges and expenses caused to or suffered by EPI from time to time shall be final and binding on us.

3. EPI shall be at liberty without reference to the Bank and without effecting the full liability of the Bank hereunder to take any other security in respect of the Supplier’s/ Contractor’s/ Sub-Contractor’s obligations and/or liabilities under or in connection with the said Supply Contract/ Contract/ Sub-Contract and to vary the forms vis-à-vis the Supplier/ Contractor/ Sub-Contractor of the said Supply Contract/ Contract/ Sub-Contract or to grant time and/or indulgence to the Supplier/ Contractor/ Sub-Contractor or to reduce or to increase or otherwise vary the prices of the total Supply Contract/ Contract/ Sub-Contract Value or to release or to forbear from enforcement of all or any of the security and/or any other security(ies) now or hereafter held by the EPI and no such dealing(s) reduction(s) increase(s) or other indulgence(s) or arrangements with the Supplier/ Contractor/ Sub-Contractor or release or forbearance whatsoever shall absolve the bank of the full liability to EPI hereunder or prejudice rights of EPI against the bank.

4. The guarantee/undertaking shall not be determined or affected by the liquidation or winding up, dissolution, or change of constitution or insolvency of the Supplier/ Contractor/ Sub-Contractor but shall in all respects and for all purposes be binding and operative until payment of all moneys made to EPI in terms thereof.

5. The Bank hereby waives all rights at any time inconsistent with the terms of this guarantee/undertaking and the obligations of the Bank in terms hereof shall not be anywise affected or suspended by reasons of any dispute or disputes having been raised by the Supplier/ Contractor/ Sub-Contractor (whether or not pending before any arbitrator, Tribunal or Court) of any denial or liability by the Supplier/ Contractor/ Sub-Contractor stopping or preventing or purporting to stop or prevent any payment by the Bank to the EPI in terms hereof.

6. The amount stated in any notice of demand addressed by EPI to Bank as liable to be paid to EPI by the Supplier/ Contractor/ Sub-Contractor or as suffered or incurred by the EPI on account of any losses or damages or costs, charges and/or expenses shall be conclusive evidence of the amount so liable to be paid to EPI or suffered or incurred by EPI as the case may be and shall be payable by the Bank to EPI in terms hereof.
7. This guarantee/undertaking shall be a continuing guarantee/undertaking and shall remain valid and irrevocable for all claims of EPI and liabilities of the Supplier/ Contractor/ Sub-Contractor arising up to and until midnight of……………….

8. This guarantee/undertaking shall be in addition to any other guarantee or security whatsoever that EPI may now or any time anywise may have in relation to the Supplier’s/ Contractor’s/ Sub-Contractor's obligations of liabilities under and/or in connection with the said Supply Contract/ Contract/ Sub-Contract, and EPI shall have full authority to take recourse to or enforce this security in preference to any other guarantee of security which EPI may have or obtain and here shall be no forbearance on the part of EPI in enforcing or requiring enforcement of any other security and shall not have the effect of releasing the Bank from its full liability hereunder.

9. It shall not be necessary for EPI to proceed against the said Supplier/ Contractor/ Sub-Contractor before proceeding against the Bank and the guarantee herein contained shall be enforceable against the Bank notwithstanding any security which the EPI may have obtained or obtain from the Supplier/ Contractor/ Sub-Contractor, shall at the time when proceedings are taken against the said Bank hereunder be outstanding or unrealised.

10. We the said Bank undertake not to revoke this guarantee during its currency except with the consent of EPI in writing and agree that any change in the constitution of the said Supplier/ Contractor/ Sub-Contractor or the said bank shall not discharge our liability hereunder.

11. We ............the said Bank further undertake that we shall pay forthwith the amount stated in the notice of demand without demur and protest notwithstanding any dispute/difference pending between the parties before the arbitrator Tribunal or Court and/or any dispute is being referred to arbitrator.

12. Notwithstanding anything contained herein above, our liability under this guarantee shall be restricted to Rs ......................... (Rupees........................................) and this guarantee shall remain in force till................. unless a claim is made on us within 3 months from that date, that is before all the claims under this guarantee shall be forfeited and we shall be relieved of and discharged from our liabilities thereunder.

Dated .................................................. day of.................................................200

For and on behalf of Bank
PROFORMA FOR INDEMNITY BOND TO BE EXECUTED BY
THE CONTRACTOR FOR SECURED ADVANCE
AGAINST MATERIALS SUPPLIED FOR THE PROJECT

(On non-judicial stamp paper of appropriate value)

INDEMNITY BOND

THIS INDEMNITY BOND is made this ............................................ day of....................... 20........... by........................................ (Contractor’s Name) a Company registered under the Companies Act, 1956/Partnership firm/Proprietary concern having its Registered Office at ............... (hereinafter called as ‘Contractor’ which expression shall include its successors and permitted assigns) in favour of Engineering Projects (India) Limited, a Company incorporated under the Companies Act, 1956 having its Registered Office at Core-3, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi - 110 003 (hereinafter called “EPI” which expression shall include its successors and assigns) :

WHEREAS EPI has awarded to the Contractor a Contract for the work of....................... vide its letter of Intent/Work Order No.............. dated................. (hereinafter referred to as “Contract”) in terms of which EPI is required to give “Secured Advance” to the Contractor as per Clause no. 35 of the General Conditions of Contract against supply of materials by the Contractor for the project on the security of materials, the quantities, rates and other particulars of which are detailed in the Bill of Quantities for the said Contract.

And WHEREAS by virtue of Clause no. 35 of the General Conditions of Contract of the said Contract, the Contractor is required to execute an Indemnity Bond in favour of EPI for the amount of “Secured Advance” towards the materials actually supplied by the Contractor for the Contract Work from time to time to EPI for the purpose of performance of the Contract. (hereinafter called the “Materials”).

“And WHEREAS the Contractor has applied to EPI that they may be allowed “Secured Advance” on the security of materials absolutely belonging to them and brought by them to the site of the works for use in construction of the work”.

NOW THEREFORE, This Indemnity Bond witnesseth as follows:

1. That in consideration of the “Secured Advance” being given to the Contractor as mentioned in the Contract, for the purpose of performance of the Contract, the Contractor hereby undertakes to indemnify and shall keep EPI indemnified, for the Actual Cumulative Amount of the “Secured Advance” given to the Contractor from time to time against the said Contract. The Contractor hereby acknowledges actual receipt of the materials etc. as per despatch title documents being /to be handed over to EPI from time to time. The Contractor shall hold such materials in trust as a “Trustee” for and on behalf of EPI.
2. That the Contractor is obliged and shall remain absolutely responsible for the safe transit/protection and custody of the materials at EPI's project site against all risks whatsoever till the materials are duly used/erected in accordance with the terms of the Contract and the plant/package duly erected and commissioned in accordance with the terms of the Contract is taken over by EPI and the Secured Advance is fully adjusted/recovered as per terms of the Contract. The Contractor undertakes to keep EPI harmless against all losses, damages, deterioration and shortages that may be caused to the materials.

3. The Contractor undertakes that the materials shall be used exclusively for the performance/execution of the Contract strictly in accordance with its terms and conditions and no part of the materials shall be utilized for any other work or purpose whatsoever. It is clearly understood by the Contractor that non-observance of the obligations under this Indemnity Bond by the Contractor shall inter-alia constitute a criminal breach of trust on the part of the Contractor for all intents and purposes including legal/penal consequences.

4. That EPI is and shall remain the exclusive owner of the materials free from all encumbrances, charges or liens of any kind, whatsoever. The materials shall at all times be open to inspection and checking by the Engineer – In - Charge or other employees/agents authorized by him in this regard. Further, EPI shall always be free at all times to take possession of the materials in whatever form the materials may be, if in its opinion, the materials are likely to be endangered, misutilised or converted to uses other than those specified in the Contract, by any acts of omission or commission on the part of the Contractor or any other person or on account of any reason whatsoever and the Contractor binds himself and undertakes to comply with the directions of demand of EPI to handover the materials without any demur or reservation.

5. That this Indemnity Bond is irrevocable. If at any time any loss or damage occurs to the materials or the same or any part thereof is mis-utilised in any manner whatsoever, then the Contractor hereby agrees that the decision of the Engineer-In-Charge of EPI as to assessment of loss or damage to the materials shall be final and binding on the Contractor. The Contractor binds itself and undertakes to replace the lost and/or damaged materials at its own cost and/or shall pay the amount of ‘Secured Advance’ to EPI without any demur, reservation or protest. This is without prejudice to any other right or remedy that may be available to EPI against the Contractor to recover any amount or all the amounts of this Bond from any dues of the Contractor under the Contract or as per the law.

6. This Bond shall remain in force and effect till the completion of the work as per the aforesaid Contract and till all the amount recoverable under this Bond from the Contractor is fully recovered by EPI. The Bond can not be revoked by the Contractor without the written consent of EPI.

7. That Contractor also agrees that any change in the constitution of the Contractor shall not discharge them from their obligation and liability.

8. This Bond shall be treated as an additional addage to the Contract and nothing herein contained shall be construed to adversely affect the rights of EPI in the Contract.
IN WITNESS WHEREOF, the Contractor has signed this Indemnity Bond through its duly authorized representative on the date and place first above written.

**For and on behalf of Contractor**

(Contractor’s Name)

<table>
<thead>
<tr>
<th>WITNESS:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 1. Signature ......................</td>
<td>Signature ..........................</td>
</tr>
<tr>
<td>2. Name .........................</td>
<td>Name (Executant) ..................</td>
</tr>
<tr>
<td>3. Address .......................</td>
<td>Designation .......................</td>
</tr>
<tr>
<td>( Authorised representative )</td>
<td></td>
</tr>
<tr>
<td>2. 1. Signature ......................</td>
<td></td>
</tr>
<tr>
<td>2. Name .........................</td>
<td></td>
</tr>
<tr>
<td>3. Address .......................</td>
<td>Seal</td>
</tr>
</tbody>
</table>
FORM FOR GUARANTEE BOND

FOR ANTI-TERMITE TREATMENT

THIS AGREEMENT made this _____ day of Two thousand _____ between M/s________ (hereinafter called the guarantor of the one part and M/s Engineering Projects (India) Limited, hereinafter called EPI hereinafter called the OWNER of the other part.

Whereas this agreement is supplementary to the contract hereinafter called the contract dated________ made between the guarantor of the one part and Engineering Projects (India) Ltd., of the other part whereby the Contractor inter-alia, understood to render the buildings and structures in the said contract recited, completed, termite proof. And whereas the guarantor agreed to give a guarantee to the effect that the said structure will remain termite proof for TEN YEARS to be so reckoned from the date after the maintenance period prescribed in the contract expires.

During this period of guarantee the guarantor shall make good all defects and for that matter shall replace at his risk and cost such wooden member as may be damaged by termite and in case of any other defect being found, he shall render the building termite proof at his cost to the satisfaction of the Engineer-In-Charge and shall commence the works of such rectification within seven days from date of issuing notice from the Engineer-In-Charge calling upon him to rectify the defects falling which the work shall be got done by EPI/ OWNER by some other Contractor at the guarantor’s cost and risk and in the later case the decision of the Engineer-In-Charge as to the cost recoverable from the guarantor shall be final and binding.

That if the Guarantor fails to execute the Anti-Termite treatment or commits breaches hereunder then the Guarantor will indemnify EPI against all losses damages, cost expenses or otherwise which may be incurred by him by reasons of any default on the part of the guarantor in performance and observance of this supplemental Agreement. As to the amount of loss and or damage and/or cost incurred by EPI/ OWNER, the decision of the Engineer-In-Charge will be final and binding on the parties.

In witness where of these presents have been executed by the Guarantor________ and by____________ for and on behalf of EPI on the day of month and year first above written.

Signed sealed and delivered by (Guarantor)

IN THE PRESENCE OF:
1.
2.

Signed for and on behalf of EPI by/ in presence of:
1.
2.
GUARANTEE TO BE EXECUTED BY CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF WATER PROOFING WORKS

The agreement made this ................. day of .................. Two thousand .................. between ...................... (hereinafter called Guarantor of the one part) and EPI (hereinafter called the Execution Agency of the other part).

WHEREAS this agreement is supplementary to a contract (hereinafter called the Contract), dated ............ and made between the GUARANTOR OF THE ONE part and EPI of the other part, whereby the Contractor, inter-alia, undertook to render the buildings and structures in the said contract recited completely water and leak proof.

AND WHEREAS the Guarantor agreed to give a guarantee to the effect that the said structures will remain water and leak proof for ten years from the date of handing over of the structure of water proofing treatment.

NOW THE GUARANTOR hereby guarantees that water proofing treatment given by him will render the structures completely leak proof and the minimum life of such water proofing treatment shall be ten years to be reckoned from the date after the maintenance period prescribed in the contract.

Provided that the Guarantor will not be responsible for leakage caused by earthquake or structural defects or misuse of roof or alteration and for such purpose.

a) Misuse of roof shall mean any operation, which will damage proofing treatment, like chopping of firewood and things of the same nature, which might cause damage to the roof.

b) Alternation shall mean construction of an additional storey or a part of the roof or construction adjoining to existing roof whereby proofing treatment is removed in parts

c) The decision of the Engineer-In-Charge with regard to cause of leakage shall be final

During this period of guarantee, the Guarantor shall make good all defects and in case of any defect being found render the building water proof to the satisfaction of the Engineer-In-Charge at his cost and shall commence the work for such rectification within seven days from the date of issue of notice from the Engineer-In-Charge calling upon him to rectify the defects failing which the work shall be got done by EPI by some other Contractor at the guarantor's cost and risk. The decision of Engineer-In-Charge as to the cost, payable by the Guarantor shall be final and binding.

That if the Guarantor fails to execute the waterproofing or commits breach thereunder, then the Guarantor will indemnify the principal and his successors against all laws
damage, cost, expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and / or damage and / or cost incurred by EPI, the decision of the Engineer-In-Charge will final and binding on the parties.

IN WITNESS WHEREOF these presents have been executed by the Obligor, and by ............ And for and on behalf of EPI on the day, month and year first above written.

Signed, sealed and delivered by Obligor in the presence of-

1. 

2. 

Signed for and on behalf of EPI by _____________

In presence of :

1. 

2. 

AGREEMENT FORM

This agreement made this day of (Month) (Year), between THE ENGINEERING PROJECTS (INDIA) LIMITED (EPI), (A Govt. of India enterprise) a company incorporated under the Companies Act, 1956 having its Registered and Corporate Office at Core-3, Scope Complex, 7, Institutional area, Lodhi Road, New Delhi – 110003 (hereinafter referred to as the “EPI” which expression shall include its administrators, successors, executors and assigns) of the one part and M/s (NAME OF CONTRACTOR) (hereinafter referred to as the ‘Contractor’ which expression shall unless the context requires otherwise include its administrators, successors, executors and permitted assigns) of the other part.

WHEREAS, EPI, is desirous of construction of (NAME OF WORK) (hereinafter referred to as the “PROJECT") on behalf of the (NAME OF OWNER/MINISTRY) (hereinafter referred to as “OWNER”), and had invited Tenders as per Tender Documents vide NIT No. ______.

AND WHEREAS (NAME OF CONTRACTOR) had participated in the above referred Tender vide their tender dated ______ and EPI has accepted their aforesaid Tender and award the contract for (NAME OF PROJECT) on the terms and conditions contained in its Letter of Intent No. ________ dated _______ resulting into a contract.

NOW THEREFORE THIS DEED WITNESSETH AS UNDER:

ARTICLE 1.0 – AWARD OF CONTRACT

1.1 SCOPE OF WORK

EPI has awarded the contract to (NAME OF CONTRACTOR) for the work of (NAME OF WORK) on the terms and conditions in its Letter of intent No. ________ dated _______ and the documents referred to therein. The award of work has taken effect from (DATE) i.e. the date of issue of aforesaid letter of intent. The terms and expressions used in this agreement shall have the same meanings as are assigned to them in the “Contract Documents” referred to in the succeeding Article.

ARTICLE 2.0 – CONTRACT DOCUMENTS

2.1 The contract shall be performed strictly as per the terms and conditions stipulated herein and in the following documents attached herewith (hereinafter referred to as “Contract Documents”).

a) EPI Notice Inviting Tender vide No. _______ date _______ and EPI’s Tender Documents consisting of:

   i) Instructions to Tenderers and General Conditions of Contract (GCC) along with amendments/errata to GCC (if any) issued (Volume-I).
ii) Additional Conditions of Contract including Appendices & Annexures, Volume-II.

iii) Bill of Quantities alongwith amendments/corrigendum of schedule items, if any (Volume-III).

iv) Technical Specifications

v) Drawings

vi) ______________________________________________

b) (NAME OF CONTRACTOR) letter/proposal no._________________

dated ________ and their subsequent communication:

i) Letter of Undertaking of Tender Conditions dated ______________

ii) _____________________________________________________

iii) _____________________________________________________

2.2 EPI’s detailed Letter of Intent No. _________ dated ____ including Bill of Quantities. Agreed time schedule, Contractor’s Organisation Chart and list of Plant and Equipments submitted by Contractor.

2.3 All the aforesaid contract documents referred to in Para 2.1 and 2.2 above shall form an integral part of this Agreement, in so far as the same or any part thereof conform, to the Tender Documents and what has been specifically agreed to by EPI in its Letter of Intent. Any matter inconsistent therewith, contrary or repugnant thereto or deviations taken by the Contractor in its “TENDER” but not agreed to specifically by EPI in its Letter of Intent, shall be deemed to have been withdrawn by the Contractor without any cost implication to EPI. For the sake of brevity, this Agreement alongwith its aforesaid contract documents and Letter of Intent shall be referred to as the “Contract”.

ARTICLE 3.0 – CONDITIONS & CONVENANTS

3.1 The scope of Contract, Consideration, Terms of Payments, Advance, Retention Moneys, Taxes wherever applicable, Insurance, Agreed Time Schedule, Compensation for delay and all other terms and conditions contained in EPI’s Letter of Intent No. __________ dated _____ are to be read in conjunction with other aforesaid Contract Documents. The contract shall be duly performed by the Contractor strictly and faithfully in accordance with the terms of this contract.

3.2 The scope of work shall also include all such items which are not specifically mentioned in the Contract Documents but which are reasonably implied for the satisfactory completion of the entire scope of work envisaged under this contract unless otherwise specifically excluded from the scope of work in the Letter of Intent.

3.3 Contractor shall adhere to all requirements stipulated in the Contract documents.

3.4 Time is the essence of the Contract and it shall be strictly adhered to. The progress of work shall conform to agreed works schedule/contract documents and Letter of Intent.

3.5 This agreement constitutes full and complete understanding between the parties and terms of the presents. It shall supersede all prior correspondence to the extent of inconsistency or repugnancy to the terms and conditions contained in
Agreement. Any modification of the Agreement shall be effected only by a written instrument signed by the authorized representative of both the parties.

3.6 The total contract price for the entire scope of this contract as detailed in Letter of Intent is Rs. _________________ (Rupees _____________________________ only), which shall be governed by the stipulations of the contract documents.

ARTICLE 4.0 – NO WAIVER OF RIGHTS

4.1 Neither the inspection by EPI or the Engineer-In-Charge or Owner or any of their officials, employees or agents nor order by EPI or the Engineer-In-Charge for payment of money or any payment for or acceptance of, the whole or any part of the work by EPI or the Engineer-In-Charge nor any extension of time nor any possession taken by the Engineer-In-Charge shall operate as waiver of any provisions of the contract, or of any power herein reserved to EPI, or any right to damage herein provided, nor shall any waiver of any breach in the contract be held to be a waiver of any other or subsequent breach.

ARTICLE 5.0 – GOVERNING LAWS AND JURISDICTION

5.1 The Laws applicable to this contract shall be the laws in force in India and as amended from time to time.

Jurisdiction shall be of the Court (s) stated in the 'Memorandum' to the ‘Form of Tender” only.

5.2 Notice of Default

Notice of default given by either party to the other party under the Agreement shall be in writing and shall be deemed to have been duly and properly served upon the parties hereto, if delivered against acknowledgment due or by FAX or by registered mail duly addressed to the signatories at the address mentioned herein above.

IN WITNESS WHEREOF, the parties through their duly authorized representatives have executed these presents (execution whereof has been approved by the Competent Authorities of both the parties) on the day, month and year first above mentioned at New Delhi.

For and on behalf of:      For and on behalf of:
(NAME OF CONTRACTOR)     M/s. Engineering Projects (I) Ltd.
WITNESS:       WITNESS:
1.         1. 
2.         2.
ENGINEERING PROJECTS (INDIA) LIMITED
(A Govt. of India Enterprise)

QUALITY CONTROL FORMATS AND CHECKLISTS
### NAME OF PROJECT

### CONTRACT

| CONTRACT No. | LOCATION BLOCK | FLOOR | AREA |

#### CHECK LIST FOR CONCRETING

**REF DRAWING No.**

<table>
<thead>
<tr>
<th>LAYOUT</th>
<th>Alignment Checked</th>
<th>Level of base</th>
<th>Dimensional Check (edges &amp; diagonals)</th>
<th>Starers</th>
<th>Location of cutouts &amp; services</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAGING / SCAFFOLDING</td>
<td>Adequacy &amp; rigidity of Props, stays, bracings, conformity to scheme dims.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FORMWORK</td>
<td>Qty. of forms and support Props adequate</td>
<td>Vertical form surface in alignment &amp; plumb</td>
<td>Even Surface Oil sprayed</td>
<td>Gaps between shuttering are properly closed</td>
<td>No space for sagging of Form work</td>
</tr>
<tr>
<td>REINFORCEMENT</td>
<td>Cutting &amp; bending as per Bar bending schedule (Schedules attached)</td>
<td>Adequate laps welds</td>
<td>Chair / cover blocks Placed as per scheme</td>
<td>Binding wire not Touching shuttering</td>
<td>Fixtures, inserts Cunlits In position</td>
</tr>
<tr>
<td>Dowels &amp; positioning Provided as per drg.</td>
<td>Walkway for</td>
<td>Labour provided</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PRE-CONCRETING**

| Concreting Arrangements | Approval of Construction joint | Mixer / vibrator Condition & mixing | Top level of Concrete marked | Transporting & Placing arrangement |

**POST-CONCRETING**

| Compaction Checked | Removal of Laitance | Post Concreting Level/Dimensions | | |

**DESHUTTERING & CLEARING**

| Curing days .......... | Surface finish | Concrete Test Results OK | |

**CLEARANCE from Elect In-charge**

**W.O. ITEM** | **UNIT** | **QTY.**

| CONTRACTOR | DATE | SITE ENGR | DATE | SITE INCHARGE | DATE | CONSULTANT | DATE |

---

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**NAME OF PROJECT**

**CONTRACT**

**CHECK LIST FOR MASONRY WORK**

**REF DRAWING No.**

**LOCATION BLOCK**

**CONTRACT No.**

**FLOOR**

**AREA**

<table>
<thead>
<tr>
<th>LAYOUT</th>
<th>Alignment &amp; wall Thickness Checked</th>
<th>Brick on edge (top course)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCAFFOLDING</td>
<td>Adequacy of props, Stays, platform</td>
<td>Rigidity of base Movement Space Approach to height</td>
</tr>
<tr>
<td>PRE-LAYING</td>
<td>Working arrangements &amp; service provisions checked</td>
<td>Bricks as per specification Mortar grade &amp; mix As specified Bricks moistened</td>
</tr>
<tr>
<td>LAYING</td>
<td>Joint thickness &amp; course Ht. As specified</td>
<td>Joint alignment Checked Vertical joints Properly mortar filled from top</td>
</tr>
<tr>
<td>Raking of joints Done (if applicable)</td>
<td>Bearing plaster for Concrete</td>
<td></td>
</tr>
<tr>
<td>CURING AND CLEARING</td>
<td>Proper curing of const. Joint</td>
<td>Scaffolding removed (if required)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SIGNATURE</th>
<th>W.O. ITEM</th>
<th>UNIT</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTRACTOR</td>
<td>DATE</td>
<td>SITE ENGR</td>
<td>DATE</td>
</tr>
<tr>
<td>SITE INCHARGE</td>
<td>DATE</td>
<td>CONSULTANT</td>
<td>DATE</td>
</tr>
</tbody>
</table>

121
<table>
<thead>
<tr>
<th>CONTRACT</th>
<th>CHECK LIST FOR PLASTERING WORK</th>
</tr>
</thead>
<tbody>
<tr>
<td>REF DRAWING No.</td>
<td>LOCATION BLOCK</td>
</tr>
<tr>
<td>CONTRACT No.</td>
<td>SCAFFOLDING</td>
</tr>
<tr>
<td>SERVICE</td>
<td>All chasing work</td>
</tr>
<tr>
<td>SURFACE PREPARATION</td>
<td>Clearing &amp; raning of surface</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>PLASTERING</td>
<td>Mix &amp; W/P compound</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>FINISHING</td>
<td>Texture</td>
</tr>
</tbody>
</table>

CLEARANCE from Elect In-charge

W.O. ITEM | UNIT | QTY
--- | --- | ---
SIGNATURE | CONTRACTOR | DATE | SITE ENGR | DATE | SITE INCHARGE | DATE | CONSULTANT | DATE
<table>
<thead>
<tr>
<th>EXCAVATION</th>
<th>LAYING/RCC</th>
<th>MANHOLE</th>
<th>BACKFILLING</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Layout</td>
<td>Bed</td>
<td>In layers</td>
</tr>
<tr>
<td></td>
<td>Slope / cutting as per Specifications</td>
<td>RCC pipes as per requirement</td>
<td>Mortar as per specifications</td>
</tr>
<tr>
<td></td>
<td>Level</td>
<td>Jointing of Pipes</td>
<td>Plastering</td>
</tr>
<tr>
<td></td>
<td>Boxing</td>
<td>Strata bore Dewatering (wherever required)</td>
<td>End of pipes plugged</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCAFFOLDING</td>
<td>Platform</td>
<td>Stability</td>
<td>Movement space</td>
</tr>
<tr>
<td>-------------</td>
<td>----------</td>
<td>-----------</td>
<td>----------------</td>
</tr>
<tr>
<td>SERVICE PROVISIONS</td>
<td></td>
<td>All chiseling work</td>
<td>Complete</td>
</tr>
<tr>
<td>SURFACE PREPARATION</td>
<td>Roughening/hackling of surface done</td>
<td>Fixing metal/lathe</td>
<td>Chicken mesh</td>
</tr>
<tr>
<td>BASE PLASTER</td>
<td>Mix &amp; W/P compound</td>
<td>Coating/thickness</td>
<td>As specified</td>
</tr>
<tr>
<td>TOP LAYER</td>
<td>Fixing of beading for grooves as per drawing</td>
<td>Lines and levels of grooves maintained</td>
<td>Mix as per specification</td>
</tr>
<tr>
<td></td>
<td>Washing of top layer</td>
<td>Washing with Acid (light)</td>
<td>Curing day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SIGNATURE</th>
<th>CONTRACTOR</th>
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<th>DATE</th>
<th>SITE INCHARGE</th>
<th>DATE</th>
<th>CONSULTANT</th>
<th>QTY</th>
<th>W.O. ITEM</th>
<th>UNIT</th>
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</thead>
</table>

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**NAME OF PROJECT**

<table>
<thead>
<tr>
<th>CONTRACT</th>
<th>CHECK LIST FOR WASTE/SOIL/VENT PIPES ETC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>REF DRAWING No: _________________________</td>
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</table>

<table>
<thead>
<tr>
<th>CONTRACT No.</th>
<th>LOCATION BLOCK</th>
<th>FLOOR</th>
<th>AREA</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>Make as specified</th>
<th>□ Thickness / class as specified</th>
<th>□ Length &amp; dia as specified</th>
<th>□ No cracks or holes visible</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAYOUT</td>
<td>Space distribution &amp; Alignment as spec.</td>
<td>□ Plumb of vertical line checked</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>FIXING PIPE &amp; FITTINGS</td>
<td>Qty available for pipes fittings &amp; jointing material as per size &amp; fixing</td>
<td>□ Cutting &amp; Jointing as specified</td>
<td>□ Fixing of fittings &amp; specials as specified</td>
<td>□ Connection with corr. Internal networks</td>
</tr>
<tr>
<td>SMOKE TEST</td>
<td>Open ends plugged</td>
<td>□ Injection of smoke Pressure</td>
<td>□ No leakage of Smoke</td>
<td>□ Section is Ok</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W.O. ITEM</th>
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<th>DATE</th>
<th>SITE INCHARGE</th>
<th>DATE</th>
<th>CONSULTANT</th>
<th>DATE</th>
</tr>
</thead>
</table>

125
<table>
<thead>
<tr>
<th>CONTRACT No.</th>
<th>LOCATION BLOCK</th>
<th>FLOOR</th>
<th>AREA</th>
</tr>
</thead>
</table>

**CHECK LIST FOR MOSAIC FLOORING**

**REF DRAWING No.**

**LAYOUT**
- Sub base prepared
- Slope provision checked

**BASE LAYER**
- Mix as specified
- Evenness checked
- Joints treatment if any, provided

**TOP LAYER**
- Mix as specified
- Proper levelling done

**FINISHING**
- Grinding
- Final grinding

- Provision of services checked
- Paneling (max size separator strips)
- Level of sub base checked
- Water/cement slurry applied
- Cement concrete thickness checked
- Ramming/leveling compaction done
- Trowelling finish proper
- Repair applied at grinding stages
- Polishing

---

**W.O. ITEM** | **UNIT** | **QTY.**
--- | --- | ---

**SIGNATURE**

**CONTRACTOR** | **DATE** | **SITE ENGR** | **DATE** | **SITE INCHARGE** | **DATE** | **CONSULTANT** | **DATE**
--- | --- | --- | --- | --- | --- | --- | ---

126
<table>
<thead>
<tr>
<th>LAYOUT</th>
<th>Service provisions</th>
<th>Fixing pattern</th>
<th>Level of base &amp; dark</th>
<th>Finish level</th>
<th>Door &amp; window frames in position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sanitary, electric</td>
<td></td>
<td>Height marked</td>
<td>Guide</td>
<td></td>
</tr>
<tr>
<td>BASE</td>
<td>Mix</td>
<td>Thickness</td>
<td>Watering /</td>
<td>Evenness</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Layers</td>
<td>Cement slurry</td>
<td>Verticality, corners at right angle</td>
<td></td>
</tr>
<tr>
<td>LAYING</td>
<td>Moistening of tiles</td>
<td>Plan position of cut pieces at corner</td>
<td>Cut to size</td>
<td>Chamfering of edges &amp; edge matching proper</td>
<td>Raking / Jointing</td>
</tr>
<tr>
<td></td>
<td>Cement slurry adhesive</td>
<td>Level &amp; plumb checked</td>
<td>No hollow sound on tapping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FINISHING</td>
<td>Grounding of joints</td>
<td></td>
<td>Curing of joints</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SIGNATURE</th>
<th>CONTRACTOR</th>
<th>DATE</th>
<th>SITE ENGR</th>
<th>DATE</th>
<th>SITE INCHARGE</th>
<th>DATE</th>
<th>CONSULTANT</th>
<th>DATE</th>
</tr>
</thead>
</table>

NAME OF PROJECT ____________________________

REFERENCE DRAWING No. ____________________________

LOCATION BLOCK ___________ FLOOR ___________ AREA ___________
NAME OF PROJECT ____________________________

<table>
<thead>
<tr>
<th>CONTRACT NO.</th>
<th>CHECK LIST FOR WATER BOUND MACADAM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOCATION ________________________</td>
</tr>
<tr>
<td>MATERIAL AGGREGATE</td>
<td>Gradation as specified</td>
</tr>
<tr>
<td>SCREENINGS</td>
<td>Gradation as specified</td>
</tr>
<tr>
<td>MOORUM</td>
<td>Gradation as specified</td>
</tr>
<tr>
<td>LAYOUT</td>
<td>Alignment of central line as per drawings and reference points</td>
</tr>
<tr>
<td>WATER BOUND MACADAM</td>
<td>Templates placed of specified thickness</td>
</tr>
<tr>
<td></td>
<td>Dry rolling as specified</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W.O. ITEM</th>
<th>UNIT</th>
<th>QTY.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>SIGNATURE</th>
<th>CONTRACTOR DATE</th>
<th>SITE ENGR</th>
<th>DATE</th>
<th>SITE INCHARGE DATE</th>
<th>CONSULTANT DATE</th>
</tr>
</thead>
</table>
Addendum to GCC

1) **Clause No. 76.1 (GCC)**

Deleted - There shall be no Arbitration Clause for this Contract except between Central Public Sector Undertakings inter se/Government of India Departments Ministries as mentioned in the Clause No. 76.2 below:

2) **Clause No. 76/2 (G.C.C.)**

**ARBITRATION BETGWEEN CENTRAL PUBLIC SECTOR ENTERPRISES INTER SE/ GOVERNMENT OF INDIA DEPARTMENTS/MINISTRIES**

i) In the event of any dispute or difference relating to the Interpretation and application of the provisions of the contract, such dispute or difference shall be referred by either party to the arbitration as per the instructions (Office Memorandums/Circulars) issued by Govt. of India from time to time with regard to arbitration between one Government Department and another, one Government Department and a Public Sector Enterprise and Public Sector Enterprises inter se.

ii) Subject to any amendment that may be carried out by the Government of India from time to time, the procedure to be followed in the arbitration shall be as is contained in D.O. No. DPE/4/(10)/2001-PMA-GL-I dated 22.01.2004 of Department of Public Enterprises, Ministry of Heavy Industries and Public Enterprises, Government of India or any modification issued in this regard.

3) **Clause No. 76.3(BG.C.C.) JURISDICTION**

The courts in Mumbai alone will have jurisdiction to deal with matters arising from the Contract, to the exclusive of all other courts.
# MEMORANDUM

**Tender for Construction of Residential Quarters (Type-II / 32 and Type-III /16 Nos at 29th Battalion, ITBP, Jabalpur, MP**

NIT No.: **EPI/WRO/CON/693B/0090**

<table>
<thead>
<tr>
<th>Sl NO.</th>
<th>Description</th>
<th>Cl. No.</th>
<th>Values/Description to be applicable for relevant clause(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i.</td>
<td>Name of work</td>
<td></td>
<td><strong>Construction of Residential Quarters (Type-II / 32 and Type-III /16 Nos at 29th Battalion, ITBP, Jabalpur, MP</strong></td>
</tr>
<tr>
<td>ii.</td>
<td>Owner/Client</td>
<td></td>
<td>ITBP</td>
</tr>
<tr>
<td>iii.</td>
<td>Type of Tender</td>
<td></td>
<td>Works Contract</td>
</tr>
<tr>
<td>iv.</td>
<td>Earnest Money Deposit</td>
<td>NIT</td>
<td>Rs. 16,61,000/- (Rupees Sixteen Lacs Sixty One Thousand only)</td>
</tr>
<tr>
<td>v.</td>
<td>Duration of contract</td>
<td>NIT</td>
<td>15 months from the date of issue of LOI/Work Order</td>
</tr>
<tr>
<td>vi.</td>
<td>Mobilization Advance</td>
<td>8.0</td>
<td>10% of the contract value</td>
</tr>
<tr>
<td>vii.</td>
<td>Interest Rate on Mobilization Advance</td>
<td>8.0</td>
<td>12%</td>
</tr>
<tr>
<td>viii.</td>
<td>Number of installments for recovery of Mobilization</td>
<td>8.0</td>
<td>Shall be recovered from each running bill @ 15% of gross amount of monthly RA bill once the bill amount crosses 10% of the contract value.</td>
</tr>
<tr>
<td>ix.</td>
<td>Schedule of Rates applicable</td>
<td>69.0</td>
<td>Civil Works</td>
</tr>
<tr>
<td>x.</td>
<td>Validity of Tender</td>
<td>4.0</td>
<td>90 days from the date of opening of Price Bid.</td>
</tr>
<tr>
<td>xi.</td>
<td>Security Deposit Cum Performance Guaranty</td>
<td>9.0</td>
<td>5% Five percent only) of contract value including EMD within 10 days from the date of issue of Letter/ fax/e-mail of intent of acceptance of tender in the form of Bank Guarantee. The BG shall be kept valid upto the end of defect liability period. Otherwise EMD will be forfeited and LOI will stand cancelled.</td>
</tr>
<tr>
<td>xii.</td>
<td>Retention Money</td>
<td>10.0</td>
<td>5% of Gross amount in each RA bill.</td>
</tr>
<tr>
<td>xiii.</td>
<td>Time allowed for starting the work</td>
<td>43.0</td>
<td>The date of start of contract shall be reckoned from date of issue of Letter/Fax of Intent of acceptance of tender.</td>
</tr>
<tr>
<td>xiv.</td>
<td>Defect Liability Period</td>
<td>74.0</td>
<td>12 months from taking over by client.</td>
</tr>
<tr>
<td>xv.</td>
<td>Arbitration</td>
<td>76.0</td>
<td>Shall be as per Addendum to Clause No. 76 of GCC. The Venue of Arbitration shall be EPI Mumbai.</td>
</tr>
<tr>
<td>xvi.</td>
<td>Jurisdiction</td>
<td>76.3</td>
<td>Courts at Mumbai.</td>
</tr>
</tbody>
</table>

SIGNATURE OF BIDDER

NAME (CAPITAL LETTERS) : ____________________________________________

OCCUPATION : ______________________________________________________

ADDRESS : _______________________________________________________

______________________________________________

SEAL OF BIDDER
FORM OF TENDER

To,

Engineering Projects (India) Limited
(Address of submission as mentioned in “Notice Inviting Tender”)

REF.: Tender for

NIT No.: EPI/WRO/CON/693B/

1. I/We hereby tender for execution of work as mentioned in “Memorandum” to this “Form of Tender” as per Tender Documents within the time schedule of completion of work as per separately signed and accepted rates in the Bill of Quantities quoted by me / us for the whole work in accordance with the Notice Inviting Tender, Conditions of Contract, Specifications of materials and workmanship, Bill of Quantities Drawings, Time Schedule for completion of jobs, and other documents and papers, all as detailed in Tender Documents.

2. It is agreed that the time stipulated for jobs and completion of works in all respects and in different stages mentioned in the “Time Schedule for completion of jobs” and signed and accepted by me/us is the essence of the contract. I/We agree that in case of failure on my/our part to strictly observe the time of completion mentioned for jobs and the final completion of works in all respects according to the schedule set out in the said “Time Schedule for completion of jobs” and stipulations contained in the contract, the recovery shall be made from me/us as specified therein. In exceptional circumstances extension of time which shall always be in writing may, however be granted by EPI at its entire discretion for some items, and I/We agree that such extension of time will not be counted for the final completion of work as stipulated in the said “Time schedule of completion of jobs”.

3. I/We agree to pay the Earnest Money, Security Deposit cum Performance Guarantee, Retention Money and accept the terms and conditions as laid down in the “Memorandum” to this “Form of Tender”.

4. Should this Tender be accepted, I/We agree to abide by and fulfill all terms and conditions referred to above and as contained in Tender Documents elsewhere and in default thereof, allow EPI to forfeit and pay EPI, or its successors or its authorized nominees such sums of money as are stipulated in the Tender Documents.
5. I/We hereby pay the earnest money amount as mentioned in the “Memorandum” to this “Form of Tender” in favour of Engineering Projects (India) Limited payable at place as mentioned in the “NIT/ITT”.

6. If I/we fail to commence the work within 7 days of the date of issue of Letter of Intent and / or I/We fail to sign the agreement as per Clause 84 of General Conditions of Contract and/or I/We fail to submit Security Deposit cum Performance Guarantee as per Clause 9.0 & 9.1 of General Conditions of Contract, I/We agree that EPI shall, without prejudice to any other right or remedy, be at liberty to cancel the Letter of Intent and to forfeit the said earnest money as specified above.

7. I/We are also enclosing herewith the Letter of Undertaking on the prescribed pro-forma as referred to in condition of NIT.

Date the __________________________ day of ______________________________

SIGNATURE OF BIDDER

NAME (CAPITAL LETTERS) : __________________________________________

OCCUPATION ________________________________________________

ADDRESS _____________________________________________________

_____________________________________________________________

SEAL OF BIDDER
LETTER OF UNDERTAKING

(TO BE ENCLOSED IN ENVELOPE-1 ALONGWITH EMD)

ENGINEERING PROJECTS (INDIA) LIMITED
(Address of submission as mentioned in “Notice Inviting Tender”)

REF. : Tender for
NIT No. :

Sir,

UNDERTAKING FOR ACCEPTANCE OF TENDER CONDITIONS

1. The Tender Documents for the work as mentioned in “Memorandum” to “Form of Tender” have been issued to me/us by ENGINEERING PROJECTS (INDIA) LIMITED and I / We hereby unconditionally accept the tender conditions and Tender Documents in its entirety for the above work.

2. The contents of clause 1.2 and 1.3 of the Tender Documents (Instructions to Tenderers) have been noted wherein it is clarified that after unconditionally accepting the tender conditions in its entirety, it is not permissible to put any remark(s) / condition(s) (except unconditional rebate on price, if any) in the ‘Price-Bid’ enclosed in “Envelope-2” and the same has been followed in the present case. In case this provision of the Tender is found violated at any time after opening “Envelope-2”, I / We agree that my/our tender shall be summarily rejected and EPI shall, without prejudice to any other right or remedy be at liberty to forfeit the full said Earnest Money absolutely.

3. The required Earnest Money for this work is enclosed herewith.

Yours faithfully,

(Signature of the Tenderer)
Seal of Tenderer

Dated : ____________________
TENDER NO : EPI/WRO/CON/ITBP/693B/0090

Construction of Residential Quarters (Type-II / 32 and Type-III /16 Nos at 29th Batalion, ITBP, Jabalpur, MP

ADDITIONAL CONDITIONS OF CONTRACT (ACC) & TECHNICAL SPECIFICATIONS
ENGINEERING PROJECTS (INDIA) LTD.
(A GOVT. OF INDIA ENTERPRISE)

ADDITIONAL CONDITIONS OF CONTRACT

The following Additional conditions shall be read in conjunction with General Conditions of Contract. The provisions in Additional Conditions of Contract shall take precedence over General Conditions of Contract.

INTRODUCTION

Indo Tibetan Border Police (ITBP) intends Construction of Residential Quarters (Type-II / 32 and Type-III /16 Nos at 29th Battalion, ITBP, Jabalpur, MP

The following clauses of Additional Conditions of Contract (ACC) shall be applicable for this contract:

These Additional Conditions of Contract shall be read in conjunction with General Conditions of Contract, Instructions to Tenderers (ITT), Notice Inviting Tenders (NIT), Bill of Quantities (BOQ), Tender Drawings, and Technical Specifications & Other Tender Documents

1) GENERAL

The work in general shall be carried out as per the latest CPWD specifications with up to date correction slips, unless otherwise specified in the nomenclature of the individual item or as per specifications provided with this tender. Any item not covered under these specifications shall be carried out as per approved specifications. In case any item is not covered in any of these documents, the same shall be carried out as per the latest BIS Code in practice or as per approval of Engineer in Charge of EPIL.

Where any portion of additional conditions of contract is repugnant to or at variance with any provision of the Instructions to Tenderers and General Conditions of contract and/or the other documents forming part of the contract then unless a different intention appears the provision of the Additional Conditions of Contract shall be deemed to over-ride the provisions of the general conditions of contract and/or the other documents forming part of the contract only to the extent such repugnant/variations in the additional conditions of contract as are not possible of being reconciled with the provision with Instructions to Tenderers or General Conditions of contract and/or the other documents forming part of the contract.

2) DEFINITIONS

Definitions as per General Conditions of Contract (GCC) shall be amended or the following definitions appended as under

a) The words “Site” in various clauses of General Conditions of Contract (GCC) and other documents of this Tender shall mean “29th Battalion, ITBP, Jamtara Village, Gaur PO, Jabalpur.

b) Wherever the sentence “the cost to be incurred by the Contractor shall deemed to be included in the quoted rates of the BOQ items” as mentioned in various General Conditions of contract is appearing, the same shall be read as “the cost to be incurred by the contractor shall deemed to be included in the BOQ rates including the percentage quoted on the BOQ rates / amount.”

c) Wherever in General Conditions of Contract, approval of EPIL / Executing Agency is mentioned, it shall include the approval from the Owner’s representative also.

3) APPROACH TO SITE
The proposed site 29th Battalion ITBP, is situated at Jamtara Village, Gaur PO, Jabalpur M.P. (Approx. 8 KM from Jabalpur railways Station.)

4) SCOPE OF WORK

The scope of work, in general, includes Construction of Residential Quarters (Type-II / 32 and Type-III /16 Nos at 29th Battalion, ITBP, Jabalpur, MP (hereinafter referred to as “Works”) as per Technical specifications, Designs, Drawings, BOQ, Instructions and Terms and Conditions given in Tender Documents and its amendments/clarifications etc. received from Client/ EPI from time to time.

5) SET OF CONTRACT DOCUMENTS

The clause No. ‘6.0’ of General Conditions of Contract (GCC) of this Tender document shall be read as under:

“The following documents will complete a set of tender documents:

a) Notice Inviting Tender (NIT)

b) Instructions to tenderer General Conditions of Contract, Addendum to GCC, form of tender, letter of undertaking, Memorandum, Technical specification

c) Additional Conditions of Contract (ACC), bidders information

d) Drawings

e) Bill of Quantities (Price Bid)

6) TIME SCHEDULE & PROGRESS

The sub-clause no. ‘43.2’ of clause no. ‘43.0’ of General Conditions of contract shall be read as under:

“The contractor shall also furnish within 10 days of date of letter/ telegram of Intent a Time and Progress Chart (Bar Chart) for completion of work within stipulated time. This time & progress chart shall be based on the milestones given hereunder. This will be duly got approved from EPIL. This approved Bar Chart shall form a part of the agreement. Achievement of milestones as well as total completion has to be within the time period allowed. The milestones to be applicable for this contract shall be as under:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Milestone</th>
<th>Time allowed for completion (since inception of project)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Building work up to plinth level</td>
<td>3 months</td>
</tr>
<tr>
<td>2</td>
<td>RCC framed structure</td>
<td>10 months</td>
</tr>
<tr>
<td>3</td>
<td>Misc, finishing work like cement Plaster, flooring, painting electrical work etc., i/c handing over.</td>
<td>15 Months</td>
</tr>
<tr>
<td>4</td>
<td>External Development &amp; Bulk Services (Civil &amp; Electrical)</td>
<td>15 Months</td>
</tr>
</tbody>
</table>

The contractor shall also ensure achievement of following mile stones in terms of financial targets, failing which intermediate liquidity damages shall be liable to be effected;

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Time allowed for Achievement of financial Targets (since inception of project)</th>
<th>Financial Achievement During the Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3 Months</td>
<td>25%</td>
</tr>
<tr>
<td>2</td>
<td>6 Months</td>
<td>35%</td>
</tr>
<tr>
<td>3</td>
<td>12 Months</td>
<td>75%</td>
</tr>
<tr>
<td>4</td>
<td>15 Months</td>
<td>100%</td>
</tr>
</tbody>
</table>

7) PROGRESS REPORTS AND SCHEDULES
The contractor shall submit to the Engineer-in-charge by the third day of every Month two copies of a report duly updated along with BAR/CPM/PERT Chart in an approved Perform showing the progress made in construction of the works during the previous month. Photographs indicating progress and other activities at site will be provided by the contractor along with progress report.

8) REVIEW MEETINGS

During the progress of the works the Contractor or his authorized representative is expected to participate in the monthly review meetings and/or any additional meetings as instructed by the Engineer-in-Charge. Any revision of the schedule of completion as a result of the review, will be submitted by the Contractor to the Engineer-in-Charge within a week who will approve it after due scrutiny. The Contractor will adhere to the revised schedule thereafter. No additional payment shall be made to the Contractor for any multiple shift work or other incentive methods contemplated by him in his work even though the EPIL/ITBP approves the time schedule. The approval of the revised time schedule shall not in any way relieve the contractor from the terms & conditions of contract contained elsewhere in the contract documents.

9) QUALITY ASSURANCE PROGRAMME

The last paragraph of clause no. ‘81.0’ of General Conditions of contract (GCC) shall be read as under:

“The quality formats/ checks lists for different components of the work shall be as directed and approved by the Engineer-in-Charge. The approved formats shall be adopted for manufacturing, installation, inspection & commissioning of the work. These filled in formats shall be prepared in two copies and duly signed by representatives of contractor and EPIL. All the costs associated with printing of formats and testing of materials required as per Technical Specification or as desired by Engineer-in-charge shall be borne by contractor without any extra cost to EPIL and shall be deemed to be included in contractor’s quoted rates in the schedule/ Bill of quantities (BOQ).”

The Quality Control Forms and Checklists provided in the General Conditions of Contract (GCC) shall be modified by Engineer-in-Charge as per requirements of quality checks on the basis of Technical Specification & codal requirements, shop drawings etc.

The formats for quality checks/inspection shall be developed and submitted to Engineer-in-Charge for approval and shall be adopted after approval.

10) ARRANGEMENT OF CONCRETE

The Contractor has to submit the design mix for the work to be executed and get it approved from a reputed lab. other requirements will be as decided by Engineer in charge

11) PROTECTION OF SITE

The contractor is required to make arrangements for protection of site at which the works are to be executed from inundation due to water, floods or other such situations etc. No extra payments shall be allowed for any delay in execution of the works on account of water standing at site of works and no claims for an extra rate shall be entertained on these accounts unless otherwise expressly specified.

12) DAMAGE AND LOSS

Damage to the existing structures: Any damage to the existing structures during the execution of work shall be made good by the contractor at his own cost and the site of work left clean and tidy on completion. Rectification/reinstatement/making good etc. shall conform to the standard materials
originally used in the work and finished work shall match with existing work in all respects to the entire satisfaction of the Engineer-in-charge.

13) SITE DOCUMENTS

The following site documents shall mainly be maintained by the contractor at site:

a) Copy of contract documents and drawings.
b) Computerized bill format.
c) Site Order Book.
d) Material testing registers/ Quality Inspection Reports.
e) Measurement books on computerized format.
f) Progress bar chart.
g) Sample approval register.
h) Visitors register.
i) Any other detail and specific requirement as deemed necessary.
j) Hindrance Register
k) Work Diary,
l) Stage passing Register

In case the above are not provided at site within 10 days of placement of LOI, EPIL shall provide the same and necessary expenditure shall be deducted from the bills for documents.

14) MINOR DETAILS OF CONSTRUCTION:

The rates quoted by the Contractor shall be deemed to cover for all the minor details / requirement of construction which may not have been specifically shown on the drawings or given in particular specifications, BOQ, but are required as per established engineering practice.

15) DISCREPANCY IN DRAWINGS:

The Contractor shall be responsible to ensure co-relation in Structural drawings Architectural Drawings and Bill of Quantities, before commencement and execution of work. In case of discrepancy, the Contractor shall bring it to the notice of the Engineer-in-Charge for clarifications within 28 days of the issue of Letter of Acceptance. In the event of such discrepancy arising during the course of the work for which drawings are given after the date of issue of Letter of Acceptance, the Contractor shall seek clarifications within 14 days of receipt of such drawings. The Contractor shall take into consideration such contingencies in the completion schedule. The Contractor shall not be eligible for any extension of time for such occurrences. The decision of the Engineer-in-Charge shall be final and binding in this case. The bidder is also advised to visit the site and seek clarifications before submitting his bid.

16) EMPLOYER NOT TO SUPPLY ANY MATERIALS:

The Employer shall not supply or procure any material, for use on works, to the Contractor and he has to make his own arrangements for supplying, procuring, transportation and storage of all such materials required for the construction works at his own cost. However at any point of time EPI/Client feels that the requisite material is not being provided by contract the same shall be arranged by EPI and cost Plus 10% will be debited to contractor.

17) WITNESSING OF TESTS BY THE ENGINEER-IN-CHARGE

The Contractor shall make under the direction and in the presence of Engineer-in-charge, such tests and inspections as have been specified or as the engineer-in-charge shall consider necessary to determine whether or not the full intent of requirements of the specifications and the other related contract documents have been fulfilled. In case the work does not meet the full intent of the specifications and the other related contract documents it shall be rectified by the Contractor at no extra cost and the Contractor shall bear all the expenses for any further tests considered necessary.

18) PROJECT COMPLETION

The contractor shall inform in writing at least One month in advance about the date of completion of work so that arrangements for taking / handing over are organized by EPIL along with the OWNER.
well in time. The completion certificate shall be issued by EPIL in consultation with the OWNER after having fully satisfied themselves about the satisfactory completion of the work.

19) During post construction phase the contractor shall be responsible for carrying out the following activities but not limited to the following: Rectification of the defects promptly as pointed out by EPIL or Owner’s representative(s) during the Operation & Maintenance period.

   ii) Submission of “FINAL REPORT” of the completed project containing all technical & other related details.

20) The Contractor shall hold harmless and indemnify the EPIL and the OWNER against any claims or liability because of personal injury including death of any employees of the contractor arising out of or in consequence of the performance of this contract.

   EPIIL and the OWNER shall not be responsible for any loss or damage to property of any kind belonging to the Contractor or its employees, servants or agents during execution of the contract.

   In case of any damage or loss of property relating to the WORK(S) that may happen, the Contractor shall at his own cost, repair and make good the same in conformity with the Contract. Adequate insurance coverage shall be obtained by the Contractor for this purpose.

21) PLANTS & MACHINERY:

   All plant and machinery required for execution of work shall have to be arranged by the contractor at his own cost. At least following plants & machinery shall be deployed at site.

   1) Batching plant -1Nos
   2) Water tanker- 2 Nos
   3) Weigh batcher mixture machine-2nos.
   4) Earth rammer-2nos.
   5) Excavator-1nos
   6) Dumper-2nos
   7) Tractor with trolley -2nos
   8) De-water pump-1no.
   9) Vibrator -4nos.
   10) Vibrator breaker
   11) Megger -1000V, for measuring of 3000M Ohms-1no.
   12) Crimping tool-1no.
   13) Tong tester-1no
   14) Multimeter-1no

22) EQUIPMENTS FOR TESTING OF MATERIALS & CONCRETE AT SITE LABORATORY

   All necessary equipment for conducting all necessary tests shall be provided at the site laboratory by the contractor at his own cost. The following minimum laboratory equipments shall be set up at site office laboratory:

   (i) Cube testing machine : 1 No.
   (ii) Slump Cone : 3 Nos.
   (iii) Tensile Briquette testing machine : 1 No.
   (iv) Vicats apparatus : 1 No.
   (v) Moisture Meter : 1 No.
(vi) Megger & earth resistance tester : 1 No.
(vii) Pumps and pressure gauges for hydraulic testing : 1 No.
(viii) Drying Oven : 1 No.
(ix) Weighing scale with pan type weight : 2 Nos.
(x) Graduated glass cylinder : 6 Nos.
(xi) Sets of sieves for coarse aggregate [40; 20; 10; 4.75mm] : 2 Nos.
(xii) Sets of sieves for fine aggregate [4.75; 2.36; 1.18; 600; 300 & 150 micron] : 2 Nos.
(xiii) Core cutter for soil compaction with accessories : 1 No.
(xiv) Cube Moulds 15 x 15 x 15 cm : 18 Nos.
(xv) Efflorescence Test Tray : 2 Nos.
(xvi) Multimeter : 1 Nos.
(xvii) Vernier Callipers - Digital Type : 2 Nos.
(xviii) Screw Gauge - Digital Type : 2 Nos.
(xix) Any other equipment for site tests as outlined in BIS and as directed by the Engineer-in-charge.
(xvi) Tong Tester : 1 No.

23) DOCUMENTS FOR SUPPLY ITEMS

For supply items in Part III of BOQ the Supplier shall submit the following documents to EPIL.

a) Warranty Cards.
b) Manufacturer’s test certificate.
c) Any other test certificate from an external laboratory to determine the Technical Specification.
d) Catalogues
e) Pollution Control Certificate.
f) Documents required for registration of vehicle with the local transport Authority and other inter state movement of vehicle.
g) List of recommended spares with specification and costs thereof.
h) Operation & Maintenance manuals.

24) The following minimum key personnel would be deployed on the project by the Contractor for day to day execution and supervision of its works during the entire duration of the project. The minimum number and level of Engineers, Supervisors and other personnel to be deployed by the contractor during Maintenance/defect liability period shall be as directed by EPI. In case contractor fails to deploy adequate number of personnel at site/ office, EPI after giving seven days notice shall engage the required personnel solely at the risk and cost of the contractor and debit the cost of the same to the account of the contractor.
25) SECURITY DEPOSIT:

In the event of award of “Works”, Contractor shall submit to EPI, Bank Guarantees from a Nationalised Bank / Scheduled Bank towards security deposit @ 5% of the contract value of the accepted tender within 10 days from the date of LOI as per the EPI format enclosed and BG shall be valid up to defect liability period i.e. 12 months from the date of taking over the project, with claim period of 6 months failing which EPI at his discretion may revoke the LOI & forfeit the EMD furnished along with tender. Security deposit will be returned to the contractor after satisfactory completion of Project and defect liability period.

26) RETENTION MONEY:

The Retention Money shall be deducted from each running bill of the Contractor at 5% (five only) of the gross value of the Running Account bill. The retention money shall be refunded to the contractor after completion of the Project successfully up to the satisfaction of EPI/CLIENT along with final Bill. Clause no 9.00 of GCC shall also be referred for payment of Retention money.

27) MOBILIZATION ADVANCE:

Mobilization Advance up to a maximum amount as mentioned in the “MEMORANDUM” to the “Form of Tender” i.e.10% of contract value shall be paid to the contractor on submission of non-revocable and un conditional Bank Guarantee for an amount equal to 110% of the Mobilization advance from a Nationalized Bank/Scheduled Bank as per the enclosed proforma after signing of agreement.

The mobilization advance shall be paid as per clause no.8.00 of GCC.

28) Taxes and Duties:

All Taxes, Duties, VAT, Cess, Levies, Octroi, Entry Tax, Royalties, Works Contract Tax, Turnover Tax, Labour Welfare Cess, Service Tax and other expenses etc. as applicable for this “Works” as on date of NIT are included in the contract price. The payment of total Works contract Tax, VAT, Turnover Tax, Labour welfare cess etc. applicable on the Contract value shall be responsibility of the CONTRACTOR and is included in the Contract price of the CONTRACTOR. In case EPI pays any WCT/VAT/TOT/Labour welfare cess etc. on this project, the same shall be recovered as reimbursement from the CONTRACTOR by deducting the same from their bills or other dues and in such cases no certificate in this regard shall be issued by EPI to the CONTRACTOR. Any variation in taxes and imposition of new
taxes shall be paid/recovered over and above the quoted price upon submission of proof by either side.

The service tax will be reimbursed @5.6% to successive bidder on submission of documentary evidence from the authority for deposit of service tax.

29) The contractor shall prepare and submit shop drawings for, electrical work etc. to Engineer In-charge for approval before execution of the work.

30) The contractor shall get approval of plinth area on completion of work at plinth level and final approval of the area at the completion of building from authority as per approved drawing/norms followed by local authority during approval of construction drawing. No extra claim shall be entertained on this account.

31) The contractor has to get executed the works from specialized agencies for the specialized nature of works such as aluminum works, wood works, false ceiling works, flooring works, finishing items, arboriculture, electrical works any other specialised work as decided by Engineer In charge. The contractor has to obtain the approval from Engineer-In charge of EPIL for execution of specialised nature of work.

32) It is the responsibility of the contractor for getting the approval from the local statutory authorities such as town planning / municipal authorities / electricity board/fire department etc. and other department for the works executed at site as per the approved plans and designs etc. The statutory fees payable for approval shall be made directly to the local government department / state authorities by EPIL/ITBP authorities. Other incidental expenditure if any shall be borne by the contractor and no reimbursement will be made for the same.

33) The contractor is responsible for obtaining the connection for water supply, sewer connection, electric connection and other connections if any from local authorities/state Electricity board. However the statutory official payments payable to Govt. department shall be paid by EPIL/ITBP directly to the concerned authorities.

34) The contractor shall have to obtain all Approvals including Connections/ NOCs/ Completion Certificates/ Occupancy Certificate, etc from the concerned Local/Statutory authorities for Sewerage works, Water Supply works, Fire Fighting work, Fire Alarm system work, DG set etc. at his own cost and nothing extra other than statutory fee/charges shall be payable on this account to the contractor. However, the letters required from the owner for the needful stated purposes will be arranged by EPIL from the owner as per the request of contractor along with the statutory charges/fee demanded by the local/statutory authorities.

35) The contractor shall engage a specialized agency for execution of, fire fighting work, fire alarm system and lift work. The specialized agencies so engaged should have relevant license as required for execution of these works. The contractor will submit the credentials of the specialized agencies along with their consent for approval of EPIL before engaging the specialized agency. It may, however, be noted that the entire responsibility towards quantity and quality of the entire project including services shall remain with the main contractor. Nothing extra will be paid on this account.

36) Concrete mixed design by using approved admixture shall be carried out by the contractor at his own cost from approved laboratory before starting the work.

37) Electrical Works shall be carried out as per CPWD specifications for Electrical Works (Part-I) Internal, 2005, (Part-II) External, 1994 with up to date correction slips, General specifications for Electrical Works part-VII (DG sets), 2006; General specifications for Electrical Works part-IV (Sub-station), 2007; General specifications for Electrical works- Part V (Wet riser & sprinkler systems) 2006.

38) For items not covered under any of the specifications mentioned in Tender Documents, the works shall be carried out as per CPWD Specifications/manufacturer’s specifications/General Engineering Practice and/or as per directions of Engineer-in-Charge. The rate for such extra work shall be derived as as follows:

a) If the item is available in DSR 2014, contractor has to execute the item with the same rate ± tender percentage
b) If the item is not available in DSR 2014 and similar item is available, rate for such extra work shall be derived from the similar item by adding or deleting the differences + tender percentage

c) If the rate for any item is not possible to derive as mentioned above, the rate for which shall be derived by analyzing as per the prevailing market rates.

39) The Contractor shall procure Reinforcement steel and Structural steel required for the works directly from the Manufacturer which mandatorily have to be primary procedure re-rolled reinforcement shall be used.

40) The contractor should invariably obtain necessary manufacturers test certificates from the suppliers of steel and cement for each and every consignment and furnish them to the Engineer-in-charge before use on works.

41) The original bills of procurement should be submitted to the Engineer-in-charge for making payment of the item. The contractor shall purchase the steel and cement on the name of work, the name of contractor and furnish the same to the Engineer-in-charge. The steel and cement without the above two names will not be accepted on the works.

42) If any difference is observed on carriage inwards, carriage outwards and theoretical requirement of steel and cement for finished works, recovery at double the rate will be effected from the contractors bills for the quantity varied above the allowable limits.

43) Three sets of As Built Drawings shall be submitted by the contractor in hard and soft copies.

44) For all Schedule BOQ items the nomenclature /rates/ unit of DSR items shall be followed. In case of any ambiguity is observed in Scheduled BOQ items relevant DSR item will hold good.

45) The contractor will arrange to carry out total station survey before start of work and after completion of work at his own cost and will provide sufficient Hard & soft Copies to EPIL.

46) All the cost of travel, lodging, boarding etc. towards visits by Client, their Consultant etc. to the manufacturing units/works for the inspection of materials, equipment etc. under the scope of work of Contractor shall be borne by the Contractor.

47) Water and Electricity required for constructions activities shall be arranged by the Contractor on their own and no payment shall be releases for the same. The rates quoted by the Contractor are deemed to be inclusive of above.

48) The Contractor shall provide and maintain facilities as per Annexure – I for exclusive use of EPI. These facilities and vehicles shall be the property of the Contractor at the end of the contract.

49) Payments for the work done shall be released to Contractor within Fifteen working days of receipt of RA Bill duly certified by EPI’s representative including mobilization advance and secured advance etc. and after deducting recoveries if any. Recovery / Adjustment of the Mobilization advance and secured advance shall be as per the terms of contract / CPWD norms.

The final bill payment to the Contractor shall be released 30 days after receipt of corresponding payment from client and after submitting Sales Tax clearance certificates, EPF clearance certificate, all other clearances, approvals, certificates etc. as per agreement for the “Works” and as per statutory requirement.

All payments including RA bills, Final bills be made to the contractor upon received of correspondence payment received from client.

50) The Contractor shall be fully responsible to complete the “Works” in workmen like manner to the satisfaction of Client and EPI by maintaining high standard of quality and precision as per ‘Tender documents’, Agreements, Terms & Conditions, Specifications, Drawings etc., within the contractual completion period and within their quoted rates/amount. In case Client reduces or increases scope of work related to
Contractor’s portion of work, the same shall be binding on Contractor and the Contractor has to execute the same at rates quoted by them.

51) In case Contractor is awarded the “Works” and fails to execute the same as per agreed schedule of progress of work and as per specified quality and/or lags behind in activities required for timely completion of “Works”, as determined by EPI/Client, then EPI shall give 15 days written notice to Contractor to achieve the specified quality and/or to deploy adequate resources to the satisfaction of EPI, for timely completion of “Works”. Upon expiry of the notice period, if Contractor fails to achieve specified quality and/or fails to take action for timely completion of “Works”, then EPI shall have option to withdraw the remaining work partly or in full from Contractor and get the same executed at the risk and cost of the Contractor from alternative agency/agencies.

52) The Contractor confirms that it holds EPF Code number, CST-TIN, VAT-TIN/Sales tax on Works contract number, Service tax registration number, PAN (Permanent Account Number of Income Tax) etc. and shall be responsible for depositing EPF subscription and contribution for labour and staff employed by it on the “Works” and Service tax, other taxes, duties and dues etc. as per statutory requirements and documentary evidence of same shall be provided to EPI. The Contractor shall also be responsible for labour welfare and for arranging labour and other licenses/ permits/ clearances etc. for the project at their own cost. The Contractor shall comply with all the requirements as per labour laws/acts. All the records in this regard shall be maintained by Contractor as per statutory requirements and rules and shall be produced by the Contractor on demand if required.

53) The Contractor shall be responsible for obtaining all approvals from EPI/Client with regard to quality of materials & workmanship and measurements etc. for their portion of work. The Contractor shall be responsible for reconciliation of issue material, if any. In case there is any shortfall of free issue items found during reconciliation, recovery at double the cost of materials prevailing at that time of recovery shall be made from the Contractor’s due payment.

54) In case of non-approval of Contractor’s association for the Project by the Client and/or by the Corporate office of EPI due to any reasons whatsoever at any stage of the “Works”, the Contractor shall have no claim on EPI.

55) Income tax shall be deducted as per the prevailing rate of tax as applicable.

56) The Contractor shall plan and execute the “Work” in his scope of work in such a manner that the other works, connected with the “Works” of the Contractor, but not included in Contractor’s scope of work do not get affected / delayed.

57) The quantities indicated in the BOQ are tentative. However contractor has to execute the works as per drawings and site conditions. Payment will be released for the work executed as per the rates quoted by contractor even if the quantities increases or decreases upto any extent.

58) The Contractor shall deploy sufficient plant & equipment of the required capacity and in good working condition for completion of the works in stipulated time with required quality. The equipment should either be owned by the Contractor or hired/leased. The deployment of equipment by Contractor shall be as decided by EPI and the same shall not be less than the minimum deployment stipulated, if any, for execution of “Works” and as per schedule agreed with EPI. The Contractor shall make arrangement for regular maintenance including preventive and breakdown maintenance and maintain stock of essential spares at site/near to site so as to ensure minimum breakdown time of equipment. The equipment once brought to site shall not be allowed to be removed without the consent of EPI. In case the Contractor fails to deploy sufficient equipment to the satisfaction of EPI or in case of prolonged breakdown of equipment, EPI at its sole discretion shall arrange the required equipment and debit all the related costs including ten percent overheads of EPI and shall recover the same from the due payments of Contractor, including from its bank guarantees available with EPI.

59) Contractor shall ensure compliance with all Central, State and Local Laws, Rules, Regulations etc. as applicable or may be applicable during the course of execution, maintenance etc. of the “Works” and shall indemnify EPI against any claim or damages whatsoever on such accounts. The Contractor shall keep EPI indemnified at all times against infringement of any Patent or Intellectual Property rights.
EPI is an ISO-9001 and ISO-14001 Company. The conditions of the ISO as applicable should be followed by the Contractor for implementation & maintaining the established procedures of EPI for this purpose. Following documents have been provided by EPI to Contractor & Contractor confirms receipt of the same:

The “Parties” shall make efforts to settle disputes, if any, amicably. Only if amicable settlement is not possible, the same shall be referred to the sole arbitration of the Chairman & Managing Director (CMD) of EPI or the person appointed by the CMD, EPI and the decision of the arbitrator shall be final and binding on the “Parties”. Arbitration will be according to “ Conciliation & Arbitration” clause of GCC.

Project sign board to be supplied and erected at the site office as per the drawing enclosed.

The work executed by Contractor shall be subject to audit and quality control checks from Quality Control Division & Technical Audit of EPI, Client, Inspecting Agency of the Client and Chief Technical Examiner of Central Vigilance Commission, Govt. of India. In the eventuality of any defect/ sub standard works as brought out in the report or noticed otherwise at any time during execution, maintenance period etc., the same shall be made good by the Contractor. In case Contractor fails to rectify the defect/sub-standard work within the time period stipulated by EPI, EPI shall get it rectified at the risk and cost of Contractor and shall recover the amount from the dues of the Contractor.

EPI has agreed to award the work to the Contractor on the basis of details regarding experience profile, financial standing, credentials, fulfillment of statutory obligations, etc. of Contractor submitted by Contractor to EPI. In case, at a later stage if it is found that the Contractor has submitted incorrect, false details and credentials resulting in apprehensions on the capabilities of Contractor with regard to quality & timely completion of works, financial capabilities etc, EPI can terminate this order solely at its option. In this eventuality the Contractor shall be liable for the losses suffered by EPI and further Contractor shall have no claim on EPI, whatsoever.

BARRICADING OF SITE

The contractor has to make their own arrangements for barricading of proposed site of the 29th Battalion for ITBP at Jabalpur (M.P.) as per Site conditions. No payment shall be made on account of barricading the above mentioned work at site. The barricading of site shall be as per the directions of Engineer In-charge. The material used for barricading of work shall be taken back by contractor after completion of the work with written permission of Engineer In-charge.

OPC Cement only is to be used to this work, however in case any crisis for OPC cement , the party shall submit the documentary proof in support in such case the difference of cost of OPC and PPC cement shall be recovered from the party.

SIGNATURE OF THE CONTRACTOR WITH SEAL
Annexure – I

FACILITIES TO BE PROVIDED BY PARTY TO EPI

Immediately on placement of LOI/Work Order (whichever is earlier) by EPI on the PARTY, the PARTY at its own cost shall provide furnished office, facilities etc. exclusively for the use of personnel of EPI as per details given below. The PARTY shall make his rates in their offer sufficiently comprehensive to cover the cost of the facilities as per details shown below and the PARTY shall not be entitled for any extra payment for the same:

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A) OFFICE ACCOMMODATION</strong></td>
<td>1500 Sq.ft</td>
</tr>
<tr>
<td>Furnished Office accommodation at one or more locations as per direction of EPI with basic amenities like Toilets, Drinking water arrangement, lights, fans etc. for exclusive use of EPI’s Engineers &amp; Staff and maintenance of the same till Defect Liability Period. The Specifications and Design of accommodation shall be as approved by EPI.</td>
<td></td>
</tr>
<tr>
<td><strong>B) FURNITURE OF TOTAL VALUE</strong></td>
<td>Rs. 40,000/-</td>
</tr>
<tr>
<td><strong>C) OFFICE EQUIPMENT</strong></td>
<td></td>
</tr>
<tr>
<td>a) Fax machine</td>
<td>1 No.</td>
</tr>
<tr>
<td>b) 1) Computer (Latest version, Windows 8.1) with minimum 500 GB HDD along with UPS &amp; Operator (in case Computer Operator is not provided by the PARTY, recovery of Rs. 8000/- per month / per computer shall be made from the PARTY’s bills in this regard) and Latest version of Software like MS Project, MS Office etc. (2) Laptop – i5, 4th Generation, 500 GB HDD 8GB RAM preloaded windows 8.1,</td>
<td>2 Nos. 1 No.</td>
</tr>
<tr>
<td>c) Laser or any other Printer of A3 size with scanner &amp; copier</td>
<td>2 Nos.</td>
</tr>
<tr>
<td>d) Internet Facilities (if available in location of Site)</td>
<td>1 No.</td>
</tr>
<tr>
<td>e) Refrigerator (180ltr.) or any other gadget of equivalent cost as decided by EPI</td>
<td>1 No.</td>
</tr>
<tr>
<td>f) Air Conditioner with cooling &amp; heating (1.5Ton Capacity)</td>
<td>1 No.</td>
</tr>
<tr>
<td>g) RO (Drinking Water) or any other gadget of equivalent cost as decided by EPI</td>
<td>1 No.</td>
</tr>
<tr>
<td>h) Photocopy Machine (i(CANON NP 3050 or equivalent model) or any other gadget of equivalent cost as decided by EPI)</td>
<td>1 No.</td>
</tr>
<tr>
<td>i) Digital Camera of 10.1 pixel</td>
<td>1 No.</td>
</tr>
<tr>
<td><strong>D) CONSUMABLES</strong></td>
<td></td>
</tr>
<tr>
<td>a) All consumables like Stationary, ink etc. shall be provided by PARTY till end of defect liability period. (Stationary items are inclusive of visiting cards, rubber stamps, letter pads, photocopies, photocopy papers &amp; other items of daily office use). Amount shall be restricted to:</td>
<td>Rs. 3000/- per month</td>
</tr>
</tbody>
</table>
b) Running & Maintenance of the equipment mentioned above are to be done by the PARTY at his own cost.

<table>
<thead>
<tr>
<th>E) TELEPHONE WITH STD FACILITY AND INSTRUMENT</th>
<th>As per Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Office Telephone (Fixed Line) - 1 No.</td>
<td></td>
</tr>
<tr>
<td>b) Mobile Phone - 2 Nos.</td>
<td></td>
</tr>
<tr>
<td>Monthly operational expenditure on account of all telephones shall be restricted to.</td>
<td></td>
</tr>
<tr>
<td>The cost of each Mobile Phone Instrument shall be restricted to Rs 6,000/-</td>
<td>Rs. 4,500/- per Month</td>
</tr>
</tbody>
</table>

**F) VEHICLE (Brand New)**

<table>
<thead>
<tr>
<th>Brand New Four wheel drive Scorpio DX vehicle or equivalent with Driver and accessories valuing Rs. 40,000/- each vehicle</th>
<th>1 No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly running shall be restricted to 3000 Kms. (each vehicle)</td>
<td></td>
</tr>
</tbody>
</table>

**G) OFFICE BOY CUM COOK on Full time basis for EPI**

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<tr>
<th>1 No.</th>
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</table>

The vehicles shall be brand new and shall be provided with driver on full time basis. Consumables like diesel/petrol/oil lubricants and spare parts etc. shall be provided by the PARTY at their cost. The vehicles shall be maintained in good working condition. In case of breakdown, replacement of vehicles shall be provided by PARTY immediately. The cost of registration, transportation etc. shall be borne by the PARTY. In case a vehicle is not required by EPI, a recovery of Rs. 40,000/- per month per vehicle shall be made from the PARTY for this purpose till the end of defect liability period. In case Driver, POL, maintenance of any vehicle is not required by EPI for any vehicle, a recovery of Rs. 20,000.00 per month per vehicle shall be made from the PARTY for this purpose till the end of defect liability period.

The above gadgets and facilities should be brand new and of reputed make and all facilities shall be provided and maintained properly (including payment of water & electricity bills etc.) by the PARTY at Project site or at any other office related with execution of this project till completion of work, handing over, defect liability period in all respect at his own cost. The PARTY shall also make stand-by arrangement for water & electricity to ensure un-interrupted supply. The equipment/items shall be the property of PARTY at the end of contract. The PARTY shall be responsible for watch and ward of site office and other facilities etc. In case of theft/damage of any equipment/items, the PARTY shall immediately replace the same within a maximum period of two days.

The PARTY shall provide ‘Sign Board(s)’ as per design approved by EPI and/or Client.

In case the above facilities are not provided by the PARTY within 10 (ten) days of award of work or replacement is not provided within the specified period, EPI shall arrange the same at the risk and cost of the PARTY and make the recoveries from the bills of the PARTY for the same. The decision of EPI shall be final and binding on the PARTY in this regard.
CONCILIATION AND ARBITRATION

Before resorting to arbitration as per the clause given below, the parties if they so agree may explore the possibility of conciliation as per the provisions of Part-III of the Arbitration and Conciliation Act, 1996. When such conciliation has failed, the parties shall adopt the following procedure for arbitration:

1. Except where otherwise provided for in the contract, any disputes and differences relating to the meaning of the specifications, designs, drawings and materials used in the work or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions or these conditions or otherwise concerning the works or the execution or failure to execute the same whether arising during the progress of the work or after the completion or abandonment thereof shall be referred to the Sole Arbitration of the Chairman and Managing Director (CMD) of Engineering Projects (India) Limited (EPI), or any other person discharging the functions of CMD of EPI is unable to act, to the Sole Arbitration of some other person appointed by the CMD of EPI or such person discharging the functions of CMD of EPI. There will be no objection if the arbitrator so appointed is an employee of Engineering Projects (India) Limited. However, such an employee shall not have directly dealt with the said contract or the works thereunder on behalf of EPI. Such Arbitrator shall be appointed within 30 days of the receipt of letter of invocation of arbitration duly satisfying the requirements of this clause.

2. If the arbitrator so appointed resigns his appointment, is unable or unwilling to act due to any reason whatsoever, or dies, the Chairman & Managing Director aforesaid or in his absence the person discharging the duties of the CMD of EPI may appoint a new arbitrator in accordance with these terms and conditions of the contract, to act in his place and the new arbitrator so appointed may proceed from the stage at which it was left by his predecessor.

3. It is a term of the contract that the party invoking the arbitration shall specify the dispute/differences or questions to be referred to the arbitrator under this clause together with the amounts claimed in respect of each dispute.

4. The arbitrator may proceed with the arbitration ex-parte, if either party, in spite of a notice from the arbitrator, fails to take part in the proceeding.

5. The work under the contract shall continue, if required, during the arbitration proceedings.

6. The arbitrator shall make speaking Award and give reasons for his decisions in respect of each dispute/claim along with the sums awarded separately on each individual item of dispute or difference or claims. The Arbitrator shall make separate award on each reference made to him.

7. The award of the arbitrator shall be final, conclusive and binding on both the parties.

8. Subject to the aforesaid, the provisions of the Arbitration and Conciliation Act, 1996 or any statutory modifications or re-enactment thereof and the Rules made there under and for the time being in force shall apply to the arbitration proceedings and Arbitrator shall publish his Award Accordingly.

Note: Notwithstanding anything contained here in above, this clause shall not be applicable where the dispute is between EPI and another Public Sector Enterprise or Govt. Department for which a separate Arbitration Clause is provided vide Clause No. A given below:
A. ARBITRATION BETWEEN PUBLIC SECTOR ENTERPRISES INTERSE/ GOVERNMENT DEPARTMENTS.

1. In the event of any dispute or difference relating Interpretation and application of the provisions of the contract, such dispute or difference shall be referred by either party to the arbitration as per the instructions (Office Memorandum/Circulars) issued by Govt. of India from time to time with regard to arbitration between one Govt. Deptt and another, one Govt. Deptt. and a Public Sector Enterprise and Public Sector Enterprises inter se.

2. Subject to any amendment that may be carried out by the Government of India from time to time the procedure to be followed in arbitration shall be as is contained D.O. No. DPE/4(10)/2001-PMA-GL1 dated 22/01/2004 of Department of Public Enterprises, Ministry of Heavy Industries and Public Enterprises or any modification issued in this regard.

ANNEXURE - III
PARTICULAR SPECIFICATIONS

1. **General**: The work shall be carried out strictly in accordance with particular specifications and drawings. The drawings, specifications BOQ etc. shall be taken complementary and also supplementary to each other and shall form part this contract. Any work or material shown on drawings and not specifically included in BOQ/specification or vice versa shall be executed and deemed to be included in the scope of work of Item rate. **However, the steel for reinforcement work shall be TMT-BARS of Fe-415.**

   The work shall be carried out as per CPWD specifications, based on DSR 2014. The items not included in the DSR shall be executed as per the recommendations and specifications of the manufacturer duly approved by the ITBP. In case of items having option in DSR like external finishing, the selection of items to be used shall be decided by the ITBP.

2. In case there are no specifications for items shown on the drawings or where items are not exhaustively described, the general specifications of CPWD shall be followed for which nothing extra shall be paid. In case, no details are available even in CPWD specification, then decision of owner/EPIL is final & binding on the contractor.

3. **Scope of works**: The scope of work for buildings under this contract includes for full & final and entire completion of all works including all internal and external services in all respects described in particular specification and as shown on drawings forming part of the contract.

4. Although all the details of construction have been by and large covered in these documents, any item or details of construction not specifically covered but obviously implied and essential to consider Civil works and all internal and external services complete and functional, shall be deemed to have been covered in the rates quoted. The cost of external development works pertaining to a particular contract shall also be carried out on a final lump sum price based on the rates quoted for each item. The tenderer may however, consider a minimum level of specifications conforming to IS code or National Building Code to cover any missing details.

5. **Sample of Materials**: The Contractor shall produce samples of all materials and shall obtain approval of these in writing from Architect/Project Engineer before he places bulk order for the materials for incorporation in the works. The samples must be produced at least six weeks before they are to be incorporated in sample dwelling units. Materials to be incorporated in the work shall conform to latest relevant ISI. The items should be ISI marked where manufactured.

6. **Slopes**: Adequate slope shall be provided in areas where there is likelihood of ingress of water such as toilets, balconies, verandah, kitchens, terraces, top of chajjas, window cills, plinth protections etc. though these may not be expressly shown in drawings.

7. **Curing**: Exposed surfaces of all cement works viz. cement concrete, brick work, flooring, plastering, pointing and the like shall be cured by keeping the surface adequately and continuously wet as directed by Architect and Project Engineer for at least seven days where ordinary portland cement has been used.
TECHNICAL SPECIFICATIONS

NON-SCHEDULE ITEMS

1. Earth for Filling

The earth used for filling shall be free from salts, organic or other deteriorous matter. Highly expansive soils like black cotton soil shall not be used, unless so specified. All clods of earth exceeding 50mm shall be broken or removed. Earth obtained from borrow pits and surplus earth from excavation, if any, shall be directly used for filling and avoid double handling.

2. Flush shutters for doors & cupboards:

Flush shutter for doors & cupboards shutters shall be solid core types with block board core as indicated in Bill of Quantity and shall conform to IS-2202 and ISI marked with blockboard (conforming to the requirements as per IS-1659-1969 with frame of 1st class Hardwood and well matched commercial 3 ply veneering with vertical grains or cross bands and both faces decorative lamination 1mm thick.

3. Ceramic Designer (Highlighter) Tiles

Ceramic Designer tiles of 1st Quality conforming to IS-15622 (thickness to be specified by the manufacturer) & of approved make/colour as approved by the Project Manager/Architect having compressive strength of 350kg/cm sq., water absorption 10% maximum by weight and Abrasion resistance 2mm average,2.5mm individual specimen. Dimensional tolerance maximum 1mm.

a. Laying instructions for Floor:

1. Prepare base mortar with cement and sand in the ration of 1:4
2. Set the levels for floor (i.e dead level or slope as specified by the Project Engineer/Architect ).
3. Prepare cement slurry i.e mixture of cement and water to form a thick paste and spread it on the levelled base mortar.
4. Wet the backside of the tile with water. Complete immersion of tile in water is not required.
5. If tiles are square or rectangular in shape, set the right angles for the area and place the first tile along the right angle line and place it in on base mortar .Tap gently only with a rubber or wooden mallet to obtain perfect levels.
6. Clean the surface of the tile with clean water immediately after laying with wet sponge. Ensure that the base mortar cement which squeezes through the joints, does not settle on the tile. Also ensure that the water used is not hard of brackish.
7. Do not use the area laid for at least 24 hours.
8. Fill in the joints with pointing material which is mixture of white cement and desired colour pigment. For higher quality of finishes, you could use. If required, a polymer based cementitious tilling joint filler like Roffe rainbow. To get the desired colour/shade. Mix the same with water to form a smooth paste which should be applied to the joints, preferably with the use of rubber squeeze or rubber sheet. Donot apply the pointing material all over the surface.
9. Allow pointing material to set for 15 minutes and then clean the surface of the tile with a clean wet sponge, removing the excess pigment on tile surface.
10. Wash the surface with soap water or mild detergent to obtain a clean surface and wipe it.
**b. Laying instruction for walls**

1. Plaster the surface to be tiles with mortar (Cement and sand in the ratio of 1:3)
2. Prepare cement mortar i.e mixture of cement sand and water to form a thick paste and spread it on the back side of the tile after wetting the tile with sponge.
3. Instructions given for Floor (Nos 4,5,6,7,8,9,10 above) should be followed.

**c. Desired site conditions for laying of Ceramic Designer Tiles**

_The following works are to be completed prior to commencing laying of Ceramic Designer Tiles._

1. Final painting of ceiling in rooms.
2. Two coats of wall painting in all rooms (the final painting should be done only after laying of floor tile)
3. Wiring and Fixing of all electrical components.
4. Plumbing work.
5. Fixing of grills for windows.
6. Fixing and Polishing of windows/windows frames /door frames and doors.
7. Bathrooms floor and wall tiles should be laid after all the work in the bathroom is completed.
8. Fixing of wall and platform slabs.

If mosaic/marble/any other natural stone which needs machining and polishing is being used in any other part of the floor, it is necessary that this work be completed before commencing the laying of Ultra Tiles.

If all the above precautions are taken and the instructions followed, your Ultra Tiles will give you decades of trouble-free services.

4. **Chicken Wire Mesh:**

   Chicken Wire Mesh shall be of galvanized mild steel wire cloth conforming for IS 1568-1970. Wire Cloth shall be regularly woven wire with a number of equally spaced parallel wire in both warp and weft direction for produce uniformly openings. The wire cloth shall be properly selvedge by one or more wires in each edge.

5. **Antitermite Treatment**

   Chemical Chlorpyriphos /Lindane emulsifiable concentrate 20% conforming to relevant IS specification in water emulsion shall be applied uniformly at the prescribed rate in all stages of treatment. Concentration of the chemical as emulsifiable concentrate is indicated on the sealed containers. For obtaining the specified concentration. Chemical shall be diluted with water in the required ‘quantity before it is used. Graduated containers shall be used for the dilution of the chemical.

6. **ACOUSTICAL SUSPENDED CEILING SYSTEM**

   Mineral Fibre acoustical suspended ceiling system with Fire Fissured Tiles having MICRO LOOK XL 15MM in modules size of 600mm x 600mm x 15mm with B10 Block Casting laid on grid system of hot dipped galvanised steel suspension system with 15mm wide T-Section Flanges colour white having rotary stitching on the main runners spaced at 1200mm & 600mm cross tees fixed to the soffit by approved hangers [G.I wire 4.0mm dia] at 1200mm max. centre all as per nomenclature.

**INSTALLATION:**

To comprise main runner spaced at 1200mm centres securely fixed to the structural soffit using suspension system (specifications below) at 1200mm maximum centre. The First/Last suspension system at the end of each main runner should not be greater than 450mm from the adjacent wall.
Flush fitting 1200mm long cross tees to be interlocked between main runners at 600mm centre to form 1200 x 600 mm module. Perimeter trim wall angles of size 3000x19x19mm, secured to walls at 450 mm maximum centres.

7. STRUCTURAL GLAZING

Structural glazing at Façade of ground plus three buildings using glazing section on direct stick mullion & transom system of which mullion shall be of 80x50x0.8 mm with notch & transom to be of 50x50x1.8 mm with notch, Aluminum Glazing sections shall be powder coated with heat treatment on three surfaces in Ivory/Black colour using 6mm thick SSG EVO Star ET 425 AURA GREEN HEAT REFLECTIVE GLASS ULT - 24%, Solar Factor – 0.25% and U-Value-3.72 W Sq.M of approved colour of Make Saint Gobain to be pasted with 12mm x 6mm both side adhesive Spacer foam tape & structural silicon of Dow Corning 995 grade or its equivalent. The Weather /water sealing of glass joints shall be done with 10 mm wide Dow Corning make weather sealant of grade 789 or its equivalent. The Mullion of Aluminum structure is to be fastened with R.C.C. Slab/beam with help of Powder coated/ Galvanized MS Brackets of 75 mm length with help of M10 x 100 mm Mechanical tempered Dash Fasteners. The job Includes all necessary hardware, cleat, Screws, nut washers etc. Complete job with as per direction of Engineer-in-charge and the job should be water tight.

8. ALUMINIUM WORK

A) ALUMINIUM GRILL
Anodized Aluminium Grill of 7.5 mm thick of approved pattern (Pan type) (minimum thickness of powder coating 50 micron) shall be fixed as per manufacturer instructions.

B) ALUMINIUM DOORS, WINDOWS AND VENTILATORS:

Aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular and other sections of approved make conforming to IS: 733 and IS : 1285, fixed with rawl plugs and screws or with fixing clips, or with expansion hold fastners including necessary filling up of gaps at junctions, at top, bottom and sides with required PVC/neoprene felt etc. Aluminium sections shall be smooth, rust free, straight, mitered and jointed mechanically wherever required including cleat angle. Aluminium snap beading for glazing / paneling, C.P. brass / stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge. (Glazing and panelling to be paid for separately. Powder coated aluminium (minimum thickness of powder coating 50 micron).

All Sections of Aluminium work being used in the work will be Powder coated minimum thickness of powder coating 50 micron

Codes and Standards:
The Codes and standards generally applicable to the work of this section are listed herein under:

IS: 733 Wrought aluminium and aluminium alloy bars, rods and sections (for general engineering purpose).

IS: 1285 Wrought aluminium and aluminium alloy extruded round tube and hollow sections (for general engineering purpose).

IS: 1362 Dimension for screw thread for general purpose.
IS:1761 Transparent sheet glass for glazing and framing purposes.
IS:1948 Aluminium doors, window and ventilators.
IS:1949 Aluminium windows for industrial buildings.

The following clauses are intended to amplify the requirements of the references/ documents listed above and the contractor shall comply with these clauses.
SAMPLES AND SHOP DRAWINGS

All aluminium doors, windows and ventilators shall be furnished by an approved manufacturer and shall be conforming to IS:1948. Before placing their order, the contractor shall submit shop drawings and samples for the approval of the Engineer. If required, the contractor shall also submit the necessary engineering calculations. Shop drawings shall clearly show all work including mechanical systems, the arrangement of components, the sequence and details of fabrications, assembly and erection. These drawings shall also give full size details, all dimensions and thickness anchoring devices and accessories.

9. TOUGHENED GLASS

GENERAL

Toughened glass is 4 to 5 times stronger than its equivalent thickness of normal annealed float of sheet glass. It offers great resistance to sudden temperature changes and sudden impacts. Toughening, which shall be carried out horizontally (without tong-marks), shall conform to ASTM 1048. All works such as cutting, grounding, drilling etc. On glass shall be carried out prior to toughening. Once tempering is done, no work will be allowed on the glass.

SGG(SAINT GOBIN GLASS) Antelio-Plus is an advanced solar control glass that is manufactured by depositing layers of metallic nitrides on to clear or body tinted float glass by magnetically enhanced cathodic sputtering under vacuum conditions.

SGG Antelio-Plus is manufactured to meet the most exacting standards in order to deliver high performance with ease in processing. SGG Antelio-Plus is versatile and satisfies several designer criteria including solar control (to reduce the cooling cost) and optimum light transmittance (to reduce glare).

Glass Application- Façade Glazing

<table>
<thead>
<tr>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
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<td>Performance</td>
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<table>
<thead>
<tr>
<th>Glass Name</th>
<th>SGG Antelio Plus Blue Green ST 450</th>
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<tr>
<td>Processing</td>
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<tr>
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<td>Reflection Internal</td>
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<tr>
<td>Shading Coefficient</td>
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<tr>
<td>Relative Heat Gain W/sqm K</td>
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</table>

Values in accordance with ISO 9050
Values have been certified by the Institute of Solar Energie of Farunhofer Corporation

10. PATCH FITTING GLASS DOOR

Patch Fitting Glass door Cum Fixed window with 12mm thick toughened glass and PSS/SSS finish of Dorman equivalent make approved make as per manufacturer’s/ drawing and as approved by Architect/ Engineer-in-charge.

11. SURFACE TEXTURE PAINT

Application Process/Methology

1. Acrylic Primer (Duracoat) added with water 1:1 ratio and than applied with Roller and Brush. The purpose of pure acrylic primer is to reduce the absorption of the plaster, act as a water proof agent and highlight the repairs.
2. Minor Repair check or a coat (As required) With Exterior grade Putty.
3. One Coat of Duracoat with spray & Pressed (As a base Coat).
4. Two coats of Pure acrylic emulsion, Ultrashield in desired shade.

The above product has salient features:

- Anti Fungal
- Breathes out trapped moisture
- Flexibility and elasticity
- Long shade Life
- Dust Repellent
- Water Repellent

12. ALUMINIUM COATED METAL SHEET ROOFING

LYZAC High Rib Baregal volume 0.5mm thick zink Aluminium coated metal roofing sheet in longest joint system to be fixed with hilti make shelf. Drilling and topping screen with EPDM metal bonded washer including all flashing & ceiling joints with silicon/epoxy as directed by Engineer-in-charge.

13. WOODEN FLOORING

Wooden flooring of 25mm thick with pre laminated flat pressed three layer Engineered Hard Wood Flooring on Stage exterior grade including edge profiles as may be required in desired shape and size of approved colour and texture including front cladding of stage riser laid over leveled floor surfaces as per manufacturer’s instructions.

14. STAINLESS STEEL BUILDERS HARDWARE FITTINGS/ FIXTURES

Builder’s Hardware such as sliding Door Bolts, Tower Bolts Handles, Door Stopper shall be of stainless Matt finish fixed with necessary screws etc. complete.

15. VITRIFIED TILE FLOORING

Vitrified Tiles 200/300x200x10mm thick of Décor Series as shown on drawings of Johnson make or equivalent of any other makes as mentioned in Appx “A’ of makes here in before shall be provided at locations indicated. The tiles shall be fixed with adhesive “FAIR FIX” STP laid on 20mm thick CM 1:4 [1cement: 4 coarse sand] including pointing the joints with White cement and matching pigment etc. complete.

16. STAINLESS STEEL RAILING

Stainless Steel Railing of SS 304 grade railing made of 38mm baluster and 38mm top rail of 1.6mm thickness with 3 mid rails of 12 OD tube connected with CNC machine made. Modular connectors fixed with dash fastners. All as per manufacturer’s specification.

17. STAINLESS STEEL RAILING WITH TOUGHENED GLASS

Stainless Steel Railing with ozone Baluster Model - OZ-BF-SS-44 Stainless Steel 304 grade in 1.6 mm thickness made of CNC components and modular system accessories along with SS Grade 304 Pipe Top Rail - 50 mm of 1.6 MM THICK NESS IN Matt Finish along with 2 Nos. Glass Holders OZ-BF-SS-ACC-GH-22 on each Baluster which are to be installed with C2C distance of 1mt. and 10mm Toughened Glass of 600 ht. with required holes fixed all as per manufactured instructions.

18. CRYSTALLINE BASED WATER PROOFING TREATMENT

Cementaious crystalline based waterproofing treatment for concrete wall and flooring with krystol T1 system. The application to be done from +ve (positive) side on a wet open pore concrete surface with
brush @ 1 kg/sqm. In accordance with manufacturer’s specification, drawing and directed by project Manager.

19. DRAPERY RODS.

Drapery rods 30mm dia of M.S Pipe of thickness 1.6mm with powder coating (wooden finish) including metal brackets, rings and ends all as specified. Fixed to brick walls/RCC lintels with dash fasteners.

20. MULTICELL POLYCARBONATE SHEET ROOFING

16mm thick multicell polycarbonate sheet (with minimum 1040mm wide) with standing seam on both sides & double tooth snap on locking system to ensure maximum uplift capability. The panels will be UV protected and antiglare/softlight. The cross section of one cell should not be more than 4mmX4mm & weight of single panel shall not be less than 3250 per square metre. The system will be fitted on purlins with spacing as specified by manufacturer.

21. ALUMINIUM COMPOSITE PANELS

Fabricating and fixing in position wall cladding with 4mm thick (0.5mm + 3.0mm + 0.5mm) with virgin polyethylene core, belonging to the 3xxx H24 Alloy series, 0.5mm aluminium skins (Front side: stove lacquered, PVDF quality with peel-off protective film - back side: wash coat without peel-off protective film, composite panels of Alucobond make as detailed in structural and architectural concept drawings and approved in shop drawing; aluminium cladding to be of sizes and panels as per conceptual Architectural drawings and finished in approved shade and colour, including required fixtures and fittings anchor fasteners and sealing with approved silicon sealant, finishing junctions with steel, concrete, stone, timber, aluminium, glass, MS structural steel all complete. Further include required preparation of shop drawings with structural consultants, providing samples, mockups, taking actual site measurements and modifying and coordinating with site and (Measurement and payment shall be made on the actual finished area).

22. EXTERIOR WOOD HIGH PRESSURE LAMINATE WALL CLADDING

Reznoclad HPL Panel for Exterior or equivalent, Exterior Decorative Panels meeting European norm compliance of CE mark having standard dimensions of 3050mm x 1300 x 6mm, to be installed on aluminium framework using matching-colour coated rivets complete as per the manufacturer’s specification. Aluminium tube 75/50/38x25x1.6mm to be fixed on ‘L’ clamps in only vertical directions should be fixed in interval on max 600mm. Panels cut to size to be fixed on aluminium tube along with rivets, leaving 6mm expansion joint between two panels in both horizontal and vertical direction. The product to conform to highest quality level meeting the following values / parameters:

| a) Flexural Strength as per EN438-6/7 | : 80 Mpa |
| b) Flexural modulus as per EN438-6/7 | : 9000 Mpa |
| c) Tensile Strength as per EN438-2 | : 60 Mpa |
| d) Resistance against wet conditions as per EN438-2 | : Rating 4 |
| e) Flame reaction as per EN13501-1 | : B-s2-d0 |
| f) Resistance against climatic conditions as per EN438-6 | : Contrast :3 |
| | : Appearance :4 |
TECHNICAL SPECIFICATION
PLUMBING/SANITARY WORKS

1.0 GENERAL:

1.1 The work shall be carried out in the accordance with the drawings and design as would be issued to the Contractor by the Design Consultant duly signed and stamped by him. The Contractor shall not take cognizance of any drawings, designs, specifications etc. not bearing Design Consultant signature and stamp. Similarly the Contractor shall not take cognizance of instructions given by any other Authority except the instructions given by the Client’s Representative in writing.

1.2 The work shall be executed and measured as per metric dimensions given in the Bill of Quantities, drawings etc.

1.3 The Contractor shall acquaint himself fully with the partial provisions for supports that may or may not be available in the structure and if are available then utilize them to the extent possible. In any case the Contractor shall provide all the supports regardless of provisions that they have been already made. Nothing extra shall be payable for situations where insert plates (for supports) are not available or are not useful.

1.4 Shop coats of paint that may be damaged during shipment or erection shall be cleaned off with mineral spirits, wire brushed and spot primed over the affected areas, then coated with paint to match the finish over the adjoining shop painted surface.

1.5 The Contractor shall protect / handle the material carefully and if any damage occurred while handling by the Contractor then the sole responsibility shall be of the Contractor. Such damages shall be rectified/recovered by the Contractor at no extra cost whatsoever.

1.6 The Contractor shall, within twenty one (21) days of receipt of the Notice of Award for the Project, where applicable, complete the submission of shop drawings to the Client’s Representative for approval by the Design Consultants in order to conform to the contract schedule.

1.7 Preparation of shop drawings and approvals authorized body prior and after the execution of works as required.

1.8 This is the GMP contract, all the tenders should be sealed and the summary of quantities shall be based on Tender drawings, recheck and confirm. Nothing shall be paid extra to complete the work after the award of tenders. The vendor shall comply to all the documents of NBC/ IS/ TAC/ Local Fire Authority while quoting the tender.

1.9 Contractor to comply with the waste management plan (attached).

1.10 Measurements:
All measurements shall be taken in accordance with relevant IS codes, unless otherwise specified.

2.0 APPLICABLE CODES AND STANDARDS:
All equipment, supply, erection, testing and commissioning shall comply with the requirements of Indian Standards and code of practice given below as amended upto the date of submission of Tender. All equipment and material being supplied shall meet the requirements of BIS and other relevant standard and codes.

Plumbing Works:

<table>
<thead>
<tr>
<th>Material</th>
<th>IS Code</th>
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<tbody>
<tr>
<td>Vitreous Chinaware</td>
<td>IS:2556 - 1974 (Part - I)</td>
</tr>
<tr>
<td></td>
<td>IS:2556 - 1981 (Part - II)</td>
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<td></td>
<td>IS:2556 - 2556 (Part - III)</td>
</tr>
<tr>
<td>Ball Valve</td>
<td>IS:1703 - 1977</td>
</tr>
<tr>
<td>Cistern Brackets</td>
<td>IS: 775 - 1970</td>
</tr>
<tr>
<td>Toilet Seat Cover</td>
<td>IS:2548 - 1983</td>
</tr>
<tr>
<td>Vitreous China Cistern</td>
<td>IS:2326 - 1987</td>
</tr>
<tr>
<td>Sand Cast Iron Pipes and Fittings</td>
<td>IS:1729 - 1979</td>
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<td>Spun Cast Iron Pipes and Fittings</td>
<td>IS:3989 - 1984</td>
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<tr>
<td>GI Pipes</td>
<td>IS:1239 - 1979</td>
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<td>Galvanising for GI Pipes</td>
<td>IS:4736 - 1986</td>
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<td>Pipe Threads</td>
<td>IS: 554 - 1985</td>
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<td>Milleable Iron Fittings</td>
<td>IS:1879 - 1987</td>
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<tr>
<td>Cast Iron Sluice Valves</td>
<td>IS: 780 - 1984</td>
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<tr>
<td>Full Way Valves</td>
<td>IS: 778 - 1984</td>
</tr>
<tr>
<td>Brass Ferrule</td>
<td>IS:2692 - 1978</td>
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</table>
3.0 QUALITY ASSURANCE AND QUALITY CONTROL:

3.1 The work shall conform to high standard of design and workmanship, shall be structurally sound and aesthetically pleasing. Quality standards prescribed shall form the backbone for the quality assurance and quality control system. In case quality standard prescribed does not appear in the quality standard, it shall be taken & considered as per relevant BIS/International standard/Manufacturer standard.

3.2 At the site, the Contractor shall arrange the materials and their stacking/storage in appropriate manner to ensure the quality. Contractor shall provide equipment and manpower to test continuously the quality of material, assemblies etc. as directed by the Client’s Representative. The test shall be conducted continuously and the result of tests maintained. In addition the Contractor shall keep appropriate tools and equipment for checking alignments, levels, slopes and evenness of surface.

3.3 The Client’s Representative shall be free to carry out such tests as may be decided by him at this sole direction, from time to time, in addition to those specified in this Document or Requires by Statutory authority. The Contractor shall provide the samples and labour for collecting the samples. Nothing extra shall be payable to the Contractor for samples or for the collection of the samples.

3.4 The test shall be conducted at Standard Laboratory selected by Client’s Representative. Contractor shall keep the necessary testing equipment such as hydraulic testing machine, smoke testing machine, gauges and other necessary equipment required.

3.5 The Client’s Representative shall transport the samples to the laboratory.

3.6 Testing charges shall be borne by the Contractor.

3.7 Testing may be witnessed by the Contractor or his Authorised Representative. Whether witnessed by the Contractor or not, the test results shall be binding on the Contractor.

3.8 Statutory approvals of drawing and installation of equipment shall be taken by the contractor, from statutory authority/TAC, as required.

4.0 SANITARY FIXTURES & C.P. FITTINGS:

4.1 SCOPE:

4.1.1 Work under this section shall consist of transportation, furnishing, installation, testing and commissioning and all labour as necessary as required to completely install all sanitary fixtures, brass and chromium plated fittings and accessories as required by the drawings and specified hereinafter given in the Bill of Quantities. Or other vise considered essentials to make the installation complete in all respect.

4.2 General Requirements

4.2.1 All fixtures and fittings shall be fixed with all such accessories as are required to complete the item in working condition whether specifically mentioned or not in the Bill of Quantities, specifications, drawings or not.

4.2.2 All fixtures and accessories shall be fixed in accordance with a set pattern matching the tiles or interior finish as per architectural design requirements. Wherever necessary the fittings shall be centered to dimensions and pattern desired.

4.2.3 Fixing screws shall be half round head chromium plated brass with C.P. washers wherever required as per directions of Client’s Representative.

4.2.4 All fittings and fixtures shall be fixed in a neat workmanlike manner true to levels and heights shows
on the drawings and in accordance with the manufacturers recommendations. Care shall be taken to fix all inlet and outlet pipes at correct positions. Faulty locations shall be made good and any damage to the finished floor, wall or ceiling surfaces shall be made good at Contractors cost.

4.2.5 All fixtures of the similar materials shall be by the same manufacturers.

4.2.6 All fittings shall be of the chromium plated materials.

4.3 Without restricting to the generally of the foregoing the sanitary fixtures shall include all sanitary fixtures, C.P. fittings and accessories etc. necessary and required for the building.

4.4 Whether specifically mentioned or not all fixtures and appliances shall be provided with approved fixing devices, nuts, bolts, screws, hangers as required. These supports shall have the necessary adjustment to allow for irregularities in the building area construction.

4.5 For the installation of the CP fittings, teflon tape shall be used.

4.6 EUROPEAN W.C:

4.6.1 European W.C. of glazed vitreous china shall be wash down, single or double siphonic type, floor or wall mounted set, flushed by means of flush valve as specified in Bill of Quantities. Flush pipe/bend shall be connected to the W.C. by means of suitable rubber adopter. Wall hung W.C. shall be supported by C.I. floor mounted chair.

4.6.2 Each W.C. seat cover shall be so fixed that it remains absolutely stationary in vertical position without falling down on the W.C. Seat cover shall be of white solid plastic, elongated open front with heavy duty hinges. Exposed fixture trims shall be Chrome plated, and trims of similar function shall be by the same manufacturer.

4.6.3 Flush valves shall be of the best approved quality procurable with C.P. control valve and C.P. flush pipe.

4.6.4 The flush pipe/bend shall be connected to the WC by means of a suitable rubber adopter.

4.6.5 Dual flushing cistern to be used and shall conform to the requirements of IS:774-1971. High level cisterns shall be of cast iron unless otherwise specified. Low level cistern shall be of the same material as the water closet or as instructed by the Owner/Architect/Consultant. The cisterns shall be mosquito proof & shall fulfill the requirements of the local Authority.

4.6.6 The levels of the WC should be checked by placing spirit level on the W.C. W.C. should be tested on completion of fixing by putting small paper balls and flushing out. If all the paper balls are not flushed out. The fixing will have to be rectified/ re-aligned.

4.7 KITCHEN /PANTRY SINKS:

4.7.1 Sinks shall be of stainless steel material as specified in the Bill of Quantities/Drawings.

4.7.2 Each sink shall be provided with R. S. brackets and clips and securely fixed. Counter top sinks shall be fixed with suitable angle iron clips or brackets as recommended by the manufacturer. Each sink shall be provided with 40 mm dia Chromium Plated waste with chain and plug or P.V.C. waste with Escutcheon plates. Fixing shall be done as directed by Client’s Representative.

4.7.3 Supply fittings for sinks shall be mixing fittings or C.P. taps, angle cocks etc. all as specified in the Bill of Quantities/Drawings.

4.8 WASH BASINS:

4.8.1 Wash basin shall be of white vitreous china of best quality manufactured by an approved firm and sizes as specified in the Bill of Quantities.

4.8.2 Wash basin shall be of under counter drop in type shall be supported on a pair of rolled steel brackets of approved design and shall be mounted on a countertop. So that rim and basin bowl is exposed from top.

4.8.3 Wash basin shall be provided with single lever mixer with chain and rubber plug, chromium plated brass bottle trap of approved quality, design and make where hot water required. Single tap where hot water is not required.

4.8.4 Wash basin shall be fixed at proper location and height and truly horizontal as shown on drawing or as directed by Client’s Representative.
4.9 HOSE BIBB'S:

4.9.1 Hose Bib of Chromium Plate tap is draw off tap with horizontal inlet and free outlet knurling on outer face to fix the hose pipe. Hose bib shall be of specified size and shall be of screw down type and shall conform to IS:781-1984. The closing device shall work by means of a disc carrying a renewable non-metallic washer which shuts against the water pressure on a seating at right angle to the axis of the threaded spindle which operate it. The handle shall be either crutch or butterfly type securely.

4.10 URINALS:
Half stall wall hung urinals of glazed vitreous china shall be provided with 15mm dia, C.P. brass spreader, 32mm dia C.P. domical waste and C.P. cast brass bottle trap with pipe and wall flange and shall fixed to wall by one C.I. bracket and two C.I. clips as recommended by manufacturers complete as directed by the Client’s Representative.

Urinals shall be flushed by means of “NO-TOUCH” infrared operated flush valves.
Waste pipes for urinals shall be any one of the given material as directed by the Client’s Representative:
   a) uPVC Pipes
   b) Rigid PVC/High density polyethylene.

Waste pipes may be exposed on wall or concealed in chase as directed by the Client’s Representative.

4.11 MEASUREMENTS:
4.11.1 Rate for providing and fixing of sanitary fixtures, accessories, urinal partitions shall include all items and operations stated in the respective specifications and Bill of Quantities, and nothing extra is payable.
4.11.2 Rates for all items under specifications para above shall be inclusive of cutting holes and chases and making good the same, C.P. screws, nuts, bolts and any fixing arrangement required.

5.0 WATER SUPPLY:
5.1 SCOPE:
5.1.1 Work under this section consists of furnishing all labour, materials equipment and appliances necessary and required to completely install the water supply system as required by the drawings, specified hereinafter and given in the bill of quantities.
5.1.2 Without restricting to the generality of the foregoing, the water supply system shall include the following:
   i. Pipe protection & painting.
   ii. Connections to all plumbing fixtures, tanks, pumps etc.
   iii. Providing hot water pipe lines and supply point with isolation valves, wherever required.
   iv. Control valves, masonry chambers and other appurtenances.
   v. Connections to all plumbing fixtures, tanks and appliances.
   vi. Excavation and refilling of pipe trenches, wherever necessary.
   vii. Internal galvanized water supply piping inside the toilets shaft/plant room/terrace.
   viii. Testing all line and fixtures as specified.

5.2 GENERAL REQUIREMENTS:
5.2.1 All materials shall be new of the best quality and shall be furnished, delivered, erected, connected and finished in every detail conforming to specifications and subject to the approval of Client’s Representative.
5.2.2 Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workmanlike manner.
5.2.3 Short or long bends shall be used on all main pipe lines as far as possible. Use of elbows shall be restricted for short connections. As far as possible all bends shall be formed by means of hydraulic pipe bending machine for pipes upto 65mm dia.
5.2.4 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. and shall be selected and arranged so as to fit properly into the allocated building space.
5.2.5 Pipes shall be securely fixed to walls by suitable clamps at intervals specified.
5.2.6 Valves and other appurtenances shall be located to provide easy accessibility for operation, maintenance and repairs.
5.2.7 Connection between dissimilar materials.
5.2.8 Drawings illustrating block out and penetration of pipes in the wall/floor/slab.
5.2.9 **Unions**: Contractor shall provide adequate no. of unions on all pipes to enable dismantling later and for servicing. Union shall be provided near each gunmetal valves.

5.3 **INTERNAL & EXTERNAL WORKS:**

5.3.1 **Materials (CPVC pipes, fittings & valves):**
5.3.1.1 All pipes inside the buildings and where specified, outside the building shall be CPVC pipes tubes conforming to Specific Gravity ASTM D 792 at 23°C should be 1.55 as specified. With Tensile Strength as per ASTM D 638 at 23°C should be 55 N/mm²
5.3.1.2 All special fittings and accessories like internally or externally threaded brass adaptors, ball valves, globe valves, unions, diaphragm valves, butterfly valves, etc shall be made of CPVC by Licensee.
5.3.1.3 The CPVC solvent cement used for installing CPVC piping systems shall conform to ASTM F493. Pipes from ½” upto 2” pipes and fittings, single step medium bodied CPVC solvent cement should be used. For CPVC pipes and fittings upwards of 2”, a primer shall be used followed by heavy bodied solvent cement conforming to ASTM F493. PVC solvent cement should not be used.

5.3.2 **Concealed Piping**
All internal concealed plumbing for water supply shall be done with CPVC. The pipes & fittings shall conform to CTS (copper tube size) SDR-11 as per ASTM D2846 OR SDR-13.5. All pipes and fittings from ½” upto 2” shall come under this category. Medium body CPVC solvent cement conforming to ASTM F493 should be used for joining pipes to fittings.

5.3.3 **External Piping:**
All external plumbing for water supply and distribution shall be done with CPVC pipes. The CPVC pipes above 2” for external water supply lines shall conform to ASTM F441 CPVC Schedule 40 & 80 pipe and will be the CPVC brand. The fittings above 2” size shall conform to ASTM F438 (Schedule 40 CPVC fittings) or ASTM F 439 (Schedule 80 CPVC fittings). All threaded CPVC fittings shall conform to ASTM F437 (threaded CPVC fittings schedule). Heavy bodied CPVC solvent cement shall be used along with a primer. IPS brand primer and heavy bodied CPVC solvent cement only should be used conforming to ASTM F493. All external CPVC pipes shall be coated with water based acrylic paint emulsion for enhanced UV protection.

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

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

5.3.6 **Clamps**
CPVC Pipes in shafts and other locations shall be supported by galvanized M.S. clamps of design approved by Project Manager. Pipes in wall chases shall be anchored by G.I. hooks. Pipes at ceiling level shall be supported on structural clamps fabricated from M.S. structuralss. Pipes in typical shafts shall be supported on slotted angles/channels as per standard drawings.

5.3.7 Spacing of clamps, hooks etc. shall be as per good engineering practice approved by the Project Manager.
5.3.8 **Unions**
Contractor shall provide adequate number of unions on pipes 50 mm and below to enable easy dismantling later when required. Unions shall be provided near each gunmetal valve, stop cock, or check valve and on straight runs as necessary at appropriate locations as required and/or directed by Project Manager.

5.3.9 **Testing:**
After laying and jointing, the pipes and fittings shall be inspected under working condition of pressure and flow. Any joint found leaking shall be redone and all leaking pipes removed and replaced without extra cost. Use of any compound or stop leak compound will not permitted. The pipes and fittings after they are laid shall be tested to hydraulic pressure of 1.5 times the working pressure or 7.5 Kg/Sq.cm which ever is more. The pipes shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock or water hammer. The draw of taps and stop cocks shall then be closed and specified hydraulic pressure shall be applied gradually. Pressure gauge must be accurate and preferably should have been recalibrated before the test. The test pump having been stopped, the test pressure should be maintained without loss for at least two hours. The pipes and fittings shall be tested in sections as the work of laying proceeds, having the joints exposed for inspection during the testing.

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

5.5 **VALVES:**
5.5.1 **Butterfly Valves:**
All the isolation valve 50cm and above on the equipment and water lines, where specified or shown on drawings shall be wafer type butterfly valves. They shall be designed to fit without gaskets, the water tight seal being obtained by EPDM seat projection at the faces compressed between the flanges. The valves shall be supplied inclusive of M.S. pipe flanges and high tensile steel bolts of dimensions recommended by suppliers of valves. The valves shall comply with following specifications:

a) Test Pressure : Body 24 Bar, Seat 16 Bar  
b) Valve Component : Material of Construction  
   i) Body : Cast Iron, Gr. FG 260, IS:210  
   ii) Disc : Nylon or Epoxy powder coated high duty iron, Gr. FG 260  
   iii) Stem : Stainless Steel or carbon steel IS:1570, Part-II.  
   iv) Seat : EPDM  
   v) Hand Lever : Cast Iron (Mechanical Memory Stop)  
   vi) Bearings : PTFE or Nylon covered S.S. bush  
   vii) Primary Seal : Reinforced PTEE slide bearings  
   viii) Temperature : 80 Degree C (max.)

5.5.2 **Installation:**
Valve shall be install in a manner that allows future removal and service of the valve. Packing and gasket shall not contain asbestos. The valve shall be of the same size as the pipe to which they are install. Valve above 150mm diameter shall be self locking warm gear type water proof and protory lubricated. Provide chain operators with chain cleats for all valves more than 2.4 meter above floor.
5.5.3 Non Return Valves:
All non-return valves shall be provided as shown in the drawings conforming to relevant Indian Standards and in accordance with the following specifications.

<table>
<thead>
<tr>
<th>Size</th>
<th>Construction</th>
<th>Ends</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upto 50 mm.</td>
<td>Gun metal</td>
<td>Screwed</td>
</tr>
<tr>
<td>65 mm and above</td>
<td>Gun metal/cast iron</td>
<td>Flanged</td>
</tr>
</tbody>
</table>

Non-return valves shall be of approved make. Flap type non-return valve shall be used and tested to 15 Kg/Sq.cm. pressure.

5.5.4 Ball Valves (Float Valve):
The ball valve shall be of high pressure class and shall be confirm to IS:1703 of sizes as specified. The nominal size of a ball valve shall be that corresponding to the size of the pipe to which it is fixed. The ball shall be of brass or gun metal as specified and the float shall be of polythene sheet. The minimum gauge of copper sheet used for making the float shall be 0.45mm for float upto 115mm dia and 0.55mm for float exceeding 115mm dia and shall be special in shape. The valve shall be constructed to permit replacing without console of the valve body from the valve line and the system shall not blow out under pressure. The jointing of the float shall be made by efficiently burnished, lapped and soldered seam or by bracing. Plastic float may also be used if specified. The body of ball valve when assembled in working conditions with the float immersed to not more than half of it's volume shall remain closed against a test pressure of 10.5 Kg/Sq.cm. All ball valves shall be capable of withstanding a pressure of 14 Kg/Sq.cm. The ball valve shall generally conform to IS specifications No. 1703-1962.

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

High Pressure:
Indicated by the abbreviation ‘HP’ for use on mains having pressure. These shall remain closed at a test pressure of 10.5 Kg/Sq.cm.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Nominal Size of Ball Valve</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15mm</td>
</tr>
<tr>
<td>1.</td>
<td>Diameter of spherical float (mm)</td>
</tr>
<tr>
<td></td>
<td>High Pressure</td>
</tr>
<tr>
<td></td>
<td>Low Pressure</td>
</tr>
<tr>
<td></td>
<td>Minimum weight of ball valve including back nut, body and piston (gms)</td>
</tr>
</tbody>
</table>

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

5.5.6 Air Valves:
Air valves shall be provided in all high points in the system to prevent air locks as shown on the drawings or directed by Client’s Representatives.

5.5.7 Testing:
All valves shall be tested while installed in pipe by hydrostatic pressure of 1.5 time of the working pressure 7.5 Kg/Sq.cm which ever is more.

5.5.8 Measurements:
All valves as mentioned in Bill of Quantities shall be measured by numbers and shall include all items mentioned in the Bill of Quantities.
5.6 CHLORINATION OF DOMESTIC WATER LINES:
5.6.1 After the completion of all the hot and cold water service piping, disinfect all the fresh water supply work and water reservoirs using a chlorine solution.

5.6.2 Chlorinated Systems Shall Include:
Domestic fresh water tanks
i. Fire water tanks
ii. All pipe work systems receiving suction from the above mentioned tanks apart from the fire systems.

5.7.3 Before handover of the system, submit to the consultant copies of the certification of performance and laboratory report (if required)
5.7.4 Under no circumstances the use of any portion of the fresh water system until it is properly disinfected, flushed and certified shall be permitted.
5.7.5 During the Chlorination work the Contractor shall take all necessary precautions to prevent site staff from drinking the system water. Such precautions shall include looking doors to ‘wet’ areas and providing warning signs in English and Hindi

6.0 INTERNAL DRAINAGE: (SOIL, WASTE, VENT AND RAIN WATER PIPES)

6.1 SCOPE:
6.1.1 Work under this section shall consist of furnishing all labour, materials, equipment and appliances necessary and required to completely install all soil, waste, vent and rainwater pipes as required by the drawings, specified hereinafter and given in the Bill of Quantities.
6.1.2 Without restricting to the generality of the foregoing, the soil, waste, vent and rainwater pipes system shall include the followings:-
   i. UPVC vertical and horizontal soil, waste and vent pipes, rainwater pipes and fittings, joints clamps and connections to fixtures.
   ii. Floor traps, floor drain clean out plugs, inlet fittings and rainwater roof drain, area/local drains, trench drain.
   iii. Waste pipes connections from all fixtures e.g. wash basins, sinks, kitchen equipment.
   iv. Testing of all pipes.
   v. Connection of main.

6.2 GENERAL REQUIREMENTS
6.2.1 All materials shall be new of the best quality conforming to specifications and subject to the approval of Client’s Representative.
6.2.2 Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workmanlike manner.
6.2.3 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.
6.2.4 Pipes shall be securely fixed to walls by suitable clamps at intervals specified.
6.2.5 Access doors for fittings and cleanouts shall be so located that they are easily accessible for repair and maintenance.
6.2.6 All works shall be executed as directed by Client’s Representative.

6.3.7 Pipes, Hangers, Supports, Clamps, Brackets etc.:  
All vertical pipes shall be fixed by M.S. Clamps truly vertical. Branch pipes shall be connected to the stack at the same angle as that of the fittings. No collars shall be used on vertical stacks. Each stack shall be terminated at top with a cowl (terminal guard). Inclined pipes running along ceiling shall be fixed on M.S. adjustable hangers of special design shown on the drawings or as directed. Pipes shall be laid to uniform slope and the hangers adjusted to the proper levels so that the pipes fully rest on them. M.S. clamps shall be of standard design and fabricated from M.S. flat 40mm x 3mm x 3mm thick. They shall be painted with two coats of black bitumen paint before fixing. Structural clamps shall be fabricated from M.S. structural members e.g. rods, angles, channels, flats, as per detailed drawing or as directed. Contractor shall provide all nuts, bolts, welding and paint the clamps with one coat of red oxide. Wooden saddles shall be provided free of cost. Slotted angle/channel supports on walls shall be provided wherever shown on drawings or as
required. Angles/channels shall be fixed to brick walls and bolts embedded in cement concrete blocks and to RCC walls with suitable anchor fasteners. Holes required in RCC walls shall be neatly drilled by electric drills and no manual chiseling will be allowed. The spacing of supports horizontally shall not exceed 1.8 M. Wherever M.S. clamps are required to be anchored directly to brick walls, concrete slabs, beams or columns, nothing extra shall be payable for clamping arrangement and for making good with cement concrete 1:2:4 (mix 1 cement :2 coarse sand :4 stone aggregate 20mm nominal size) as directed by the Client’s Representative.

6.3.8 Testing:
All pipe work shall be tested before connecting any appliances and then again after connection of appliances. Pipe shall be tested after installation by one of the test given below as directed by the Client’s Representative.

Before use at site, all u-PVC soil pipes shall be tested by filling up with water for at least 10 minutes at 3 meter head. After filling, pipes shall be struck with a hammer and inspected for blow holes and cracks. All defective pipes shall be rejected and removed from the site within 48 hours.

Water Test:
Pipes shall be tested after installation by filling up the stack with water. All openings and connections shall be suitable plugged. The total head in the stack shall however not exceed 3 M. The level of water in the stack shall not drop within 8 hours. If there is a drop in level of water the leak shall be detected and rectified and test shall be re-conducted until satisfactory result is achieved.

Smoke Test:
Contractor may test all soil and waste stacks by a smoke testing machine. Smoke shall be pumped into the stack after plugging all inlet and outlet connections. The stack shall then be observed for leakages and all defective pipes and fittings removed or repaired as directed by the Client’s Representative.

6.3.9 UPVC Pipes and Fittings:
The pipes shall be round and shall be supplied in straight lengths with socketed ends. The internal and external surfaces of pipes shall be smooth, clean, free from groovings and other defects. The ends shall be cleanly cut and square with the axis of the pipe. The pipes shall be designated by external diameter and shall conform to IS:4985-1981.

<table>
<thead>
<tr>
<th>Outer Dia (mm)</th>
<th>Pressure (Kg/cm²)</th>
<th>Inner Dia (mm)</th>
<th>Weight/Mt(Kg.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>4</td>
<td>104.5</td>
<td>1.315</td>
</tr>
<tr>
<td>125</td>
<td>4</td>
<td>118.7</td>
<td>1.712</td>
</tr>
<tr>
<td>140</td>
<td>4</td>
<td>133.0</td>
<td>2.131</td>
</tr>
<tr>
<td>160</td>
<td>4</td>
<td>152.0</td>
<td>2.783</td>
</tr>
<tr>
<td>180</td>
<td>4</td>
<td>175.9</td>
<td>3.560</td>
</tr>
<tr>
<td>200</td>
<td>2</td>
<td>190.1</td>
<td>4.526</td>
</tr>
<tr>
<td>225</td>
<td>4</td>
<td>213.8</td>
<td>5.480</td>
</tr>
</tbody>
</table>

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

Laying and Jointing:
The pipes shall be laid and clamped to wooden plugs fixed above the surface of the wall. Alternatively plastic clamps of suitable designs shall be preferred. Provision shall be made for the effect of thermal movement by not gripping or disturbing the pipe at supports between the anchors for suspended pipes. The supports shall allow the repeated movements to take place without abrasion. Jointing for UPVC pipes shall be made by means of solvent cement for horizontal lines and ‘O’ rubber ring for vertical line. The type of joint shall be used as per site conditions/direction of the Client’s Representative. Where UPVC pipes are to be used for rain water pipes, the pipe shall be finished with CPVC adopter for insertion in the R.C.C. slab for a water proof joint complete as directed by Client’s Representative.
Supports:
UPVC pipes require supports at close intervals. Recommended support spacing for unplasticised PVC pipes is 1400 mm for pipes 50 mm dia and above. Pipes shall be aligned properly before fixing them on the wooden plugs with clamps. Even if the wooden plugs are fixed using a plumb line, pipe shall also be checked for its alignment before clamping, piping shall be properly supported on, or suspended from clamps, hangers as specified and as required. The Contractor shall adequately design all the brackets, saddles, anchors, clamps and hangers and be responsible for their structural sufficiency. Pipe supports shall be primer coated with rust preventive paint.

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

Testing:
All lengths of PVC rain water pipes shall be fully tested for water tightness by means of water test maintained for not less than 30 minutes. All pipes shall be subjected to a test pressure of at least 1.5 metre head of water head. The test pressure shall, however, not exceed 6 meter head at any point. The pipes shall be plugged preferably with standard design plugs with rubber plugs on both ends. The upper end shall, however, be connected to a pipe for filling with water and getting the required head.

6.3.10 Waste Pipe from Appliances:
i) Waste pipe from appliances e.g. wash basins, sinks, urinals, chrome plate where seen water coolers shall be of galvanized steel (heavy class) conforming to IS:1239-1979.
ii) All pipes shall be fixed in gradient towards the outfalls of drains. Pipes inside a toilet room shall be in chase unless otherwise shown on drawings. Where required pipes may be run at ceiling level in suitable gradient and supported on structural clamps. Spacing for clamps for such pipes shall be as follows:

<table>
<thead>
<tr>
<th>Vertical</th>
<th>Horizontal</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.V.C. Pipes</td>
<td>180 cms</td>
</tr>
</tbody>
</table>

6.3.11 Measurements:
UPVC/CPVC waste/soil, waste, vent and rain water pipes shall be measured over all along the centre line correct to a centimeter including all fittings along its length. The rate for these pipes shall be inclusive of all fittings, holder bat clamps, lead caulked joint for UPVC and cement joints for UPVC and all other items described in the Bill or Quantities. The portion of the pipe within the collar for C.I/UPVC pipe at the joint shall not be included in the length of the pipe work.

6.4 TRAPS:
6.4.1 Nahani Trap or Floor Traps:
Nahani traps or floor traps shall be cast iron, deep seal with an effective seal of 50 mm. The trap and waste pipes shall be set in cement concrete blocks firmly supported on the structural floor. The blocks shall be in 1:2:3 mix (1 cement: 2 coarse sand: 4 stone aggregate 20 mm nominal size) mixed with water proof compound and extended to 40 mm below finished floor level. Contractor shall provide all necessary shuttering and centering for the blocks. Size of the block shall be 30 x 30 cms. of the required depth. The trap shall be installed at lowest point ensure no ponding occurs at perimeters of the drain.

6.5 Floor Trap Inlet
Bath room traps and connections shall ensure free and silent flow of discharging water. Where specified, the Contractor shall provide a special type galvanized iron inlet fitting without or with one, two or three inlet sockets to receive the waste pipe. Joint between waste and fitting shall be connected to a UPVC ‘P’ or ‘S’ trap with at least 50mm seal traps shall be paid for separately. Floor trap inlet fittings and the trap shall be set in cement concrete blocks.
6.6 C.P./Stainless Steel Gratings
Floor and Urinal traps shall be provided with 100-150mm square or round C.P./Stainless steel grating as approved by Client’s Representative with rim of approved design and shape. Minimum thickness shall be 4-5mm or as specified in the Bill of Quantities.

6.7 Cleanout Plugs:
Contractor shall provide cast brass cleanout plugs in all horizontal run more than 15 mtr length required one cleanout plugs shall be threaded and provided with key holes for opening. Cleanout plugs shall be fixed to the pipe by a CPVC socket and lead caulked joint.

6.8 Pipe Sleeves:
Pipe sleeves 50mm larger diameter than pipes shall be provided wherever pipes pass through walls and slabs and annular space filled with fire proof materials like putty, fire seal etc. All pipes shall be accurately cut to the required sizes in accordance with relevant BIS codes and burs removed before laying. Open ends of the pipe shall be closed as the pipe is installed to avoid entrance of foreign matters. Vertical sleeve shall finish 50mm above finish floor level.

7.0 EXTERNAL DRAINAGE SYSTEM : (SEWERAGE & STORM WATER):

7.1 SCOPE:
i. Work under this section shall consist of furnishing all labour, materials, equipment and appliances necessary and required to completely install the drainage system as required by the drawings and specified hereinafter or given in the Bill of Quantities.

ii. Without restricting to the generality of the foregoing, the drainage system shall include: Sewer lines including excavations, pipe lines, man holes, drop connections, underground storm water drains, including pipes, man holes, catch basins and open drains, thrust blocks.

7.2 GENERAL REQUIREMENTS:
All materials shall be new of the best quality conforming to specifications and subject to the approval of the Client’s Representatives. Drainage lines shall be laid to the required gradients and profiles. All drainage work shall be done in accordance with the local municipal bye-laws. Contractor shall obtain necessary approval and permission for the drainage system from the municipal or any other competent authority and also existing invert levels required to enter sanitary system. Location of all manholes, catch basins, etc. shall be confirmed by the Client’s Representatives before the actual execution of work at site. All excavation, trenches etc shall be barricaded as per instruction of the Client’s Representatives. All works shall be executed as directed by the Client’s Representatives.

7.3 TRENCHES FOR PIPE & DRAINS:
7.3.1 Alignment and Grade:
The drains are to be laid to alignment and gradients in continuous shown on the drawings but subject to such modifications, as shall be ordered by the Client’s Representative from time to time to meet the requirements of the works. No deviations from the line, depths of cutting or gradients of sewers shown in the plans and sections shall be permitted except by the express direction in writing of the Client’s Representative.

7.3.2 Opening out Trenches:
In excavating the trenches at the road metaling, pavement kerbing etc. are to be placed on one side and preserved for rein statement when the trench or other excavation shall be filled-up. Before any road metal is replaced, it shall be carefully shifted. The surface of all trenches and holes shall be restored and maintained to the satisfaction of the Client’s Representative. The Contractor shall not cut or break down any live fence or trees in the line of the proposed works but shall tunnel under them unless the Client’s Representative shall order to the contrary. Trench to be excavated to alignment + depth required. Trench to be properly dressed and de-watered. Trench shall be kept free of water at all time. Discharge of water shall be into nearest drainage channel not on the road.
All under ground pipe to be laid in trench. Pipes to be laid and maintained at required levels and grade during course of work. All joints to be aligned and complete. Trench shall be of 450mm wide than pipe. Concrete anchors at change in direction for C.I. pipe shall be provided. Pipe shall be rest on cushion in the trench. The Contractor shall scrub up and clear the surface over the trenches and other excavations of all stumps, roots and all other encumbrances affecting execution of the work and shall remove them from the site to the approval of the Client’s Representative.

7.3.3 Construction Across the Roads:
All the pipe line or drain crossing existing road, the road crossing shall be excavated at a time, the second half being commenced after the pipes have been laid in the first half and the trench refilled. Necessary safety measure for traffic as directed shall be adopted. All type of pipes, water mains, cables etc. met within the course of excavation shall be carefully protected and supported. Care shall be taken not to disturb the electrical and communication cable removal of which is necessary, shall be arranged by the Client’s Representative or the Contractor shall arrange to support and protect them during excavation.

7.3.4 Excavation to be Taken to Proper Depth:
The trenches shall be excavated to such depth and width that the sewers pipe shall rest on cushion so that the inverts may be at the levels given on the section/plan. In bad ground the Client’s Representative may order the Contractor to excavate to a greater depth than that shown on the drawings and to fill up the excavation to the level of the sewer with such materials as decided by Client’s Representative in writing.

7.3.5 Refilling:
The filling shall be done in layers not exceeding 15mm in depth. Each layer shall be watered, rammed and consolidated. Ramming shall be done with iron rammers where possible and with blunt end of the crow brass where rammers can not be used. Special care shall be taken to ensure that no damage is caused to the pipes, drains, masonry or concrete in the trenches. Filling in trenches shall be commenced soon after the joints of pipes, cables, conduits etc. have been tested and approved by Client’s Representative. The space around the pipes shall be cleared of all debris where the trenches are excavated in hard/soft soil. The filling shall be done with earth on the sides and tops of pipes in layers not exceeding 15mm in depth. Each layer shall be watered rammed and consolidated. The clods and lumps of earth exceeding 8cm in any direction shall be broken or removed before the excavated earth is used for filling. Generally no test is done to determine the instu diversity of filled earth but on the discretion of Client’s Representative the 95 proctor’s compaction test may be done to ensure the in situ density after filling. Consolidation is removal of water from the pores and compaction is the explosion of air from the pores. In case of refilling consolidation places most important role as the watering of the each layer is being done properly. If required by the Client’s Representative proctors needle may also be used for the proper checking of the refilling items of in situ density.

7.3.6 Contractor Shall Restore Settlement and Damages:
The Contractor shall at his own cost make good promptly during the whole period the works are in hand, any settlements that may occur in the surfaces or roads, beams, footpaths, gardens, open spaces etc. Whether public or private caused by his trenches or by his other excavations due to not using the method of compaction as given in clause 7.3.5 and he shall be liable for any accidents caused thereby. He shall also at his own expense and charges, repair and make good any damage done to the building and other properties.
7.3.7 Disposal of Surplus Soil:

The Contractor shall at his own cost and charge, dispose off from the site all surplus excavated material not required to be used on the works.

i. The width of excavated trench shall be as per table given below:

<table>
<thead>
<tr>
<th>Excavation upto</th>
<th>Upto 100 mm dia pipe</th>
<th>Upto 150 mm dia pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 cms depth</td>
<td>33 cms</td>
<td>33 cms</td>
</tr>
<tr>
<td>90 - 150 cms depth</td>
<td>60 cms</td>
<td>60 cms</td>
</tr>
<tr>
<td>150 - 300 cms depth</td>
<td>75 cms</td>
<td>75 cms</td>
</tr>
<tr>
<td>300 - 500 cms depth</td>
<td>90 cms</td>
<td>100 cms</td>
</tr>
</tbody>
</table>

7.3.8 Protection of Existing Services:

All pipes, water mains, cables etc encountered in the course of excavation shall be carefully protected and supported. In case of any damage caused the same shall be made good at no extra cost failing which necessary works will be carried out by the Clients Representative and contract charged to the Contractor.

7.4 RCC PIPES:

7.4.1 All underground storm water drainage pipes and sewer lines where specified (other than those specified cast iron) shall be centrifugally spun RCC pipes NP2 for general and NP3 where road crossing. Pipes shall be true and straight with uniform bore throughout. Cracked, wrapped pipes shall not be used on the work. All pipes shall be tested by the manufacturer and the Contractor shall produce, prior to use on site, a certificate to that effect from the manufacturer. The pipes shall be with or without reinforcement as required and of the class as specified. These shall conform to IS:458 - 1971. The reinforced cement concrete pipes shall be manufactured by centrifugal (or spun) process. All pipes shall be true to shape, straight, perfectly sound and free from cracks and flaws. The external and internal surface of the pipes shall be smooth and hard. The pipes shall be free from defects resulting from imperfect grading of the aggregate mixing or moulding. The pipes shall be R.C.C. light duty, NP2 and NP3 type.

7.4.2 Laying:

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

7.4.3 Jointing: (Rigid Spigot and Socket Joint):

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

7.4.4 Curing:

The joint shall be cured for at least seven days.
7.4.5 Cement Concrete for Pipe Supports:
   a) Unless otherwise directed by the Client’s Representative cement concrete for bed, all round or in
      haunches shall be laid as follows:

<table>
<thead>
<tr>
<th></th>
<th>Upto 1.5m depth (5’)</th>
<th>Upto 3m depth (10’)</th>
<th>Beyond 3m depth (10’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipes in open ground (no sub soil water)</td>
<td>all round (1:5:10)</td>
<td>in haunches (1:3:6)</td>
<td>all round (1:5:10)</td>
</tr>
<tr>
<td>RCC/C.I pipes in sub soil water</td>
<td>all round (1:3:6)</td>
<td>in haunches (1:3:6)</td>
<td>in haunches (1:3:6)</td>
</tr>
<tr>
<td>RCC/C.I. pipes (in all conditions)</td>
<td>all round (1:3:6)</td>
<td>in haunches (1:3:6)</td>
<td>in haunches (1:3:6)</td>
</tr>
<tr>
<td>RCC/C.I pipes under road or building</td>
<td>all round (1:3:6)</td>
<td>all round (1:3:6)</td>
<td>all round (1:3:6)</td>
</tr>
</tbody>
</table>

b) RCC pipes or CI pipes may be supported on brick masonry or pre-cast RCC or in situ cradles. Cradles shall be as shown on the drawings.

c) Pipes in loose soil or above ground shall be supported on brick or stone masonry pillars as shown on the drawings.

7.4.6 Testing:
All lengths of the sewer and drain shall be fully tested for water tightness by means of water head maintained for not less than 30 minutes. Testing shall be carried out from manhole to manhole. All pipes shall be subjected to a test pressure of at least 1.5 metres head of water at the highest point of the section under test. The pipes shall be plugged preferably with standard drain plugs (with rubber rings) on both ends. The upper end shall, however, be connected to a pipe for filling with water and getting the required head. Permissible drops in water head should not exceed ……………………….

7.4.7 Measurement:
   a) Excavation: Measurement for excavation of pipes trenches shall be made per linear meter.
   b) Trenches shall be measurement between outside walls of manholes at top and the depth shall be the average depth between the two ends to the nearest cm. The rate quoted shall be for a depth upto 1.5 metre or as given in the Bill of Quantities.

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

c) RCC pipes shall be measured for the length of the pipe line per linear meter i.e.:
   i. Length between manholes shall be recorded from inside of one manhole to inside of other manhole.
   ii. Length between gully trap and manhole shall be recorded between socket of pipe near gully trap and inside of manhole.

7.5 Sewer Appurtenances:
   Inspection Chambers and Manholes:

   i. Size of Chambers/Manholes:
      The size given in Bill of Quantities and drawings shall be internal finished size of chamber. The work shall be done strictly as per standard drawing and following specifications.

   ii. Bed Concrete:
      Shall be in 1:4:8 cement concrete 200 mm thick.

   iii. Brick Work:
      Brick work shall be with best quality bricks in 1:6 cement mortar.

   iv. Plaster:
      Inside of the walls of chamber/manhole shall be plastered with 12/15 mm thick cement plaster
1:3 (1 cement :3 coarse sand) and finished smooth with a floating coat of neat cement. Manholes shall be plastered from outside as above but with rough plaster. Water proofing compound as approved by the Client’s Representative shall be added in the cement sand mortar ratio as specified by manufacturer.

v. **Benching:**
Channel and benching shall be done in cement concrete 1:2:4 rendered smooth with neat cement. The following depth of channel and benching shall be adopted:

<table>
<thead>
<tr>
<th>Size of Drain</th>
<th>Top of channel at the centre above at side bed conc.</th>
<th>Depth of benching walls above bed conc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 cm</td>
<td>15 cm</td>
<td>20 cm</td>
</tr>
<tr>
<td>15 cm</td>
<td>20 cm</td>
<td>30 cm</td>
</tr>
<tr>
<td>20 cm</td>
<td>25 cm</td>
<td>35 cm</td>
</tr>
<tr>
<td>25 cm</td>
<td>30 cm</td>
<td>40 cm</td>
</tr>
<tr>
<td>30 cm</td>
<td>35 cm</td>
<td>45 cm</td>
</tr>
</tbody>
</table>

**Manhole Covers and Frames:**

The covers and frames shall conform to IS:1726-1960 and shall be of the following grades and types:

a) **Heavy Duty:**
   These shall be denoted by the letters ‘HD’ circular solid type for use under heavy vehicular traffic conditions.

b) **Medium Duty:**
   These shall be denoted by the letter ‘MD’ circular or rectangular solid type for use under light traffic conditions such as foot paths, carriage drives and cycle tracks.

c) **Light Duty:**
   These shall be denoted by the letters ‘LD’ or rectangular size for use in domestic premises of where they are not subjected to wheeled traffic loads.

The covers and frames shall be leanly cast and they shall be free from air and sand holes and from cold shuts. They shall be nearly dressed and carefully trimmed. All castings shall be free from voids whether due to shrinkage gas inclusion or other causes. Covers shall have a raised chequered design on the top surface to provide an adequate non-slip grip.

The covers shall be capable of easy opening and closing and it shall be fitted in the frame in workmanship like manner. The cover shall be gas tight and water tight.

The size of covers specified shall be taken as the clear internal dimensions of the frame. The approximate weights of the various type of manhole covers and frames shall be as in table given below:

<table>
<thead>
<tr>
<th>Description of C.I. Manhole Cover</th>
<th>Weight of Cover Kg.</th>
<th>Weight of Frame Kg.</th>
<th>Total Weight of Cover and Frame Kg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD 560 mm dia</td>
<td>108</td>
<td>100</td>
<td>208</td>
</tr>
<tr>
<td>LD, rectangular</td>
<td>23</td>
<td>15</td>
<td>38</td>
</tr>
<tr>
<td>455x610mm (single seal)</td>
<td>58</td>
<td>58</td>
<td>116</td>
</tr>
</tbody>
</table>

2 ½% variation in weight shall be permissible on either side. Covers and frames shall be coated with a black bituminous composition. The coating shall be smooth tepacious. It shall not flow when exposed to a temperature of 63 Deg. and shall not be brittle as to chip off temp. of 0 Deg. C.

The frame of manhole cover shall be firmly embedded to correct alignment and levels in RCC slab or plain concrete, as the case may be on the top of the masonry. After completion of the work, manhole covers shall be sealed by means of thick grease.
vii. **Foot Rests:**

All manholes deeper more than 0.6 m shall be provided with plastic foot rests (Polypropylene is injection moulded around a 12mm dia steel reinforcing bar). These shall be embedded 20cm, deep with 20 x 20 x 10cm blocks of cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20cm, nominal size). The block with plastic foot rest placed its centre shall be cast in situ along the masonry and surface finished with 12mm thick cement plaster 1:3 (1 cement : 3 coarse sand) finished smooth.

viii. **All cast iron and Mild Steel items shall be provided with two coats of bitumastic paint.**

**Measurement:**

Manhole shall be measured in numbers as indicated in the Bill of Quantity. The depth of manhole shall be measured from invert of channel to the top of manhole cover. Quoted rate shall cover the range of ± 0.24 metre on the depth specified in schedule and also the cost of items specified in the Bill of Quantities and Specifications viz.

- Bed concrete.
- Brick work.
- Plastering.
- R.C.C. top slab, benching and channeling including drop connections.
- Supply and fix M.S. foot rests.
- Keeping holes and embedding pipes for all the connections.
- Excavation, refilling, necessary dewatering and disposing off surplus soil to a place as directed by Client’s Representative.
- Curing.
- Cost of frame and cast iron cover including reinforcement, angle frame and embedding the frame in concrete bed.
- Testing.
- De-watering of chambers.

**Gully Trap:**

Gully traps shall be fixed in cement concrete 1:5:10 mix and a brick masonry chamber 30 x 30cms C.I. sealed cover and frame weighting not less than 7.3 Kgs to be constructed as per standard drawings. Where necessary, sealed cover shall be replaced with C.I. grating of the same size (1 cement : 5 coarse sand : 10 stone aggregate : 40mm nominal size).

**Measurements:**

Gully traps shall be measured by the number and rate which shall include all excavation, foundation, concrete, brick masonry, cement plaster inside and outside, CI grating and sealed cover and frame.

### 7.6 DROP CONNECTIONS:

**7.6.1** In case where branch pipe sewer enters the manhole of main sewer, a drop connection should be provided. H.C.I. pipes and specials conforming to IS:1729-1964 as revised from time to IS:1729-1964 as revised from time to time shall be of the size same as of the branch pipe sewer.

For 150 x 250mm main line, if the difference in level between the water line (peak-flow-level) and the invert level of branch line is less than 60cm, a drop connection may be provided within the manhole by giving ramp. If the difference in level is more than 60 cm the drop should be provided externally.

**7.6.2** Excavation:

The excavation shall be done for the drop connection at the place where the branch line meets the manhole. The excavation shall be carried up to the bed concrete of the manhole and to the full width of the branch line.

**7.6.3** Laying:

At the ends of branch sewer line Cast Iron tee shall be fixed to the line which shall be extended through wall of the manhole by horizontal piece of Cast Iron pipe form an inspection on cleaning eye, the open end shall be provided with chain and lid. The Cast Iron drop pipe shall be connected to the tee at the top and to Cast Iron bend at the bottom. The end shall be extended through the wall of the manhole by a piece of Cast Iron pipe which shall discharge into the channel. Necessary channel shall
be made with cement concrete 1:2:4 (1 cement :2 coarse sand :4 graded stone aggregate to 20mm nominal size) and finished smooth to connect the main channel. The joint between Cast Iron pipe to fittings shall be lead caulked. The joint between Cast Iron tee and RCC branch line shall be made with cement mortar 1:1 (1 cement :1 fine sand). The exposed portion of the drop connection shall be encased around with minimum 15 cm thick concrete 1:3:6 (1 cement :3 fine sand :6 graded stone aggregate 40mm nominal size) and cured. For encasing the concrete around the drop connection, necessary centering and shuttering shall be provided.

The holes made in the walls of manholes shall be made good with brick work in cement mortar 1:5 (1 cement :5 fine sand) and plastered with cement mortar 1:3 (1 cement :3 coarse sand) on the inside of the manhole wall. The excavated earth shall be back filled in the trench in level with the original ground level.

7.7 Making Connections:
The Contractor shall connect the new sewer line to the existing manhole by cutting the walls, benching and restoring them to the original conditions. A new channel shall be cut in the benching of the existing manhole for a new connections. The Contractor shall remove all sewage and water if encountered in making the connection without additional cost to the Owner.

7.7.1 Measurements:
Item for making connection to municipal sewer shall be paid for by number and shall include all items given in the Bill of Quantities.

8.0 TUBE WELL:

8.1 Scope:
Work under this section shall consist of providing materials and labour necessary and required for boring of tube well as per drawings and specified hereinafter in the Schedule of Quantities. Whether specifically mentioned or not, all fixtures, fittings and appliances shall be provided with necessary devices as required.

8.2 General Requirements:
8.2.1 The work in general shall comprise of the following operations:
a) Obtaining any approval from the Municipal or other relevant authorities for sinking of the tube well.
b) Boring the necessary hole of required dia with sinking of necessary casing pipe and removal of the same after the work is over or completing the bore to required depth without casing pipe.
c) Shrouding with graded gravel around the slotted, blind and housing pipes as described in the schedule.
d) Giving yield tests as directed by the Owner and other works as described in the schedule. Tube well yield shall be minimum capacity 20 m³/hour, or as stated in Schedule of Quantities.
e) The entire work shall be carried out in a workman like manner and strictly in accordance with IS:2800.
f) The boring of the tube well shall be done by rotary/percussion or any standard method by means of drilling rig or manually subject to site conditions.
g) The tube well pipe shall be shrouded with pea gravel of size 1/6” to 3/16” size.

8.2.2 The rates quoted shall be as per running metre depth of boring through the soils. The casing pipe will not be paid for and will be the property of the contractors. No compensation will be paid for the casing pipe if left within the ground or after commissioning of the tube well.

8.2.3 The Contractor shall make his own arrangement for the supply of water and power necessary for the work and workman.

8.2.4 All other necessary materials and equipment shall be arranged by the Contractor without any additional cost to the Owner.

8.2.5 In case it is necessary to abandon (with approval of the Owner) the tube well at any stage of construction, no payment will be made to the Contractor for the transport of his plant and equipment for boring and sinking of casing pipe. No compensation on any account is admissible in this regard.
8.2.6 The Contractor shall not be entitled for any compensation for delay of completion on account of any break-down or dropping of tools, tackle in the bore hole or the time of lowering housing pipe/blind/slotted pipe or lifting the casing pipe.

8.2.7 The time for completion shall be two months from the date of placing firm order.

8.3 Performance Guarantee:
The contractor shall guarantee the system to maintain flow requirements as per the specifications and drawings.

8.4 Information to be furnished by the Tenderer:
The tenderer shall furnish the following information:

i) Method of drilling adopted

ii) Date of starting drilling

iii) Date of completion

iv) Pilot hole or test hole

<table>
<thead>
<tr>
<th>Bit Type</th>
<th>Bit Size</th>
<th>hours from To</th>
</tr>
</thead>
<tbody>
<tr>
<td>v) Boring done</td>
<td>Bit Type</td>
<td>Bit Size</td>
</tr>
<tr>
<td>vi) Reemining</td>
<td>Bit Type</td>
<td>Bit Size</td>
</tr>
<tr>
<td>vii) Lithological log</td>
<td>from</td>
<td>to formation</td>
</tr>
<tr>
<td>viii) Assembly of production well</td>
<td>Length</td>
<td>Type</td>
</tr>
<tr>
<td></td>
<td>Perforation per meter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Housing pipe</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blind pipe</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strainer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bail Plug</td>
<td></td>
</tr>
</tbody>
</table>

ix) Type of tube well/above/below ground level

x) Size of gravel

xi) Method used for development

xii) Total hours of development

xiii) Total hours of testing

xiv) Stage draw down test:

<table>
<thead>
<tr>
<th>Speed RPM</th>
<th>Discharge</th>
<th>Period run</th>
</tr>
</thead>
<tbody>
<tr>
<td>xiv) Aquifer performance test:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time of test</td>
<td>Spend</td>
<td>Rev/minutes</td>
</tr>
<tr>
<td></td>
<td>LPM</td>
<td>Discharge</td>
</tr>
<tr>
<td>xv) Static water level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xvi) Rated discharge in litres/minute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xvii) Depression head of the production well</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xviii) Sand contents at the rate of discharge after 20 minutes of the start of pump</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xix) Sand contents in RPM at 1.5 times the normal depression after 20 minutes of the start of pump.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xx) Sand contents in RPM @ 20% in excess of rated</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
discharge, if 50% extra depression cannot be arranged.

xxi) Samples of starts neatly packed in sample bags (They shall be obtained from the bore hole and collected in glass jars indicating the depth at which it is encountered).

xxii) Chart of pipe assembly lowered – state the variations in diameter of pipe at different depths.

xxiii) Results of mechanical analysis of samples of unconsolidated starts.

xxiv) Verticity test on prescribed form.

xxv) Physical/Chemical and bacteriological analysis of tube well water.

9.0 RAIN WATER HARVESTING:

9.1 General:
9.1.1 Surface water is inadequate to meet our daily water demand and we have to depend on ground water. Due to rapid urbanization, infiltration of rain water into the sub-soil has decreased drastically and recharging of ground water has diminished. The result of this in decline in water levels in most of the country.

9.1.2 Two overcome with the problem mentioned above. The right solution is to use the rain water harvesting techniques.

9.2 Definition of Water Harvesting:
9.2.1 In scientific terms, water harvesting refers to collection and storage of main water and also other activities aimed at harvesting surface and ground water, prevention of losses through evaporation and seepage and all other hydrological studies and engineering interventions, aimed at conservation and efficient utilization of the limited water endowment of physiographic unit such as a water shed.

9.2.2 In general, water harvesting is the activity of direct collection of rain water. The rain water from the roof or from the surface can be directly stored for direct use or can be recharged in the ground water.

9.2.3 Most of the people are not aware that the rain water is the first form of water in the hydrological cycle, hence is a primary source of water for us. The other source like rivers, lakes and groundwater are all secondary source of water. In present times, we depend entirely on such secondary sources of water. In the process, it is forgotten that rain is the ultimate source that feed the water to all the secondary sources and remain ignorant of its value. Water harvesting means to understand the value of rain and to make optimum of rain water at the place where it falls.

9.3 Necessity of Water Harvesting:
9.3.1 In India there is a lot of rain, yet there is no water. The annual rainfall over India is higher compared to the global average rainfall. However, this rainfall occurs during short spells of high intensity. Due to such high intensities and short duration of heavy rain, most of the rain falling on the surface tends to flow away rapidly to these secondary sources as mentioned above, and very little rain water is left for the recharging of the ground water.

9.3.2 It is necessary to implement measures to ensure that rain falling over a region is tapped as much as possible through water harvesting, either by recharging it into the ground water aquifers or storing it for direct use.

9.4 Amount of Water Harvested:
9.4.1 The total amount of water that is received in the form of rainfall over an area is called rain water endowment of the area. Now out of this the amount that can be effectively harvesting is called the water harvesting potential. Water harvesting potential is rainfall (mm) x collection efficiency.

9.4.2 The collection efficiency accounts for the fact that all the rain water falling over an area cannot be effectively harvested because of evaporation, spillage etc. Factor like runoff coefficient and the first flush wastage are taken into account when estimating the collection efficiency.

9.5 Advantages of Rain Water Harvesting:
9.5.1 The advantages by adopting Rain Water Harvesting is as under:
i) Provides self-sufficiency to water supply system.
ii) Reduce the cost for pumping of ground water.
iii) Provides high quality water, soft and low in minerals.
iv) Improves the quality of ground water through dilution when recharged to ground water.
v) Reduces soil erosion in urban areas.
vi) The roof top rain water harvesting is less expensive.
vii) Rain Water harvesting system is simple which can be adopted by individuals.
viii) An ideal solution of water problem in areas having inadequate water resources.
ix) Reduces the runoff which chokes the storm water drains.

9.6 Method of Rain Water Harvesting:
9.6.1 The method of rain water harvesting are of two types. One by storage of rain water on surface for future use. Second by recharging to ground water.
9.6.2 The storage of rain water on surface is a traditional technique and structures used were underground tanks, ponds, check dams, weirs etc. and recharge to ground water is a new concept of rain water harvesting and name of few of them are recharge pits, trenches, dug wells, hand pumps, recharge wells, recharge shafts, lateral shaft and borewells shaft with borewells etc.
TECHNICAL SPECIFICATIONS

INTERNAL ELECTRICAL WORKS

Internal & External electrical works will be carried out as per CPWD specifications and will be paid accordingly.

A. CABLES

MEDIUM VOLTAGE 1.1 kV GRADE XLPE INSULATED / PVC INSULATED CABLES

1. GENERAL

The MV cables shall be supplied, inspected, laid, tested and commissioned in accordance with drawings, Specifications, relevant Indian Standard and cable manufacturer's instruction.

2. MATERIAL

Specifications of PVC insulated, sheathed aluminum / copper conductor cable shall be as follows:

a. Conductor

Stranded compacted circular conductor shall be of electrical grade high conductivity aluminum/copper conductor as per IS: 8130 / 84.

b. Insulation

The insulation shall be compounded PVC, application shall be by extrusion process insulation type C (85deg.C) conforming to IS: 5831-1984. The thickness of insulation will be as per the relevant Indian codes.

c. Laying-up

Insulated conductors of multi core cables shall be with thermoplastic fillers in the interstices. The phase identification of cores shall be by colored strips.

d. Inner Sheath

Cores shall be surrounded either by a wrapped or an extruded PVC sheath. The thickness of the inner sheath shall be as per relevant Indian codes.

e. Armouring

The armouring shall be provided over the inner sheath. Single core cable shall have non-magnetic armouring. Multi core cables shall have either galvanized round steel wires or flat steel strip armouring. Steel wires and strips for armouring confirm to IS: 3975. The direction of lay of armouring shall be opposite to that of cores.

f. Outer Sheath

Single and multi core cables are provided with an extruded PVC outer-sheath. The thickness of the sheath shall be as per IS: 1554-1988. The PVC compound for the outer-sheath shall confirm to Type ST1 of IS 5831. The colour of the outer sheath shall be black.

3. Specifications for XLPE insulated HR PVC sheathed aluminum / copper conductor cable shall be as follows:
a. **Conductor**

   Stranded compacted circular conductor shall be of electrical grade high conductivity aluminum / copper conductor per IS: 8130/84.

b. **Insulation**

   The insulation shall be of natural unfilled chemically cross linked polyethylene conforming to IS: 7098. The thickness of insulation shall be as per the relevant Indian codes.

c. **Laying-up**

   Insulated conductors of multi core cables shall be with plastic fiber in the interstices. The phase identification of cores shall be by colored strips.

d. **Inner Sheath**

   The cores shall be surrounded by either a wrapped or by an extruded PVC sheath. The thickness of the inner sheath shall be as indicated in the relevant codes.

e. **Armouring**

   The armouring shall be provided over the inner sheath. Single core cable shall have non-magnetic armouring. Multi core cables shall have either galvanized round steel wires or flat steel strip. Steel wires and strips for armouring confirm to IS: 3975. The direction of lay of armouring shall be opposite to that of cores.

f. **Outer Sheath**

   Single and multi core cables are provided with an extruded PVC outer-sheath. The thickness of the sheath shall be as per IS: 1554-1988. The PVC compound for the outer-sheath shall confirm to Type ST2 of IS: 5831. The colour of the outer sheath shall be black.

4. **CABLE LAYING AND HANDLING**

   It should be ensured that both ends of the cable are properly sealed to prevent ingress / absorption of moisture.

5. **CABLE HANDLING**

   When cable drums have to be moved over short distance, they should be rolled in the direction of the arrow marked on the drum.

   While removing cables, the drums shall be properly mounted on jacks or on a cable wheels or any other suitable means, making sure the spindle, jack etc. are strong enough to take the weight of the drum.

   The cables shall not be given a sharp bend to a small radius. The minimum safe bending radius for all types of PVC/XLPE cables shall be taken as 12 times the overall diameter of the cable. Wherever practicable, larger radius should be adopted. At joints and terminations, the bending radius of individual cores of a multicore cable shall not be less than 15 times its overall diameter.

   Cable with kinks and straightened kinks, or with similar apparent defects like defective armoring etc. shall not be installed / laid.

   Cables of different voltages as well as power and control cables should be kept in different trenches/racks with adequate separation. Where available space is restricted, LV/MV cable shall be laid above HV cables.
Where cables cross over cannot be avoided, the cable of higher voltage shall be laid at a lower level than the cable of lower voltage.

Installation of cables including jointing shall be carried out as per IS: 1255 amended and revised to date.

Power and communication cables shall, as far as possible cross at right angles. Where power cables are laid in proximity to communication cables, the horizontal and vertical clearances shall not normally be less than 60 cm.

Cables shall be laid direct in ground, in pipes / closed ducts, in open ducts or on surface depending on environmental conditions, and as required in schedule of quantities.

During the preliminary stages of laying the cable, consideration should be given to proper location of the joint position so that when the cable is actually laid, the joints are made in the most suitable places and as approved by Consultant. As far as possible, water logged locations, carriage ways, pavements, proximity to telephone cables, gas or water mains, inaccessible places, ducts, pipes, racks, etc. shall be avoided.

The cable shall not in any circumstances be bent so as to form an abrupt right angle but must be rounded off at the corners to a radius not less than 12 times the overall diameter of the cable.

In case, where there are chances of any damage to the wiring/cables, such wiring/cables shall be covered with a sheet metal protective covering (not less than 16 SWG), the base of the covering being flush with the plaster or brickwork as the case may be, or the wiring /cables shall be drawn through a heavy gauge metal conduit pipe by complying with all the requirements of conduit wiring system.

Such protective covering shall, in all cases, be fitted on all down drops within 1.5 m from the floor or from floor level up to the switch board, whichever is less.

While cutting and stripping of the outer sheathing of the cable, care shall be taken that the sharp edge of the cutting instrument does not touch the inner insulation of the conductors. The protective outer covering of the cable shall be stripped off near connecting terminal and this protective covering shall be maintained upto close proximity of connecting terminals. The cables laid near junction boxes shall be made moisture proof with a plastic compound.

6. CABLE JOINTING & TERMINATION

Jointing shall be as per the manufacturer’s recommendations using standard kits. Cable joints shall be made in suitable, approved cable joint boxes, jointing of cables in the joint boxes and filling of compound shall be done as per manufacturer’s recommendations. Heat shrinkable joints shall be made.

Cables shall be terminated onto the terminals of switchgear through crimping lugs of proper size and of heavy duty. Cable lugs shall be fitted onto the cable by crimping or compression jointing.

Continuity of cable armouring is to be maintained. Double compression glands to be used. Proper crimping tools to be used.

7. TRENCHING & CABLE LAYING

The minimum width of trench shall be 45 cm and depth shall be 75cm for laying of cable. Where more than one cable is to be laid in the same trench in horizontal formation, the width of trench shall be increased such that the minimum gap between the cables is one diameter of the cable unless specified otherwise.

The clearance between axis of the end cables and the sides of the trench shall be minimum 1.5 D (diameter) of the end cable.
The trenches shall be excavated in reasonably straight lines. Wherever there is a change in direction, suitable curvature shall be provided.

Where gradients and changes in depth are unavoidable, these shall be gradual.

The bottom of the trenches shall be level and free from stone, brick bats etc. The trench shall then be provided with a layer of clean, dry sand cushion of not less than 9 cm in depth.

Cable laid in trenches in a single tier formation shall have a covering of clean, dry sand of not less than 20 cms. above the base cushion of sand before the protective cover is laid.

In the case of vertical multi-tier formation, after the first cable has been laid, a sand cushion of 30 cms shall be provided over the initial bed before second tier is laid. If additional tiers are formed, each of the subsequent tiers shall have a sand cushion of 30 cms as stated above. The top-most cable shall have final sand covering not less than 17 cms before the protective cover is laid.

Unless otherwise specified, the cables shall be protected by second class bricks of not less than 20 cm x 10 cm x 10 cm (nominal size) as per CPWD building specification, or protection covers placed on top of the sand, (brick to be laid breadth wise) for the full length of the cable to satisfaction of the owner. Where more than one cable is to be laid in the same trench, this protective covering shall cover all the cables and project at least 5 cm over the sides of and cables.

The trenches shall be then back filled with excavated earth free from stone or other sharp-edged debris and shall be rammed and watered, if necessary, in successive layers not exceeding 30 cm. Unless otherwise specified, a crown of earth not less than 50 mm in the center and tapering towards the sides of the trench shall be left to allow for subsidence. The crown of earth, however, should not exceed 10 cms.

Where road bends or lawns have been cut or kerb stones displaced, the same shall be repaired to the satisfaction of the architect and all surplus earth or rock removed to places as specified.

In locations such as road crossing, entry to building in paved areas etc. cables shall be laid in pipes or closed ducts.

All cable entry/exit points into the building through pipe sleeves shall be properly sealed with water and fire safe sealants in an approved manner to avoid any seepage of water into the building.

Manholes of adequate size, as decided by the Architect, shall be provided to facilitate of adequate strength feeding/drawing in of cables and to provide working space for persons. Suitable manhole covers with frame of proper design shall cover Manholes.

CABLE LOOPS: Sufficient cable loop length shall be left.

8. CABLES ON HANGERS OR RACKS / TRAYS

The contractor shall provide and install all iron hangers racks, or racks with die-cast cleat, with fixing rag bolts or girder clamps or other specialist fixing as required.

Where hangers or racks are to be fixed to wall sides ceiling and other concrete structures, the contractor shall be responsible for cutting away, fixing and grouting in rag bolts and making good the damages as required.

The hangers or racks shall be designed to leave at least 25 mm clearance between the cables and the face to which it fixed. Multiple hangers shall have two or more fixing holes. All cables shall be saddled at not more than 500 mm intervals. These shall be designed to keep provision of some spare capacity for future development. Minimum spacing between the cables shall be one diameter of the cable or as specified.
9. CABLE TRAY

a) The MS cable trays should have undergone rigorous rust proofing process, which should comprise of alkaline, degreasing, descaling in diluted sulphuric acid and a recognized phosphating process. The sheet work shall then be given two coats of oxide primer before two coats of final painting. Cable trays shall be either painted (Stove enameled) or hot dip galvanized as called for in the schedule of quantities.

b) Cable trays shall be complete with bends, joints, coupler plates and accessories as may be required for joining the cable trays.

c) Cable trays shall be either perforated or ladder type as called for in the schedule of quantities.

10. PERFORATED CABLE TRAYS

Standard Technical details of perforated cable tray shall be as follows:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Description</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>150mm to 450mm width</td>
<td>2mm thick &amp; 40mm collar</td>
</tr>
<tr>
<td>2.</td>
<td>600mm to 750mm width</td>
<td>2mm thick &amp; 50mm collar</td>
</tr>
<tr>
<td>3.</td>
<td>900mm to 1200mm width</td>
<td>3mm thick &amp; 75mm collar</td>
</tr>
</tbody>
</table>

Minimum 10mm dia GI rod suspender shall be used @ 1500mm intervals.

11. LADDER TYPE CABLE TRAYS

Standard technical details of ladder type cable trays shall be as follows:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>SIZE OF TRAY (Width)</th>
<th>SIZE OF MAIN CHANNEL</th>
<th>SIZE OF RUNG &amp; SPACING BETWEEN RUNGS</th>
<th>SIZE OF ANGLE FOR SUPPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>900mm to 1500mm</td>
<td>25 x100 x 25 x 3mm</td>
<td>20 x 50 x 20 x 3mm @ 250C/C</td>
<td>50x50x5mm @150mm C/C</td>
</tr>
<tr>
<td>2.</td>
<td>600mm to 750mm</td>
<td>25 x 75 x 25 x 2.5mm</td>
<td>20 x 40 x 20 x 2.5mm @ 250C/C</td>
<td>40X40x5mm @180mm C/C</td>
</tr>
<tr>
<td>3.</td>
<td>150mm to 450mm</td>
<td>5 x 75 x 25 x 2mm</td>
<td>20 x 30 x 20 x 2.5mm @ 250C/C</td>
<td>32X32x4mm @180mm C/C</td>
</tr>
</tbody>
</table>

Fixing arrangement shall be as approved by the Consultant / Owner / PMC

Hardware to be used in cable tray system shall be galvanized or zinc passivated.

a. Quality of Zinc

Zinc to be used shall conform to minimum Zn 98 grade as per requirement of IS: 209-1992.

b. Coating Requirement

Minimum weight of zinc coating for mild steel flats with thickness upto 6 mm in accordance with IS:6745-1972 shall be 400 g/sqm.

The weight of coating expressed in grams per square meter shall be calculated by dividing the total weight of Zinc by total area (both sides) of the coated surface.

The Zinc coating shall be uniform, smooth and free from imperfections as flux, ash and dross inclusions, bare patches black spots, pimples, lumpiness, runs; rust stains bulky white deposits, blisters.
Mild steel flats / wires shall undergo a process of degreasing, pickling in acid, cold rinsing and then galvanizing.

12. TESTING OF CABLES

The Meggar value in normal dry weather shall be 50 mega ohm for 1.1 kV grade cable. Cables shall be tested at works for the following tests before being dispatched to site by the project team:

a. Insulation Resistance Test.
b. Continuity resistance test.
c. Sheathing continuity test.
d. Earth test (in armoured cables)
e. Hi Pot Test.

Test shall also be conducted at site for insulation between phases and between phase and earth for each length of cable, before and after jointing. On completion of cable laying work, the following tests shall be conducted in the presence of the Owner’s site representative:

a. Insulation Resistance Test (Sectional and overall)
b. Continuity resistance test.
c. Sheathing continuity test.
d. Earth test.

d. Earth test.

All tests shall be carried out in accordance with relevant Standard Code of Practice and Electricity Rules. The Contractor shall provide necessary instruments, equipment and labour for conducting the above tests and shall bear all expenses in connection with such tests. All tests shall be carried out in the presence of the PMC / Owner representative.

13. CABLE TAGS

Cable tags shall be made out of 2mm thick aluminum sheets. Each tag shall be 2" in dia or 3” x 3” square with one hole of 2.5mm dia, 6 mm below the periphery, or as approved by Consultant. Cable designations are to be punched with letters / number punches and the tags are to be tied to cables with piano wires of approve quality & size. Tags shall be tied inside the panels beyond the glanding as well as above the glands at cable entries. Along trays tags are to be tied at all bends. On straight lengths, tags shall be provided at every 5 meters.

Cables shall be secured to cable trays with 3mm thick x 25mm wide aluminum strips/suitable GI clamp, or as approved by Consultant, at 1000 mm intervals and screwed by means of rust proof screws, washers and bolts, of adequate but not excessive lengths. Cable trays for horizontal runs suspended from the ceiling will be supported with mild steel straps or brackets, at 1000 mm intervals and the overall tray arrangement shall be of a rigid construction. External cabling route marker with GI plate marked with “DANGER 1.1 kV CABLE” with 1 meter long GI angle iron grouting bracket including 1:3:6 ratio cement concrete base block of minimum size 200 x 200 x 350 mm to be provided or as approved by Elect. Supply Company.

B. EARTHING

1. SYSTEM OF EARTHING

The system shall be TNS with 4 wires supply system (R, Y, B, N and 2 Nos. E) brought from the main LT Panel.

All non-current carrying metal parts of the electrical installation shall be earthed as per IS: 3043 – 1987 with latest amendment. All metal conduits, cable sheath, switchgear, DBs, light fixture, equipment and all other parts made of metal shall be bonded together and connected to earth electrodes. Earthing shall be in conformity with provisions of rules 32, 61, 62, 67 and 68 of Indian Electricity Rules, 1956.
All earthing conductors shall be of high conductivity copper or GI, as specified in the schedule of quantities & shall have protection against mechanical damage. The cross-sectional area of earth conductors shall not be smaller than half that of the largest current carrying conductor.

Main earthing conductors shall be taken from the earth connections at the main L T panel to an earth electrode with which the connection is to be made. All joints in tapes shall be with four rivets and shall be brazed in case of copper and by welding bolting in case of GI. Wires shall be connected with crimping lugs, all bolts shall have spring washers. Sub- mains earthing conductors shall run from the main distribution panel to the sub distribution panel. Final distribution panel earthing conductors shall run from sub-distribution panel.

Circuit earthing conductor shall run from the exposed metal of equipment and shall be connected to any point on the main earthing conductor, or its distribution panel. Metal conduits, cable sheathing and armouring shall be earthed at the ends adjacent to distribution panel at which they originate, or otherwise at the commencement of the run by an earthing conductor in effective electrical contact with cable sheathing. Where equipment is connected by flexible cord, all exposed metal parts of the equipment shall be earthed by means of an earthing conductor enclosed with the current carrying conductors within the flexible cord. Switches, accessories, lighting fitting etc. which are rigidly secured in effective electrical contact with a run of metallic conduit shall not be considered as a part of the earthing conductor for earthing purposes, even though the run of metallic conduit is earthed.

a. All Lighting fixtures, sockets outlets, fans, switch boxes and junction boxes etc. shall be earthed with copper wire as specified in schedule of quantities. The earth wire ends shall be connected with solderless/bottle type copper lugs.

All the earth wires in switch boxes, sockets outlets, DB’s and light fixtures shall be of green Colour (PVC insulated).

Main earth bus shall be taken from the L.T. switch board to earth electrodes. The electrical resistance of earthing conductors shall be low enough to permit passage of fault current necessary to operate fuse or circuit breaker, and it shall not exceed 1 ohm.

2. SIZING OF EARTHING CONDUCTORS

The cross sectional area of earthing conductor shall not be smaller than half of the largest current carrying conductor subject to an upper limit of 80 Sq.mm. If the area of the largest current carrying conductor or bus bar exceeds 160 sq.mm then two or more earthing conductors shall be used in parallel, to provide at least half the cross sectional area of the current carrying conductor or bus bars. All fixtures, outlet boxes, junction boxes and power circuits upto 15 amps shall be earthed with PVC insulated copper wire.

All 3 phase switches and distribution panels upto 60 amps rating shall be earthed with 2 Nos. distinct and independent 4 mm dia copper / GI wires. All 3 phase switches and distribution panels upto 100 amps rating shall be earthed with 2 Nos. distinct and independent 6 mm dia copper / GI wires. All switches, bus bar, ducts and distribution panels of rating 200 amps and above shall be earthed with minimum of 2 nos separate and independent 25 mm x 3 mm copper / GI tape.

Earthing details given in Table – A & B shall be referred to as a general guidance. Exact sizes to be worked out by the contractor as per relevant IS Codes.
### Table A

#### Size of earth leads

(a) For Transformer/Generator Neutral Point Earthing:

<table>
<thead>
<tr>
<th>Transformer/ DG Set Rating</th>
<th>Electrolytic</th>
<th>Galvanized</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bare copper</td>
<td>Iron</td>
</tr>
<tr>
<td></td>
<td>Conductor Wire or strip</td>
<td>Conductor Wire or strip</td>
</tr>
<tr>
<td>50kVA &amp; below/4mm dia</td>
<td>4mm dia</td>
<td>25mm x 6.0mm</td>
</tr>
<tr>
<td>75 kVA</td>
<td>25mm x 3.0mm</td>
<td>25mm x 6.0mm</td>
</tr>
<tr>
<td>100 kVA</td>
<td>25mm x 6.0mm</td>
<td>32mm x 6.0mm</td>
</tr>
<tr>
<td>150 kVA</td>
<td>25mm x 6.0mm</td>
<td>40mm x 6.0mm</td>
</tr>
<tr>
<td>200 kVA</td>
<td>25mm x 6.0mm</td>
<td>40mm x 6.0mm</td>
</tr>
<tr>
<td>250 kVA</td>
<td>25mm x 6.0mm</td>
<td>40mm x 6.0mm</td>
</tr>
<tr>
<td>300 kVA</td>
<td>25mm x 6.0mm</td>
<td>40mm x 6.0mm</td>
</tr>
<tr>
<td>500 kVA</td>
<td>40mm x 6.0mm</td>
<td>40mm x 6.0mm</td>
</tr>
<tr>
<td>750 kVA</td>
<td>40mm x 6.0mm</td>
<td>50mm x 6.0mm</td>
</tr>
<tr>
<td>1000 kVA</td>
<td>40mm x 6.0mm</td>
<td>50mm x 6.0mm</td>
</tr>
<tr>
<td>1250 kVA</td>
<td>50mm x 6.0mm</td>
<td>50mm x 6.0mm</td>
</tr>
<tr>
<td>1500 kVA</td>
<td>50mm x 6.0mm</td>
<td>75mm x 6.0mm</td>
</tr>
<tr>
<td>2000 kVA</td>
<td>50mm x 6.0mm</td>
<td>75mm x 6.0mm</td>
</tr>
</tbody>
</table>

**NOTE:** EXACT SIZE OF EARTH LEAD TO BE DETERMINED AS PER LATEST IS CODES.

### Table B

(b) For Equipment Earthing (Applicable to Transformer, Generators, Switchgears, Panels, DB’s, Motors etc.)

<table>
<thead>
<tr>
<th>Rating of 400-V, 3ph 50 cy. Equipment In kVA</th>
<th>Bare Electrolytic Copper conductor Wire / Strip</th>
<th>Galvanised Iron Wire / Strip</th>
</tr>
</thead>
<tbody>
<tr>
<td>upto 5</td>
<td>2mm dia</td>
<td>2mm dia</td>
</tr>
<tr>
<td>6 to 15</td>
<td>3mm dia</td>
<td>3mm dia</td>
</tr>
<tr>
<td>16 to 30</td>
<td>4mm dia</td>
<td>4mm dia</td>
</tr>
<tr>
<td>31 to 50</td>
<td>6mm dia</td>
<td>6mm dia</td>
</tr>
<tr>
<td>51 to 100</td>
<td>25mm x 3.0mm</td>
<td>25mm x 6.0mm</td>
</tr>
<tr>
<td>101 to 125</td>
<td>25mm x 3.0mm</td>
<td>32mm x 6.0mm</td>
</tr>
<tr>
<td>126 to 150</td>
<td>25mm x 3.0mm</td>
<td>32mm x 6.0mm</td>
</tr>
<tr>
<td>151 to 200</td>
<td>25mm x 6.0mm</td>
<td>40mm x 6.0mm</td>
</tr>
<tr>
<td>201 to 300</td>
<td>25mm x 6.0mm</td>
<td>50mm x 6.0mm</td>
</tr>
<tr>
<td>301 to 500</td>
<td>32mm x 6.0mm</td>
<td>50mm x 6.0mm</td>
</tr>
<tr>
<td>501 to 800</td>
<td>40mm x 6.0mm</td>
<td>50mm x 6.0mm</td>
</tr>
<tr>
<td>Above 800</td>
<td>50mm x 6.0mm</td>
<td>50mm x 6.0mm</td>
</tr>
</tbody>
</table>

**NOTE:** EXACT SIZE OF EARTH LEAD TO BE DETERMINED AS PER LATEST IS CODES.

**NOTE:** ALL THREE PHASE EQUIPMENT SHALL BE DOUBLE EARTHED
3. **PROHIBITED CONNECTIONS**

Neutral conductor, sprinkler pipes, or pipes conveying gas, water, or inflammable liquid, structural steel work, metallic enclosures, metallic conduits and lighting protection system conductors shall not be used as a earthing conductor.

4. **CONNECTION/JOINTS**

The earthing connections/joints should be bolted, riveted, welded, brazed type.

In case of bolted joints, GI/Passivated hardware’s of adequate size/nos. should be used for firm connections. The minimum contact area should be equal to the width of the strip or cross-sectional area of earthing lead. Welded/brazed joints should be smooth and continues. All welded/brazed joints should be treated with anti-corrosive paints to protect it from corrosion/rusting.

All bolted connections/joints of Cu strip should be tinned.

Wherever, flexible earthing connection is must, it should be hydraulically crimped lugs of Copper/Aluminum.

The effective earthing connection surface should be smooth & free from paints and oxide coatings.

5. **EARTHING**

The following must always be ensured in earthing system:

All earths must be interconnected. This includes transformer neutrals, Transformer body, HT Panels, LT Panels, lightning protection system earths, UPS earths etc and provision for interconnection with other services earthing grid etc. shall be made. All earth pits should be at equi-potential.

Extraneous conductive parts such as gas pipes, other service pipes and ducting risers and pipes of fire protection equipment and exposed metallic parts of the building structure.

The Contractor shall get the soil resistivity test done at his own cost of the area where earthing pits are to be located before starting the installation.

6. **RESISTANCE TO EARTH**

The resistance of earthing system shall not exceed 1 ohm.

**SPECIFICATION FOR HOT DIP GALVANIZING PROCESS FOR MILD STEEL USED FOR EARTHING FOR ELECTRICAL INSTALLATION**

7. **GENERAL REQUIREMENTS**

a. **Quality of Zinc**

Zinc to be used shall conform to minimum Zn 98 grade as per requirement of IS: 209-1992.

b. **Coating Requirement**

Minimum weight of zinc coating for mild steel flats with thickness upto 6 mm in accordance with IS:6745-1972 shall be 400 g/sqm.

The weight of coating expressed in grams per square meter shall be calculated by dividing the total weight of Zinc by total area (both sides) of the coated surface.
The Zinc coating shall be uniform, smooth and free from imperfections as flux, ash and dross inclusions, bare patches black spots, pimples, lumpiness, runs; rust stains bulky white deposits, blisters.

Mild steel flats / wires shall undergo a process of degreasing pickling in acid, cold rinsing and then galvanizing. Jointing of earthing tape shall be by welding. All joints and cut ends shall be properly painted with aluminum paint.

8. **MAINTENANCE FREE CHEMICAL EARTHING:**

Maintenance Free Chemical Earthing shall be done strictly as per manufacturer’s recommendations. It shall be completely maintenance free, long life close to 25 years, environmentally safe, non corrosive & electrically conductive. The earth resistance results shall be less than one ohm.

C. **MV PANELS:**

1. **GENERAL**

Medium voltage power control centres (generally termed as switchboard panels) shall be in sheet steel clad cubic pattern, free floor standing, totally enclosed, compartmentalized design having multitier arrangement of the incomers and feeders as per details given in the schedule of quantities. All panels shall conform to the requirements of the latest addition of IS and shall be suitable for 415 V, 3 phase AC supply or 230 V single phase AC supply as required. The drawing of panel may got approved from Engineer En-charge before placing order.

2. **CONSTRUCTIONAL FEATURES**

The Switch Boards shall be totally enclosed, sheet steel cubic pattern, extensible on either side, dead front, floor mounting type (wall mounting if specifically asked for in BOQ) and shall have a bus bar chamber at the top and the cable entry from the bottom. (For panel requiring top cable entries if any, refer to BOQ). The cable terminations should be in side the feeder compartment only.

The Switch Boards shall be completely dust and vermin proof. Synthetic rubber gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust and vermin proof to provide a degree of ingress protection of IP 43. All doors and covers shall also be fully gasketed with synthetic rubber. All the live parts shall be properly shrouded with FRP sheets.

The Switch Board shall be fabricated with CRCA Sheet Steel of thickness not less than 2.0mm and shall be folded and braced as necessary to provide a rigid support for all components. The doors and covers shall be constructed from CRCA sheet steel of thickness not less than 1.6 mm. Joints of any kind in sheet metal shall be seam welded and all welding slag ground off and welding pits wiped smooth with plumber metal. Base channel shall be fabricated from ISMC 75 and door shall be provided at the bottom with arrangement for fixing bolts in the foundation.

All panels and door covers shall be properly fitted and square with the frame. The cutouts in the panel shall be correctly positioned.

Lifting lugs of adequate strength shall be provided on each transport section of the panels. Fixing screws shall enter holes tapped into an adequate thickness of metal or provided with hank nuts. Self threading screws shall not be used in the construction of the Switch Boards.

3. **SWITCHBOARD DIMENSIONAL LIMITATIONS**

A base channel 75 mm x 5 mm thick shall be provided at the bottom.

The overall height of the Switch Board shall be limited to 2200 mm

The height of the operating handle, push buttons etc shall be restricted between 300 mm and 1900 mm from finished floor level.

4. **BUS BARS**

The bus bars shall be suitable for 4 wire, 415 volts, 50 Hz, system. The main bus bar shall be made of high conductivity electrolytic grade AL 91E Aluminium. The bus bars shall have uniform cross section
throughout the panel. The bus bars shall be capable of carrying the rated current at 415 volts continuously. The bus bar will run in a separate busbar chamber using bus insulators made of non-deteriorating, vermin proof, non hygroscopic materials such as epoxy fiber, reinforced polyester or moulding compound (min. 25mm clearance between phase to phase & phase to neutral busbars shall be provided). The interval between the two insulators will be designed after considering the following:

a) Strength and safe load rating of the insulator,
b) The vibrating force generated during a fault,
c) A Factor of safety of 1.25
d) A set of insulators at both ends of the bus.

Bus bars shall be sized considering maximum current density of 1 Amps/ cross section Sq.mm area. The size of the bus bar calculations must be approved by the consultants. The bus bars shall be designed to withstand a temperature rise of 45°C above the ambient. To limit the temperature rise in the bus bar chamber a set of louvers can be provided at strategical places considering the air circulation.

All the bus bars shall be insulated with PVC heat shrinking sleeves throughout (except at joints) the length of the panel. The electro-galvanised high tensile steel nuts, bolts, plain or spring washers of suitable size will be used in connecting the various section of the bus bars.

5.0 SWITCH BOARD INTERCONNECTIONS

All connections between the bus bars/Breakers terminations shall be through solid Aluminium strips of adequate size to carry full rated current which shall be PVC/fibre glass insulated. For switch unit ratings upto 63A PVC insulated copper conductor wires of adequate size to carry full load current can be used. The terminations of all such interconnections shall be properly crimped.

6.0 CABLE TERMINATIONS

Knockout holes of appropriate size and number shall be provided in the Switch Board in conformity with the location of incoming and outgoing conduits/cables. All cable entries shall be from bottom until & unless specifically asked for in the BOQ.

The cable terminations of the circuit breakers shall be brought out to terminal cable sockets suitably located in the panel.

All outgoing links for FSU/MB feeders shall be in the feeder compartment only.

The Switch Boards shall be complete with tinned brass cable sockets, tinned brass compression glands, gland plates, supporting clamps and brackets etc for termination of 1100 volt grade aluminium conductor PVC cables.

7.0 EARTHING

The panels shall be provided with an aluminium earth bus of suitable size running through out the length of the switchboard. Suitable earthing eyes/bolts (at min. two points) shall be provided on the main earthing bus to connect the same to the earth grid at the site. Sufficient number of star washers shall be provided at the joints to achieve earth continuity between the panels and the sheet metal parts.

8.0 INTERLOCKING

The panels shall be provided with the following interlocking arrangement.

a) The door of the switch-fuse compartments is so interlocked with the switch drive or handle that the door can be opened only if the switch is in 'OFF' position. De-interlocking arrangement shall also be provided for occasional inspection.

b) It shall not be possible for the breaker to be withdrawn when in 'ON' position.

c) It shall not be possible for the breakers to be switched on unless it is either in fully inserted positions or for testing purposes in fully isolated position.
d) The breaker shall be capable of being raked in to ‘testing’ ‘isolated’ and ‘maintenance’ positions and kept locked in any of these position.

e) A safety latch to ensure that the movement of the breaker as it is withdrawn, is checked before it is completely out of the cubicle shall be provided.

9.0 WIRING
All wiring for relays and meters shall be with PVC insulated copper conductor wires. The wiring shall be coded and labeled with approved ferrules for identification. The minimum size of copper conductor control wires shall be 1.5 sq.mm except for the circuits related to current transformers or circuits with current carrying capacity more than 5 Amps (for which min. 2.5 Sq.mm copper conductor wires shall be used).

10.0 SHEET STEEL TREATMENT AND PAINTING
Sheet Steel materials used in the construction of these units should have undergone a rigorous rust proofing process comprising of alkaline degreasing, descaling in dilute sulfuric acid and a recognised phosphating process. The steel work shall then receive two coats of oxide primer before final painting. Castings shall be scrupulously cleaned and fettled before receiving a similar oxide primer coat.

All sheet steel shall after metal treatment shall be powder coated with shade RAL 7032 (Siemens Gray) on the outside of the panel and mounting plates shall be of orange shade. Each coat of paint shall be properly stoved and the paint thickness shall not be less than 50 microns (shade of paint may be changed if the Engineer In charge so desires).

11.0 NAME PLATES AND LABELS
Suitable engraved white on black name plates and identification labels of metal for all Switch Boards and Circuits shall be provided. These shall indicate the feeder number and feeder designation.

12.0 INSTALLATION
Installation shall be done by erection Contractor.

13.0 TESTING AND COMMISSIONING
Copies of type tests and routine test as per relevant specification, carried out at manufacturer’s work shall be submitted to the ENGINEER IN CHARGE as required.

Wiring and connections including earthing shall be checked for continuity and tightness.

Insulation shall be measured with a 500 V megger and insulation resistance shall not be less than 100 Mega ohms

Interlocking operation to be checked as per requirement.

Tests shall be performed in presence of authorized representative of the ENGINEER IN CHARGE for which the contractor shall give due prior notice.

14.0 HIGH VOLTAGE TEST
A high voltage test with 2.5 KV for one minute shall be applied between the poles and earth. Test shall be carried out on each pole in turn with the remaining poles earthed, all units raked in position and the breakers closed. Original test certificate shall be submitted along with panel.

15.0 PRE-COMMISSION TESTS:
Panels shall be commissioned only after the successful completion of the following tests. The tests shall be carried in the presence of Architect’s/Consultant’s or their representatives.
i) All main and auxiliary bus bar connections shall be checked and tightened.

ii) All wiring termination and bus bar joints shall be checked and tightened.

iii) Wiring shall be checked to ensure that it is according to the drawing.

iv) All wiring shall be tested for insulation resistance by a 1000 volts meggar.

v) Phase rotation tests shall be conducted

vi) All relays and protective devices shall be tested for correctness of settings and operation by introducing a current generator and an ammeter in the circuit.

16.0 CLIMATIC CONDITIONS:

The panels & switch gear components shall be suitable for following climatic conditions:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBT</td>
<td>45°C</td>
<td>3°C</td>
</tr>
<tr>
<td>RH</td>
<td>90%</td>
<td>20%</td>
</tr>
</tbody>
</table>

17.0 HEATING ARRANGEMENT:

The panel shall be provided with a thermostatically controlled heating arrangement for monsoon (200 Watt) to take care of high humidity conditions. A 6/16A service socket outlet (single phase) shall be provided in one of the compartments in all the panels.

18.0 METERING, INSTRUMENTATION AND PROTECTION

1.0 The specifications hereinafter laid down shall cover all the meters, instrumentation and protective devices required for the electrical work. The ratings, type and quantity of meters, instruments and protective devices shall be as per the schedule of quantities and drawings.

Measuring Instruments

General

Direct reading electrical instruments shall be in conformity with IEC-51, BS: 89 or IS: 1248. The accuracy of direct reading shall be 1.0 for voltmeters and 1.5 for ammeters. Other type of instruments shall have accuracy of 1.5. The error due to variations in temperature shall be limited to a minimum. The meter shall be enclosed in a dust tight housing. The housing shall be of steel or phenolic mould. The design and manufacture of the meters shall ensure the prevention of fogging of instrument glass. Instrument meters shall be sealed in such a way that access to the measuring element and to the accessories within the case shall not be possible without removal of the seal. The meters shall be provided with white dials and black scale marking. The pointer shall be black in colour and shall have zero position adjustment device which could be operated from outside. The direction of deflection shall be from left to right. Suitable selector switches shall be provided for all ammeters and voltmeters intended to be used on three phase supply.

a) Ammeters

Ammeters shall be moving iron type. The moving part assembly shall be with jewel bearings. The jewel bearing shall be mounted on a spring to prevent damage to pivot due to vibrations and shocks. The ammeters shall be manufactured and calibrated as per the latest edition of IS 1248 or BS 89. Ammeters shall be instrument transformer operated, and shall be suitable for 5 A. Secondary of instrument transformer. The scales shall be calibrated to indicate primary current, unless otherwise specified. The ammeters shall be capable of carrying sustained overloads during fault conditions without damage or loss of accuracy.
b) **Voltmeters**

Voltmeter shall be of moving iron type. The range for 400 volts, 3 phase voltmeters shall be to 0 to 500 volts. Suitable selector switch shall be provided for each voltmeter to read voltage between any two lines of the system. The voltmeter shall be provided with protection fuse of suitable capacity.

## 2.0 INSTRUMENT TRANSFORMERS

### Current Transformers

Current transformers shall be in conformity with IS:2705 (Part-I, II, & III) in all respects. All current transformers to be used in the L.T. Electrical panels shall be low tension, ring type resin cast current transformer with the requisite currents ratio having secondary of the current transformers selected will be based on the following:

1. For energy measuring : 1.0 class of accuracy.
2. For other metering : 1.5 class of accuracy.
3. For protects on : 3.0 class of accuracy. Where a common CT is used for different functions the CT accuracy class will be equal to the best class required by any of those function.

Current transformers shall be capable of withstanding without damage, magnetic and thermal stresses due to short circuit fault of 35 MVA on medium voltage system. Terminals of the current transformers shall be marked permanently for easy identification of poles. Current transformers shall be provided with earthing terminals for earthing chassis frame work and fixed part of the metal casing (if any). Each CT shall be provided with rating plate indicating the following:

1. Name and make
2. Serial Number
3. Transformation ratio
4. Rated burden
5. Rated voltage
6. Accuracy class

The current transformers to be selected for this panel will have at least 20% extra VA capacity available over the normal capacity based on the following details :

1. For ammeters : 3 VA
2. For current coils of KW & KWHR, PF, KVAR meters or for all recorders : 5 VA.
3. For normal wiring : 2 VA.
4. For current coil of protection relays: 10 VA under; no circumstances the VA rating of the CT's will be less than 15 VA.

Current transformers shall be mounted such that they are easily accessible for inspection, maintenance and replacement. The wiring for CTs shall be copper conductor, PVC insulated wires with proper termination lugs and wiring shall be bunched with cable straps and fixed to the panel structure in a neat manner.

### a) Push Buttons

The push buttons used in the panels will be rated for more than 415 volts and 2 amps. All the push buttons will be mounted on the front door and the assembly will be in two parts. All the push buttons will be mounted on the front door of the cubicle in regular symmetrical fashion as per the general norms being practiced. Only one make of push buttons will be used in the assembly of all the panels. The selection of the colour of the push buttons will be as follows

<table>
<thead>
<tr>
<th>Function</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting/Switching ON</td>
<td>Green</td>
</tr>
</tbody>
</table>
b) Indicating Lights

The indicating lights used in the panel will be pleasant looking and round shape having the following features;

1. A separate front lens for its easy replacement.
2. Facility to replace the bulb from the front.
3. Bayonet pin cap bulbs of standard size to be used.
4. The shape of the lens to allow viewing from sides.
5. Series resistance with use of low voltage bulb for longer life.
6. Clear and distinct indication for light ON and OFF with differences of brightness of the lens.

The selection of the colours of the indicating lamps will be as follows:
- Red for system in operation
- Amber for system ready for operation.
- Green for system being put off.
- Red, yellow and blue for incoming supply.

5.0 TESTING

5.1 Instrument transformers shall be tested at factory as per IS:2705 & IS:3156. The test shall incorporate the following:

a) Type tests
b) Routine tests

Original test certificates in triplicate shall be provided.

5.2 Meters shall be tested as per IS: 1248. The tests shall include both type tests and routine tests. Original test certificate in triplicate shall be furnished.

5.3 a) Suitable injection tests shall be applied to the secondary circuit of every instrument to establish the correctness of calibration and working order.

b) All relays and protective devices shall be tested to establish correctness of setting and operation by introducing a current generator and an ammeter in the circuit.

19.0 MINIATURE CIRCUIT BREAKERS

The MCB’s shall be of the completely moulded design suitable for operation at 240/415 Volts 50 Hz system. MCB’s shall be quick make and break type conforming to relevant IS. Housing shall be heat resistant and have a high impact strength. MCB’s shall be flush mounting type and shall be provided with trip free manual operating lever with ON/OFF indications.

MCB’s shall be provided with magnetic thermal releases for overcurrent and short circuit protection. The overload or short circuit device shall have a common trip bar in case of DP and TPN MCB’s. The MCB’s shall have inverse time delayed thermal overload and instantaneous magnetic short circuit protection. The MCB time current characteristic shall coordinate with H.R.C. fuse/PVC cable characteristic.

The MCB’s shall have a minimum breaking capacity of 10 kA at 230/415 volts in accordance with IEC : 898 - 1995 and IS : 8828 – 1996

20.0 MOULDED CASE CIRCUIT BREAKERS
1.0 GENERAL

Moulded case circuit breakers shall be incorporated in the switch board wherever specified. MCCB shall conform to IEC:947-II or IS:13947-II in all respects. MCCB shall be suitable for three phase 415 volts AC. Suitable discrimination shall be provided between upstream and downstream breakers in the range of 10-20 milli seconds. All MCCBs will have earth fault module (if specifically asked) and front operated. All four pole MCCB shall be suitable for three phase four wire system, with the neutral clearly identified and capable of first make last break feature.

2.0 CONSTRUCTION

The MCCB cover and case shall be made of high strength heat-resistant and flame retardant thermosetting insulating material, operating handle shall be quick make/quick break. The operating handle shall have suitable ‘ON’ ‘OFF’ and ‘TRIPPED’ mechanical indicators notable from outside. All MCCBs shall have a common operating handle for simultaneous operation and tripping of all the three phases. The MCCB should be suitable for disconnection and isolation with marking on front name plate.

Suitable arc extinguishing device shall be provided for each contact. Tripping unit shall be thermal-magnetic type provided on each pole and connected by a common trip bar such that tripping of any one pole operates all three poles to open simultaneously. Thermal magnetic tripping device shall have IDMT characteristics for sustained over load and short circuits. All MCCBs above 250 Amps will also have short circuit magnetic pickup level adjustment.

**MCCBs**

All MCCBs shall have variable thermal overload releases which can be adjusted at site.

3.0 Contact tips shall be made of suitable arc resistant, sintered alloy for long electrical life. Terminals shall be of liberal design with adequate clearances. All MCCBs of higher ratings above 250 Amps, shall be provided with separate extended arcing contacts.

4.0 INTERLOCKING

Moulded case circuit breakers shall be provided with the following interlocking devices for interlocking the door of a switch board.

a) Handle interlock to prevent unnecessary manipulations of the breaker.

b) Door interlock to prevent the door being opened when the breaker is in ON or OFF position.

c) Defeat-interlocking device to open the door even if the breaker is in ON position.

5.0 BREAKING CAPACITY

The moulded case circuit breaker shall have a rated service. Short circuit breaking capacity of not less than 25 KA rms at 415 volts AC. Wherever required, higher breaking capacity breakers to meet the system short circuit fault shall be used.

6.0 ACCESSORIES

All the accessories like shunt, undervoltage contact blocks shall be of snap fitting possible at site.

7.0 TESTING

a) Original test certificate of the MCCB shall be furnished.
b) Pre-commissioning tests on the switch board panel incorporating the MCCB shall be done as per standard specifications.

21.0 MEDIUM VOLTAGE AIR CIRCUIT BREAKER

1.0 GENERAL

Air circuit breakers shall be incorporated in the panels wherever specified. ACB shall conform to IEC 947-II or IS: 13947-II in all respects. ACBs shall be suitable for operation on 415 volts, 3 phase, 50 Hz, AC supply. All air circuit breakers using in the panel will be mounted in separate cubicles and will be of the same make to maintain the uniformity.

2.0 TYPE AND CONSTRUCTION

Air circuit breakers shall be of enclosed pattern, dead front air break type with trip free operating mechanism. All ACBs will be thermal magnetic type. Air Circuit breakers shall be of with drawable type and will be mounted on a rigid steel frame. The ACBs shall be strong and robust in construction with suitable arrangement for anchoring when in fully engaged or fully drawn out positions. There shall be no dependence upon the panel board frame for any critical alignment. The withdrawal arrangement shall be such as to allow smooth and easy movement. The ACB shall have minimum four positions service, test, isolated and maintenance.

All the current carrying parts of the circuit breakers shall be silver plated. Suitable arcing contacts shall be provided to protect the main contacts. The contacts shall be of spring loaded design. The sequence of operation of the contacts shall be such that arcing contacts 'make before' and break after the main contacts. Arcing contacts shall be provided with efficient arc chutes on each pole. The contact tips and arc chutes shall be suitable for ready replacement. Self-aligning isolating contacts with automatic shutters to screen the live parts shall be provided. The design of the breaker shall be such that all the components are easily accessible for inspection, maintenance and replacement.

Operating Mechanism

Air circuit breaker shall be provided with a quick-make, trip free operating mechanism. The operating mechanism shall be strain-free spring operated. The system will have horizontal, self-aligning, isolating pairs of moving and stationary power and control contacts. The unit will have three horizontal positions corresponding to:

a) **Plugged in Position**

Here both the power and control contacts are in made position and the breakers gets mechanically locked in this position. The breaker can go in ON position only after being locked in this position.

b) **Test Position**

Here the power contacts gets isolated where as the control contacts can be kept in made status. The breakers can be mechanically locked in this position and made ON and off for testing purposes.

c) **With drawn Position**

In this position the power and control connections are in isolated status and the moving portion of the breaker can be dismantled from the panel.

An isolating shutter or set of shutters are to be provided for the automatic coverage of live power and control fixed isolating contacts in the withdrawn position.
All the breakers with remote closing arrangement will have a spring charging motor of single phase 230 V and a closing coil. In case of power failure the spring charging can be done manually with the help of button or lever. The circuit breaker should switch on only when the spring is charged fully which should be able to store energy for one closing and one tripping operation. The spring will also get fully charged when the breaker is in closed position. In this case the spring should store enough energy to make first tripping, one re-closing and the second tripping. The ACB should have an anti pumping feature.

The breaker will have quick making trip free closing mechanism. The operation of the mechanism will be independent of the speed of the closing lever or the duration of the closing signal.

The breaker will have following indications distinctly not able from out side :-

- Mechanical indicator for spring fully charged.
- Mechanical indicator for spring discharged.
- Electrical indication of breaker ON status.
- Electrical indication of breaker OFF status.
- Electrical indication of trip circuit healthy.
- Separate trip indication for overload and short circuit.

All breakers will have switching ON and OFF time of less than 4 cycles and will have the following interlocks for the safe operation of the equipment.

Breakers to ON only when mechanically locked many of the three horizontal isolation position.

When the breaker is in plugged in position it will ON only with the front door closed.
The breakers will be provided with 6 Nos. each of type NO and NC auxiliary contacts rated for 10 Amps AC at 415 V and 6 Amps DC at 48 V. These contacts are in addition to the ones already in use for the operation of the breaker and will be required for subsequent interlocks incorporated in near future.

When ever requested mechanical positive inter locks will be provided between the operation of different breakers with the help of individually unique and matched castle key locks.

Rating

The rating of the circuit breaker shall be as per the drawings and schedule of quantities. The rated breaking capacity of the breakers shall be minimum 50 KA or as specified at 415 volts AC. The rated making capacity shall be as per relevant standard.

Accessories

Circuit breakers shall be provided with the following Accessories.
a) Under-voltage relay for the incoming ACB.
b) Overload release with IDMT characteristics.
c) Instantaneous over current relays.
d) Alarm switches (if specifically asked for)
e) Auxiliary switches
f) Circuit breaker position indicators ON/OFF/TEST/ ISOLATED.

Testing

Testing of each circuit breaker shall be carried out at the works as per IS:13947-II and the original test certificate shall be furnished in triplicate. The tests shall incorporate at least the following:
a) Impulse withstand test
b) Power frequency withstand test
c) Short circuit test
d) Temperature-rise test under rated conditions.
9.1 ADDITIONAL REQUIREMENTS

1. The contractor shall submit the original manufacturer’s test certificates in respect of, ACB, Pumping Sets, Motors, Starters, Main switches etc.

2. The aluminium copper conductor cable (heavy) should be ISI marked PVC insulated, armored and should be confirming to relevant IS-Specifications, codes with latest amendments.

3. Test Certificate:-
   A test certificate from the manufacturers shall be handed over to the department before installation of the equipment specifying that the equipment conforms to relevant I.S. S/P.W.D. specifications.

4. Wiring Diagram:-
   After completion of the work a complete drawing showing connections to the various equipments is to be prepared by the tenderer and to be submitted to the department alongwith final bill of the work.

5. Connections:-
   Inter connections from the bus-bar chamber to the different main switches/Air circuit breakers should be through solid copper bars of the required capacity duly insulated for which no extra payment will be made.

6. The rates quoted should be F.O.R. at site of work including cost of installation, freight, octroi taxes and other charges. Nothing extra over and above rates will be admissible.

7. Superfluous conditions and conditional tender will be rejected.

8. Telegraphic tenders and tenders without earnest money in shape of deposit at call will not be accepted.

9. The machinery will be installed as per standard P.W.D. specifications and to the entire satisfaction of the Engineer-in-charge.

10. The quantity of electrical equipments and pumping sets can be increased/ decreased by the department.

11. The tender submitted by the firms shall be valid for 90 days (3 months) from the date of opening of Price Bid.

12. In case any mistake is found in the N.I.T. the same shall be rectifiable even after the opening of the tender and execution of contract agreement as per requirement and site conditions.

13. Pump, Motor, Generator, Starters, ACB shall be inspected by Department officers at the factory premises before being transported to the store or agency/work place.

9.2 OPERATION & MAINTENANCE
9.2.1 The contractor shall maintain all Independent Feeders erected under this contract for a period of 12 months during the Defect Liability Period. Details of staff to be deputed during the maintenance period shall be submitted to the Engineer-in-Charge and prior approval shall be taken.

FIRE FIGHTING

TECHNICAL SPECIFICATION

SECTION- I: FIRE PROTECTION SYSTEM

1. SCOPE

The scope of this section consists of following but is not limited and required as per site conditions, to supply, installation, testing and commissioning of the fire protection system. The philosophy of the system is as follows:

a. The Fire Suppression System shall comprise the Fire Hydrants System, and Hand Appliances.

i. Fire Hydrant System (Pressurised) for the internal landing valves and the hose reels at landings.

b. The Hydrant System under normal conditions shall be pressurized by means of the electric motor driven Jockey Pump.

c. The Hydrant shall be provided with two pump sets, one of which will be diesel engine driven and the other electric motor driven.

d. The starting and stopping of the Jockey pump shall be automatic based on the pressure switches at preset low and high pressure.

e. Terrace Pump

f. The electric motor driven Hydrant starts automatically at a preset pressure by means of a pressure switch. As soon as the Hydrant Pump starts, the Jockey Pump Stops. If for any reason or electric failure the electric motor driven Hydrant Pump does not start at the preset pressure or is unable to maintain the pressure, the diesel engine driven Hydrant Pump starts at the preset pressure.

g. The Hydrant Pump, whether electric motor driven or the diesel engine driven shall be stopped only manually.

h. Tenderer shall ensure Hydro Testing of the complete system.

i. The Tenderer shall obtain the necessary approval of the drawings and the schemes from the local authority / Fire Deptt. as per the requirement at his own cost. The tenderer shall also take care of any other requirement so that insurance cover can be obtained, if required at minimum premium at later date. After completion of work completion certification for fire officer /local authority.

j. The tenderer shall design and after approval of Services Consultant/ Engineer In Charge/ Engineer-In-Charge display a glass covered framed floor plan clearly showing the locations of all landing valves, hose reels, hand appliances, as well as the DO’s and DON’T’s near each stair case landing for the personnel and the exit direction in case of an emergency. The dimensions of the floor plan, its scale, lettering size, colour scheme etc shall be as directed by the Services Consultant/Engineer In Charge/Engineer-In-Charge.

k. Cost for getting Approval of Fire Hydrant and Sprinkler system from local fire authority and any other relevant statutory authority at initial and various other stages of work, including preparation of
report/drawings as per fire authority shall be included. Contractor shall include cost of all liason work which are not explicitly mentioned above but are mandatory to have fire authority approval.

2. PIPE WORK

2.1 GENERAL REQUIREMENTS

All materials shall be of the best quality conforming to the specifications and subject to the approval of the Consultants.

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.

Pipes shall be securely fixed to walls and ceilings by suitable clamps and supports (galvanised after fabrication) at intervals specified. Only approved type of anchor fasteners shall be used for RCC slabs and walls / floors etc.

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

Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workman like manner.

Pipe accessories such as gauges, meters, control devices, etc. shall have the same working pressure rating as the associated pipework. All pipework shall be free from burrs, rust and scale and shall be cleaned before installation. All personnel engaged on welding operations must possess a certificate of competence issued by an acceptable / recognized authority.

2.2 PIPING

Pipes of following types are to be used:

Sprinkler and Hydrant system pipes shall be Mild Steel black pipes as per IS: 1239 heavy grade (for pipes of sizes 150 mm N.B. and below) and IS: 3589 heavy grade (for pipe sizes above 150 mm NB). M.S. pipes buried below ground shall be primered by anticorrosive pyp kote primer and suitably wrapped with bitumin base 4 mm pyp kote wrapping ang coating.

All pipe clamps and supports shall be fabricated from MS steel sections and shall be factory galvanised before use at site. Welding of galvanised clamps and supports shall not be permitted.

Pipes shall be hung by means of expandable anchor fastener of approved make and design. The hangers and clamps shall be fastened by means of galvanised nuts and bolts. The size/diameter of the anchor fastener and the clamps shall be suitable to carry the weight of water filled pipe and dead load normally encountered.

Hangers and supports shall be throughly galvanised after fabrication. The selection and design of the hanger & support shall be capable of carrying the sum of all concurrently acting loads. They shall be designed to provide the required supporting effects and allow pipeline movements as necessary. All guides, anchor braces, dampener, expansion joint and structural steel to be attached to the building/structure trenches etc. shall be provided. Hangers and components for all piping shall be approved by the Consultants.

The piping system shall be tested for leakages at 2 times the operating pressure or 1.5 time shut-off pressure, which ever is highest including testing for water hammer effects.

Flanged joints shall be used for connections for vessels, equipment, flanged valves and also on two straight lengths of pipelines of strategic points to facilitate erection and subsequent maintenance work.

For pipes under ground installation the pipes shall be buried at least one meter below ground level and shall have 230 mm x 230 mm masonry or concrete supports at least 300 mm high at 3m intervals. Masonry work to have
plain cement concrete foundation (1 cement: 4 coarse sand: 8 stone aggregate) of size 380x380x75 thick resting on firm soil.

Mains below ground level shall be supported at regular intervals not exceeding 3.0 metres and shall be laid at least 2.0 metre away from the building.

2.3 PIPING INSTALLATION & SUPPORT

Tender drawings indicate schematically the size and location of pipes. The Contractor, on the award of the work, shall prepare detailed working drawings, showing the cross-sections, longitudinal sections, details of fittings, locations of isolating and control valves, drain and air valves, and all pipe supports. He must keep in view the specific openings in buildings and other structure through which pipes are designed to pass.

Piping shall be properly supported on, or suspended from, on stands, clamps, hangers as specified and as required. The Contractor shall adequately design all the brackets, saddles, anchor, clamps and hangers, and be responsible for their structural stability.

Pipe work and fittings shall be supported by hangers or brackets so as to permit free expansion and contraction. Risers shall be supported at each floor with Galvanised steel clamps. To permit free movement of common piping support shall be from a common hanger bar fabricated from Galvanised steel sections.

Pipe hangers shall be provided at the following maximum spacing:

<table>
<thead>
<tr>
<th>Pipe Dia (mm)</th>
<th>Hanger Rod Dia (mm)</th>
<th>Spacing between Supports (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 25</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>32 to 50</td>
<td>10</td>
<td>2.7</td>
</tr>
<tr>
<td>80 to 100</td>
<td>12</td>
<td>2.7</td>
</tr>
<tr>
<td>125 to 150</td>
<td>16</td>
<td>3.6</td>
</tr>
<tr>
<td>200 to 300</td>
<td>19</td>
<td>5.3</td>
</tr>
</tbody>
</table>

The end of the steel rods shall be threaded and not welded to the threaded bolt.

All pipe work shall be carried out in a proper workman like manner, causing minimum disturbance to the existing services, buildings, roads and structure. The entire piping work shall be organized in consultation with other agencies work, so that area can be carried out in one stretch.

Cut-outs in the floor slab for installing the various pipes area are indicated in the drawings. Contractor shall carefully examine the cut-outs provided and clearly point out wherever the cut-outs shown in the drawings, do not meet with the requirements.

Pipe sleeves, larger diameter than pipes, shall be provided wherever pipes pass through walls and slab and annular space filled with fibreglass and finished with retainer rings.

The contractor shall make sure that the clamps, brackets, saddles and hangers provided for pipe supports are adequate or as specified / approved by Consultants. Piping layout shall take due care for expansion and contraction in pipes and include expansion joints where required.

All pipes shall be accurately cut to the required sizes in accordance with relevant BIS codes and burrs removed before laying. Open ends of the piping shall be closed as the pipe is installed to avoid entrance of foreign matter. Where reducers are to be made in horizontal runs, eccentric reduces shall be used for the piping to drain freely. In other locations, concentric reduces may be used.
Automatic air valves shall be provided at all high points in the piping system for venting. All valves shall be of 15mm pipe size and shall be associated with an equal size gate valves. Automatic air valves shall be provided on hot water risers.

Discharge from the air valves shall be piped through a pipe to the nearest drain or sump. All pipes shall be pitched towards drain points.

Pressure gauges shall be provided as shown on the approved drawings. Care shall be taken to protect pressure gauges during pressure testing.

2.4 PIPE FITTINGS

Pipe fittings mean tees, elbows, couplings, unions, flanges, reducers etc and all such connecting devices that are needed to complete the piping work in its totality.

Fabricated fittings shall not be permitted for pipes diameters 50mm and below.

When fabricated fittings are used, they shall be fabricated, welded in workshops. They shall be inspected by Engineer-In-Charge before dispatch from the workshop. The welding procedures of the workshop should have been approved by the rules for sprinkler system and applicable to hydrant and sprinkler system. For “T” connection, pipes shall be drilled and reamed. Cutting by gas or electrical welding shall not be permitted.

2.5 JOINTING

2.5.1 WELDED JOINTS :

Joints between MS pipes and fittings shall be made with the pipes and fittings having "V" groove and welded with electrical resistance welding in an approved manner. But welding without “V” groove shall not be permitted.

All joints in the pipe line with screwed fittings shall be seal welded after testing and the weld plus the adjoining portion shall be given two coats of zinc rich primer.

2.5.2 FLANGED JOINTS (65 MM DIA AND ABOVE)

Flanged joints with flanges conforming to IS: 6392 shall be provided on

A. Straight runs at intervals not exceeding 25-30m on pipe lines of 50 mm dia and above and as directed by the Engineer-In-Charge.

B. For jointing all types of valves, appurtenances, pumps, connections with other type of pipes, to water tanks and other places necessary and as required for good engineering practice and as shown/noted on the drawings.

C. Flanges shall be with GI bolts and nuts and 3mm insertion gasket of natural rubber conforming to IS: 11149.

2.5.3 UNIONS (UPTO 50 MM DIA)

Approved type of dismountable unions shall be provided on pipe lines of 40 mm dia and smaller dia, in locations similar to those specified for flanges.

3. AIR VESSEL

The air vessel shall be provided to compensate for slight loss of pressure in the system and to provide an air cushion for counter-acting pressure, surges, whenever the pumping sets come into operation. Air vessel shall conform to IS:3844. It shall be normally half full of water, when the system is in normal operation. Air vessel shall be fabricated with 8 mm thick M.S. plate with dished ends and suitable supporting legs. It shall be provided with
one 100 mm dia flanged connection from pump, one 25 mm drain with valve, one water level gauge and 25 mm sockets for pressure switches. The air vessel shall be tested to pressure for 12 hours at 2 times the operating pressure or 1.5 times the shut-off.

4. **AIR CUSHION TANK**

Every wet riser shall be provided with an air cushion tank at its top most point. The air cushion shall be provided with an automatic air release cock, 20 mm dia drain pipe, drain valve and shut off valve.

5. **SYSTEM DRAINAGE**

The system shall be provided with suitable drainage arrangement with drain valves complete with all accessories.

6. **VALVE CHAMBERS**

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

7. **VALVES**

7.1 **SLUICE VALVES**

Sluice valves shall be double flanged valves with cast iron body. The spindle, wall seat and wedge nuts shall be of bronze. They shall generally have non-rising spindle and shall be of the particular duty and design called for.

The valves shall be supplied with suitable flanges, non-corrosive bolts and asbestos fibre gaskets. Sluice valves shall conform to Indian Standard IS: 780-1969 and IS: 2906.

7.2 **BUTTERFLY VALVE**

The butterfly valve shall be suitable for waterworks and rated for 300 P.S.I

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

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

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

7.3 **BALL VALVE**

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

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

The handle shall be provided with PVC jacket. The handle shall also indicate the direction of ‘open’ and ‘closed’ situations. The gap between the ball and the Teflon packing shall be sealed to prevent water seeping.
The handle shall also be provided with a lug to keep the movement of the ball valve within 90°. The lever shall be operated smoothly and without application of any unnecessary force.

7.4 **GUN METAL VALVES**

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

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

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

7.5 **NON-RETURN VALVE**

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

7.6 **PRESSURE RELIEF VALVE**

Each System shall be provided with a Pressure Relief Valves. The Valve shall be spring actuated and set to operate as per field requirement. The Valve shall be constructed of bronze and provided with an open discharge orifice for releasing the water. The Valve shall be open lift type.

8. **PRESSURE SWITCH**

The pressure switches shall be employed for starting and shutting down operation of pumps automatically, dictated by line pressure. The Pressure Switch shall be diaphragm type. The housing shall be die cast aluminium, with SS 316 movement, pressure element and socket. The set pressure shall be adjustable.

The Switch shall be suitable for consistent and repeated operations without change in values. It shall be provided with IP: 55 water and environment protection.

9 **PRESSURE GAUGE**

Pressure gauge shall be provided near all individual connections of the hydrant system with isolation valves and near each flow switch assembly of the sprinkler system. Pressure gauge shall be 50 mm dia gunmetal bourdon type with gunmetal isolation ball valve, tapping and connecting pipe and nipple. The gauge shall be installed at appropriate height for easy readability.

10 **PAINTING**

All Hydrant and Sprinkler pipes shall be painted with post office red colour paint. All M S pipes shall first be cleaned thoroughly before application of primer coat. After application of primer coat two coats of enamel paint shall be applied. Each coat shall be given minimum 24 hours drying time. No thinners shall be used. Wherever required all pipe headers shall be worded indicating the direction of the pipe and its purpose such as "TO RISER NO.1" etc.

Painting shall be expertly applied; the paint shall not over run on surfaces not requiring painting such as walls, surfaces etc. Nuts and bolts shall be painted black, while valves shall be painted blue.

11. **FIRE HYDRANTS**

11.1.1 **INTERNAL HYDRANTS**
A. Contractor shall provide on each landing and other locations as shown on the drawings double headed gunmetal landing valve with 100 mm dia inlet as per IS:5290, with shut off valves having cast iron wheels as shown on the drawings. Landing valve shall have flanged inlet and instantaneous type outlets as shown on the drawings.

B. Instantaneous outlets for fire hydrants shall be standard pattern and suitable for fire hoses.

C. Contractor shall provide for each internal fire hydrant station two numbers of 63 mm dia. 15 m long rubberized fabric lined hose pipes with gunmetal male and female instantaneous type coupling machine would with GI wire (hose to IS:636 type 2 and couplings to IS:903 with IS certification), fire hose reel, gunmetal branch pipe with nozzle to IS:903. This shall be measured and paid for separately.

D. Contractor shall provide standard fire hose reels of 20mm dia high pressure dunlop rubber hose 36.5 m long with gunmetal nozzle, all mounted on a circular hose reel of heavy duty mild steel construction having cast iron brackets. Hose reel shall be connected directly to the wet riser with an isolating valve. Hose reel shall conform to IS:884 and shall be mounted vertically. This shall be measured and paid for separately.

E. Each internal hydrant hose cabinet shall be provided with a drain in the bottom plate. The drain point shall be lead away to the nearest general drain.

F. Each internal hydrant hose cabinet containing items as above shall also be provided with a nozzle spanner and a Fireman’s Axe. The cabinet shall be recessed in the wall as directed. This shall be measured and paid for separately.

G. Each hose cabinet shall be conspicuously painted with the letters “FIRE HOSE”.

11.1.2 HOSE REEL
Hose reel shall conform to IS : 884, heavy duty, 20 mm dia length shall be 36 metre long fitted with gun metal chromium plated nozzle, mild steel pressed reel drum which can swing upto 170 degree with wall brackets of cast iron finished with red and black enamel complete.

11.1.3 FIRE HOSE
All hose pipes shall be of 63 mm diameter RRL/ CP as required, conforming to IS : 636 or IS : 8423. The hose shall be provided with copper alloy delivery coupling. The hose shall be capable of withstanding a bursting pressure of 35.7 Kg/Sq.cm without undue leakage or sweating. Hose shall be provided with instantaneous spring-lock, type couplings.

11.1.4 BRANCH PIPE, NOZZLE
Branch pipes shall be of gun metal with loaded tin bronze ring at the discharge and to receive the nozzle and provided at the other with a leaded tin bronze ring to fit into the instantaneous coupling. Nozzle shall be of spray type of diameter of not less than 16 mm and not more than 25 mm. Nozzle shall be of loaded tin bronze branch pipe and nozzle shall be of instantaneous pattern conforming to Indian Standard - 903.

11.1.5 HOSE CABINET
Hose cabinet shall be provided for all internal and external fire hydrants. Hose cabinets shall be fabricated from 16 gauge MS powder coated sheet of fully welded construction with hinged double front door partially glazed (3 mm glass panel) with locking arrangement, stove enamelled fire red paint (shade No. 536 of IS:5) with “FIRE HOSE” written on it prominently (size as given in the schedule of quantities). Cabinet surfaces in contact with the walls shall not be powder coated but instead given two coats of anti-corrosive bitumastic paint.

11.1.6 INTERNAL HOSE CABINET
Hose cabinet shall be of glass fronted with hinged door & lock. The cabinet shall be made of 16 gauge thick MS sheet and spray painted to shade No. 536 of IS: 5. The hose cabinet shall be of size to accommodate the following:
A. Landing Valves (Single/double headed)
B. Hose pipe
C. Hose reel (36.5 mtr.)
D. Branch pipes, nozzles (2 sets)
E. Fire man’s axe and hand appliances
FIRE DETECTION & ALARM SYSTEM (FDA)

TECHNICAL SPECIFICATION

1.0 GENERAL

1.1 DESCRIPTION:
The fire alarm system shall comply with requirements of NFPA Standard 72 for Protected Premises Signaling Systems except as modified and supplemented by this specification. The system shall be electrically supervised and monitor the integrity of all conductors. The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL listing.

1.2 SCOPE:
A new intelligent reporting, microprocessor controlled fire detection system shall be installed in accordance to the project specifications and drawings.

1.2.1 Basic Performance:
Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Style 6 (Class A) Signaling Line Circuits (SLC). Initiation Device Circuits (IDC) shall be wired Class A (NFPA Style D) as part of an addressable device connected by the SLC Circuit. Notification Appliance Circuits (NAC) shall be wired Class A (NFPA Style Z) as part of an addressable device connected by the SLC Circuit. On Style 6 or 7 (Class A) configurations a single ground fault or open circuit on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm. Alarm signals arriving at the FACP shall not be lost following a primary power failure (or outage) until the alarm signal is processed and recorded. NAC speaker circuits shall be arranged such that there is a minimum of one speaker circuit per floor of the building or smoke zone which ever is greater. Audio amplifiers and tone generating equipment shall be electrically supervised for normal and abnormal conditions. NAC speaker circuits and control equipment shall be arranged such that loss of any one (1) speaker circuit will not cause the loss of any other speaker circuit in the system. Two-way telephone communication circuits shall be supervised for open and short circuit conditions.

2.0 DRAWINGS & TECHNICAL SUBMITTALS

2.1 General:
Two copies of all submittals shall be submitted to the Architect/Engineer for review. All references to manufacturer’s model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality. Equivalent compatible UL-listed equipment from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

2.1.1 Shop Drawings:
Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications. Include manufacturer’s name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts. Show annunciator layout, configurations, and terminations.
2.1.2 Manuals:
Submit simultaneously with the shop drawings, complete operating and maintenance manuals listing
the manufacturer’s name(s), including technical data sheets.
Wiring diagrams shall indicate internal wiring for each device and the interconnections between the
items of equipment.
Provide a clear and concise description of operation that gives, in detail, the information required to
properly operate the equipment and system.

2.1.3 Software Modifications:
Provide the services of a factory trained and authorized technician to perform all system software
modifications, upgrades or changes. Response time of the technician to the site shall not exceed 4
hours.
Provide all hardware, software, programming tools and documentation necessary to modify the fire
alarm system on site. Modification includes addition and deletion of devices, circuits, zones and
changes to system operation and custom label changes for devices or zones. The system structure
and software shall place no limit on the type or extent of software modifications on-site.

2.1.4 Certifications:
Together with the shop drawing submittal, submit a certification from the major equip
ment manufacturer indicating that the proposed supervisor of the installation and the proposed performer
of contract maintenance is an authorized representative of the major equipment manufacturer.
Include names and addresses in the certification.

2.1.5 WARRANTY:
All work performed and all material and equipment furnished under this contract shall be free from
defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full
cost of maintenance, labor and materials required to correct any defect during this one year period
shall be included in the submittal bid.

3.0 APPLICABLE STANDARDS AND SPECIFICATIONS:

3.1 The specifications and standards listed below form a part of this specification. The system
shall fully comply with the latest issue of these standards, if applicable.

A) National Fire Protection Association (NFPA) - USA:

- NFPA 13 Sprinkler Systems
- NFPA 16 Foam/Water Deluge and Spray Systems
- NFPA 17 Dry Chemical Extinguishing Systems
- NFPA 17A Wet Chemical Extinguishing Systems
- NFPA 2001 Clean Agent Extinguishing Systems
- NFPA 72 National Fire Alarm Code
- NFPA 76 Telecommunication Facilities
- NFPA 318 Clean Room Applications
- NFPA 90A Air conditioning & ventilation system

B) Underwriters Laboratories Inc. (UL) - USA:

- UL 268 Smoke Detectors for Fire Protective Signaling Systems
- UL 864 Control Units for Fire Protective Signaling Systems 9th Edition Listed
- UL 268 A Smoke Detectors for Duct Applications
- UL 521 Heat Detectors for Fire Protective Signaling Systems
UL 464 Audible Signaling Appliances
UL 38 Manually Actuated Signaling Boxes
UL 346 Waterflow Indicators for Fire Protective Signaling Systems
UL 1971 Visual Notification Appliances
UL 228 Door Holders

3.2 NATIONAL BUILDING CODES

3.2.1 DELHI FIRE CODES

The Video Display Terminal (VDT) shall comply with Swedish magnetic emission and X-radiation guidelines MPR 1990:10.

3.2.2 APPROVALS:

The system shall have proper listing and/or approval from the following nationally recognized agencies:
UL Underwriters Laboratories Inc (9th Edition)
The fire alarm control panel shall meet UL Standard 864 9th Edition (Control Units)
The system shall be listed by the national agencies as suitable for extinguishing release applications.
The system shall support release of high and low pressure CO2.

4.0 PRODUCTS

4.1 EQUIPMENT AND MATERIAL, GENERAL:

All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protective signaling system, meeting the National Fire Alarm Code.
All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.
All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

5.0 CONDUIT AND WIRE:

5.1 Conduit:

Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements. Where required, all wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit.
Cable must be separated from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, per NEC Article 760-29.
Wiring for 24 volt DC control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
Conduit shall not enter the fire alarm control panel, or any other remotely mounted control panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.
Conduit shall be 3/4-inch (19.1 mm) minimum.

5.2 Wire:

All fire alarm system wiring shall be new.
Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for
Initiating Device Circuits and Signaling Line Circuits, and 14 AWG (1.63 mm) for Notification Appliance Circuits.

All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.

Wire and cable shall have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR).

Wiring used for the multiplex communication circuit (SLC) shall be twisted and unshielded and support a minimum wiring distance of 12,500 feet. The design of the system shall permit use of IDC and NAC wiring in the same conduit with the SLC communication circuit.

All field wiring shall be electrically supervised for open circuit and ground fault.

The fire alarm control panel shall be capable of t-tapping Class B (NFPA Style 4) Signaling Line Circuits (SLCs). Systems that do not allow or have restrictions in, for example, the amount of t-taps, length of t-taps etc., are not acceptable.

Terminal Boxes, Junction Boxes and Cabinets:

All boxes and cabinets shall be UL listed for their use and purpose.

Initiating circuits shall be arranged to serve like categories (manual, smoke, waterflow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.

The fire alarm control panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the main power distribution panel as FIRE ALARM. Fire alarm control panel primary power wiring shall be 12 AWG. The control panel cabinet shall be grounded securely to either a cold water pipe or grounding rod.

6.0 MAIN FIRE ALARM CONTROL PANEL OR NETWORK NODE:

The main FACP Central Console shall contain a microprocessor based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, panel modules including initiating circuits, control circuits, and notification appliance circuits, local and remote operator terminals, printers, annunciators, and other system controlled devices.

6.1. In conjunction with intelligent Loop Control Modules and Loop Expander Modules, the main FACP shall perform the following functions:

- Supervise and monitor all intelligent addressable detectors and monitor modules connected to the system for normal, trouble and alarm conditions.
- Supervise all initiating signaling and notification circuits throughout the facility by way of connection to monitor and control modules.
- Detect the activation of any initiating device and the location of the alarm condition. Operate all notification appliances and auxiliary devices as programmed. In the event of CPU failure, all SLC loop modules shall fallback to degrade mode. Such degrade mode shall treat the corresponding SLC loop control modules and associated detection devices as conventional two-wire operation. Any activation of a detector in this mode shall automatically activate associated Notification Appliance Circuits.
- Visually and audibly annunciate any trouble, supervisory, security or alarm condition on operator's terminals, panel display, and annunciators.

1. When a fire alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:
   - The system alarm LED shall flash.
   - A local piezo-electric audible device in the control panel shall sound a distinctive signal.
   - The 640-character backlit LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
   - Printing and history storage equipment shall log and print the event information along with a time and date stamp.
   - All system outputs assigned via preprogrammed equations for a particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.

2. When a trouble condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:
a. The system trouble LED shall flash.
b. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
c. The 640-character backlit LCD display shall indicate all information associated with the trouble condition, including the type of trouble point and its location within the protected premises.
d. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
e. All system outputs assigned via preprogrammed equations for a particular point in trouble shall be executed, and the associated system outputs (trouble notification appliances and/or relays) shall be activated.

3. When a supervisory condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:
   a. The system trouble LED shall flash.
   b. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
   c. The 640-character backlit LCD display shall indicate all information associated with the supervisory condition, including the type of trouble point and its location within the protected premises.
   d. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
   e. All system outputs assigned via preprogrammed equations for a particular point in trouble shall be executed, and the associated system outputs (trouble notification appliances and/or relays) shall be activated.

4. When a security alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:
   a. The system security LED shall flash.
   b. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
   c. The 640-character backlit LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
   d. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
   e. All system outputs assigned via preprogrammed equations for a particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.

5. When a pre-alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:
   a. The system pre-alarm LED shall flash.
   b. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
   c. The 640-character backlit LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
   d. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
   e. All system outputs assigned via preprogrammed equations for a particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.

7.0 Operator Control

1. Acknowledge Switch:
   a. Activation of the control panel acknowledge switch in response to new alarms and/or troubles shall silence the local panel piezo electric signal and change the alarm and trouble LEDs from flashing mode to steady-ON mode. If multiple alarm or trouble conditions exist, depression of this switch shall advance the LCD display to
the next alarm or trouble condition. In addition, the FACP shall support Block
Acknowledge to allow multiple trouble conditions to be acknowledged with a single
depression of this switch.
b. Depression of the Acknowledge switch shall also silence all remote annunciator
piezo sounders.

7.0 Signal Silence Switch:

Depression of the Signal Silence switch shall cause all programmed alarm notification appliances and
relays to return to the normal condition. The selection of notification circuits and relays that are
silence able by this switch shall be fully field programmable within the confines of all applicable
standards. The FACP software shall include silence inhibit and auto-silence timers.
1. Drill Switch:
   Depression of the Drill switch shall activate all programmed notification appliance circuits.
The drill function shall latch until the panel is silenced or reset.
2. System Reset Switch:
   Depression of the System Reset switch shall cause all electronically latched initiating devices
to return to their normal condition. Initiating devices shall re-report if active. Active
notification appliance circuits shall not silence upon Reset. Systems that de-activate and
subsequently re-activate notification appliance circuits shall not be considered equal. All
programmed Control-By-Event equations shall be re-evaluated after the reset sequence is
complete if the initiating condition has cleared. Non-latching trouble conditions shall not
clear and re-report upon reset.
3. Lamp Test:
The Lamp Test switch shall activate all local system LEDs, light each segment of the liquid
crystal display and display the panel software revision for service personal.
4. Scroll Display Keys:
   There shall be Scroll Display keys for FIRE ALARM, SECURITY, SUPERVISORY, TROUBLE, and
   OTHER EVENTS. Depression of the Scroll Display key shall display the next event in the
   selected queue allowing the operator to view events by type.
5. Print Screen:
   Depression of the PRINT SCREEN switch shall send the information currently displayed on
   the 640-character display to the printer.

9.0 System Capacity and General Operation

1. The control panel shall be capable of expansion via up to 10 SLC modules. Each module shall
   support a maximum of 318 analog/addressable devices for a maximum system capacity of
   3180 points. The system shall be capable of 3072 annunciation points per system regardless
   of the number of addressable devices.
2. The Fire Alarm Control Panel shall include a full featured operator interface control and
   annunciation panel that shall include a backlit 640-character liquid crystal display, individual,
   color coded system status LEDs, and a QWERTY style alphanumeric keypad for the field
   programming and control of the fire alarm system. Said LCD shall also support graphic bit
   maps capable of displaying the company name and logo of either the Engineer In charge or
   installing company.
3. All programming or editing of the existing program in the system shall be achieved without
   special equipment and without interrupting the alarm monitoring functions of the fire alarm
   control panel.

10.0 The FACP shall be able to provide the following software and hardware features:

10.1 a. Pre-signal and Positive Alarm Sequence: The system shall provide means to cause alarm
signals to only sound in specific areas with a delay of the alarm from 60 to up to 180 seconds
after start of alarm processing. In addition, a Positive Alarm Sequence selection shall be
available that allows a 15-second time period for acknowledging an alarm signal from a fire
detection/initiating device. If the alarm is not acknowledged within 15 seconds, all local and
remote outputs shall automatically activate immediately.
b. Smoke Detector Pre-alarm Indication at Control Panel: To obtain early warning of incipient or potential fire conditions, the system shall support a programmable option to determine system response to real-time detector sensing values above the programmed setting. Two levels of Pre-alarm indication shall be available at the control panel: alert and action.

c. Alert: It shall be possible to set individual smoke detectors for pre-programmed pre-alarm thresholds. If the individual threshold is reached, the pre-alarm condition shall be activated.

d. Action: If programmed for action, and the detector reaches a level exceeding the pre-programmed level, the control panel shall indicate an action condition. Sounder bases installed with either heat or smoke detectors shall automatically activate on action Pre-Alarm level, with general evacuation on alarm level.

e. The system shall support a detector response time to meet world annunciation requirements of less than 3 seconds.

f. Device Blink Control: Means shall be provided to turn off detector/module LED strobes for special areas.

g. NFPA 72 Smoke Detector Sensitivity Test: The system shall provide an automatic smoke detector test function that meet the requirements of NFPA 72.

h. Programmable Trouble Reminder: The system shall provide means to automatically initiate a reminder that troubles exist in the system. The reminder will appear on the system display and (if enabled) will sound a piezo alarm.

i. On-line or Off-line programming: The system shall provide means to allow panel programming either through an off-line software utility program away from the panel or while connected and on-line. The system shall also support upload and download of programmed database and panel executive system program to a Personal Computer/laptop.

j. History Events: The panel shall maintain a history file of the last 4000 events, each with a time and date stamp. History events shall include all alarms, troubles, operator actions, and programming entries. The control panels shall also maintain a 1000 event Alarm History buffer, which consists of the 1000 most recent alarm events from the 4000 event history file.

k. Smoke Control Modes: The system shall provide means to perform FSCS mode Smoke Control to meet NFPA-92A and 90B and HVAC mode to meet NFPA 90A.

l. The system shall provide means for all SLC devices on any SLC loop to be auto programmed into the system by specific address. The system shall recognize specific device type ID’s and associate that ID with the corresponding address of the device.

m. Drill: The system shall support means to activate all silenceable fire output circuits in the event of a practice evacuation or “drill”. If enabled for local control, the front panel switch shall be held for a minimum of 2 seconds prior to activating the drill function.

n. Passwords and Users: The system shall support two password levels, master and user. Up to 9 user passwords shall be available, each of which may be assigned access to the programming change menus, the alter status menus, or both. Only the master password shall allow access to password change screens.

o. Block Acknowledge: The system shall support a block Acknowledge for Trouble Conditions.

p. Sensitivity Adjust: The system shall provide Automatic Detector Sensitivity Adjust based on Occupancy schedules including a Holiday list of up to 15 days.

q. Environmental Drift Control: The system shall provide means for setting Environmental Drift Compensation by device. When a detector accumulates dust in the chamber and reaches an
 unacceptable level but yet still below the allowed limit, the control panel shall indicate a maintenance alert warning. When the detector accumulates dust in the chamber above the allowed limit, the control panel shall indicate a maintenance urgent warning.

s. Custom Action Messages: The system shall provide means to enter up to 100 custom action messages of up to 160 characters each. It shall be possible to assign any of the 100 messages to any point.

t. Print Functions: The system shall provide means to obtain a variety of reports listing all event, alarm, trouble, supervisory, or security history. Additional reports shall be available for point activation for the last Walk Test performed, detector maintenance report containing the detector maintenance status of each installed addressable detector, all network parameters, all panel settings including broadcast time, event ordering, and block acknowledge, panel timer values for Auto Silence, Silence Inhibit, AC Fail Delay time and if enabled, Proprietary Reminder, and Remote Reminder timers, supervision settings for power supply and printers, all programmed logic equations, all custom action messages, all non-fire and output activations (if pre-programmed for logging) all active points filtered by alarms only, troubles only, supervisory alarms, prealarms, disabled points and activated points, all installed points filtered by SLC points, panel circuits, logic zones, annunciators, releasing zones, spal zones, and trouble zones.

u. Local Mode: If communication is lost to the central processor the system shall provide added survivability through the intelligent loop control modules. Inputs from devices connected to the SLC and loop control modules shall activate outputs on the same loop when the inputs and outputs have been set with point programming to participate in local mode or when the type codes are of the same type: that is, an input with a fire alarm type code shall activate an output with a fire alarm type code.

v. Resound based on type for security or supervisory: The system shall indicate a Security alarm when a monitor module point programmed with a security Type Code activates. If silenced alarms exist, a Security alarm will resound the panel sounder. The system shall indicate a Supervisory alarm when a monitor module point programmed with a supervisory Type Code activates. If there are silenced alarms, a Supervisory alarm will resound the panel sounder.

w. Read status preview - enabled and disabled points: Prior to re-enabling points, the system shall inform the user that a disabled device is in the alarm state. This shall provide notice that the device must be reset before the device is enabled thereby avoiding activation of the notification circuits.

x. Custom Graphics: When fitted with an LCD display, the panel shall permit uploading of a custom bit-mapped graphic to the display screen. Graphic shall display when all systems are normal.

y. Multi-Detector and Cooperating Detectors: The system shall provide means to link one detector to up to two detectors at other addresses on the same loop in cooperative multi-detector sensing. There shall be no requirement for sequential addresses on the detectors and the alarm event shall be a result or product of all cooperating detectors chamber readings.

z. Tracking/Latching Duct: The system shall support both tracking and latching duct detectors.

aa. ACTIVE EVENT: The system shall provide a Type ID called FIRE CONTROL for purposes of air-handling shutdown, which shall be intended to override normal operating automatic functions. Activation of a FIRE CONTROL point shall cause the control panel to (1) initiate the monitor module Control-by-Event, (2) send a message to the panel display, history buffer, installed printer and annunciators, (3) shall not light an indicator at the control panel, (4) Shall display ACTIVE on the LCD as well a display a FIRE CONTROL Type Code and other information specific to the device.
bb. NON-FIRE Alarm Module Reporting: A point with a type ID of NON-FIRE shall be available for use for energy management or other non-fire situations. NON-FIRE point operation shall not affect control panel operation nor shall it display a message at the panel LDC. Activation of a NON-FIRE point shall activate control by event logic but shall not cause any indication on the control panel.

c. Security Monitor Points: The system shall provide means to monitor any point as a type security.

dd. One-Man Walk Test: The system shall provide both a basic and advanced walk test for testing the entire fire alarm system. The basic walk test shall allow a single operator to run audible tests on the panel. All logic equation automation shall be suspended during the test and while annunciators can be enabled for the test, all shall default to the disabled state. During an advanced walk test, field-supplied output point programming will react to input stimuli such as CBE and logic equations. When points are activated in advanced test mode, each initiating event shall latch the input. The advanced test shall be audible and shall be used for pull station verification, magnet activated tests on input devices, input and output device and wiring operation/verification.

e. Control By Event Functions: CBE software functions shall provide means to program a variety of output responses based on various initiating events. The control panel shall operate CBE through lists of zones. A zone shall become listed when it is added to a point’s zone map through point programming. Each input point such as detector, monitor module or panel circuit module shall support listing of up to 10 zones into its programmed zone map.

ff. Permitted zone types shall be general zone, releasing zone and special zone. Each output point (control module, panel circuit module) can support a list of up to 10 zones including general zone, logic zone, releasing zone and trouble zone. It shall be possible for output points to be assigned to list general alarm. Non-Alarm or Supervisory points shall not activate the general alarm zone.

gg. 1000 General Zones: The system shall support up to 1000 general purpose software zones for linking inputs to outputs. When an input device activates, any general zone programmed into that device’s zone map will be active and any output device that has an active general zone in its map will be active. It shall also be possible to use general zone as arguments in logic equations.

hh. 1000 Logic Equations: The system shall support up to 1000 logic equations for AND, OR, NOT, ONLY1, ANYX, XZONE or RANGE operators that allow conditional I/O linking. When any logic equation becomes true, all output points mapped to the logic zone shall activate.

ii. 10 trouble equations per device: The system shall provide support for up to 10 trouble equations for each device, which shall permit programming parameters to be altered, based on specific fault conditions. If the trouble equation becomes true, all output points mapped to the trouble zone shall activate.

jj. Control-By-Time: A time based logic function shall be available to delay an action for a specific period of time based upon a logic input with tracking feature. A latched version shall also be available. Another version of this shall permit activation on specific days of the week or year with ability to set and restore based on a 24 hour time schedule on any day of the week or year.

kk. Multiple agent releasing zones: The system shall support up to 10 releasing zones to protect against 10 independent hazards. Releasing zones shall provide up to three cross-zone with four abort options to satisfy any local jurisdiction requirements.

ll. Alarm Verification, by device, with timer and tally: The system shall provide a user-defined global software timer function that can be set for a specific detector or indicating panel module input. The timer function shall delay an alarm signal for a user-specified time period.
and the control panel shall ignore the alarm verification timer if another alarm is detected during the verification period. It shall also be possible to set a maximum verification count between 0 and 20 with the "0" setting producing no alarm verification. When the counter exceeds the threshold value entered, a trouble shall be generated to the panel.

10.2 Central Processing Unit

10.2.1. The Central Processing Unit shall communicate with, monitor, and control all other modules within the control panel. Removal, disconnection or failure of any control panel module shall be detected and reported to the system display by the Central Processing Unit.

10.2.2. The Central Processing Unit shall contain and execute all control-by-event (including Boolean functions including but not limited to AND, OR, NOT, ANYx, and CROSSZONE) programs for specific action to be taken if an alarm condition is detected by the system. Such control-by-event programs shall be held in non-volatile programmable memory, and shall not be lost with system primary and secondary power failure.

10.2.3. The Central Processing Unit shall also provide a real-time clock for time annotation, to the second, of all system events. The time-of-day and date shall not be lost if system primary and secondary power supplies fail.

10.2.4 The CPU shall be capable of being programmed on site without requiring the use of any external programming equipment. Systems that require the use of external programmers or change of EPROMs are not acceptable.

10.2.5 Consistent with UL864 standards, the CPU and associated equipment are to be protected so that voltage surges or line transients will not affect them.

10.2.6 Each peripheral device connected to the CPU shall be continuously scanned for proper operation. Data transmissions between the CPU and peripheral devices shall be reliable and error free. The transmission scheme used shall employ dual transmission or other equivalent error checking techniques.

10.2.7 The CPU shall provide an EIA-232 interface between the fire alarm control panel and the UL Listed Electronic Data Processing (EDP) peripherals.

10.2.8 The CPU shall provide two EIA-485 ports for the serial connection to annunciation and control subsystem components.

10.2.9 The EIA-232 serial output circuit shall be optically isolated to assure protection from earth ground.

10.2.10 The CPU shall provide one high-speed serial connection for support of network communication modules.

10.2.11 The CPU shall provide double pole relays for FIRE ALARM, SYSTEM TROUBLE, SUPERVISORY, and SECURITY. The SUPERVISORY and SECURITY relays shall provide selection for additional FIRE ALARM contacts.

10.3 Display

10.3.1 The system display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters.

10.3.2 The display assembly shall contain, and display as required, custom alphanumeric labels for all intelligent detectors, addressable modules, and software zones.

10.3.3 The system display shall provide a 640-character backlit alphanumeric Liquid Crystal Display (LCD). It shall also provide ten Light-Emitting-Diodes (LEDs), that indicate the status of the following system
parameters: AC POWER, FIRE ALARM, PREALARM, SECURITY, SUPERVISORY, SYSTEM TROUBLE, OTHER EVENT, SIGNALS SILENCED, POINT DISABLED, and CPU FAILURE.

10.3.4 The system display shall provide a QWERTY style keypad with control capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels with up to ten (one Master and nine User) passwords shall be accessible through the display interface assembly to prevent unauthorized system control or programming.

10.3.5 The system display shall include the following operator control switches: ACKNOWLEDGE, SIGNAL SILENCE, RESET, DRILL, and LAMP TEST. Additionally, the display interface shall allow scrolling of events by event type including, FIRE ALARM, SECURITY, SUPERVISORY, TROUBLE, and OTHER EVENTS. A PRINT SCREEN button shall be provided for printing the event currently displayed on the 640-character LCD.

10.4 Loop (Signaling Line Circuit) Control Module:

10.4.1 The Loop Control Module shall monitor and control a minimum of 318 intelligent addressable devices. This includes 159 intelligent detectors (Photoelectric, Thermal etc.) and 159 monitor or control modules.

10.4.2 The Loop Control Module shall contain its own microprocessor and shall be capable of operating in a local/degrade mode (any addressable device input shall be capable of activating any or all addressable device outputs) in the unlikely event of a failure in the main CPU.

10.4.3 The Loop Control Module shall provide power and communicate with all intelligent addressable detectors and modules on a single pair of wires. This SLC Loop shall be capable of operating as a NFPA Style 6 (Class B) circuit.

10.4.4 The SLC interface board shall be able to drive an NFPA Style 6 twisted shielded circuit up to 12,500 feet in length. The SLC Interface shall also be capable of driving an NFPA Style 6, no twist, no shield circuit up to 3,000 feet in length. In addition, SLC wiring shall meet the listing requirements for it to exit the building or structure. "T"-tapping shall be allowed in either case.

10.4.5 The SLC interface board shall receive analog or digital information from all intelligent detectors and shall process this information to determine whether normal, alarm, or trouble conditions exist for that particular device. Each SLC Loop shall be isolated and equipped to announce an Earth Fault condition. The SLC interface board software shall include software to automatically maintain the detector’s desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information may also be used for automatic detector testing and the automatic determination of detector maintenance requirements.

10.5 Enclosures:

10.5.1 The control panel shall be housed in a UL-listed cabinet suitable for surface or semi-flush mounting. The cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer’s standard finish.

10.5.2 The back box and door shall be constructed of 0.060 steel with provisions for electrical conduit connections into the sides and top.

10.5.3 The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators. For convenience, the door may be site configured for either right or left hand hinging.

10.5.4 The control unit shall be modular in structure for ease of installation, maintenance, and future expansion.

10.6 Power Supply:
10.6.1 The Addressable Main Power Supply shall operate on 120/240 VAC, 50/60 Hz, and shall provide all necessary power for the FACP.

10.6.2 The Addressable Main Power Supply shall provide sufficient power to the CPU, using a switching 24 VDC regulator and shall incorporate a battery charger for 24 hours of standby power using dual-rate charging techniques for fast battery recharge.

10.6.3 The Addressable Main Power Supply shall provide a battery charger for 24 hours of standby using dual-rate charging techniques for fast battery recharge. The supply shall be capable of charging batteries ranging in capacity from 25-200 amp-hours within a 48-hour period.

10.6.4 The Addressable Main Power Supply shall provide a very low frequency sweep earth detect circuit, capable of detecting earth faults.

10.6.5 The Addressable Main Power Supply shall be power-limited per 1995 UL864 requirements.

10.7 Universal Digital Alarm Communicator Transmitter (UDACT).

The UDACT is an interface for communicating digital information between a fire alarm control panel and an UL-Listed central station.

10.7.1 The UDACT shall be compact in size, mounting in a standard module position of the fire alarm control cabinet. Optionally, the UDACT shall have the ability for remote mounting, up to 6,000 feet from the fire alarm control panel. The wire connections between the UDACT and the control panel shall be supervised with one pair for power and one pair for multiplexed communication of overall system status. Systems that utilize relay contact closures are not acceptable.

10.7.2 The UDACT shall include connections for dual telephone lines (with voltage detect), per UL/NFPA/FCC requirements. It shall include the ability for split reporting of panel events up to three different telephone numbers.

10.7.3 The UDACT shall be completely field programmable from a built-in keypad and 4 character red, seven segment display.

10.7.4 The UDACT shall be capable of transmitting events in at least 15 different formats. This ensures compatibility with existing and future transmission formats.

10.7.5 Communication shall include vital system status such as:

- Independent Zone (Alarm, trouble, non-alarm, supervisory)
- Independent Addressable Device Status
- AC (Mains) Power Loss
- Low Battery and Earth Fault
- System Off Normal
- 12 and 24 Hour Test Signal
- Abnormal Test Signal (per UL requirements)
- EIA-485 Communications Failure
- Phone Line Failure

10.7.6 The UDACT shall support independent zone/point reporting when used in the Contact ID format. In this format the UDACT shall support transmission of up to 2,040 points. This enables the central station to have exact details concerning the origin of the fire or response emergency.

11.0 Stand Alone Voice Evacuation Control Panel

11.1 A stand alone Voice Evacuation Control Panel shall be available from the same manufacturer of the main fire alarm system.

11.2 This Voice Control Panel shall work stand alone or as a slave to the Main Control Panel.
11.3 Shall have as minimum requirements:

b. Speaker circuit that can be wired both Class A or B.
c. Integral Digital Message Generator with a capacity of up to 60 seconds. The Digital Message Generator shall be capable of primary and secondary messages (30 seconds each). These messages shall field programmable without the use of additional equipment.
d. Built in alert tone generators with steady, slow woop, high/low and chime tone field programmable.
e. Integral Diagnostic LEDs for Power, System Trouble, Message Generator Trouble, Tone Generator Trouble, and Alarm.

The Voice Control Panel shall be fully supervised including microphone, amplifier output, message generator, speaker wiring, and tone generators.

Speaker outputs shall be fully power-limited.

12.0 Auxiliary Field Power Supply – Addressable

12.1 The auxiliary addressable power supply is a remote 24 VDC power supply used to power Notification Devices and field devices that require regulated 24VDC power. The power supply shall also include and charge backup batteries.

12.2 The addressable power supply for the fire alarm system shall provide up a minimum of 6.0 amps of 24 volt DC regulated power for Notification Appliance Circuit (NAC) power or 5 amps of 24 volt DC general power. The power supply shall have an additional .5 amp of 24 VDC auxiliary power for use within the same cabinet as the power supply. It shall include an integral charger designed to charge 7.0 - 25.0 amp hour batteries.

12.3 The addressable power supply shall provide four individually addressable Notification Appliance Circuits that may be configured as two Class "A" and two Class "B" or four Class "B" only circuits. All circuits shall be power-limited per UL 864 requirements.

12.4 The addressable power supply shall provide built-in synchronization for certain Notification Appliances on each circuit without the need for additional synchronization modules. The power supply's output circuits shall be individually selected for synchronization. A single addressable power supply shall be capable of supporting both synchronized and non-synchronized Notification Devices at the same time.

12.5 The addressable power supply shall operate on 120 or 240 VAC, 50/60 Hz.

12.6 The interface to the power supply from the Fire Alarm Control Panel (FACP) shall be via the Signaling Line Circuit (SLC) or other multiplexed means. Power supplies that do not use an intelligent interface are not suitable substitutes. The required wiring from the FACP to the addressable power supply shall be a single unshielded twisted pair wire.

12.7 The addressable power supply shall supervise for battery charging failure, AC power loss, power brownout, battery failure, NAC loss, and optional ground fault detection. In the event of a trouble condition, the addressable power supply shall report the incident and the applicable address to the FACP via the SLC.

12.8 The addressable power supply shall have an AC Power Loss Delay option. If this option is utilized and the addressable power supply experiences an AC power loss, reporting of the incident to the FACP will be delayed. A delay time of eight or sixteen hours shall be Dip-switch selected.

12.9 The addressable power supply shall have an option for Canadian Trouble Reporting and this option shall be Dip-switch selectable.
12.10 The addressable power supply mounts in either the FACP backbox or its own dedicated surface mounted backbox with cover.

12.11 Each of the power supply's four output circuits shall be DIP-switch selected for Notification Appliance Circuit or General Purpose 24 VDC power. Any output circuit shall be able to provide up to 2.5 amps of 24 VDC power.

12.12 The addressable power supply's output circuits shall be individually supervised when they are selected to be either a Notification Appliance Circuit when wired Class "A" or by the use of and end-of-line resistor. When the power supply's output circuit is selected as General 24VDC power, the circuit shall be individually supervised when an end-of-line relay is used.

12.13 When selected for Notification Appliance Circuits, the output circuits shall be individually DIP-switch selectable for Steady, March Time, Dual Stage or Temporal.

12.14 When selected as a Notification Appliance Circuit, the output circuits of the addressable power supply shall have the option to be coded by the use of a universal zone coder.

12.15 The addressable power supply shall interface and synchronize with other power supplies of the same type. The required wiring to interface multiple addressable power supplies shall be a single unshielded, twisted pair wire.

12.16 An individual or multiple interfaced addressable power supplies shall have the option to use an external charger for battery charging. Interfaced power supplies shall have the option to share backup battery power.

13.0 Field Charging Power Supply: The FCPS is a device designed for use as either a remote 24 volt power supply or to power Notification Appliances and provide synchronization signals to visual strobe devices.

13.1 The FCPS shall be available in two models offering either up to 6.0 amps (4.0 amps continuous) or 8.0 amps (6.0 amps continuous) of regulated 24-volt power. It shall include an integral charger designed to charge 7.0 amp hour batteries and to support 60-hour standby.

13.2 The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a relay. Four outputs (two Style Y or Z and two Style Y) shall be available for connection to the Notification devices.

13.3 The FCPS shall include an attractive surface mount backbox.

13.4 The Field Charging Power Supply shall include the ability to delay the AC fail delay per NFPA requirements.

13.5 The FCPS include power limited circuitry, per 1995 UL standards.

14.0 System Circuit Supervision:

14.1 The FACP shall supervise all circuits to intelligent devices, annunciators and conventional peripherals and annunciate loss of communications with these devices. The CPU shall continuously scan above devices for proper system operation and upon loss of response from a device shall sound an audible trouble, indicate that device or devices are not responding and print the information in the history buffer and on a printer.

14.2 Sprinkler system valves, standpipe control valves, PIV and main gate valves shall be supervised for off-normal position.

15.0 Field Wiring Terminal Blocks:

All wiring terminal blocks shall be the plug-in/removable type and shall be capable of terminating up to 12 AWG wire. Terminal blocks that are permanently fixed to the PC board are not acceptable.
15.1 Printer

15.1.1 Printers shall be of the automatic type, printing code, time, date, location, category, and condition.

15.1.2 The printer shall provide hard-copy printout of all changes in status of the system and shall time-stamp such printouts with the current time-of-day and date. The printer shall be standard carriage with 80-characters per line and shall use standard pin-feed paper. The printer shall be enclosed in a separate cabinet suitable for placement on a desktop or table and Ul, ULC listed for use with the NFS-3030. The printer shall communicate with the control using an interface complying with Electrical Industries Association standard EIA-232D. The printer power shall be 120 VAC @ 60 Hz.

15.1.3 Thermal printers are not acceptable.

15.1.4 The system shall have a strip printer capable of being mounted directly in the main FACP enclosure. Alarms shall be printed in easy-to-read RED, other messages, such as a trouble, shall be printed in BLACK. This printer shall receive power from the system power supply and shall operate via battery back up if AC mains are lost. The strip printer shall be UL 864 listed.

16.0 Transponders (Remotely Located Control Panels): (Repeater Panel)

16.1 Transponders shall be listed under UL category UOJZ as an independent, local fire alarm control unit as well as being listed as a critical component in a multiplex fire alarm system. Transponders shall be located where shown on the plans.

The transponder shall serve as the interface between conventional initiating fire devices, controlled signaling devices, and the FACP. The supervised multiplex communication port shall be an integral part of the transponder.

16.2 Each Transponder shall be powered from a local Power Supply, and shall provide all power necessary for its own operation, including standby power.

16.3 Transponders shall be used to house batteries and power supplies to allow a true distributed processing and amplification.

16.4 Each transponder shall have the following indicators and operator Controls:
   a. Alarm Acknowledge/Signal Silence/Reset Switch
   b. Power LED
   c. System alarm LED
   d. System trouble LED
   e. Local piezoelectric signal
   f. Red alarm per Initiating Device Circuit
   g. Green on/off LED per notification appliance circuit or relay

16.5 Each transponder will be capable of expansion of up to 24 field circuits of the following types in any mix:

16.6 a. Initiating Device Circuits (IDC): IDCs may be added to the transponder in groups of 8 Style B (Class B), or 4 Style D (Class A) circuits. Each circuit shall be capable of monitoring up to 30 compatible 2-wire smoke detectors, and/or any number of contact type initiating devices.

   b. Auxiliary Control Relay Outputs: Auxiliary relay outputs may be added to the transponder in groups of eight individually controlled single Form-C circuits. Alternately, the eight independent relays may be configured as four dual Form-C. All relay contacts shall be rated 2 A @ 30 VDC.

   c. Notification Application Circuits: Notification Application Circuit outputs may be added to the transponder in groups of 8 Class B (Style Y), or 4 Class A (Style Z) circuits. Each circuit shall be capable of being configured as a Telephone, Horn, Strobe or Speaker Circuit.
17.0 Remote Transmissions:

17.1 Provide local energy or polarity reversal or trip circuits as required.
17.2 The system shall be capable of operating a polarity reversal or local energy or fire alarm transmitter for automatically transmitting fire information to the fire department.
17.3 Provide capability and equipment for transmission of zone alarm and trouble signals to remote operator's terminals, system printers and annunciators.
17.4 Transmitters shall be compatible with the systems and equipment they are connected to such as timing, operation and other required features.
17.5 System Expansion: Design the main FACP and transponders so that the system can be expanded in the future (to include the addition of twenty percent more circuits or zones) without disruption or replacement of the existing control panel. This shall include hardware capacity, software capacity and cabinet space.

18.0 Field Programming

18.1 The system shall be programmable, configurable and expandable in the field without the need for special tools, laptop computers, or other electronic interface equipment. There shall be no firmware changes required to field modify the system time, point information, equations, or annunciator programming/information.

18.2 It shall be possible to program through the standard FACP keyboard all system functions.

18.3 All field defined programs shall be stored in non-volatile memory.

18.4 Two levels of password protection shall be provided in addition to a key-lock cabinet. One level shall be used for status level changes such as point/zone disable or manual on/off commands (Building Manager). A second (higher-level) shall be used for actual change of the life safety program (installer). These passwords shall be five (5) digits at a minimum. Upon entry of an invalid password for the third time within a one minute time period an encrypted number shall be displayed. This number can be used as a reference for determining a forgotten password.

18.5 The system programming shall be "backed" up on a 3.5" floppy diskette utilizing an upload/download program. This system back-up disk shall be completed and given in duplicate to the building Engineer In charge and/or operator upon completion of the final inspection. The program that performs this function shall be "non-proprietary", in that, it shall be possible to forward it to the building Engineer In charge/operator upon his or her request.

The installer's field programming and hardware shall be functionally tested on a computer against known parameters/norms which are established by the FACP manufacturer. A software program shall test Input-to-Output correlations, device Type ID associations, point associations, time equations, etc. This test shall be performed on an IBM-compatible PC with a verification software package. A report shall be generated of the test results and two copies turned in to the engineer(s) on record. It shall be the responsibility of the equipment supplier/installer to ensure that all equipment supplied will fit in locations designated on plans and in the specifications.

19.0 Specific System Operations

19.1 Smoke Detector Sensitivity Adjust: Means shall be provided for adjusting the sensitivity of any or all analog intelligent smoke detectors in the system from the system keypad or from the keyboard of the video terminal. Sensitivity range shall be within the allowed UL window.

19.2 Alarm Verification: Each of the Intelligent Addressable Smoke Detectors in the system may be independently selected and enabled to be an alarm verified detector. The alarm verification function shall be programmable from 5 to 50 seconds and each detector shall be able to be selected for verification during the field programming of the system or anytime after system turn-on. Alarm verification shall not require any additional hardware to be added to the control panel. The FACP
shall keep a count of the number of times that each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.

19.3 System Point Operations:
   a. Any addressable device in the system shall have the capability to be enabled or disabled through the system keypad or video terminal.
   b. System output points shall be capable of being turned on or off from the system keypad or the video terminal.

19.4 Point Read: The system shall be able to display the following point status diagnostic functions without the need for peripheral equipment. Each point shall be annunciated for the parameters listed:
   a. Device Status.
   b. Device Type.
   c. Custom Device Label.
   d. Software Zone Label.
   e. Device Zone Assignments.
   f. Analog Detector Sensitivity.
   g. All Program Parameters.

19.5 System Status Reports: Upon command from an operator of the system, a status report will be generated and printed, listing all system statuses:

19.6 System History Recording and Reporting: The fire alarm control panel shall contain a history buffer that will be capable of storing up to 4000 system events. Each of these events will be stored, with time and date stamp, until an operator requests that the contents be either displayed or printed. The contents of the history buffer may be manually reviewed, one event at a time, and the actual number of activations may also be displayed and or printed. The history buffer shall use non-volatile memory. Systems that use volatile memory for history storage are not acceptable.

19.7 Automatic Detector Maintenance Alert: The fire alarm control panel shall automatically interrogate each intelligent system detector and shall analyze the detector responses over a period of time.

If any intelligent detector in the system responds with a reading that is below or above normal limits, then the system will enter the trouble mode, and the particular Intelligent Detector will be annunciated on the system display, and printed on the optional system printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.

19.8 The system shall include the ability (programmable) to indicate a "pre-alarm" condition. This will be used to alert maintenance personal when a detector is at 80% of its alarm threshold in a 60 second period.

20.0 Network Control Annunciator

A network control annunciator shall be provided to display all system intelligent points. The NCA shall be capable of displaying all information for all 200,000 possible points on the network. Network display devices, which are only capable of displaying a subset of network points, shall not be suitable substitutes.

The NCA shall include a minimum of 640 characters, backlit by a long life, solid state LCD display. It shall also include a full QWERTY style keypad with tactile feel. Additionally, the network display shall include ten soft-keys for screen navigation and the ability to scroll events by type. i.e. Fire Alarm, Supervisory Alarm, Trouble, etc.

The network control annunciator shall have the ability to display up to eight events in order of priority and time of occurrence. Counters shall be provided to indicate the total number of events by type.

The NCA shall mount in any of the network node fire alarm control panels. Optionally, the network display may mount in a backbox designed for this use. The network shall support a minimum of 103
network control annunciators (not to exceed total node capacity) and shall connect to the network over either a wire or fiber interface.

The network control annunciator shall have an event history buffer capable of storing a minimum of 1000 events in non-volatile memory. Additionally, the NCA shall have a fire alarm history buffer capable of storing a minimum of 200 events in non-volatile memory. Systems that do not protect fire alarm events from being overwritten by other events are not suitable substitutes.

The NCA shall include two optically isolated, 9600 baud, industry standard EIA-232 ports for UL864 listed printers and CRT's. These peripheral devices shall print or display network activity.

The network control annunciator shall include control switches for system wide control of Acknowledge, Signal Silence, System Reset, Drill, and local Lamp Test. A mechanical means by which the controls switches are "locked out", such as a key, shall be available.

The NCA shall include long life LEDs to display Power, Fire Alarm, Pre-Alarm, Security Alarm, System Trouble, Supervisory, Signals Silenced, Disabled Points, Other (non-fire) Events, and CPU Failure.

The network control annunciator shall include control switches for system wide control of Acknowledge, Signal Silence, System Reset, Drill, and local Lamp Test. A mechanical means by which the controls switches are "locked out", such as a key, shall be available.

The NCA shall include long life LEDs to display Power, Fire Alarm, Pre-Alarm, Security Alarm, System Trouble, Supervisory, Signals Silenced, Disabled Points, Other (non-fire) Events, and CPU Failure.

The network control annunciator shall include a Master password and up to nine User passwords. Each password shall be up to eight alpha-numeric characters in length. The Master password shall be authorized to access the programming and alter status menus. Each User password may have different levels of authorization assigned by the Master password.

The NCA shall allow editing of labels for all points within the network; control on/off of outputs; enable/disable of all network points; alter detector sensitivity; clear detector verification counters for any analog addressable detector within the network; clear any history log within the network; change the Time/Date settings; initiate a Walk Test.

The network control annunciator shall support an optional WindowsTM based program utility. This utility shall allow the user create an NCA database, upload/download an NCA database, and download an upgrade to the NCA executive. To ensure program validity, this utility shall check stored databases for errors. A compare function shall be included to identify differences between databases.

For time keeping purposes the NCA shall include a time of day clock.

Each NCA shall support up to 32 additional 80 character remote display annunciators for displaying network activity. These "Terminal Mode" displays will mimic the activity appearing on the corresponding NCA.

21.0 Digital Voice Command Center

The Digital Voice Command Center located with the FACP, shall contain all equipment required for all audio control, emergency telephone system control, signaling and supervisory functions. This shall include speaker zone indication and control, telephone circuit indication and control, digital voice units, microphone and main telephone handset.

Function: The Voice Command Center equipment shall perform the following functions:

Operate as a supervised multi-channel emergency voice communication system.

Operate as a two-way emergency telephone system control center.

Audibly and visually annunciate the active or trouble condition of every speaker circuit and emergency telephone circuit.

Audibly and visually annunciate any trouble condition for digital tone and voice units required for normal operation of the system.

Provide all-call Emergency Paging activities through activation of a single control switch.

As required, provide vectored paging control to specific audio zones via dedicated control switches.

Provide a factory recorded “library” of voice messages and tones in standard WAV. File format, which may be edited and saved on a PC running a current Windows® operating system.

Provide a software utility capable of off-line programming for the VCC operation and the audio message files. This utility shall support the creation of new programs as well as editing and saving
existing program files. Uploading or downloading the VCC shall not inhibit the emergency operation of other nodes on the fire alarm network.

Support an optional mode of operation with four analog audio outputs capable of being used with UL 864 fire-listed analog audio amplifiers and SCL controlled switching.

The Digital Voice Command shall be modular in construction, and shall be capable of being field programmable without requiring the return of any components to the manufacturer and without requiring use of any external computers or other programming equipment.

The Digital Voice Command and associated equipment shall be protected against unusually high voltage surges or line transients.

22.0 Audio Amplifiers

22.1 The Audio Amplifiers will provide Audio Power (@70 Volts RMS) for distribution to speaker circuits.

Multiple audio amplifiers may be mounted in a single enclosure, either to supply incremental audio power, or to function as an automatically switched backup amplifier(s).

The audio amplifier shall include an integral power supply, and shall provide built-in LED indicators for the following conditions:

- Earth Fault on DAP A (Digital Audio Port A)
- Earth Fault on DAP B (Digital Audio Port B)
- Audio Amplifier Failure Detected
- Trouble
- Active Alarm Bus input
- Audio Detected on Aux Input A
- Audio Detected on Aux Input B
- Audio Detected on FireFighter’s Telephone Riser
- Receiving Audio from digital audio riser
- Short circuit on speaker circuit 1
- Short circuit on speaker circuit 2
- Short circuit on speaker circuit 3
- Short circuit on speaker circuit 4
- Data Transmitted on DAP A
- Data Received on DAP A
- Data Transmitted on DAP B
- Data Received on DAP B
- Board failure
- Active fiberoptic media connection on port A (fiberoptic media applications)
- Active fiberoptic media connection on port B (fiberoptic media applications)
- Power supply Earth Fault
- Power supply 5V present
- Power supply conditions – Brownout, High Battery, Low Battery, Charger Trouble

The audio amplifier shall provide the following built-in controls:

- Amplifier Address Selection Switches
- Signal Silence of communication loss annunciation
- Reset
- Level adjustment for background music
- Enable/Disable for Earth Fault detection on DAP A
- Enable/Disable for Earth Fault detection on DAP A
- Switch for 2-wire/4-wire FFT riser

Adjustment of the correct audio level for the amplifier shall not require any special tools or test equipment.
Includes audio input and amplified output supervision, back up input, and automatic switch over function, (if primary amplifier should fail).

System shall be capable of backing up digital amplifiers.

23.0 **Audio Message Generator (Prerecorded Voice)/Speaker Control:**

Each initiating zone or intelligent device shall interface with an emergency voice communication system capable of transmitting a prerecorded voice message to all speakers in the building.

Actuation of any alarm initiating device shall cause a prerecorded message to sound over the speakers. The message shall be repeated four (4) times. Pre- and post-message tones shall be supported.

A built-in microphone shall be provided to allow paging through speaker circuits.

24.0 **Speakers:**

All speakers shall operate on 70 VRMS or with field selectable output taps from 0.5 to 2.0 Watts.

Speakers in corridors and public spaces shall produce a nominal sound output of 84 dBA at 10 feet (3m).

Frequency response shall be a minimum of 400 HZ to 4000 HZ.

The back of each speaker shall be sealed to protect the speaker cone from damage and dust.

25.0 **System paging from emergency telephone circuits shall be supported.**

The audio message generator shall have the following indicators and controls to allow for proper operator understanding and control:

- **LED Indicators:**
  - Lamp Test
  - Trouble
  - Off-Line Trouble
  - Microphone Trouble
  - Phone Trouble
  - Busy/Wait
  - Page Inhibited
  - Pre/Post Announcement Tone

- **Controls with associated LED Indicators:**
  - Speaker Switches/Indicators

  The speaker circuit control switches/indicators shall include visual indication of active and trouble status for each speaker circuit in the system.

  The speaker circuit control panel shall include switches to manually activate or deactivate each speaker circuit in the system.

26.0 **Fire Fighters Telephone System**

The emergency telephone circuit control panel shall include visual indication of active and trouble status for each telephone circuit in the system.

The telephone circuit control panel shall include switches to manually activate or deactivate each telephone circuit in the system.
27.0 Waterflow Operation
An alarm from a waterflow detection device shall activate the appropriate alarm message on the main panel display, turn on all programmed notification appliance circuits and shall not be affected by the signal silence switch.

27.1 Supervisory Operation
An alarm from a supervisory device shall cause the appropriate indication on the system display, light a common supervisory LED, but will not cause the system to enter the trouble mode.

27.2 Signal Silence Operation
The FACP shall have the ability to program each output circuit (notification, relay, speaker etc) to deactivate upon depression of the signal silence switch.

28.0 Sprinkler and Standpipe Valve Supervisory Switches:
Each sprinkler system water supply control valve riser, zone control valve, and standpipe system riser control valve shall be equipped with a supervisory switch. Standpipe hose valves, and test and drain valves shall not be equipped with supervisory switches.
PIV (post indicator valve) or main gate valves shall be equipped with a supervisory switch.
The switch shall be mounted so as not to interfere with the normal operation of the valve and adjusted to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.
The supervisory switch shall be contained in a weatherproof aluminum housing, which shall provide a 3/4 inch (19 mm) conduit entrance and incorporate the necessary facilities for attachment to the valves.
The switch housing shall be finished in red baked enamel.
The entire installed assembly shall be tamper proof and arranged to cause a switch operation if the housing cover is removed, or if the unit is removed from its mounting.
Valve supervisory switches shall be provided and connected under this section and installed by mechanical contractor.

29.0 Non-Alarm Input Operation
Any addressable initiating device in the system may be used as a non-alarm input to monitor normally open contact type devices. Non-alarm functions are a lower priority than fire alarm initiating devices.
Combo Zone
A special type code shall be available to allow waterflow and supervisory devices to share a common addressable module. Waterflow devices shall be wired in parallel, supervisory devices in series.

30.0 SYSTEM COMPONENTS:

30.1 Printer
The printer shall provide hard-copy printout of all changes in status of the system and shall time-stamp such printouts with the current time-of-day and date. The printer shall be standard carriage with 80-characters per line and shall use standard pin-feed paper. The printer shall be enclosed in a separate cabinet suitable for placement on a desktop or table. The printer shall communicate with the control panel using an interface complying with Electrical Industries Association standard EIA-232D. Power to the printer shall be 120 VAC @ 60 Hz.
The system shall have a strip printer capable of being mounted directly in the main FACP enclosure. Alarms shall be printed in easy-to-read RED, other messages, such as a trouble, shall be printed in BLACK. This printer shall receive power from the system power supply and shall operate via battery back-up if AC mains are lost. The strip printer shall be UL 864 listed.

30.2 **Video Display Terminal**

The Video Display Terminal shall provide a visual display and an audible alert of all changes in status of the system and shall annotate such displays with the current time-of-day and date. The Video Display Terminal shall be enclosed in a cabinet suitable for placement on a desktop or table.

A detachable keyboard shall be provided that may be used for programming, testing, and control of the system. Individual keys shall be provided on the keyboard for the ACKNOWLEDGE, RESET, LAMP TEST, SYSTEM TEST, and SIGNAL SILENCE functions of the control panel. The video display terminal shall include a count of all alarms and troubles in the system, as well as a count of all alarms and trouble requiring acknowledgment. These counts shall be continuously displayed during all FACP operations.

31.0 **SYSTEM COMPONENTS - ADDRESSABLE DEVICES**

Addressable Devices - General

Addressable devices shall use simple to install and maintain decade, decimal address switches. Devices shall be capable of being set to an address in a range of 001 to 159.

Addressable devices, which use a binary-coded address setting method, such as a DIP-switch, are not an allowable substitute.

Detectors shall be intelligent (analog) and addressable, and shall connect with two wires to the fire alarm control panel Signaling Line Circuits.

Addressable smoke and thermal detectors shall provide dual alarm and power/polling LEDs. Both LEDs shall flash green under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady red illumination by the control panel, indicating that an alarm condition has been detected. If required, the LED flash shall have the ability to be removed from the system program. An output connection shall also be provided in the base to connect an external remote alarm LED.

The fire alarm control panel shall permit detector sensitivity adjustment through field programming of the system. The panel on a time-of-day basis shall automatically adjust sensitivity.

Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.

The detectors shall be ceiling-mount and shall include a separate twist-lock base with tamper proof feature. Bases shall include a sounder base with a built-in (local) sounder rated at 85 DBA minimum, a relay base and an isolator base designed for Style 7 applications.

The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.

Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device.

Detectors will operate in an analog fashion, where the detector simply measures its designed environment variable and transmits an analog value to the FACP based on real-time measured values. The FACP software, not the detector, shall make the alarm/normal decision, thereby allowing the sensitivity of each detector to be set in the FACP program and allowing the system operator to view the current analog value of each detector.

Addressable devices shall store an internal identifying code that the control panel shall use to identify the type of device.

A magnetic test switch shall be provided to test detectors and modules. Detectors shall report an indication of an analog value reaching 100% of the alarm threshold.

Addressable modules shall mount in a 4-inch square (101.6 mm square), 2-1/8 inch (54 mm) deep electrical box. An optional surface mount Lexan enclosure shall be available.
32.0 Programmable Electronic Exit Point Directional Sounders:

Electronic sounders shall operate on 24 VDC nominal. Electronic sounders shall be field programmable without the use of special tools, at a sound level of at least 90 dBA measured at 10 feet from the device. Shall be flush or surface mounted as shown on plans. Shall produce broad band directional sound to guide occupants to safe exists even in complete darkness. Strobe lights shall meet the requirements of the ADA, UL Standard 1971, be fully synchronized, and shall meet the following criteria:

- The maximum pulse duration shall be 2/10 of one second.
- Strobe intensity shall meet the requirements of UL 1971.
- The flash rate shall meet the requirements of UL 1971.

Field Wiring Terminal Blocks

For ease of service all panel I/O wiring terminal blocks shall be removable, plug-in types and have sufficient capacity for #18 to #12 AWG wire. Terminal blocks that are permanently fixed are not acceptable.

33.0 Addressable Manual Fire Alarm Box (manual station)

Addressable manual fire alarm boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.

All operated stations shall have a positive, visual indication of operation and utilize a key type reset.

Manual fire alarm boxes shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches (44 mm) or larger.

34.0 Intelligent Multi-Co-Operative Sensing type Photoelectric Smoke Detector

The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall be in position to work in advance multi Co-Operative Sensing, on command from the control panel, send data to the panel representing the analog level of smoke density.

35.0 Intelligent Thermal Detectors

Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signaling line circuit.

36.0 Intelligent Laser Photo Smoke Detector

36.1 The intelligent laser photo smoke detector shall be a spot type detector that incorporates an extremely bright laser diode and an integral lens that focuses the light beam to a very small volume near a receiving photo sensor. The scattering of smoke particles shall activate the photo sensor.

36.2 The laser detector shall have conductive plastic so that dust accumulation is reduced significantly.

36.3 The intelligent laser photo detector shall have nine sensitivity levels and be sensitive to a minimum obscuration of 0.03 percent per foot.

36.4 The laser detector shall not require expensive conduit, special fittings or PVC pipe.
36.5. The intelligent laser photo detector shall support standard, relay, isolator and sounder detector bases.

36.6. The laser photo detector shall not require other cleaning requirements than those listed in NFPA 72. Replacement, refurbishment or specialized cleaning of the detector head shall not be required.

36.7. The laser photo detector shall include two bicolor LEDs that flash green in normal operation and turn on steady red in alarm.

37.0 **Intelligent Multi Criteria Acclimating Detector**

37.1 The intelligent multi criteria Acclimate detector shall be an addressable device that is designed to monitor a minimum of photoelectric and thermal technologies in a single sensing device. The design shall include the ability to adapt to its environment by utilizing a built-in microprocessor to determine its environment and choose the appropriate sensing settings. The detector design shall allow a wide sensitivity window, no less than 1 to 4% per foot obscuration. This detector shall utilize advanced electronics that react to slow smoldering fires and thermal properties all within a single sensing device.

37.2 The microprocessor design shall be capable of selecting the appropriate sensitivity levels based on the environment type it is in (office, manufacturing, kitchen etc.) and then have the ability to automatically change the setting as the environment changes (as walls are moved or as the occupancy changes).

37.3 The intelligent multi criteria detection device shall include the ability to combine the signal of the thermal sensor with the signal of the photoelectric signal in an effort to react hastily in the event of a fire situation. It shall also include the inherent ability to distinguish between a fire condition and a false alarm condition by examining the characteristics of the thermal and smoke sensing chambers and comparing them to a database of actual fire and deceptive phenomena.

38.0 **Intelligent Duct Smoke Detector**

38.1 The smoke detector housing shall accommodate either an intelligent ionization detector or an intelligent photoelectric detector, of that provides continuous analog monitoring and alarm verification from the panel.

38.2 When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system.

39.0 **Hostile-Area Smoke Detector**

39.1 The detector shall be designed to provide early warning smoke detection in environments where traditional smoke detectors are not practical.

39.2 The detector shall have a filter system to remove particles down to 25 microns.

39.3 This filter system shall remove unwanted airborne particles and water mist. This shall allow the detector to operate in environments where traditional smoke detectors would have nuisance alarms.

39.4 The filter system shall consist of 2 filters one of which is field replaceable.

39.5 The filter system shall have an intake fan to draw air and smoke through the filters into the sensing chamber.

39.6 The filter system shall be supervised so that if the filter is clogged or the fan fails the control panel reports trouble.

39.7 The filter system shall be powered from 24 VDC separate from the SLC communications.
39.8 The detector shall utilize a photoelectric sensing chamber.

40.0 Two Wire Detector Monitor Module

40.1 Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional 2-wire smoke detectors or alarm initiating devices (any N.O. dry contact device).

40.2 The IDC zone may be wired for Class A or B (Style D or Style B) operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

41.0 Addressable Control Module

41.1 Addressable control modules shall be provided to supervise and control the operation of one conventional NACs of compatible, 24 VDC powered, polarized audio/visual notification appliances.

41.2 The control module NAC may be wired for Style Z or Style Y (Class A/B) with up to 1 amp of inductive A/V signal, or 2 amps of resistive A/V signal operation.

41.3 Audio/visual power shall be provided by a separate supervised power circuit from the main fire alarm control panel or from a supervised UL listed remote power supply.

41.4 The control module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30 VDC.

42.0 Addressable Relay Module

42.1 Addressable Relay Modules shall be available for HVAC control and other building functions. The relay shall be form C and rated for a minimum of 2.0 Amps resistive or 1.0 Amps inductive. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.

43.0 Isolator Module

43.1 Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC Class A or Class B branch. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC loop segment or branch. At least one isolator module shall be provided for each floor or protected zone of the building.

43.2 If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.

43.3 The isolator module shall not require address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.

43.4 The isolator module shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

44.0 BATTERIES:

The battery shall have sufficient capacity to power the fire alarm system for not less than twenty-four hours plus 5 minutes of alarm upon a normal AC power failure.

The batteries are to be completely maintenance free. No liquids are required. Fluid level checks for refilling, spills, and leakage shall not be required.

If necessary to meet standby requirements, external battery and charger systems may be used.
45.0 EXECUTION

45.1 INSTALLATION:

Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas. Manual fire alarm boxes shall be suitable for surface mounting or semi-flush mounting as shown on the plans, and shall be installed not less than 42 inches (1067 mm), nor more than 48 inches (122 mm) above the finished floor.

45.2 TEST:

The service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment shall be provided to technically supervise and participate during all of the adjustments and tests for the system. All testing shall be in accordance with NFPA 72, Chapter 7. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP. Verify activation of all waterflow switches. Open initiating device circuits and verify that the trouble signal actuates. Open and short signaling line circuits and verify that the trouble signal actuates. Open and short notification appliance circuits and verify that trouble signal actuates. Ground all circuits and verify response of trouble signals. Check presence and audibility of tone at all alarm notification devices. Check installation, supervision, and operation of all intelligent smoke detectors using the walk test.

Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points. When the system is equipped with optional features, the manufacturer’s manual shall be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

45.3 FINAL INSPECTION:

At the final inspection, a factory-trained representative of the manufacturer of the major equipment shall demonstrate that the system functions properly in every respect.

46.0 INSTRUCTION:

Instruction shall be provided as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.

The contractor and/or the systems manufacturer’s representatives shall provide a typewritten "Sequence of Operation."
LIST OF APPROVED MAKES/BRANDS/AGENCIES

The Owner/Consultant reserves the right to select any of the brands indicated in the list of approved makes without any extra claim from the contractor. Following makes/brands are also approved in addition to those mentioned in the item of works as described in BOQ & Specifications.

**CIVIL WORKS**

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<td>BIS APPROVED QUALITY</td>
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<td>52</td>
<td>POLYURETHANE PAINT</td>
<td>MRF OR EQUIVALENT</td>
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<td>53</td>
<td>WAX POLISH</td>
<td>MEN’SSION, (RECKITT &amp; COLMAN), ASIAN OR EQUIVALENT</td>
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<td>54</td>
<td>MELAMINE</td>
<td>ICI DULUX, ASIAN, MRF OR EQUIVALENT</td>
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<td>55</td>
<td>SILICON WATER REPELLENT SOLUTION</td>
<td>GE BAYER, REMMERS, DUPONT OR EQUIVALENT</td>
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<td>56</td>
<td>GYPSUM CEILING</td>
<td>INDIA GYPSUM, LAFARGE, GYPROC, SAINT GOBIN</td>
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<td>57</td>
<td>MINERAL FIBRE TILES CEILING</td>
<td>ARMSTRONG, AMF, USG, GYPROC</td>
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<td>LAMINATED WOODEN FLOORING</td>
<td>KRONO, PERO, TARKETT, ARMSTRONG OR EQUIVALENT</td>
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<td>59</td>
<td>VENETIAN BLINDS</td>
<td>MAT CORNER, DECOR, VISTA OR EQUIVALENT</td>
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<td>PVC FLOORING</td>
<td>POLYFLOR, TARKETT, GERFLO, ARMSTRON OR EQUIVALENT</td>
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<td>61</td>
<td>MDF BOARD</td>
<td>ANCHOR, DURO, MERINO, GREENLAM, CENTURY, KITPLY, NOVAPAN, NUWUD</td>
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<td>EXTERIOR WOOD HIGH PRESSURE LAMINATE</td>
<td>REZNOCLAD, PRODEMA, FUNDERMAX, FORMICA, MERINO, DECLOM</td>
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<td>Brand or Equivalent</td>
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<td>WOODEN PANELLING</td>
<td>FAME LINE, ARMSTRONG OR EQUIVALENT</td>
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<td>64</td>
<td>ALUMINIUM LOUVERS</td>
<td>FAME LINE, DEXONE OR EQUIVALENT</td>
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<td>65</td>
<td>MODULAR FURNITURE</td>
<td>UNICOS, STEEL CASE, BENE OR EQUIVALENT</td>
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**Note:**

1. Wherever equivalent makes are referred, the same shall be as per BIS and as per approval of Engineer-in-charge/Consultant.

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<thead>
<tr>
<th>S. NO.</th>
<th>ITEM</th>
<th>MAKE</th>
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<tbody>
<tr>
<td>1.</td>
<td>MS BLACK ENAMELLED/ GALVANIZED ERW CONDUITS</td>
<td>BEC / AKG/ NIC/SUPREME OR EQUIVALENT</td>
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<td>MS CONDUIT ACCESSORIES</td>
<td>AKG/BE/C/ SUPREME /APPROVED EQUIVALENT</td>
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<td>PVC CONDUIT (FRLS HEAVY DUTY)</td>
<td>AKG/BE/RAVINDRA/SUPREME /AVONPLAST OR EQUIVALENT</td>
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<td>4.</td>
<td>GI/MS PIPES</td>
<td>JINDAL/PARKASH SURYA/ TATA,KALINGA</td>
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<td>5.</td>
<td>COPPER CONDUCTOR PVC INSULATED WIRES</td>
<td>EDEN/ BRIMSON/POLYCB/SKYTONE OR EQUIVALENT</td>
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<td>6.</td>
<td>MODULAR SWITCHES, SOCKET OUTLETS AND WIRING</td>
<td>MDS -LEGRAND (MOSAIC SERIES)/ CLIPSAK (OPAL)/ MK (WRAPAROUND PLUS)/ CRABTREE/NORTH WEST/ANCHOR</td>
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<td>A/C OUTLETS</td>
<td>NORTH WEST/MDS-LEGRAND/CLIPSAL/CRABTREE</td>
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<td>DATA OUTLETS</td>
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<td>PHOTO CHROMATIC SWITCH</td>
<td>BAJAJ/WIPRO/PHILIPS/HAVELS</td>
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<td>LIGHT FIXTURES</td>
<td>PHILIPS/WIPRO/BAJAI/PRIERLITE/HPL</td>
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<td>CEILING/EXHAUST FANS</td>
<td>CROMPTONGREAVES/KHAITAN/USHA/BAJAI/ ORIENT</td>
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<td>DISTRIBUTION BOARDS</td>
<td>SCHNEIDER/SIEMENS/HAGER/ HAVELLS OR EQUIVALENT</td>
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<td>14.</td>
<td>MV CABLES / CONTROL CABLES</td>
<td>UNIVERSAL (SATNA)/GLOSTER/POLYCB/ SKYTONE OR EQUIVALENT</td>
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<td>POWER &amp; CONTROL CABLES</td>
<td>UNIVERSAL (SATNA)/ GLOSTER/ POLYCB/ SKYTONE OR EQUIVALENT</td>
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<td>16.</td>
<td>BUS DUCT (AIR INSULATED TYPE)</td>
<td>CONTROL AND SWITCH GEAR/SCHINEIDER/ADVANCE/L&amp;T OR EQUIVALENT</td>
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<td>17.</td>
<td>CO-AXIAL CABLES</td>
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<td>18.</td>
<td>FLEXIBLE WIRES</td>
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<td>SPLITTER BOX</td>
<td>SHYAM ANTENNA/CAT VISION/SWIFT AUDIO VIDEO</td>
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<td>CABLE TRAY</td>
<td>CONTROLS AND SWITCH GEAR/SCHNEIDER/ ADVANCE/L&amp;T OR EQUIVALENT</td>
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<td>HT XLPE 11 KVA CABLE</td>
<td>UNIVERSAL (SATNA)/GLOSTER/SKYTONE/POLYCB OR EQUIVALENT</td>
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<td>RAYCHEM/3M OR EQUIVALENT</td>
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<td>23.</td>
<td>EARTHING SYSTEM</td>
<td>ERICO/ALLTEC/JMV OR EQUIVALENT</td>
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<td>BATTERY CHARGER</td>
<td>AE/VOLTSTAT/WAVE ELECTRONICS</td>
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<td>FREE LEAD ACID BATTERY</td>
<td>EXIDE/AMRON/AMARA RAJA</td>
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<td>KAPPA/AE/MATRIX</td>
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<td>28.</td>
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<td>SIEMENS (3VL)/MERLIN GERIN (COMPACT)</td>
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<td>ITEM</td>
<td>MAKE</td>
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<td>29.</td>
<td>ACB</td>
<td>L&amp;T (U-POWER WITH UN RS 3)/ SIEMENS (3 W L WITH ETU 76B) / MERLIN GERIN (MASTERPACT WITH MICROLOGIC 6A)/HPL/HAVELS</td>
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<td>MV CONTACTORS/TIMER/STARTERS</td>
<td>L&amp;T/SIEMENS/MG/HPL/HAVELS</td>
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<td>ALL METERS</td>
<td>CONZERV (ENERCON) / MG OR EQUIVALENT</td>
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<td>PROTECTIVE RELAYS</td>
<td>ALSTOM/ABB/SIEMENS/L&amp;T/MG</td>
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<td>INDICATION LAMPS/PUSH BUTTON</td>
<td>L&amp;T/SCHNEIDER/SIEMENS</td>
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<td>TERMINAL BLOCKS</td>
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<td>CHANGE OVER SWITCH</td>
<td>HPL/L&amp;T/SIEMENS/C&amp;S</td>
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<td>37.</td>
<td>BUS BAR</td>
<td>JINDAL/INDALCO/CENTURY</td>
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<td>38.</td>
<td>DIMMERS</td>
<td>LUTRON / DARBAR / CALIPSA</td>
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<td>39.</td>
<td>L.T. PANEL BOARDS / SUB-PANEL/ METER BOARDS</td>
<td>CONTROL AND SWITCH GEAR/VIKAS PANELS/AMBIT/L&amp;T/BHARAT SWITCH GEAR</td>
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<td>DISTRIBUTION BOARDS</td>
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<td>SUB-STATION SAFETY EQUIPMENT</td>
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<td>42.</td>
<td>BATTERIES</td>
<td>EXIDE/PANASONIC/ROCKET</td>
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<td>43.</td>
<td>LIST OF APPROVED MAKES FOR EPABX, ACTIVE AND PASSIVE COMPONENTS</td>
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<td>44.</td>
<td>JACKPANNEL, PATCHCORDS, I/O, FACEPLATE ETC.</td>
<td>DIGILINK/SIEMON/CORNING OR EQUIVALENT</td>
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<td>LAN SWITCHES</td>
<td>CISCO/EXTEREME/JUNIPER OR EQUIVALENT</td>
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<td>RACKS</td>
<td>APW/VALL RACK/RITTAL</td>
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<td>EPABX SYSTEM AND DIGITAL PHONES</td>
<td>AVAYA/ALCATEL/CISCO/HITACHI/SEIMENS</td>
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<td>48.</td>
<td>ANALOG PHONES</td>
<td>BEETEL/SIEMENS/BPL</td>
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</table>
## FIRE SUPPRESSION & PUMPS

1. **FIRE HYDRANT VALVES**
   - MINIMAX, NEWAGE, SUPEREX PLAZA OR EQUIVALENT

2. **FIRE HOSE PIPES**
   - JAYSHREE, NEWAGE, MINIMAX PLAZA OR EQUIVALENT

3. **FIRST AID FIRE HOSE REELS**
   - MINIMAX, NEWAGE, SAFE GUARD OR EQUIVALENT

4. **PRESSURE SWITCH**
   - INDFOSS/SWITZER, SAFE GUARD OR EQUIVALENT

5. **VIBRATION ISOLATOR**
   - RESISTOFLEX, DUNLOP, KUNWAL OR EQUIVALENT

6. **CI BUTTERFLY VALVES**
   - AUDCO, ZOLOTO, CASTLE OR EQUIVALENT

7. **CI DOUBLE FLANGED NERVs**
   - KIRLOSKAR, DRIP, CASTLE, INTER VALVE OR EQUIVALENT

8. **GATE VALVE**
   - LEADER, ZOLOTO, SANT OR EQUIVALENT

9. **BALL VALVE**
   - AUDCO, ZOLOTO TBS OR EQUIVALENT

10. **FIRE EXTINGUISHERS**
    - MINIMAX, SAFEX, SUPEREX OR EQUIVALENT

## PLUMBING

1. **VITREAUS CHINA WARE**
   - PARRYWARE, HINDUSTAN SANITARY WARE, CERA, JOHNSON, RASI

2. **PVC CONNECTORS**
   - SUPRIME, PARKASH, SURYA

3. **SEAT COVER (HEAVY DUTY)**
   - COMMANDER, DIPLOMAT, BESTOLITE, PRINCE, HINDWARE, PARRYWARE

4. **STAINLESS STEEL SINK**
   - PRESTIGE, KINGSTON, NEELKANTH, JAYANA, NIRALI, AMC

5. **AUTO URINAL FLUSH SYSTEM**
   - AOS AUTO ROBO FLUSHING SYSTEM, TOSHI, UTEC SYSTEM

6. **CP BRASS FITTINGS AND TOILET ACCESSORIES**
   - JAQUAR, GEM, ESS-ESS, KINGSTON, SEIKO

7. **ANGEL VALVE WITH FITTINGS**
   - ARCO, AQUA PLUS, PARKO, SEIKO/MAYUR/OTHELO/ZOLOTO

8. **FLOOR DRAIN FIXTURE, RAIN WATER OUTLETS & CHANNEL GRATINGS**
   - ISI APPROVED

9. **C.P. GRATING FOR FLOOR TRAP**
   - CHILLY, SEIKO, COBRA, NEELKANTH

10. **CAST IRON PIPES & FITTINGS MANHOLE COVERS AND FRAMES**
    - NECO, HEPCO, BENGAL IRON OR EQUIVALENT

11. **AS PER IS:3989 (PIPES & FITTINGS)**
    - NECO, HEPCO, BENGAL IRON OR EQUIVALENT

12. **AS PER IS:1726 (MANHOLE COVERS AND FRAMES)**
    - NECO, BC, SKF, RAJ IRON FOUNDRY AGRA OR EQUIVALENT

13. **AS PER IS:1536- C.I. (LA)**
    - KESORAM CALCUTTA, ELECTRO STEEL CALCUTTA, IISCO, SUPRA

14. **C.I. L.A FITTINGS**
    - KARTAR, KESORAM, ELECTROSTEEL OR EQUIVALENT

15. **PIPE CLAMPS**
    - ISI APPROVED,

16. **GI PIPES (IS : 1239 AND IS : 3589)**
    - TATA STEEL, JINDAL, PRAKASH-SURYA, KALINGA

17. **GI PIPES FITTINGS**
    - UNIK, ZOLOTO, KS, R BRAND, OR EQUIVALENT

18. **BUTTERFLY VALVE**
    - CASTLE, AUDCO, KSB, OR EQUIVALENT

19. **WAFER TYPE CHECK VALVE**
    - CASTLE, ADVANCE, KIRLOSKAR, ZOLOTO, LEADER
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<td>AIR RELEASE VALVE</td>
<td>ZOLOTO, OR, RBM, LEADER OR EQUIVALENT</td>
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<td>21.</td>
<td>ANTI VIBRATION MOUNTING AND FLEXIBLE CONNECTIONS</td>
<td>KANWAL INDUSTRIAL CORPORATION, DUNLOP, RESISTOFLEX</td>
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<td>22.</td>
<td>PRESSURE SWITCH</td>
<td>DANFOSS / SYSTEM SENSOR / INDOSS OR EQUIVALENT</td>
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<td>23.</td>
<td>PRESSURE GAUGE</td>
<td>H GURU, FIEBIG, SANT OR EQUIVALENT</td>
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<td>24.</td>
<td>CLOSED CELL NITRILE INSULATION</td>
<td>ARKC, A-FLEX, OWEN’S CORNINGS OR EQUIVALENT</td>
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### LIGHTENING PROTECTION

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<td>LPI – AUS., FOUDRETECH – FRANCE, E.F. – SWITZERLAND</td>
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<td>DOWN CONDUCTOR</td>
<td>LPI – AUS., FOUDRETECH – FRANCE, E.F. – SWITZERLAND</td>
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<td>LPI – AUS., FOUDRETECH – FRANCE, E.F. – SWITZERLAND</td>
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<td>SURGE COUNTER</td>
<td>LPI – AUS., FOUDRETECH – FRANCE, E.F. – SWITZERLAND</td>
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### AIR CONDITIONING

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<td>1.</td>
<td>OUTDOOR &amp; INDOOR UNITS</td>
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<tr>
<td>a</td>
<td>HIWALL UNIT</td>
<td>TOSHIBA, DAIKIN, OG</td>
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<tr>
<td>b</td>
<td>CASSETTE TYPE UNIT</td>
<td>TOSHIBA, DAIKIN, OG</td>
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<td>DIGITAL INEVTER &amp; OTHER ACCESSORIES</td>
<td>TOSHIBA, DAIKIN, OG</td>
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<td>1.</td>
<td>FDA &amp; PAVA</td>
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<td>• ESSER – GERMANY</td>
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<td>• HFP-11-FIRE FINDER USA-(Siemens)</td>
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<td>• GENT</td>
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<td>ADDRESSABLE DETECTORS</td>
<td>• ESSER – GERMANY</td>
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<td>MODULES/ MCP</td>
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<td>5</td>
<td>RESPONSE INDICATOR</td>
<td>• AS APPROVED BY CONSULTANT/CLIENT</td>
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**BIDDER’S INFORMATION**  
*(All the bidders must submit the document with filled in data with their offer in Technical bid)*

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<thead>
<tr>
<th><strong>Company Name</strong>*</th>
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<tr>
<td><strong>Registered Address</strong>*</td>
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**Name of Partners/Directors**

**Bidder type***  
Indian/Foreign

**City***  
**State***  
**Country***  
**Postal code***

**PAN/TAN Number***  
(PAN/TAN number must have 10 characters. e.g. AESTG2458A)  
For bidders who do not have PAN/TAN number may enter TEMPZ9999 as the PAN/TAN number.

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<thead>
<tr>
<th><strong>Company’s Establishment Year</strong></th>
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<tbody>
<tr>
<td><strong>Company’s Nature of business</strong>*</td>
<td></td>
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</tbody>
</table>
| **Company’s Legal status***  
Limited company/Undertaking/Joint venture/Partnership/others |   |
| **Company Category***  
Micro unit as per MSME/Small unit as per MSME/Medium unit as per MSME/Ancillary unit/Project of affected person of this company/SSI/others |   |

**Contact Details**

| **Enter Company’s Contact Person Details** |   |
| **Title***  
Mr/Mrs/Dr/Shree/Ms |   |
| **Contact Name*** |   |
| **Date of Birth***  
(DD/MM/YYYY) |   |
# BIDDER’S INFORMATION

(All the bidders must submit the document with filled in data with their offer in Technical bid)

<table>
<thead>
<tr>
<th>Correspondence Email*</th>
<th>(Correspondence Email ID can be same as your Login ID. All The mail correspondence will be sent only to the Correspondence Email ID.)</th>
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<tbody>
<tr>
<td>Designation</td>
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</tr>
<tr>
<td>Phone *</td>
<td>(Phone details eg: +91 044 22272449)</td>
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<tr>
<td>Mobile*</td>
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*Mandatory information (must be filled by the bidders)*