Bhopal Smart City Development Corporation Limited

REQUEST FOR PROPOSAL

January 2018

"Design, Supply, Installation, Testing and commissioning of 33/0.4 KV, 2x1500KVA Dry type Indoor transformer Substation with 2x500KVA DG set, with 3 Years O&M and other Electrical Works for Incubation Centre Building Bhopal"

"Revision-001"

Prepared by Recommended by Approved by

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SECTION-1

NOTICE INVITING TENDER

BHOPAL SMART CITY DEVELOPMENT CORPORATION LIMITED

NOTICE INVITING TENDER (NIT)

BSCDCL invites online item rate tender as per schedule as under:

Tendering Document No.	:	MPBSCDCL/TENDER NO -41
Name of the Work	:	"Design, Supply, Installation, Testing and commissioning of 33/0.4 KV, 2x1500KVA Dry type Indoor transformer Substation with 2x500KVA DG set, with 3 years o&m and other Electrical Works for Incubation Centre Building Bhopal"
Brief Scope of Work	:	"Design, Supply, Installation, Testing and commissioning of 33/0.4 KV, 2x1500KVA Dry type Indoor transformer Substation with 2x500KVA DG set, with 3 years o&m and other Electrical Works for Incubation Centre Building Bhopal"
Estimated Cost	:	Rs. 4,37,01,540 (Four Crore Thirty Seven Lakhs One Thousand Five Hundred Forty Only)
Period of Completion	:	Four (04) Months
Earnest Money Deposit	:	Rs. 4,37,015/- (Four Lakes Thirty seven Thousands Fifteen rupees Only)
Non-refundable cost of e- Tender Document	:	Rs. 15000/- (Fifteen Thousand Rupees Only)
Purchase of Tender Start Date	:	27.12.17, 17:00 Hrs
Purchase of Tender End Date	:	06.02.18, 17:30 hrs
Last date & time of submission of Online Tender	:	06.02.18, 23:30 hrs
Period during which hard copy of the documents as per NIT shall be submitted.	:	07.02.18 ,11:00 hrs
Date & Time of Opening of technical Bid (Envelope B)	:	07.02.18 ,14:00 hrs
Date & Time of Opening of Financial Bid (Envelope C)	:	Will be intimated to the successful bidders.
Validity of offer		90 days from the date of opening of price bid.
Pre-Tender Meeting & Venue		09.01.18, 12:00 hrs

The tender document can be downloaded from www.mpeproc.gov.in **"Corrigendum, if any, would appear only on the** www.mpeproc.gov.in **web site and not to be published in any News Paper".**

- The intending Bidder must read the terms and conditions of BSCDCL carefully. He should only submit his tender if he considers himself eligible and he is in possession of all the documents required.
  a) Information and Instructions for Bidder posted on Website(s) shall form part of Tender Document.

- The Tender Document as uploaded can be viewed and downloaded free of cost by anyone including intending Bidder. But the tender can only be submitted after uploading the mandatory scanned documents such as

  a) Proof of e-payment towards cost of tender document,
  b) Proof of online payment through e-portal www.mpeproc.gov.in/ Bank Guarantee of any Nationalized or Commercial Scheduled Bank against EMD in favor CEO, BSCDCL & All other documents shall be as per Notice Inviting e-tender.

- The Bidders are required to quote strictly as per terms and conditions, specifications, standards given in the tender documents and not to stipulate any deviations.
- After submission of the tender the Bidder can re-submit revised tender any number of times but before last time and date of submission of tender as notified.
- When it is desired by BSCDCL to submit revised financial tender then it shall be mandatory to submit revised financial tender. If not submitted then the tender submitted earlier shall become invalid.
- On opening date, the Bidder can login and see the tender opening process.
- Bidder can upload documents in the form of JPG format and PDF format
- Bidder has to upload scanned copies of all the documents including valid GST registration, PAN NO, TAN NO. as stipulated in the tender document.
- If the bidder is found ineligible after opening of tenders, his tender shall become invalid and cost of tender document and processing fee shall not be refunded.
- If any discrepancy is noticed between the documents as uploaded at the time of submission of tender and hard copies as submitted physically by the contractor the tender shall become invalid and cost of tender document and processing fee shall not be refunded.
- Notwithstanding anything stated above, BSCDCL reserves the right to assess the capabilities and capacity of the Bidder to perform the contract, in the overall interest of BSCDCL. In case, Bidder"s capabilities and capacities are not found satisfactory, BSCDCL reserves the right to reject the tender.
- Certificate of Financial Turn Over: At the time of submission of tender, the tender shall upload Certificate from Chartered Accountant mentioning Financial Turnover of last 3 years or for the period as specified in the tender document and further details if required may be asked from the Bidder after opening of technical tenders. There is no need to upload entire voluminous balance sheet.

The Bidder if required can submit queries in writing on E-mail address. **bscdcl@smartbhopal.city** **09.01.2018 up to 12:00 hrs.**

Annexure-I

MEMORANDUM

Sl. No.	Description	Cl. No. of NIT/ITT/Clauses of Contract (CC)	Values/Description to be Applicable for Relevant Clause (S)
1)	Name of Work		"Design, Supply, Installation, Testing and commissioning of 33/0.4 KV, 2x1500KVA Dry type Indoor transformer Substation with 2x500KVA DG set, with 3 years o&m and other Electrical Works for Incubation Centre Building Bhopal"
2)	Client/Owner		Bhopal Smart City Development Corporation Limited.
3)	Type of Tender		Percentage rate / Item Rate tender
4)	Earnest Money Deposit		Rs. 4,37,015/- (Four Lakes Thirty seven Thousands Fifteen rupees Only)
5)	Estimated Cost(PAC)		Rs. 4,37,01,540 (Four Crore Thirty Seven Lakhs One Thousand Five Hundred Forty Only)
6)	Time allowed for Completion of Work		Three (03) Months
7)	Mobilization Advance		**10%** of contract value
8)	Interest Rate of Mobilization Advance		Simple Interest Rate of 10 % Percent only) (Per Annum)
9)	Schedule of rates applicable		NON SOR, and DSR E_M 2016
10)	Validity of Tender		90 (Ninety) Days
11)	Performance Guarantee		5 % (Five Percent Only) of contract value within 30 days from the issue of Letter of Award
12)	Security Deposit/Retention Money		5.00% (Five Percent Only) of the gross value of each running bill.
13)	Time allowed for starting the work		The date of start of contract shall be reckoned from 10 days after the date of issue of letter of Award .
14	Defect Liability Period		36 months (Three Years) from the date of taking over of the work by the BSCDCL or time allowed whichever is earlier.

MANDATORY PROPOSAL (Envelope A)

1. Earnest Money Deposit (EMD)
2. Cost of Document
3. Letter of Acceptance of tender condition as per format enclosed in Annexure-II.
   (*SECTION-5 Forms and Format)

TECHNICAL PROPOSAL (Envelope B)

[PRE-QUALIFICATION CRITERIA FOR BIDDERS]

1. The Bidder should have valid registration in Government departments and having valid electrical "A" class License from MP Electrical safety department for execution of electrification work. (In case Bidder not holding valid "A" Class Electrical License from MP Electrical Safety Department they have to submit an affidavit confirming that if work is awarded they will get registered before starting the same).

2. The Average annual financial turnover for last 3 years(2014-15, 2015-16, 2016-17) shall be at least 30% of the estimated cost put to tender, Copies of balance sheets of last three financial years OR duly certified by a Chartered Accountant shall be submitted in support of the requisite financial Turnover.

3. The bidder shall have successfully completed similar nature of works ie. Indoor Substation, DG Set Installation, HT/LT panel work, cable work in Government sector during the last Seven(7) years as mentioned below:-

   Three similar works each costing not less than 40% of the estimated cost put to tender

   OR

   Two similar works each costing not less than 50% of the estimated cost put to tender

   OR

   One similar work costing not less than 80% of the estimated cost.

4. Net worth should be positive in last three years.

5. Bidder should have GST Registration, EPF Registration Certificate & PAN Card, TAN No, ESIC certificate.(a. Information regarding the constitution of the Applicant/firm e.g. Proprietary, Partnership, Private Ltd. etc. along with proof of the same such as copies of registration/ partnership deed etc.)

6. Bidder should be a single entity. **Consortium** and **Joint Venture (JVs)** are not allowed

The copy of above documents shall be submitted by the Bidder along with the hard copies of other required documents and the following list of Documents to be scanned and uploaded within the period of tender submission:

- Proof of online payment / Bank Guarantee of any Nationalized or all commercial Scheduled Bank against EMD in favor of CEO, BSCDCL.
- Copy of documents related to qualifying requirement of bidders as per NIT clause
- Certificate of Financial Turnover duly certified by CA as indicated above.
- Acknowledgement towards cost of tender fee submission.
- All pages of the entire Corrigendum (if any) duly signed by the authorized person.

FINANCIAL PROPOSAL (Envelope C)

1. Bidders who will be found Eligible in **Mandatory & Technical Proposals**, only those Bidder's financial proposals will be opened.
2. The tender will be awarded to the Bidder with the lowest quoted rate (L1) against the Probable Amount of Contract (PAC).
3. Bidders who will not be found eligible in **Mandatory and Technical Proposals,** they will be rejected and their Financial Proposals will not be opened.

INSTRUCTIONS FOR FINANCIAL BID SUBMISSION-

- Quote should be in percentage higher or below on the SOR Rates the same is to quoted in the form of decimal only. For example if contractor wants to quote 5 percent higher than he have to quote 1.05 and if he wants to quote 5 percent below he have to quote 0.95 in given column of financial bid sheet.
- Financial Bid format is uploaded in Excel Format in www.mpeproc.gov.in. At the time of financial bidding, bidder is requested to download the file, and update the same.
- For Non SOR items bidder can quote for individual item rates in respective financial bid sheet.
- Bidders are requested to check final figure in all the totals of all sheets. BSCDCL is not responsible for errors in the financial bid document.
- Bidders are required to upload the updated financial bid in the prescribed excel Format in the www.mpeproc.gov.in at the time of final financial bid submission.
- Any space left blank in the bidding sheet, then it will be considered as zero "0".

SECTION-2

INSTRUCTIONS TO BIDDER

INSTRUCTION TO BIDDER (ITB)

A. GENERAL INSTRUCTIONS:

2.1. General terms of Bidding-

2.1.1.1 No Bidder shall submit more than one BID for the Project.

2.1.1.2 The contractor is responsible for Designing, Supply, Installation, Testing and Commissioning of all electrical work.

2.1.1.3 The contractor is to give the guarantee for three year against all installation and equipment defects. Including preventive maintenance.

2.1.1.4 The contractor will be responsible for complete operation & maintenance of this new completed work for 03 years. (Operators to be provide- 2 Skilled, 2 Unskilled in each shifts for Three Shifts)

2.1.1.5 The successful bidder needs to submit performance guarantee 5% (Five per cent) of the quoted price and security deposit 5% (Five per cent), which will be released after completion of 5 years.

2.1.1.6 The agency should avail service persons in case of any maintenance or technical failure.

2.1.1.7 Deleted

2.1.1.8 The Rate should be quoted including All taxes and Charges & Nothing will be paid extra except Quoted rates.(If any rise in tax or if new tax is imposed by central or State Govt, or any Govt authority after Tender the contractor is to bear the same)

2.1.1.9 All the Civil work Should be repaired with original material including coloring if any breakage or dismantling work is done during installation of the system, including cleaning of the site, for which no extra payment shall be made to the contractor.

2.1.1.10 The rates to be given for furnished complete work, all material, labor wastage, royalties, taxes, lease rent, scaffolding , transportation charges, breakage, making good any damage to wall, ceiling, fitting etc, to make the original finish including painting, transportation, replacement, of any defective material, theft, insurance, variation in market rates, removal of rubbish dismantled material, cleaning of site be included in the quoted rates.

2.1.1.11 the contractor is to arrange for storage of material & its Security arrangement during the installation & commissioning of work.

2.1.1.12 The contractor should submit the one year defective part replacement guarantee, caused due to any reason & two year maintenance services of the system for which no extra payment will be made except quoted rate.

2.1.1.13 The contractor will be fully responsible for any accident, damages, losses, that occurs during the installation & commissioning of work. No compensation will be made by the BSCDCL.

2.1.1.14 The contractor is to take all measures for safety and security for man & material and also to follow all labor laws.

2.1.1.14 The contractor should be registered in EPF & ESIC & necessary certificate of registration shall be submitted during tendering.

2.1.1.16 The Rates should be quoted FOR at site Bhopal.

2.1.2 The Feasibility Report / Preliminary Project Report of the Project has been assessed however the Bidders are expected to carry out their own surveys, investigations and other Preliminary examination of the Project before submitting their Bids. Nothing contained in the attached drawings/BOQ shall be binding on the BSCDCL nor confer any right on the Bidders, and the BSCDCL shall have no liability whatsoever in relation to or arising out of any or all contents of TENDER.

2.1.3 Notwithstanding anything to the contrary contained in this RFP, the Preliminary terms specified in the draft Agreement shall have overriding effect; provided, however, that any conditions or obligations imposed on the Bidder hereunder shall continue to have effect in addition to its obligations under the Agreement.

2.1.4 Deleted.

2.1.5 The Bidder shall deposit a BID Security (EMD) Rs. 4,37,015/- (Four Lakes Thirty seven Thousands Fifteen rupees Only) **in accordance with the provisions of this RFP. The Bidder has to provide the BID Security (EMD) through online payment or in the form of a Bank Guarantee acceptable to the BSCDCL, as per format at Appendix-II.**

Company Name: Bhopal Smart City Development Corporation Limited
Branch Name: Allahabad Bank.
Branch Address: Arera Colony, Bhopal
A/C no. : 50327343809
IFSC Code: ALLA0210197
PAN No. : AAGCB6537N
TIN No. : 23889236926
Service Tax No. : AAGCB6537NSD001
GST no: 23AAGCB6537N1ZE

2.1.6 The validity period of the Bank Guarantee, shall not be less than 180 (one hundred and eighty) days from the BID Due Date, inclusive of a claim period of 60 (Sixty) days, and may be extended as may be mutually agreed between the BSCDCL and the Bidder.

2.1.7 The BID shall be summarily rejected if it is not accompanied by the BID Security. The BID Security shall be refundable no later than 150 (one hundred and fifty) days from the BID Due Date except in the case of the Selected Bidder whose BID Security shall be retained till it has provided a Performance Security under the Agreement.

2.1.8 The Bidder should submit a Power of Attorney as per the format at Appendix-III, Authorizing the signatory of the BID to commit the Bidder.

2.1.9 Any condition or qualification or any other stipulation contained in the BID shall render the BID liable to rejection as a non-responsive BID.
2.1.10 The BID and all communications in relation to or concerning the Bidding Documents and the BID shall be in English language.

2.1.11 The documents including this RFP and all attached documents, provided by the BSCDCL are and shall remain or become the property of the BSCDCL and are Transmitted to the Bidders solely for the purpose of preparation and the submission of a BID in accordance herewith. Bidders are to treat all information as strictly confidential and shall not use it for any purpose other than for preparation and submission of their BID. The provisions of this Clause shall also apply mutatis mutandis to BIDs and all other documents submitted by the Bidders, and the BSCDCL will not return to the Bidders any BID, document or any information provided along therewith.

2.1.12 This RFP is not transferable.

2.1.13 Any award of Project pursuant to this RFP shall be subject to the terms of Bidding Documents and also fulfilling the criterion as mentioned in clause while bidding is open to persons from any country, the following provisions shall apply then the Eligibility of such Bidder shall be subject to approval of the BSCDCL from national security and public interest perspective. The decision of the BSCDCL in this behalf shall be final and conclusive and binding on the Bidder. The holding or acquisition of equity or control, as above, shall include direct or indirect holding/ acquisition, including by transfer, of the direct or indirect legal or beneficial ownership or control, by persons acting for themselves or in concert and in determining such holding or acquisition, the BSCDCL shall be guided by the principles, precedents and definitions contained in the Securities and Exchange Board of India (Substantial Acquisition of Shares and Takeovers) Regulations, 1997, or any substitute thereof, as inforce on the date of such acquisition. The Bidder shall promptly inform the BSCDCL of any change in the shareholding, as above, and failure to do so shall render the Bidder liable for disqualification from the Bidding Process.

2.1.14 Not withstanding anything to the contrary contained herein, in the event that the Bid Due Date falls within three months of the closing of the latest financial year of a Bidder, it shall ignore such financial year for the purposes of its Bid and furnish all its information and certification with reference to the 5 (five) years or 1 (one) year, as the case may be, preceding its latest financial year. For the avoidance of doubt, financial year shall, for the Purposes of a Bid hereunder, mean the accounting year followed by the Bidder in the course of its normal business.

2.1.15 Any entity which has been barred by GOI or Govt of Madhya Pradesh, MP DISCOM for the works of expressways, National highways, ISC and EI works, and the bar subsists as on the Bid Due Date, would not be eligible to submit the BID.

2.1.16 The BSCDCL reserves the right to reject an otherwise eligible bidder on the basis of the information given in this tender document. The decision of the BSCDCL in this case shall be final.

2.2 Eligibility and qualification requirements of Bidder.For determining the eligibility of Bidder the following shall apply:

(a) An Bidder shall not have a conflict of interest (the "Conflict of Interest") that affects the Bidding Process. Any Bidder found to have a Conflict of Interest shall be disqualified and liable for

forfeiture of the BID Security or Performance Security as the case may be. A Bidder shall be deemed to have a Conflict of Interest affecting the Bidding Process, if:

(b) A Bidder shall be liable for disqualification and forfeiture of BID Security, if any legal, financial or technical adviser of the BSCDCL in relation to the Project is engaged by the Bidder, its Member or any Associate thereof, as the case may be, in any manner formatters related to or incidental to such Project during the Bidding Process or subsequent to the (i) issue of the LOA or (ii) execution of the Agreement. In the even though such adviser is engaged by the selected Bidder or Contractor, as the case may be, after issue of the LOA or execution of the Agreement for matters related or incident alto the project, then notwithstanding anything to the contrary contained herein or in the13 LOA or the Agreement and without Prejudice to any

other right or remedy or the BSCDCL, including the forfeiture and appropriation of the BID Security or Performance Security, as the case may be, which the BSCDCL may have there under or otherwise, the LOA or the Agreement, as the case may be, shall be liable to be terminated without the BSCDCL being liable in any manner whatsoever to the Selected Bidder or Contractor for the same. For the avoidance or doubt, this disqualification shall not apply where such adviser was engaged by the Bidder, its Member or Associate in the past but its assignment expired or was terminated 6 (six) months prior to the date of issue of this RFP. Nor will this disqualification apply where such adviser is engaged after a period of 3 (three) years from the date of commercial operation of the Project.

OTHER INSTRUCTIONS:-

The pre-qualification / enlistment of the contractors should be valid on the last date of submission of tenders. In case the last date of submission of tender is extended, the pre-qualification of contractor should be valid on the original date of submission of tenders. The tender document as uploaded can be seen on website www.mpeproc.gov.in and can be downloaded free of cost.

Mode of Submission: Earnest Money Deposit

Earnest Money Deposit of amount as mentioned in "NIT/ Memorandum (Annexure-I)" required to be submitted online only or Bank Guarantee from any Nationalized or all Commercial scheduled banks in the enclosed format. The EMD shall be valid for minimum period of 150 (One Hundred Fifty) days from last day of submission of Tender. **The EMD shall be scanned and uploaded to the e-Tendering website within the period of tender submission and original should be deposited in office of BSCDCL**

The EMD of all unsuccessful Bidders will be returned within thirty (30) days of the Award of the contract to successful Bidder or after the receipt of their BGs verified from the Zonal office of the issuing Bank, whichever is later. No interest will be payable by the BSCDCL on the said amount covered under EMD/Any other Security Deposit.

Interested contractor who wish to participate in the tender has also to make following payments through online payment only.

Cost of Tender Document – Rs. 15000/- To be submit online only/-

e- Tender Processing Fee – As applicable for MPEPROC portal.

EMD/ Tender document fees should be submitted online or in the form of Bank Guarantee against EMD, Cost of Tender Document and, e-Tender Processing Fee online payment receipt accordingly, shall be placed in single sealed envelope superscripted as "Earnest Money, Cost of Tender Document and Cost of e-Tender Processing Fee" with name of work and due date of opening of the tender also mentioned there on.

Copy of pre-qualification/enlistment letter and certificate of work experience (if required) and other documents as specified in the tender shall be scanned and uploaded to the e-Tendering website within the period of tender submission and certified copy of each shall be deposited in a separate envelope marked as "Other Documents".

Both the envelopes shall be placed in another envelope with due mention of Name of work, date & time of opening of tenders and to be submitted in the office of BSCDCL after last date & time of submission of tender.

Online technical tender documents submitted by intending Bidders shall be opened only of those Bidders, who"s Earnest Money Deposit, Cost of Tender Document and e-Tender Processing Fee and other documents placed in the envelope are found in order. The Price tender of those Bidders whose documents found to be in order shall be opened. The date of opening of price tender shall be informed to the Bidder.

The tender submitted shall become invalid if:

- The Bidder is found ineligible/if any document is found fake.
- The Bidder does not upload all the documents (including GST registration) as stipulated in the tender document.
- If any discrepancy is noticed between the documents as uploaded at the time of submission of tender and hard copies as submitted physically in the office of tender opening authority.

VALIDITYOF TENDER

The tender for the works shall remain open for acceptance for a period of Ninety (90) days from the date of opening of financial tender. If any Bidder withdraws his tender before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the tender which are not acceptable to the BSCDCL, then the BSCDCL shall, without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money as aforesaid. Further the Bidders shall not be allowed to participate in the retendering process of work.

ACCEPTANCE OF TENDER

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

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

The witnesses to the Tender/Contract Agreement shall be other than the Bidder/ Bidders competing for this work and must indicate full name, address, and status/occupation with dated signatures.
The acceptance of tender will rest with the BSCDCL who does not bind itself to accept the lowest tender and reserves to itself the right to reject any or all the tenders received without assigning any reason thereof. Tenders in which, any of the prescribed conditions are not fulfilled or found incomplete in any respect are liable to be rejected.

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 authorized representative shall be intimated by the contractor within 07 days of issue date of letter of Awards by BSCDCL.

The Bidder shall not be permitted to tender for works if his near relative is posted in the project office or concerned Zonal Office of the BSCDCL. 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 BSCDCL. Any breach of this condition by the Bidder 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 BSCDCL.
For the purpose of operation of this clause a near relative shall mean wife, husband, parents, grandparents, children, grandchildren, brothers, sisters, uncles, aunts, cousins and their corresponding in-laws

The time of completion of the entire work, as contained in contract shall be as mentioned in "Memorandum - Annexure-I", which shall be reckoned from the 10th day after issue of the letter of Award by the BSCDCL.

Canvassing whether directly or indirectly, in connection with Bidders is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable for rejection.

The tender award, execution and completion of work shall be governed by tender documents consisting of (but not limited to) Letter of Award/Letter of work order, Bill of Quantities, Special Conditions of Contract, General Conditions of Contract, Specifications, Drawings. The Bidders shall be deemed to have gone through the various 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.The drawings with the tender documents are Tender Drawing and are indicative only.

ADDENDA/ CORRIGENDA

Addenda/Corrigenda to the tender documents may be issued prior to the date of submission of the tender to clarify or effect modification in specification and/or contract terms included in various tender documents. The Bidder shall suitably take into consideration such Addenda/Corrigenda while submitting his tender. The Bidder shall return such Addenda/ Corrigenda duly signed and stamped as confirmation of its receipt & acceptance and submit along with the tender document. All addenda/ Corrigenda shall be signed and stamped on each page by the Bidder and shall become part of the tender and contract documents.

SITE VISIT AND COLLECTING LOCAL INFORMATION

Before tendering, the Bidders are 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, application of taxes, duties and levies as applicable & any other relevant information required by them to execute complete scope of work. The Bidder may obtain all necessary information as to risks, weather conditions, contingencies & other circumstances (insurgencies etc.) which may influence or affect their tender prices. Bidder shall be deemed to have considered site conditions whether he has inspected it or not and to have satisfied himself in all respect before quoting his rates and no claim or extra charges whatsoever in this regard shall be entertained / payable by the BSCDCL at a later date.

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 the 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 BSCDCL 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.

HANDING OVER & CLEARING OF SITE

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 requirement of local traffic police or/and 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.

The efforts will be made by the BSCDCL 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, the BSCDCL shall only consider suitable extension of time for the execution of the work. It should be clearly understood that the BSCDCL shall not consider any revision in contract price or any other compensation whatsoever viz. towards idleness of Contractors labor, equipment etc.

Old structures on the proposed site, if required, shall be demolished by the contractor properly at his own cost unless and otherwise mentioned elsewhere in the tender document. The useful material

obtained from demolition of structures & services shall be the property of the owner/BSCDCL and these materials shall be stacked in workmanship like at the place specified by the Engineer-in-charge.

Necessary arrangement including its maintenance is 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 demolished during execution for smooth progress of the project, shall be rehabilitated to its original status and condition (including black topping) by the contractor at his own cost. The cost to be incurred by contractor in this regards shall be deemed to be included in the quoted rates of the bill of quantity items and contractor shall not be entitled for any extra payment whatsoever in this regard.

The information about the public utilities (whether over ground or underground) like electrical/ telephone/ water supply lines, OFC Cables, open drain etc. is the responsibility of contractor to ascertain the utilities that are to be affected by the works through the site investigation.

The contractor shall be responsible to obtain necessary approval from the respective authorities for shifting/ re-alignment of existing public utilities. BSCDCL shall only assist the contractor for liasioning in obtaining the approval from the concerned authorities.

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.

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.

CLARIFICATION AFTER TENDER SUBMISSION

Bidder's attention is drawn to the fact that during the period, the tenders are under consideration, the Bidders are advised to refrain from contacting by any means, the BSCDCL and/or his employees/ representatives on matters related to the tender under consideration and that if necessary, BSCDCL 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 Bidders.

ORDER OF PRECEDENCE OF DOCUMENTS

In case of difference, contradiction, discrepancy, with regard to conditions of contract, Specifications, Drawings, Bill of quantities etc. forming part of the contract, the following shall prevail in order of precedence.

Letter of Award, along with statement of agreed variations and its enclosures, if any. description of Bill of Quantity / Schedule of Quantities. Special Condition of Contract. Technical specifications (General, Additional and Technical Specification) as given in Tender documents.

General Conditions of Contract. Drawings, CPWD/ BSCDCL specifications (as specified in Technical Specification of the Tender) update with correction slips issued up to last date of receipt of tenders. Relevant B.I.S. Codes.

SECTION-3

CLAUSES OF CONTRACT

CLAUSES OF CONTRACT(CC)

DEFINITIONS

The Contract means the documents forming the tender and acceptance thereof and the formal agreement executed between the competent authority on behalf of BSCDCL 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.

Bhopal Smart City Development Corporation Limited, hereinafter called 'BSCDCL' propose to get the works executed as mentioned in the Contract on behalf of Owner/ Client as Implementing agency/Executing Agency.

3.1 In the contract, the following expressions shall, unless the context otherwise requires, have the meanings, hereby respectively assigned to them:-

APPROVAL means approved in writing including subsequent written confirmation of previous verbal approval.

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

CONTRACTOR shall mean the individual, firm**,** LLP 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 LLP or company, or the successors of such firm or company and the permitted assignees of such individual, firm or company.

CONTRACT VALUE means the sum for which the tender is accepted as per the letter of Award.

DRAWINGS mean the drawings referred to in the contract document including modifications if any and such other drawings as may from time to time be furnished and/ or approved by BSCDCL.

DATE OF COMMENCEMENT OF WORK: The date of start of contract shall be reckoned from 10 days after the date of issue of letter of Award.

ENGINEER-IN-CHARGE means the Engineer of BSCDCL who shall supervise and be in-charge of the work.

LANGUAGE: All documents and correspondence in respect of this contract shall be in English Language.

i)**"LETTER OF AWARD"** shall mean BSCDCL"s letter or notification conveying its acceptance of the tender subject to such conditions as may have been stated therein.

MONTH means English Calendar month „Day" means a Calendar day of 24 Hrs each **BSCDCL** shall means Bhopal Smart City Development Corporation Limited, a company registered under the Indian Company Act, with its registered office at Near Natraj Petrol Pump, Sector A, Berkheda, Bhopal, Madhya Pradesh 462023 or its Administrative officers or its engineer or other employees authorized to deal with any matter with which these persons are concerned on its behalf.

OWNER/ CLIENT means the Government, Organization, Ministry, Department, Society, Cooperative, JV Entities (whether incorporated or unincorporated or registered as the case may be) etc. who has awarded the work/ project to BSCDCL and/ or appointed BSCDCL as Implementing / Executing Agency/ Project Manager and/ or for whom BSCDCL is acting as an agent and on whose behalf BSCDCL is entering into the contract and getting the work executed.

SCHEDULE(s) referred to in these conditions shall mean the standard schedule of rates of the government mentioned in the Memorandum (Annexure-I) with the amendments thereto issued up to the date of receipt of the tender.

ii) **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 BSCDCL/client/owner or used for the purpose of the contract.

iii) **TENDER** means the Contractor"s priced offer to BSCDCL 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 Award or Award letter. The word TENDER is synonymous with Tender and the Word TENDER DOCUMENTS with "Tendering Documents" or "offer documents".

WRITING means any manuscript typed written or printed statement under or over signature and/or seal as the case may be.

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.
The headings in the clauses/ conditions of tender documents are for convenience only and shall not be used for interpretation of the clause/ condition.
Words imparting the singular meaning only also include the plurals and vice versa where the context requires. Words importing persons or parties shall include firms and corporations and organizations having legal capacities.

Excepted Risk are risks due to riots (other than those on account of contractor"s employees), war (whether declared or not) invasion, act of foreign enemies, hostilities, civil war, rebellion revolution, insurrection, military or usurped power, any acts of Government, damages from aircraft, acts of God, such as earthquake, lightening and unprecedented floods, and other causes over which the contractor has no control and accepted as such by the BSCDCL or causes solely due to use or occupation by Government of the part of the works in respect of which a certificate of completion has been issued or a cause solely due to BSCDCL"s faulty design of works.

Market Rate shall be the rate as decided by the Engineer-in-Charge on the basis of the prevailing cost of materials and labour at the site where the work is to be executed plus the percentage mentioned elsewhere in the tender document to cover, all overheads and profits.

PERFORMANCE GUARANTEE:

"Within 30 (Thirty) days from the date of issue of letter of Award or within such extended time as may be granted by BSCDCL in writing, the contractor shall submit to BSCDCL an irrevocable performance bank guarantee in the form appended, from any Nationalized Bank or all Commercial schedule bank equivalent to 5 % (Five per cent only) of the contract value for the due and proper execution of the Contract. The Performance Guarantee shall be initially valid up to the stipulated date of completion plus 60 days beyond that. In case the time for completion of works gets extended, the contractor shall get the validity of Performance Guarantee extended to cover such extended time for completion of work.

BSCDCL reserve the right of forfeiture of the performance guarantee in the event of the contractor"s failure to fulfill any of the contractual obligations or in the event of termination of contract as per terms and conditions of contract.

Performance guarantee shall be returned after completion of 5 years.

In case the contractor fails to submit the performance guarantee of the requisite amount within the stipulated period or extended period, letter of Award automatically will stand withdrawn and EMD of the contractor shall be forfeited.

SECURITY DEPOSIT/ RETENTION MONEY

The Security deposit or the retention money shall be deducted from each running bill of the contractor @ 5% (five per cent only) of the gross value of the Running Account bill. Earnest money shall be adjusted first in the security deposit and further recovery of security deposit shall commence only when the upto date amount of security deposit exceeds the earnest money deductible under this clause. No Interest shall be paid on amount so deducted. Security deposit will be released after completion of 5 years.

The release/refund of security deposit of the contractor shall be subject to the observance/compliance of the conditions as under and whichever is later:

a) Expiry of the defect liability period in conformity with provisions contained in clause (Defect liability clause). The expiry of defect liability period shall be extended from time to time depending upon extension of time granted by BSCDCL.

The contractor produces a clearance certificate from the labour office. As soon as the work is virtually completed, the contractor shall apply for the labour clearance certificate to the 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 after 3 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.

BSCDCL reserves the right of part or full forfeiture of security deposit in addition to other claims in the event of contractor"s failure to fulfill any of the contractual obligations or in the event of termination of contract as per terms and conditions of contract.

MOBILIZATION ADVANCE

Mobilization advance up to maximum of amount as mentioned in the "Memorandum (Annexure-I)" shall be paid to the contractor, if requested by him, on submission of irrevocable Bank Guarantee valid for contract period of an amount 1.2 times of the mobilization advance to take care of advance and interest at prescribed rate from a nationalized bank or all Commercial scheduled bank in the enclosed Performa. The Mobilization advance shall be interest bearing @ as mentioned in the "Memorandum (Annexure-I)".

This advance shall be paid in three installments as follows:

First Installment of fifty percent of total mobilization advance shall be paid after the agreement is signed and upon submission of performance guarantee for full amount as specified.

2nd installment of twenty five percent of total mobilization advance will be paid after the setting up of site office and site laboratory, complete mobilization of plant and machinery, scaffolding & shuttering materials etc.

The Balance twenty five percent of total mobilization advance shall be paid on completion of 10% of work in terms of cost and after the contractor has fully mobilized the work at site.

The mobilization advance bear simple interest at the rate as mentioned in the Memorandum (Annexure-I) and shall be calculated from the date of payment to the date of recovery (365 days in a year) both days inclusive, on the outstanding amount of advance. Recovery of such mobilization advanced including interest shall be made by the deduction from the contractor"s bills commencing after first ten percent of the gross value of the work is executed and paid, on pro-rata percentage basis to the gross value of the work billed beyond 10% in such a way that the entire advance is recovered either by the time eighty percent of the gross value of the contract is executed and paid, together with interest due on the entire outstanding amount up to the date of recovery of the installment or on expiry of eighty percent of contract period (i.e. time allowed for completion of work in terms of Memorandum- Annexure-I) whichever is earlier.

The bank guarantee submitted by contractor against mobilization advance shall initially be made for the full amount as mentioned in para 4.1 above and valid for the contract period, and be kept renewed from time to time to cover the balance amount and likely period of completion of recovery together with interest. However, the contractor can submit part bank guarantees against the mobilization advance in as many numbers as per proposed number of recovery installments equivalent to the amount of each installment.

Notwithstanding what is contained above, no mobilization advance whatsoever shall be payable, if payment of mobilization advance is not mentioned in the Memorandum (Annexure-I).

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 75 % (seventy five percent) 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 BSCDCL site Engineer shall be paid to the Contractor for all non- perishable items as per UADD/MPPWD/CPWD 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 shall be paid for the balance quantities of materials. The contractor shall construct suitable go-down 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 also 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.

DEVIATIONS / VARIATIONS EXTENT AND PRICING

The Engineer-in-Charge shall have power (i) 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, (ii) to omit part of the works in case of non-availability of a portion of the site or for any other reasons and the contractor shall be bound to carry out the works in accordance with any instructions given to him in writing signed by the Engineer-in- Charge and such alterations, omissions, additions, or substitutions shall form part of the contract as if originally provided therein and any altered, additions or substituted works which the contractor may be directed to do in the manner specified above as part of the work, shall be carried out by the contractor on the same conditions in all respects including price on which he agreed to do the main work except as hereunder provided:

The time for the completion of the work shall, in the event of any deviations resulting in additional cost over the tendered value sum being ordered be extended, if requested by the contractor, as follows: in the proportion which the additional cost of the altered, additional or substituted work bears to the original tendered value plus 25% of the time calculated in (i) above or such further additional time as may be considered reasonable by the Engineer-in-Charge.

If the extra items includes any work for which no rate is specified in the contract,
then such work shall be carried out at the rates entered in the schedule of rates (as mentioned in Memorandum (Annexure-I)) 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 (Annexure-I) for Civil/ Sanitary Works). The scheduled item means the items appearing in the Schedule of Rates (as mentioned in Memorandum (Annexure-I)for Civil/ Sanitary Works) which shall be applicable in this clause. This clause will apply mutates mutandis to electrical work except that Electrical Schedule of Rates as mentioned in Memorandum (Annexure-I) will be considered in place of Civil/ Sanitary works Schedule of rates as mentioned in Memorandum (Annexure-I)

However, In the case of extra item(s), (items that are completely new, and are in addition to the items contained in the contract, and not included in the schedule of rates (as mentioned in Memorandum (Annexure-I)), the contractor may within fifteen days of receipt of order or occurrence of the item(s) claim rates, supported by proper analysis, for the work and the engineer-in-charge shall within one month of the 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 the contractor shall be paid in accordance with the rates so determined.

In the case of substituted items (items that are taken up with partial substitution or in lieu of items of work in the contract), the rate for the agreement item (to be substituted) and substituted item shall also be determined in the manner as mentioned in the following para:

If the market rate for the substituted item so determined is more than the market rate of agreement item (to be substituted), the rate payable to the contractor for the substituted item shall be the rate for the agreement item (to be substituted) so increased to the extent of the difference between the market rates of substituted item and the agreement item (to be substituted).

If the market rate for the substituted item so determined is less than the market rate of the agreement (to be substituted), the rate payable to the contractor for the substituted item shall be the rate for the agreement item (to be substituted) so decreased to the extent of the difference between the market rates of substituted item and the agreement item (to be substituted)

In the case of contract item(s), substituted item(s), contract cum substituted items, which exceed the limits laid down in Memorandum (Annexure-I), the contractor shall within fifteen days of receipt of order of 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 scheduled of quantities, the Engineer-in-Charge shall within one month 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 the contractor shall be paid in accordance with the rates so determined.

The provisions of the preceding paragraph shall also apply to the decrease in the rates of items for the work in excess of the limits laid down in Memorandum (Annexure-I), and the Engineer-in-charge shall after giving notice of the contractor within one month of occurrence of the excess and after taking into consideration any reply received from him within fifteen days of the receipt of the notice revise the rates for the work in question within one month of the expiry of the said period of fifteen days having regard to the market rates.

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. However, the Engineer-in-charge may authorize consideration of such claims on merits.

For the purpose of operation of Memorandum (Annexure-I), the following works shall be treated as works relating to foundation unless and otherwise defined in the Contract:

For Buildings: All works up to 1.2 meters above ground level or up to floor 1 level whichever is lower.

Any operation incidental to or necessarily has to be in contemplation of Bidder while filling, tender or necessary for proper execution of the item included in the Schedule of quantities or in the schedule of rates mentioned above, whether or not specifically indicated in the description of the item and the relevant specifications shall be deemed to be included in the rates quoted by the Bidder or the rate given in the said schedule or rates as the case may be Nothing extra shall be admissible for such operations.

Market Rates to be determined as per clauses given in the tender document shall be on the basis of **Prevailing rates of Material (unless mentioned otherwise)**, **Relevant Labour authority rate for Labour**, **market rates of T&P** etc. **plus 15% towards Contractors" Profits and Overheads**.

The following factors may be considered in the justification of rates on which

Contractor"s overhead & profit shall not be applicable**:**

Buildings and Other Construction Worker Cess as applicable in the state of work place

EPF (Employer Contribution) component, as per EPF act on the portion of labour"s wages

ESCALATION

No claim on account of any escalation on whatsoever ground shall be entertained at any stage of works. All rates as per Bill of Quantities (BOQ) quoted by contractor shall be firm and fixed for entire contract period as well as extended period for completion of the works. No escalation shall be applicable on this contract.

COMPENSATION FOR DELAY

If the contractor fails to maintain the required progress in terms of clauseor relevant clause of GCC & Special Conditions of Contract, to complete the work and clear the site on or before the contract or extended date of completion, he shall, without prejudice to any other right or remedy available under the law to the BSCDCL on account of such breach, pay as agreed compensation the amount calculated at the rates stipulated below 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 or the relevant clause in GCC & Special 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) Compensation for delay of work @1.5% per month delay to be computed on daily basis.

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 BSCDCL.

In case, the contractor does not achieve a particular milestone mentioned elsewhere in the tender document, or the re-scheduled milestone(s) the amount shown against that milestone shall be withheld, to be adjusted against the compensation levied at the final grant of Extension of Time. With-holding of this amount or failure to achieve a milestone, shall be automatic without any notice to the Contractor. However, if the contractor catches up with the progress of work on the subsequent milestone(s), the withheld amount shall be released. In case the contractor fails to make up for the delay in subsequent milestone(s), amount mentioned against each milestone missed subsequently also shall be withheld. However, no interest, whatsoever, shall be payable on such withheld amount.

ACTION IN CASE WORK NOT DONE AS PER SPECIFICATIONS

All works under or in course of execution or executed in pursuance of the contract, shall at all times be open and accessible to the inspection and supervision of the Engineer-in-charge, his authorized subordinates in charge of the work and all the superior officers, officer of the Quality Assurance Unit of the BSCDCL or any organization engaged by the BSCDCL for Quality Assurance and the contractor shall, at all times, during the usual working hours and at all other times at which reasonable notice of the visit of such officers has been given to the contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing, present for that purpose. Orders given to the Contractor"s agent shall be considered to have the same force as if they had been given to the contractor himself. If it shall appear to the Engineer-in-charge or his authorized subordinates in-charge of the work or to the officer of Quality Assurance or his subordinate officers or the officers of the organization engaged by the BSCDCL for Quality Assurance or his subordinate officers, that any work has been executed with unsound, imperfect, or unskillful workmanship, or with materials or articles provided by him for the execution of the work which are unsound or of a quality inferior to that contracted or otherwise not in accordance with the contract, the contractor shall, on demand in writing which shall be made within twelve 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 charge and cost. In the event of the failing to do so within a period specified by the Engineer-in-Charge in his demand aforesaid, then the contractor shall be liable to pay compensation at the same rate as given in this tender document (for non-completion of the work in time) for this default. In such case the Engineer-in-Charge may not accept the item of work at the rates applicable under the contract but may accept such items at reduced rates as the Engineer in charge may consider reasonable during the preparation of on account bills or final bill if the item is so acceptable without detriment to the safety and utility of the item and the structure or he may reject the work outright without any payment and/or get it and other connected and incidental items rectified, or removed and re- executed at the risk and cost of the contractor. Decision of the Engineer-in-Charge to be conveyed in writing in respect of the same will be final and binding on the contractor.

ACTION IN CASE OF BAD WORK

If it shall appear to the Engineer-in-Charge or his authorized representative 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 twelve 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 while the contractor failure to do so shall continue, 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.

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 contractor 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 any of the following cases:

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

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

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 behalf by the Engineer-in-Charge; or

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 behalf by the Engineer-in-Charge; or

If the contractor shall offer or give or agree to give to any person in BSCDCL 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 relation to the obtaining or execution of this or any other contract for BSCDCL; or If the contractor shall enter into a contract with BSCDCL 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

If the contractor shall obtain a contract with BSCDCL as a result of wrong tendering or other non-bona-fide methods of competitive tendering or commits breach of Integrity Pact; or 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 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 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.

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 cases aforesaid, the Engineer-in-Charge may without prejudice to any other right or remedy which shall have accrued or shall accrue hereafter to BSCDCL, by a notice in writing to cancel the contract as whole or only such items of work in default from the Contract, the Engineer-in-charge shall have powers:

Take possession of site and any materials, constructional plant, implements, stores, etc. thereon; and/ or Carry out the incomplete work by any means at the risk and cost of the contractor; and/ or The Engineer-in-charge shall determine the amount, if any, is recoverable from the contractor for completion of the part work/part incomplete work of any item(s) taken out of his hands and execute at the risk and cost of the contractor, the liability of contractor on account of loss or damage suffered by BSCDCL because of action under this clause shall not exceed 10% of the tendered value of the work.

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 security deposit recoverable under the contract and performance guarantee shall be liable to be forfeited and un-used materials, construction plants, implements, temporary buildings, etc. shall be taken over and shall be absolutely at the disposal of the BSCDCL. If any portion of the Security Deposit has not been paid or received it would be called for and forfeited; and/ or

To employ labor paid by the BSCDCL and to supply materials to carry out the work or any part of the work debiting the contractor with the cost of the labour and the price of the materials 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. If the expenses incurred by the BSCDCL are less than the amount payable to the contractor at his agreement rates, the difference shall not be paid to the contractor; and/ or

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 and/ or relevant clause of Condition Special 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 BSCDCL under his contract or on any other account whatsoever or from his security deposit
or the proceeds of sales of unused materials, construction plants, implements temporary buildings etc. thereof or a sufficient part thereof as the case may be. If the expenses incurred by the BSCDCL are less than the amount payable to the contractor at his agreement rates, the difference shall not be paid to the contractor; and/or 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 BSCDCL in completing the works or part of the works or the excess loss or damages suffered or may be suffered by BSCDCL as aforesaid after allowing such credit shall without prejudice to any other right or remedy available to BSCDCL 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, constructional plant, 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 BSCDCL and unsold materials, constructional plant etc. shall be returned to the contractor, provided always that if cost or anticipated cost of completion by BSCDCL 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 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 above, are in excess of the security deposit forfeited, these shall be Limited to the amount by which the excess cost incurred by the BSCDCL exceeds the security deposit so forfeited.

CONTRACTOR LIABLE TO PAY COMPENSATION EVEN IF ACTION NOT TAKEN UNDER CLAUSE OF AGREEMENT

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 any 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, materials and stores, in or upon the works, or the site thereof belonging to the contractor, or procured by the contractor and intended to the 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, 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.

CARRYING OUT PART WORK AT RISK & COST OF CONTRACTOR

If contractor:
At any time makes default during currency of work or does not execute any part of the work with due diligence and continues to do so even after a notice in writing of 7 days in this respect from the Engineer-in-Charge; or
Commits default in complying with any of the terms and conditions of the contract and does not remedy it or takes effective steps to remedy it within 7 days even after a notice in writing is given in that behalf by the Engineer-in- Charge; or

Fails to complete the work(s) or items of work with individual dates of completion, on or before the date(s) so determined, and does not complete them within the period specified in the notice given in writing in that behalf by
the Engineer-in-Charge.

The Engineer-in-Charge without invoking action under given clause of contract may, without prejudice to any other right or remedy against the contractor which have either accrued or accrue thereafter to BSCDCL, by a notice in writing to take the part work/part incomplete work of any item(s) out of his hands and shall have powers to: Take possession of the site and any materials, constructional plant, implements, stores, etc., thereon; and/or Carry out the part work / part incomplete work of any item(s) by any means at the risk and cost of the contractor.

The Engineer-in-Charge shall determine the amount, if any, is recoverable from the contractor for completion of the part work/ part incomplete work of any item(s) taken out of his hands and execute at the risk and cost of the contractor, the liability of contractor on account of loss or damage suffered by BSCDCL because of action under this clause shall not exceed 10% of the tendered value of the work.

In determining the amount, credit shall be given to the contractor with the value of work done in all respect in the same manner and at the same rate as if it had been carried out by the original contractor under the terms of his contract, the value of contractor's materials taken over and incorporated in the work and use of plant and machinery belonging to the contractor. The certificate of the Engineer-in-Charge as to the value of work done shall be final and conclusive against the contractor provided always that action under this clause shall only be taken after giving notice in writing to the contractor. Provided also that if the expenses incurred by the department are less than the amount payable to the contractor at his agreement rates, the difference shall not be payable to the contractor.

Any excess expenditure incurred or to be incurred by BSCDCL in completing the part work/ part incomplete work of any item(s) or the excess loss of damages suffered or may be suffered by BSCDCL as aforesaid after allowing such credit shall without prejudice to any other right or remedy available to BSCDCL in law or per as agreement be recovered from any money due to the contractor on any account, and if such money is insufficient, the contractor shall be called upon in writing and shall be liable to pay the same within 30 days.

If the contractor fails 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, constructional plant, implements, temporary building at site etc. and adjust the proceeds of sale thereof towards the dues recoverable from the contractor under the contract and if thereafter there remains any balance outstanding, it shall be recovered in accordance with the provisions of the contract. In the event of above course being adopted by the Engineer-in-Charge, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any engagements or made any advance on any account or with a view to the execution of the work or the performance of the contract.

SUSPENSION OF WORKS

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:

- On account of any default on part of the contractor, or
- For proper execution of the works or part thereof for reason other than the default of the contractor, or
- 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% for completion period. No adjustment in contract price will be allowed for reasons of such suspension.

ii) In the event of the Contractor treating the suspension as an abandonment of the Contract by BSCDCL, 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.

TERMINATION OF CONTRACT ON DEATH OF CONTRACTOR

Without prejudice to any of the right or remedies under this contract if the contractor dies, the Engineer in-charge shall have the option of terminating the contract without compensation to the contractor.

TIME ESSENCE OF CONTRACT & EXTENSION FOR DELAY

The time allowed for execution of the Works as specified in the Memorandum (Annexure-I) or the extended time in accordance with these conditions shall be the essence of the contract. The execution of the works shall commence from such time period as mentioned in MEMORANDUM (ANNEXURE – I) or 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 BSCDCL shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the earnest money & performance guarantee absolutely.

Within 10 (Ten) days of Letter of Award, 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 progress report including photographs shall be submitted by the contractor on the prescribed format & the intervals (not exceeding one month)as decided by the Engineer in Charge. The compensation for delay as per tender document 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% of the tendered value of work".

If the work(s) be delayed by:

1. force-majeure or
2. Abnormally bad weather, or
3. Serious loss or damage by fire, or
4. Civil commotion, local commotion of workmen, strike or lockout, affecting any or the trades employed on the work, or
5. Delay on the part of other contractors or tradesmen engaged by Engineer-in- Charge in executing work not forming part of the Contract, or
6. Non-availability of stores, which are responsibility of the BSCDCL or,

7. Non-availability or break down of tools and plant to be supplied or supplied by BSCDCL

8. Any other cause which, in the absolute discretion of the BSCDCL, 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 within 07 days but shall nevertheless use constantly his best endeavor 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.

9. 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 in 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 BSCDCL 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 a reasonable time from the 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.

TIME SCHEDULE & PROGRESS

Time allowed for carrying out all the works as entered in the tender shall be as mentioned in the “Memorandum (Annexure-I)” which shall be reckoned from the 10th day from the date on which the letter of Award 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.

The contractor shall also furnish within 10 days of date of issue of letter of Award a CPM network/ PERT chart/ Bar Chart for completion of work within stipulated time. This will be duly got approved from BSCDCL. 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. Contractor shall mobilize and employ sufficient resources for completion of all the works as indicated in the agreed BAR CHART/PERT 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.

During the currency of the work the contractor is expected to adhere to the time schedule on mile stone and total completion and this adherence will be a part of Contractor‟s performance under the contract. During the time schedule on mile stone 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 the BSCDCL. These reviews may be undertaken at the discretion of Engineer-in-charge 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 BSCDCL/owner /consultant at the sole discretion of BSCDCL. 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.

Contractor shall submit (as directed by Engineer-in-Charge) progress reports 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. The contractor shall send completion report with as built drawings to the office of Engineer-in-Charge, of BSCDCL in writing within a period of 30 days of completion of work.

The photographs of the project taken on last day of every month indicating progress of work (in soft copies) shall be attached along with the physical progress reports to be submitted to Engineer-in-charge.

TAXES AND DUTIES

Except as otherwise specifically provided in the contract, the contractor shall be liable and responsible for the payment, of all taxes, and GST or in the state concerned which may be specified by local/state/ central government from time to time on all material 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 taxes and GST.In the event of nonpayment/default in payment of any of the above taxes, BSCDCL reserves the right to with-hold the dues/payments of contractor and make payment to local/state/Central Government authorities or to labourers as may be applicable. The rate quoted by the contractor shall be deemed to be inclusive of all taxes as given in tender document Tax deductions at source shall be made as per laws prevalent in the State as applicable for the work.

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 as applicable in the state of work.

It will be incumbent upon the Contractor to obtain a registration certificate as a dealer under the GST Act and necessary evidence to this effect shall be furnished by the Contractor to BSCDCL.

The Bidder shall quote his rates inclusive of Goods and Service Tax(GST) in conjunction with other terms and conditions. In the event of decrease / relaxation and / or waiver of any of the existing / prevailing tax(es), duties, levies, cess by Central / state Govt. Or any other statutory body(ies), after the last stipulated date for the receipt of tender including extension (if any), and the contractor thereupon has been paid or has raised claims of such tax(es), duties, levies, cess; such sums shall be recovered / deducted (from claims raised but which has not been paid) effective from the date as reckoned in the relevant statutory order / law / ordnance etc. The contractor, shall, within a period of 30 days of any such waiver/relaxation/decrease in tax(es), duties, levies, cess, give a written notice thereof to Engineer-in-charge stating the statutory change with Documentary proof thereto. Provided always that Engineer-in-charge shall have full powers to effect recovery/deduction on account of any such statutory change even if contractor has not intimated in the event when any such statutory action comes to his notice.

INCOME TAX DEDUCTION TDS)

Income tax deductions shall be made from all payments made to the contractor including advances against work done, as per the rules and regulations in force, in accordance with the Income Tax act prevailing from time to time.

GOODS AND SERVICES TAX (GST)

The Bidder shall quote rates inclusive of all type of tax and GST nothing extra shall be paid. The contractor must have GST registration number and will provide copy of Registration to BSCDCL before release of any payment by the Corporation. The contractor will submit regular Invoice / Bill fulfilling `all conditions of Goods and Service Tax (GST) Rules.

ROYALTY ON MATERIALS

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

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, constructional plant, temporary works, 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.

The rates and prices to be tendered in the bill of quantities are for completed and finished items of works and complete in all respects. It will be deemed to include all constructional 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, all taxes, royalty, duties, cess, octroi and other levies, insurance liabilities and obligations set out or implied in the tender documents and contract .

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 is caused to any temporary or permanent structure(s) in the vicinity 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.

INSURANCE OF WORKS ETC

Contractor is required to take contractor"s all risk policy or erection all risk policy (as the case may be) from an approved insurance company in the joint name with BSCDCL 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 of damage from whatever cause arising other than **excepted risks** for which he is responsible under the terms of the contract and in such manner that the BSCDCL and the contractor are covered during the period of construction of works and/or also covered during the period of defect liability for loss or damage.The work and the temporary works to the full value of such works. The materials, constructional plant, centering, shuttering and scaffolding materials and other things brought to the site for their full value. Whenever required by BSCDCL, the contractor shall produce the policy or the policies of insurance and the receipts for payment of the current premium.

INSURANCE UNDER WORKMEN COMPENSATION ACT

Contractor is required to take insurance cover under the Workman Compensation Act, 1923 amended from time to time from an approved insurance company and pay premium charges thereof. Wherever required by BSCDCL the contractor shall produce the policy or the policies of Insurance and the receipt of payment of the current premiums.

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 BSCDCL / owner / client, arising out of the execution of the works or temporary works. Wherever required by BSCDCL 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 contractors all risk policy, 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.

If the Contractor could not effect a comprehensive insurance cover against risks which he may be required to effect under the terms of the contract, then he shall give his attention to get the best insurance cover available and even in case of effecting a wider insurance cover than the one which the subsidiary of the General Insurance Company could offer, such an insurance is ought to be done after the BSCDCL‟s approval, by or through the subsidiary of the General Insurance Company.

The contractor shall at all times indemnify BSCDCL and Owner against all claims, damages or compensation under the provision of Payment of wages act-1936, Minimum Wages Act-1948, Employer‟s liability Act-1938, the workmen‟s compensation Act-1947, Industrial Disputes Act-1947 and Maternity Benefit Act- 1961 or any modifications thereof or any other law in force or as consequence of any accident or injury to any workman or other persons in or about the works, whether in the employment of the contractor or not, against all costs, charges and expenses of any suit, action or proceedings arising out of such incident or injury and against all sum or sums which may with the consent of the contractor be paid to compromise or compound any such claim. Without limiting his obligations and liabilities as above provided, the contractor shall insure against all claims, damages or compensation payable under the Workmen‟s Compensation Act 1923 or any modification thereof or any other law relating thereto.

PAYMENTS

All running payments shall be regarded as payments by way of advance against the final payment only and not as payments for work actually done and completed and/or accepted by BSCDCL and shall not preclude the recovery for bad, unsound and imperfect or unskilled work to be removed and taken away and reconstructed or 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 the BSCDCL 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 BSCDCL"s certificate of the measurement and of the total amount payable for the work accordingly shall be final and binding on contractor

It is clearly agreed and understood by the Contractor that notwithstanding anything to the contrary that may be stated in the agreement between BSCDCL and the contractor; the contractor shall become entitled to payment only after BSCDCL 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 BSCDCL leading to a delay in the release the corresponding payment by BSCDCL to the contractor shall not entitle the Contractor to any compensation/ interest from BSCDCL.

- **IF THE ITEM IS SITC THEN THE BIDDER WILL GET THE PAYMENT AS FOLLOWS:**

1. 70% against supply, 20% against installation/testing and 10 % against commissioning

2. If items are supplied then 10% for commissioning and 90 % for supply

All payments shall be released by way of e-transfer through RTGS/NEFT in India directly at their Bank account by BSCDCL.

MEASUREMENTS OF WORKS

Engineer-in-charge shall, except as otherwise provided, ascertain and determine by measurement, the value of work done in accordance with the contract. Except where any general or detailed description of the work expressly shows to the contrary, measurement shall be taken in accordance with the Procedure set forth in the UADD/MPPWD/CPWD Specification. In the case of items which are not covered by specifications, mode of measurement as specified in the Technical Specifications of the contract and if for any item no such technical specification is available, then a relevant standard method of measurement issued by the Bureau of Indian Standard shall be followed.

Provided further that, In case of Cancellation/Determination of Contract in Full or in Part in accordance with clause given in tender document (and its sub-clauses), following methodology shall be adopted in respect of measurements in addition to what has been mentioned in foregoing:-

All measurements and levels shall be taken jointly by the Engineer-in-Charge or his authorized representative and by the contractor or his authorized representative from time to time during the progress of the work and such measurements shall be signed and dated by the Engineer-in-Charge and the contractor or their representatives in token of their acceptance. If the contractor objects to any of the measurements recorded, a note shall be made to that effect with reason and signed by both the parties.

If for any reason the contractor or his authorized representative is not available and the work of recording measurements is suspended by the Engineer-in-Charge or his representative, the Engineer-in-Charge and BSCDCL shall not entertain any claim from contractor for any loss or damages on this account. If the contractor or his authorized representative does not remain present at the time of such measurements after the contractor or his authorized

representative has been given a notice in writing three (3) days in advance or fails to countersign or to record objection within a week from the date of the measurement, then such measurements recorded in his absence by the Engineer-in-Charge or his representative shall be deemed to be accepted by the Contractor. The contractor shall, without extra charge, provide all assistance with every appliance, labour and other things necessary for measurements and recording levels.

COMPUTERISED MEASUREMENT BOOKS

Engineer-in-Charge shall, except as otherwise provided, ascertain and determine by measurement the value of work done in accordance with the contract. All measurements of all items having financial value shall be entered by the contractor and compiled in the shape of the Computerized Measurement Book as per the format of BSCDCL so that a complete record is obtained of all the items of works performed under the contract. All such measurements and levels recorded by the

contractor or his authorized representative from time to time, during the progress of the work, shall be got checked by the contractor from the Engineer-in-Charge or his authorized representative as per interval or program fixed in consultation with Engineer-in-Charge or his authorized representative.

After the necessary corrections made by the Engineer-in-Charge, the measurement sheets shall be returned to the contractor for incorporating the corrections and for resubmission to the Engineer-in- Charge for the dated signatures by the Engineer- in-Charge and the contractor or their representatives in token of their acceptance.

Whenever bill is due for payment, the contractor would initially submit draft computerized measurement sheets and these measurements would be got checked/test checked from the Engineer-in-Charge and/or his authorized representative. The contractor will, thereafter, incorporate such changes as may be done during these checks/test checks in his draft computerized measurements, and submit to BSCDCL a computerized measurement book, duly bound, and with its pages machine numbered. The Engineer-in-Charge and/or his authorized representative would thereafter check this MB, and record the necessary certificates for their checks/test checks.

The final, fair, computerized measurement book given by the contractor, duly bound, with its pages numbered, should be 100% correct, and no cutting or over- writing in the measurements would thereafter be allowed. If at all any error is noticed, the contractor shall have to submit a fresh computerized MB with its pages duly numbered and bound, after getting the earlier MB cancelled by the BSCDCL. The contractor shall submit two spare copies of such computerized MB‟s for the purpose of reference and record by the various officers of the BSCDCL.

The contractor shall also submit to the department separately his computerized Abstract of Cost and the bill based on these measurements, duly bound, and its pages numbered along with two spare copies of the “bill.

The contractor shall, without extra charge, provide all assistance with every appliance, labour and other things necessary for checking of measurements /levels by the Engineer-in-Charge or his representative.

The contractor shall give not less than seven days‟ notice to the Engineer-in- Charge or his authorized representative in charge of the work before covering up or otherwise placing beyond the reach of checking and/or test checking the measurement of any work in order that the same may be checked and/or test checked and correct dimensions thereof be taken before the same is covered up or placed beyond the reach of checking and/or test checking measurement and shall not cover up and place beyond reach of measurement any work without consent in writing of the Engineer-in-Charge or his authorized representative in charge of the work who shall within the aforesaid period of seven days inspect the work, and if any work shall be covered up or placed beyond the reach of checking and/or test checking measurements without such notice having been given or the Engineer-in-Charge‟s consent being obtained in writing the same shall be uncovered at the Contractor‟s expense, or in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed.

Engineer-in-Charge or his authorized representative may cause either themselves or through another officer of the BSCDCL to check the measurements recorded by contractor and all provisions stipulated herein above or anywhere in the tender document shall be applicable to such checking of measurements or levels.

It is also a term of this contract that checking and/or test checking the measurements of any item of work in the measurement book and/or its payment in the interim, on account of final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the contractor from liabilities from any over measurement or defects noticed till completion of the defects liability period.

WITHHOLDING AND LIEN IN RESPECT OF SUMS DUE FROM CONTRACTOR

Whenever any claim or claims for payment of a sum of money arises out of or under the contract or against the contractor, BSCDCL 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, BSCDCL shall be entitled to withhold the security deposit, 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, BSCDCL 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 contract pending finalization of adjudication of any such claim.

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 BSCDCL will be kept withheld or retained as such by the Engineer-in-Charge or BSCDCL till the claim arising out of or under the contract is determined by the 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 partnership firm or a limited company, the Engineer-in-Charge or the BSCDCL 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 any partner/limited company, as the case may whether in his individual capacity or otherwise. BSCDCL 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 BSCDCL to recover the same from him in the manner prescribed in tender document 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 BSCDCL to the contractor, without any interest thereon whatsoever.

LIEN IN RESPECT OF CLAIMS IN OTHER CONTRACTS

Any sum of money due and payable to the contractor (including the security deposit returnable to him) under the contract may be withheld or retained by way of lien by the Engineer-in-Charge or by BSCDCL against any claim of the Engineer-in-Charge or BSCDCL 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 the BSCDCL. 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 the BSCDCL will be kept withheld or retained as such by the Engineer-in-Charge or the BSCDCL or till his claim arising out of the same contract or any other contract is either mutually settled or determined by the 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.

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

All items of work in the bill of quantities/ schedule of quantities shall be carried out as per the UADD/MPPWD/CPWD/ BSCDCL specifications, drawings and instructions of the Engineer-in-Charge of BSCDCL and the rates shall include for supply of required materials including proper storage, consumables, skilled & unskilled labour, supervision and tools, tackles, plant & machinery complete as called for in the detailed specifications and conditions of the contract. Latest updated UADD/MPPWD/CPWD specification shall be followed for execution of work. 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.

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.

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 materialls 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 p remises 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.

MATERIALS AND SAMPLES

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 are mentioned, other equivalent makes/ brands may be considered by the Engineer -in-Charge. In case of variance in UADD/MPPWD/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 BSCDCL 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 pr ovide the necessary facilities and assistance for this purpose.

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 BSCDCL.

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 BSCDCL. The materials articles etc. as approved shall be LABELLED as such and shall be signed by BSCDCL and the Contractor's representative.

The approved samples shall be kept in the custody of the Engineer-in- Charge of BSCDCL 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.

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.

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 BSCDCL/UADD/MPPWD/CPWD (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 calibration without delay. All field test shall be carried out in the presence of BSCDCL"s representative. All costs towards samples, materials, collection, transport, manpower, testing etc. shall be borne by the Contractor and are deemed to be included in the rates quoted by him in the bill of quantities.

The contractor(s) shall display the calibration certificate of each equipment at the location of equipment & shall get recalibrated at least one week before its expiry date.

MATERIALS PROCURED WITH THE ASSISTANCE OF BSCDCL

If any material for the execution of this contract is procured with the assistance of BSCDCL either by issue from its stores or purchase made under orders or permits or licenses obtained by BSCDCL, 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 permission of Engineer-in-charge. The contractor, if required by the BSCDCL, 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 the Engineer-in-charge shall determine having due regard to the conditions of materials. The price allowed to the contractor, however, shall not exceed the amount charged to him excluding the element of storage charges which shall be 10% of the cost charged to contractor. The decision of the Engineer-in-charge shall be final and conclusive. Contractor(s) has / have to deploy security personnel for safeguarding of materials procured at site.

CONTRACTOR TO SUPPLY TOOLS & PLANTS

The contractor shall provide at his own cost all materials, machinery, tools & plants as require for completion of work. In addition to this, appliances, implements, other plants, ladders, cordage, tackle, scaffolding and temporary works required for the proper execution of the work, whether original, altered or substituted and whether included in the specifications or other documents forming part of the contract or referred to in these conditions or not, or which may be necessary for the purpose of satisfying or complying with the requirements of the Engineer-in-Charge as to any

matter as to which under these conditions he is entitled to be satisfied, or which he is entitled to require together with carriage therefore to and from the work. The contractor shall also supply without charge the requisite number of persons with the means and materials, necessary for the purpose of setting out works, and counting, weighing and assisting the measurement or examination at any time and from time to time of the work or materials. Failing his so doing, the same may be provided by the Engineer-in-Charge at the expense of the contractor and the expenses may be deducted, from any money due to the contractor, under this contract or otherwise and/or from his security deposit or the proceeds of sale thereof, or of a sufficient portions thereof.

MOBILIZATION OF MEN, MATERIALS AND MACHINERY:

All expenses towards mobilization at site and de-mobilization including bringing in equipment, work force, materials, dismantling the equipment's, 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.

It shall be entirely the Contractors responsibility to provide, operate and maintain all necessary construction equipment's, 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.

It shall be the responsibility of the contractor to obtain the approval for any revision and/or modification desired by him from BSCDCL before implementation.

The procurement and supply in sequence and at the appropriate time of all materials and consumable shall be entirely the contractor's responsibilities and his rates for execution of work shall be inclusive of supply of all these items.

It is mandatory for the contractor to provide safety equipment's and gadgets to his all workers, supervisory and Technical staff engaged in the execution of the work while working. The minimum requirement (but not limited to) shall be gum boots, safety helmets,

Rubber hand gloves, face masks, safety nets, safety belts, goggles etc. as per work requirements. Sufficient nos. of these equipment's and gadgets shall also be provided to BSCDCL by the contractor at his own cost for use of BSCDCL Officials and/ or workforce while working/supervision of work at site. No staff/ worker shall be allowed to enter the site without these equipment's/ gadgets.

The cost of the above equipment's/ 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 payment 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 Equipment's/ 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 contractor shall abide by all rules & regulations pertaining to Health, Safety and Environment.

All designs, drawings, bill of quantities, etc., except Bar Bending Schedule, Shop & Fabrication drawings, for all works shall be supplied to the contractor for their scope of work all buildings services and development works by BSCDCL in phased manner as the works progress. However it shall be the duty and responsibility of the contractor to bring to the notice of the BSCDCL in writing as to any variation, discrepancy or any other changes required and to obtain revised drawings and designs and / or approval of the BSCDCL in writing for the same.

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.

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 the Engineer-in-charge. 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 the BSCDCL.

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 BSCDCL for approval. Before executing the item, shop drawings and bar bending schedule should be approved by BSCDCL.

BSCDCL shall supply Work Force in the various categories to assist the contractor in execution of the works on recoverable basis as per provision mentioned elsewhere in the contract.
All contractors‟ plant, machinery and equipment shall be kept in perfect condition during currency of the contract.

QUALITY ASSURANCE AND QUALITY CONTROL

To ensure that the 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 date of issue Letter of Award. BSCDCL 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:

His organization structure for the management and implementation of the proposed Quality Assurance Program.

- Documentation control system.
- The procedure for purpose of materials and source inspection.
- System for site controls including process controls.
- Control of non-conforming items and systems for corrective actions. Inspection and test procedure for site activities.
- System for indication and appraisal of inspection status. System for maintenance of records.
- System for handling, storage and delivery.
- 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 BSCDCL. All the costs associate with Printing of Formats and testing of materials required as per technical specifications or by Engineer-in-charge shall be included in the Contractor"s quoted rates in the Schedule/ Bill of quantities.

I. The work shall conform to high standards 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.
II. At the site level the Contractor shall arrange the materials, their stacking/ storage in appropriate manner to ensure the quality. Contractor shall provide equipment and manpower to test continuously the quality of materials, assemblies, etc., as directed by the Engineer. The tests shall be conducted continuously and the results of tests maintained. In addition, the Contractor shall keep appropriate tools and equipment for checking alignments, levels, slopes and evenness of the surface.
III. The Engineer shall be free to carry out such tests as may be decided by him at his sole discretion, from time to time, in addition to those specified in this document. 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.
a) The test shall be conducted at the Site laboratory that may be established by the Contractor or at any other Standard Laboratory selected by the Engineer.
b) The Contractor shall transport the samples to the laboratory for which nothing extra shall be payable. In the event of Contractor failing to arrange transportation of the samples in proper time Engineer shall have them transported and recover two times the actual cost from the Contractor's bills.

c) The testing charges shall be borne by the Contractor.
d) Testing may be witnessed by the Contractor or his authorized representative. Whether witnessed by the Contractor or not, the test results shall be binding on the Contractor.

CONTRACT COORDINATION PROCEDURES, COORDINATION MEETINGS AND PROGRESS REPORTING

The Contractor shall prepare and finalize in consultation with BSCDCL, a detailed contract coordination procedure within 15 days from the date of issue of Letter of Award 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 BSCDCL, Owners/ Clients or Consultants of BSCDCL/ Owner/ Client during the currency of the Contract, as and when required and fully cooperate with such personal and agencies involved during these discussions. The Contractor shall not deal in any way directly with the Clients/ Owners or Consultants of BSCDCL/Owner/ Clients and any dealing/correspondence if required at any time with Clients/ Owners/ Consultants shall be through BSCDCL only. During the execution of the work, Contractor shall submit at his own cost a detailed Monthly progress & programme report to the Engineer-in-charge of BSCDCL by 5th of every month. The format of monthly progress & programme report shall be as approved by Engineer-in-Charge of BSCDCL.

COMPLETION CERTIFICATE AND COMPLETION PLANS

Within ten days of the completion of the work, the contractor shall give notice of such completion to the Engineer-in-Charge and within thirty days of the receipt of such notice, the Engineer-in-Charge shall inspect the work and if there is no defect in the work, shall furnish the contractor with a final certificate of completion, otherwise a provisional certificate of physical completion indicating defects (a) to be rectified by the contractor and/or

(b) for which payment will be made at reduced rates, shall be issued. But no final certificate of completion shall be issued, nor shall the work be considered to be complete until the contractor shall have removed from the premises on which the work shall be executed all scaffolding, surplus materials, rubbish and all huts and sanitary arrangements required for his/their work people on the site in connection with the execution of the works as shall have been erected or constructed by the contractor(s) and cleaned off the dirt from all wood work, doors, windows, walls, floor or other parts of the building, in, upon, or about which the work is to be executed or of which he may have had possession for the purpose of the execution; thereof, and not until the work shall have been measured by the Engineer-in- Charge. If the contractor shall fail to comply with the requirements of this Clause as to removal of scaffolding, surplus materials and rubbish and all huts and sanitary arrangements as aforesaid and cleaning off dirt on or before the date fixed for the completion of work, the Engineer-in-Charge may at the expense of the contractor remove such scaffolding, surplus materials and rubbish etc., and dispose of the same as he thinks fit and clean off such dirt as aforesaid, and the contractor shall have no claim in respect of scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof less actual cost incurred on removal of materials / debris / malba etc.

The contractor shall submit completion plan as required vide General Specifications for Electrical works as applicable within thirty days of the completion of the work. In case, the contractor fails to submit the completion plan as aforesaid, he shall be liable to pay a sum equivalent to 2.5% of the value of the work subject to a ceiling of Rs.5,00,000 (Rs. Five Lakhs only) as may be fixed by the Engineer-in-charge concerned and in this respect the decision of the Engineer-in-charge shall be final and binding on the contractor.

PROHIBITION OF UNAUTHORISED CONSTRUCTION & OCCUPATION

No unauthorized buildings, construction of structures should be put up by the contractor anywhere on the project site, neither any building built by him shall be occupied in un-authorized manner by him or his staff.

It shall be the responsibility of the contractor to see that the building under construction is not occupied by anybody in un-authorized manner during construction, and is handed over to the Engineer-in-Charge with vacant possession of complete building. If such building though completed is occupied illegally, then the Engineer-in-Charge shall have the option to refuse to accept the said building/buildings in that position. Any delay in acceptance on this account will be treated as the delay in completion and for such delay, a levy of compensation upto 5% of tendered value of work may be imposed by the Engineer-in-Charge whose decision shall be final both with regard to the justification and quantum and shall be binding on the contractor.

However, the Engineer-in-Charge, through a notice, may require the contractor to remove the illegal occupation any time on or before construction and delivery.

FORECLOSURE OF CONTRACT BY BSCDCL/OWNER

If at any time after the commencement of the work the BSCDCL shall for any reason whatsoever is required to abandon the work or is 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 foreclosure of the whole or part of the works.

DEFECTS LIABILITY PERIOD

The contractor shall be responsible for the rectification of defects in the works for a period twelve months from the date of taking over of the works by the BSCDCL or clients whichever is later. 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 BSCDCL at the cost and expense of the contractor.

RESTRICTION ON SUBLETTING

The contractor shall not sublet or assign the whole or part of the works except where otherwise provided, by the contract. The provision of labour on piece work basis shall not be deemed to be a subletting under this clause.

The contractor may entrust specialist items of works like MEP services, HVAC, Lifts, Building Management System, Water Proofing, and Data & Communication networking, interiors, landscaping etc. to the agencies specialized in the specific trade. The contractor shall give the names and details of such firm whom it is going to employ for approval of BSCDCL. These details shall include the expertise, financial status, technical manpower, equipment, resources and list of works executed and on hand of the specialist agency. Further, prior written approval is required from BSCDCL to deploy such agency / sub-contractor.

FORCE MAJEURE

Any delay in or failure to perform of either party, shall not constitute default so as to give rise to any claim for damages, to the extent such delay or failure to perform is caused by an act of God, or by fire, explosion, flood or other natural catastrophe, governmental legislation, orders or regulation etc. Failure of the client / owner to hand over the entire site and / or release funds for the project, to BSCDCL, shall also constitute force majeure. The time for performance of the obligation by the parties shall be deemed to be extended for a period equal to the duration of the force majeure event. Both parties shall make their best efforts to minimize the delay caused by the force majeure event. If the failure / delay of the client /owner in handing over the entire site and / or in releasing the funds continues even on the expiry of the stipulated date of completion, BSCDCL, may, at the request of the contractor, foreclose the contract without any liability to either party. In the event of such foreclosure, the contractor shall not be entitled to any compensation whatsoever. If prior to such foreclosure the contractor has brought any materials to the site, the Engineer-in-Charge shall always have the option of taking over of all such materials at their purchase price or at the local current rates, whichever is lower.

NO COMPENSATION CLAUSE

The contractor shall have no claim whatsoever for compensation or idle charges against BSCDCL on any ground or for any reason, whatsoever.

DIRECTION FOR WORKS

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

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.

WORK IN MONSOON AND RAIN

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 contractors‟ rate shall be considered inclusive of cost of dewatering due to rains required if any and no extra rate shall be payable on this account. The stipulated period for completion of project includes the monsoon period, holidays & festivals.

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 BSCDCL.

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.

LAND FOR LABOUR HUTS/ SITE OFFICE AND STORAGE ACCOMMODATION

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/construction of labour camp and 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 security deposit of the contractor shall be released only after contractor demolishes all structures including foundations and gives back clear vacant possession of this land In the event the contractor has to shift his labour campus 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 BSCDCL, he shall comply with such instructions at his cost and risk and no claim whatsoever shall be entertained on this account.

WATCH, WARD AND LIGHTING OF WORK PLACE

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

SCHEDULE OF QUANTITIES / BILL OF QUANTITIES

The quantities shown against the various items of work are only approximate quantities which may vary as per the actual requirement at site. No item which is not covered in the bill of quantities shall be executed by the Contractor without the approval of the BSCDCL. In case any Extra/Substituted item is carried out without specific-approval, the same will not be paid.

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 up to date amendments issued till last date of receipt of tender documents.

TESTS AND INSPECTION

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 UADD/MPPWD/CPWD, BSCDCL 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 the BSCDCL. 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 BSCDCL at the cost of the Contractor.

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 the BSCDCL. 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 byowner/lients. The compliance of observations/improvements as suggested by the inspecting officers of BSCDCL/CTE/ State authorities/ Owners shall be obligatory on the part of the Contractor at the cost of contractor.

BORROW AREAS

The contractor shall make his own arrangements for borrow pits and borrow disposal areas including their approaches and space for movement of man, machinery, other equipment‟s 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 deemed to include the same.

CARE OF WORKS

From the commencement to the completion of works and handing over, the contractor shall take full responsibility for care thereof 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.

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 BSCDCL shall be final and binding on the contractor. No claim whatsoever shall be admissible on this account.

SETTING OUT OF THE WORKS

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 BSCDCL shall not in any way relieve the contractor of his responsibility for the correctness.

NOTICE BEFORE COVERING UP THE WORK

The contractor shall give not less than seven day‟s notice before covering up or otherwise placin 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 or his consent being obtained the same shall be uncovered at the contractor expenses and he shall have to make it good at his own expenses.

SITE CLEARANCE

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 the BSCDCL the contractor shall remove all temporary structures like the site offices, cement go-down, stores, labour hutments etc., scaffolding rubbish, debris etc. left over materials tools and plants, equipments etc., clean the site to the entire satisfaction of the Engineer-in-charge. If this is not done the same will be got done by BSCDCL at his risk and cost.

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.

SET-OFF OF CONTRACTOR‟S LIABILITIES

BSCDCL 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 security deposit and proceeds of performance guarantee.

POSSESSION PRIOR TO COMPLETION

BSCDCL 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 BSCDCL 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 BSCDCL in such case shall be final binding and conclusive.

When the whole of the works or the items or the groups of items of work have been completed the contractor will give a notice to that effect to the Engineer in writing. The Engineer shall within 7 days of the date of receipt of such notice inspect the works and give instructions in writing to the contractor specifying the balance items of work which are required to be done by the contractor and shall also notify the contractor of any defect in the works affecting completion.

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 BSCDCL by the contractor within 30 days of the completion. All costs incurred in this respect shall be borne by the contractor.

EMPLOYMENT OF PERSONNEL

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 and any other nationality in any way is associated with the works.

In case BSCDCL observed misconduct negligence or incompetence etc. on the part of any representative, agent, servant and workmen or employees etc. of the contractor, the BSCDCL shall have full power and without giving any reason to the contractor, instruct the contractor to remove such engineer / staff / worker from site and provide suitable replacements. The decision of the Engineer-in-charge shall be final and binding on the contractor. The contractor shall not be allowed any compensation on this account.

TECHNICAL STAFF FOR WORK

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 BSCDCL 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 BSCDCL to take instructions.

Within 15 days of Letter of Award, the contractor shall submit a site organizational chart and resume including details of experience of the Project-in-Charge and other staff proposed to be deputed by him and the technical team shall be deputed by 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 BSCDCL can be replaced with prior written approval of BSCDCL 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 technical reasons 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.

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. 50,000 (Rupees Fifty 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 desired strength of 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 as to the amount and the contractor‟s liability to pay the said amount.

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/ BSCDCL.

MATERIALS OBTAINED FROM DISMANTLEMENT TO BE OWNER‟S PROPERTY

All materials like stone, boulders and other materials obtained during the work of dismantling, excavation etc. will be considered BSCDCL/owner property and such materials shall be disposed off to the best advantage of BSCDCL/owner according to the instructions in writing issued by the Engineer-in-charge.

FURNISHED OFFICE ACCOMMODATION & MOBILITY COMMUNICATION TO BE ARRANGED BY CONTRACTOR

On acceptance of tender, the contractor at his own cost will construct a suitably equipped office at site with basic facilities such as telephone(s), fax, internet, photocopier, computer(s) and printer(s) along with operator(s), regular electric & drinking water supply and staff carrying vehicles for the supervisory staff with driver, fuel and maintenance etc. as per the requirement of the project. The contractor shall maintain the aforesaid facilities intact/operational during the tenancy of the contract or maximum up to 6 months beyond the stipulated contractual completion date if the work is delayed due to any reasons. Operation and maintenance cost of all such materials, equipments / services shall be borne by the contractor.

The contractor shall also make sufficient arrangement for photography/video- graphy so that photographs video can be taken of any specific activity at any point of time. The contractor shall also make arrangement of software like MS Project etc. for the purpose of preparing progress report etc.

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

LABOUR LAWS –

LABOUR LAWS TO BE COMPLIED BY THE CONTRACTOR

The contractor shall obtain a valid license under the contract labour (Regulation & Abolition) Act 1970 and the contract labour Act (Regulation & Abolition) CentralRules 1971 and amended from time to time, and continue to have a valid license until the completion of the work including defect liability period. The contractor shall also adhere by the provision of the child labour (Prohibition and Regulation) Act. 1986 and as amended from time to time.

The contractor shall also comply with the provisions of the building and other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996 and the building and other Construction Workers Welfare Cess Act, 1996.

Any failure to fulfil above requirement shall attract the penal provisions of this contract arising out the resultant for non execution of the work before the commencement of work. No labour below the age of 18 years shall be employed on the work.

Payment of wages:

The contractor shall pay to labour employed by him either directly or through subcontractors, wages not less than fair wages as defined in the BSCDCL Contractor"s Labour Regulations or as per the provisions of the Contract Labour (Regulation and Abolition) Act, 1970 and the contract Labour (Regulation and Abolition) Central Rules, 1971, wherever applicable.

The contractor shall, notwithstanding the provisions of any contract to the contrary, cause to be paid fair wage to labour indirectly engaged on the work, including any labour engaged by his sub-contractors in connection with the said work, as if the labour had been immediately employed by him

In respect of all labour directly or indirectly employed in the works for performance of the contractor"s part of this contract, the contractor shall comply with or cause to be complied with the BSCDCL contractor"s Labour Regulations in regard to payment of wages, wage period, deductions from wages recovery of wages not paid and deductions unauthorisedly made, maintenance of wage books or wage slips, publication of scale of wages and other terms of employment, inspection and submission of periodical returns and all other matters of the like nature or as per the provisions of the Contract Labour (Regulation and Abolition) Act,

1970, and the Contract Labour (Regulation and Abolition) Central Rules, 1971, wherever applicable.

(a) The Engineer-in-Charge concerned shall have the right to deduct from the moneys due to the contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non- fulfilment of the conditions of the contract for the benefit of the workers, non- payment of wages or of deductions made from his or their wages which are not justified by their terms of the contract or non-observance of the Regulations.

(b) Under the provision of Minimum Wages (Central) Rules, 1950, the contractor is bound to allow to the labours directly or indirectly employed in the works one day rest for 6 days continuous work and pay wages at the same rate as for duty. In the event of default, the Engineer-in-Charge shall have the right to deduct the sum or sums not paid on account of wages for weekly holidays to any labours and pay the same to the persons entitled thereto from any money due to the contractor by the Engineer-in-Charge concerned

The contractor shall comply with the provisions of the Payment of Wages Act, 1936, Minimum Wages Act, 1948, Employees Liability Act, 1938, Workmen's Compensation Act, 1923, Industrial Disputes Act, 1947, Maternity Benefits Act, 1961, and the Contractor"s Labour (Regulation and Abolition) Act 1970, or the modifications thereof or any other laws relating thereto and the rules made there under from time to time.

The contractor shall indemnify and keep indemnified BSCDCL against payments to be made under and for the observance of the laws aforesaid and the BSCDCL Contractor"s Labour Regulations without prejudice to his right to claim indemnity from his sub-contractors.

The laws aforesaid shall be deemed to be a part of this contract and any breach thereof shall be deemed to be a breach of this contract.

LABOUR SAFETY PROVISION

The contractor shall be fully responsible to observe the labour safety provisions:

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.

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 framed by Govt. from time to time for the protection of health and sanitary arrangements for workers.

OBSERVANCE OF LABOUR LAWS

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 BSCDCL against effect or 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 BSCDCL or the client/ owner is held liable as "Principal Employer" to pay contributions etc. under legislation of Government or Court decision in respect of the employees of the contractor, then the contractor would reimburse the amount of such payments, contribution etc. to BSCDCL and/ or same shall be deducted from the payments, security deposit etc. of the contractor.

The Contractor shall submit proof of having valid EPF registration certificate. He shall within 7 days of the close of every month, submit to BSCDCL a statement showing the recoveries of contributions in respect of each employee employed by or through him and shall furnish to BSCDCL such information as the BSCDCL is required to furnish under the provisions of para 36 B of the EPF scheme 1952 to the EPF authorities and other information required by EPFO authorities from time to time. He shall also submit a copy of challan every month in token of proof of having deposited the subscription and contribution of workers engaged on the project.

In case, the contractor is not complying the above provision BSCDCL shall withhold payment to the extent of 4.70% (Four point Seven Zero percent) of the value of the Running Account bill and shall release only after the submission of above mentioned details. If it is incumbent upon BSCDCL to deposit withhold amount with EPF authorities, the withhold amount shall be deposited by BSCDCL with EPF authorities. In such a case BSCDCL shall not refund this withheld amount to the contractor even after the production of EPF registration certificate.

MINIMUM WAGES ACT

The contractor shall comply with all the provisions of the minimum wages Act,1948, contract labour Act (Regulation & Abolition) 1970, and rules framed there under and other labour laws/local laws affecting contract labour that may be brought into force from time to time.

LABOUR CESS

The rates of the contractor shall be inclusive of labour cess. BSCDCL shall make a recovery @ 1% on account of labour cess from each RA bill of the contractor and labour cess so recovered/deducted shall be deposited with the Labour Board of the concerned state. In case the Labour Board is not established in the state, recovery made by BSCDCL on account of labour cess shall be retained under suspense account and will be deposited with the Labour Board at later date as & when the Labour Board is constituted in the state.

Every contractor, sub-contractor, affiliates, their legal assigns or heirs as the case may, shall be responsible for registration of every Building worker who has completed eighteen years of age but has not completed sixty years of age and who has been engaged in any Building or Other Construction Work for not less than Ninety Days during the preceding twelve months; with the Board / Funds as applicable under various sections of "THE BUILDINGS AND OTHER.

CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 and THE BUILDING AND OTHER

CONSTRUCTIONWORKERS" WELFARE CESS ACT, 1996.

The contractor shall also be responsible for maintaining register of beneficiaries i.e. the workers in such form as may be prescribed by the competent authority & the same shall be kept open at all reasonable times for inspection of relevant authority and officials of client / BSCDCL.

The contractor shall be further responsible for maintaining such register & records; giving such particulars of Building workers employed by him, the work performed by them, the

number of hours of work which shall constitute a normal working day, the wages paid to them, the receipts given by them and, such other particulars in such form as may be prescribed by the authority or BSCDCL.

In the event of contractor failing to comply with the above clause(s) in part or in full, BSCDCL, without prejudice to any other rights or remedy available under law or any other clause(s) of contract, shall be at absolute liberty to forfeit any sum or sums that are payable or could become payable on account of execution of contract work and decision of Engineer-in-charge shall be final & binding in this regard on the contractor.

RECOVERY OF COMPENSATION PAID TO WORKMEN

In every case in which by virtue of the provisions sub-section (1) of Section 12, of the Workmen‟s Compensation Act, 1923, BSCDCL is obliged to pay compensation to a workman employed by the contractor, in execution of the works, BSCDCL will recover from the contractor, the amount of the compensation so paid; and, without prejudice to the rights of the BSCDCL under sub-section (2) of Section 12, of the said Act, BSCDCL shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due to the contractor whether under this contract or otherwise. BSCDCL shall not be bound to contest any claim made against it under sub-section (1) of Section 12, of the said Act, except on the written request of the contractor and upon his giving to BSCDCL full security for all costs for which BSCDCL might become liable in consequence of contesting such claim.

ENSURING PAYMENT AND AMENITIES TO WORKERS IF CONTRACTOR FAILS

In every case in which by virtue of the provisions of the Contract Labour (Regulation and Abolition) Act, 1970, and of the Contract Labour (Regulation and Abolition) Central Rules, 1971, BSCDCL is obliged to pay any amounts of wages to a workman employed by the contractor in execution of the works, or to incur any expenditure in providing welfare and health amenities required to be provided under the above said Act or under the BSCDCL Contractor‟s Labour Regulations, or under the Rules framed by Government from time to time for the protection of health and sanitary arrangements for workers employed by BSCDCL‟s Contractors, BSCDCL will recover from the contractor, the amount of wages so paid or the amount of expenditure so incurred; and without prejudice to any other right or remedy available under this contract, BSCDCL shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by BSCDCL to the contractor whether under this contract or otherwise BSCDCL shall not be bound to contest any claim made against it under sub-section (1) of Section 20, sub-section (4) of Section 21, of the said Act, except on the written request of the contractor and upon his giving to the BSCDCL full security for all costs for which BSCDCL might become liable in contesting such claim.

CHANGE IN FIRM‟S CONSTITUTION TO BE INTIMATED

Where the contractor is a partnership firm, the prior approval in writing of the Engineer-in-Charge 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 where under 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 of tender document hereof and the same action may be taken, and the same consequences shall ensue as provided in the tender document

INDEMNITY AGAINST PATENT RIGHTS

The contractor shall fully indemnify the BSCDCL 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.

LAW COVERING THE CONTRACT

This contract shall be governed by the Indian laws for the time being in force.

LAWS, BYE-LAWS RELATING TO THE WORK

The contractor shall strictly adhere by the provisions, for the time being in force, of law relating to works or any regulations and bylaws 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 bylaws as aforesaid, and to pay all fees and taxes payable to such authorities in respect thereof.

CONTRACT AGREEMENT

The Contractor shall enter into a Contract Agreement with the BSCDCL within 10 (TEN) days from the date of Letter of Award or within such extended time, as may be granted by the BSCDCL failing which no payment shall be released to the contractor. 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 start the work within 10 (Ten) days of the issue of letter of Award, his earnest money is liable to be forfeited and Letter of award consequently will stand withdrawn.

MANNER OF EXECUTION OF AGREEMENT

The agreement as per prescribed Performa as enclosed shall be signed at the office of the BSCDCL within 10(TEN days) days from the date of issue of Letter of Award. The Contractor shall provide for signing of the Contract, appropriate Power of Attorney and the requisite documents/ materials. Unless and until a formal contract is prepared and executed, the Letter of Award read in conjunction with the Tendering Documents will constitute a binding contract.

The agreement will be signed in five originals and the Contractor shall be provided with one signed original and the other four originals will be retained by the BSCDCL

The Contractor shall provide free of cost to the BSCDCL all the Engineering data, drawings and descriptive materials submitted along with the tender, in at least three (3) copies to form an integral part of the Agreement within seven 7 days after issuing of Letter of

Award. Subsequent to signing of the Agreement, the Contractor at his own cost shall provide to the BSCDCL with at least five (5) true hard bound copies of Agreement within thirty (30) days of its signing.

JURISDICTION

The agreement shall be executed at BHOPAL on non-judicial stamp paper purchased in BHOPAL and the courts in BHOPAL alone will have jurisdiction to deal with matters arising there from, to the exclusion of all other courts.

ARBITRATION

1. Arbitration Procedure: If the efforts, to resolve all or any of the disputes through conciliation fail, then such a dispute shall be referred within 30 days from conclusion of conciliation process to a Sole Arbitrator who would be nominated by Executive Director Bhopal Smart City Development Corporation Limited, Bhopal. The arbitration and conciliation act 1996 as amended from time to time will be applicable. The venue of such arbitration shall be at Bhopal. The award of the sole Arbitrator shall be binding on all parties. The cost of Arbitration shall be borne by the respective parties. There will be no objections if the sole arbitrator nominated or appointed is an employee of BSCDCL.

2. The place of arbitration shall be Bhopal, M.P.

3. English Language: The request for arbitration, the answer to the request, the terms of reference, any written submissions, any orders and awards shall be in English and, if oral hearings take place, English shall be the language to be used in the hearings. The award shall be made in writing.

4. Enforcement of Award: The Parties agree that the decision or award, which shall be a speaking order, resulting from arbitration shall be final and binding upon the Parties and shall be enforceable in accordance with the provision of the Arbitration and Conciliation Act 1996 subject to the rights of the aggrieved parties to secure relief from any higher forum.

5. Performance during Arbitration: The Arbitration Proceedings shall be governed by Indian Arbitration and Conciliation Act 1996, as amended from time to time including provisions in force at the time the reference is made. Pending the submission of and/or decision on a Dispute and until the arbitral award is published; the Parties shall continue to perform their respective obligations under this Agreement without prejudice to a final adjustment in accordance with such award. The courts at Bhopal shall have the sole exclusive jurisdiction to try all the cases arising out of this agreement.

6. Notices: That any notice under the terms of this License shall be in writing by registered post or delivered personally and signed by the party or his/its duly authorized representative giving such notice. All activities including day to day management, billing, termination etc. will be carried out from the office of the CEO, Smart City Development Corporation Limited Bhopal or by his duly authorized representative. Notice shall be addressed as follows:

Chief Executive Officer

SECTION-4

LABOUR SAFETY, HEALTH & SANITARY RULES AND REGULATIONS INCLUDING FORMS

LABOUR SAFETY PROVISIONS

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 hand holds shall be provided on the ladder and the ladder shall be given an inclination not steeper than ¼ to 1 (1/4 horizontal and 1 vertical).

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.

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 that 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.

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).

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. (11.5”) 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 defense of every suit, action or other proceeding at law that may be brought by any 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.

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 90cm (3feet) above the surface of the ground. The side of the trenches, which are 1.5 m. (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.

Demolition - Before any demolition work is commenced and also during the progress of the work following precautions shall be observed:

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

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.

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.

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.

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

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.
Those engaged in welding works shall be provided with welders protective eye shields.

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

When workers are employed for works 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:

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

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

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

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.

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.

The area should be barricaded or cordoned off 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.

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

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.

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.

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

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 metres 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. The workers engaged for cleaning the manholes / sewers should be properly trained before allowing to work in the manhole.

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.

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.

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.

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.

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.

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

Suitable face masks 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.

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.

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.

Measures shall be taken whenever required in order to prevent danger arising from the application of paint in the form of spray. Measures shall be taken, whenever practicable to prevent danger arising out of dust caused by dry rubbing down and scrapping.

b) Adequate facilities shall be provided to enable working painter to wash during and on cessation of work. Suitable arrangements shall be made prevent clothing put off during working hours being spoiled by painting materials.

c) 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 BSCDCL. The BSCDCL may require when necessary a medical examination of workers. Instructions with regard to the special hygienic precautions to be taken in the painting trade shall be distributed to working painters. 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 for all injuries likely to be sustained during the course of the work. Use of hoisting machines and tackle including their attachment encourage and supports shall conform to the following standard of conditions.

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

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.

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. 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 clause shall be loaded beyond the safe working load except for the purpose of testing. In case of BSCDCL 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.

Motors gearing, transmission electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguard. Hoisting 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.

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.

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.

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 BSCDCL Official or their representatives.

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.

SECTION-5

FORMS AND FORMATS

Annexure-"II"

ACCEPTANCE OF TENDER CONDITIONS

From: (On the letter head of the company by the authorized officer having power of attorney)

BSCDCL,
……
Sub: Name of the work & NIT No.:

Sir,

This has reference to above referred tender. I/We are pleased to submit our tender for the above work and I/We hereby unconditionally accept the tender conditions and tender documents in its entirety for the above work.

I/we are eligible to submit the tender for the subject tender and I/We are in possession of all the documents required.

I/We have viewed and read the terms and conditions of this GCC/SCC carefully. I/We have downloaded the following documents forming part of the tender document:

a. Notice Inviting Tender (pg……..to….pg-)
b. Instructions to Bidder (ITB) & General conditions of Contract (pg……..to….pg-)
c. Technical Specifications (pg……..to….pg-)
d. Bill of Quantities (BOQ)- (pg……..to….pg-)
e. Tender Drawings (pg……..to….pg-)
f. Acceptance of Tender Conditions (Annexure M)
g. Corrigendum ,if any (pg……..to….pg-)

I/we have uploaded the mandatory scanned documents such as cost of tender document, EMD, e-Tender Processing Fee and other documents as per Notice Inviting e-tender AND I/We agree to pay the cost of tender document, EMD, e- Tender Processing Fee (only receipt/proof of online payment) and other documents in physical form in the form and manner as described in NIT/ITT.

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, to forfeit and pay BSCDCL, or its successors or its authorized nominees such sums of money as are stipulated in the notice inviting tenders and tender documents.

If I/we fail to commence the work within 10 days of the date of issue of Letter of Award and/or I/we fail to sign the agreement as per Contract and/or I/we fail to submit performance guarantee as per of Clauses of Contract, I/we agree that BSCDCL shall, without prejudice to any other right or remedy, be at liberty to cancel the Letter of Award and to forfeit the said earnest money as specified above.

Your faithfully,
(Signature of the Bidder with
Rubber stamp)

Dated

Appendix - 'N"

FORM XXV

DETAILS OF THE BALANCE WORK IN HAND AS ON_____

(UPTO THE PRECEDING MONTH OF SUBMISSION OF BID) WITH BSCDCL

(To be submitted in Envelop-1)

S. No	Name of the Unit/Zone/SBG/R G B	Contract Value	Date of start as per LOI/ Contract	Date of completion as per LOI / Contract	Work done up to the preceding month of submission of bid	Balance value of work

Note: The bidder shall also include the value of all such works which are awarded to bidder but yet not started up to the preceding month of submission of bid.

Appendix –"0"

FORM XXVI AFFIDAVIT

(To be submitted by bidder on non-judicial stamp paper of Rs. 100/- (Rupees Hundred only) duly attached by Notary Public)

(To be submitted in Envelop-1)

Affidavit of Mr. .....S/o ..... R/o

.....

I, the deponent above named do hereby solemnly affirm and declare as under:

That I am the Proprietor/Authorized signatory of M/s……. Having its Head Office/Regd. Office at ……

That the information/documents/Experience certificates submitted by M/s…… along with the tender for …… *(NAME OF WORK*)……

To BSCDCL Ltd. are genuine and true and nothing has been concealed.

I shall have no objection in case BSCDCL verifies them from issuing authority(ies). I shall also have no objection in providing the original copy of the document(s), in case BSCDCL demand so for verification.

I hereby confirm that in case, any document, information & / or certificate submitted by me found to be incorrect / false / fabricated, BSCDCL at its discretion may disqualify / reject / terminate the bid/contract and also forfeit the EMD / All dues.

I shall have no objection in case BSCDCL verifies any or all Bank Guarantee(s) under any of the clause(s) of Contract including those issued towards EMD and Performance Guarantee from the Zonal Branch /office issuing Bank and I/We shall have no right or claim on my submitted EMD before BSCDCL receives said verification.

That the Bank Guarantee issued against the EMD issued by (name and address of the Bank) is genuine and if found at any stage to be incorrect / false / fabricated, BSCDCL

shall reject my bid, cancel pre-qualification and debar me from participating in any future tender for three years.

I, ..., the Proprietor / Authorised signatory of M/s..... do hereby confirm that the contents of the above Affidavit are true to my knowledge and nothing has been concealed there from..... and that no part of it is false.

Verified at ..... this..... day of .....

DEPONENT

ATTESTED BY (NOTARY PUBLIC)

APLICATION FOR EXTENSION OF TIME

(To be completed by the Contractor)

P A R T –I

Name of Contractor

Name of the work as given in the Agreement

Agreement No.

Estimated amount put to tender

Date of commencement work as per agreement

Period allowed for completion of work as per agreement

Date of completion stipulated as per agreement

Period for which extension of time has been give previously

Extension granted

First extension vide Engineer-in-charge letter No… ……date	Months	Days
2nd extension vide Engineer-in-charge letter No…… date	Months	Days
3rd extension vide Engineer-in-charge letter No……. date	Months	Days
4th extension vide engineer-in-charge letter No……. date	Months	Days

Total extension previously given

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

Period for which extension is applied for:

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.

Serial No.

Nature of hindrance

Date of Occurrence

Period for which it is likely to last

Period for which extension required for this particular hindrance. Over

lapping period, if any, with reference to item

Net extension applied for

Remarks, if any

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

Extension of time required for extra work.

Details of extra work and on the amount involved:

Total value of extra work

Proportionate period of extension of time based on estimated amount put to tender on account of extra work.

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)

Date of receipt of application from Contractor for the work in the Engineer-in-charge office.

Acknowledgement issued by Engineer-in-charge vide his letter No. dated

Engineer-in-charge remarks regarding hindrances mentioned by the Contractor.

Serial No.

Nature of hindrance

Date of occurrence of hindrance

Period for which hindrance, is likely to last

Extension of time period applied for by the contractor

Over lapping period, if any, giving reference to items which over lap

Net period for which extension is recommended. Remarks as to why the hindrance occurred and justification for extension recommended.

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 up to which extension has been applied for. If extension of time is not recommended, what compensation is proposed to be levied under the agreement.

SIGNATURTE OF ENGINEER-IN-CHARGE

PROFORMA FOR EXTENSION OF TIME P A R T –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 the BSCDCL to recover compensation for delay in accordance with the provision made in Clause of the said agreement dated the ___/ ___/ ___. It is also clearly understood that the BSCDCL 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 Bhopal Smart City Development Corporation Ltd.

PROFORMA OF BANK GUARANTEE IN LIEU OF E M D (TENDER BOND)

(Judicial Stamp paper of appropriate value as per stamp Act-of respective state)

In consideration of Bhopal Smart City Development Corporation Limited, having its Registered Office at, Near Natraj Petrol Pump Sector A, Berkheda (hereinafter called "BSCDCL" which expression shall unless repugnant to the subject or context include its successors and assigns) having issued Notice Inviting Tender No..... and M/s..... having its Registered Head Office at..... (hereinafter called the "BIDDER") is to participate in the said tender for.....

Whereas BSCDCL, as a special case, has agreed to accept an irrevocable and unconditional Tender Bond Guarantee for an amount of Rs..... valid upto..... from the Bidder in lieu of Cash Deposit of Rs..... required to be made by the Bidder, as a condition precedent for participation in the said tender.

We the ..... (hereinafter called the "BANK") having its Registered, Office at..... and branch office at..... do hereby unconditionally and irrevocably undertake to pay immediately on demand in writing and without demur/protest any amount but not exceeding Rs ..... Any such demand made by BSCDCL shall be conclusive and binding on us irrespective of any dispute or differences that may be raised by the Bidder. Any change in the constitution of the Bidder or the Bank shall not discharge our liability under the guarantee.

We, the..... Bank, lastly undertake not to revoke this guarantee during its currency without the prior consent of BSCDCL in writing and this guarantee shall remain valid upto.....Unless a claim is made within three months from the date of expiry i.e.

..... (three months after the date of expiry), we shall be relieved of our liability under

this guarantee thereafter.

FOR AND ON BEHALF OF BANK

PLACE :

DATED :

WITNESS.

1.

2

PROFORMA OF BANK GUARANTEE (PERFORMANCE)

(Judicial Stamp paper of appropriate value as per stamp Act-of respective state)

Whereas the Bhopal Smart City Development Corporation Limited, having its Registered Office at BSCDCL Near Natraj Petrol Pump Sector A, Berkheda, Bhopal (hereinafter called "BSCDCL" which expression shall include its successors and assigns) having awarded a work order/contract / supply order No. dated (hereinafter called the contract) to M/s. .... (hereinafter called

the contractor / supplier) at a total price of Rs..... subject to the terms and conditions contained in the contract.

WHEREAS, the terms and conditions of the contract require the contractor to furnish a

Rs.... ..... (Rupees.....
bank guarantee for .. ..) being ..... % of the

total value of the contract for proper execution and due fulfillment of the terms and conditions contained in the contract.

We, the Bank, (hereinafter called the "Bank") do hereby unconditionally and

BSCDCL
irrevocably undertake to pay to immediately on demand in writing and without protest/or demur all moneys payable by the contractor/supplier to BSCDCL in connection with the execution/supply of and performance of the works/equipment, inclusive of any loss, damages, charges, expenses and costs caused to or suffered by or which would be caused to or suffered by BSCDCL by reason of any breach by the contractor/supplier of any of the terms and conditions contained in the contract as specified in the notice of demand made by BSCDCL to the bank. Any such demand made by BSCDCL on the bank shall be conclusive evidence of the amount due and payable by the bank under this guarantee. However, the Bank's liability under this guarantee, shall be limited to Rs..... in the aggregate

and the bank hereby agrees to the following terms and conditions:-

(i) This guarantee shall be a continuing guarantee and irrevocable for all claims of BSCDCL as specified above and shall be valid during the period specified for the performance of the contract including the period of maintenance/warranty i.e. up to……

(ii) We, the said bank further agree with BSCDCL that shall have the fullest liberty without our consent and without affecting in any manner our obligations and liabilities hereunder to vary any of the terms and conditions of the said contract or to extend time for performance of contract by the contractor
from time to time or to postpone for any time or from time to time any of the powers exercisable by BSCDCL against the contractor/supplier under the contract and forbear or enforce any of the terms and conditions relating to the said contract and we shall not be relieved from our liability by reason of any such variations or extension being granted to the contractor or for any forbearance, act or omission on the part of BSCDCL or any indulgence by BSCDCL to the contractor or by any such matter or thing whatsoever, which under the law relating to the sureties would, but for this provision, have effect of so relieving us.

This guarantee/undertaking shall be in addition to any other guarantee or security whatsoever BSCDCL may now or at any time have in relation to the

performance of the works/equipment and the company shall have full re-course to or enforce this security in performance to any other security or guarantee which the BSCDCL may have or obtained and there shall be no forbearance on the part of the company in enforcing or requiring enforcement of any other security which shall have the effect of releasing the Bank from its full liability. It shall not be necessary for BSCDCL to proceed against the said contractor/supplier before proceeding against the Bank.

This 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, but shall in all respects and for all purposes be binding and operative until payment of all moneys payable to BSCDCL in terms thereof are paid by the Bank.

The Bank hereby waives all rights at any time inconsistent with the terms of this Guarantee and the obligations of the bank in terms hereof, shall not be otherwise effected or suspended by reasons of any dispute or disputes having been raised by the supplier/contractor (whether or not pending before any Arbitrator, Tribunal or Court) or any denial of liability by the supplier/contractor stopping or preventing or purporting to stop or prevent any payment by the Bank to BSCDCL in terms hereof.

We, the said Bank, lastly undertake not to revoke this guarantee during its currency except with the previous consent of BSCDCL in writing. Unless a claim is made in writing within three months from the date of expiry of this guarantee i.e.....
(three months after the date of expiry) we shall be
relieved this guarantee thereafter.from all liabilities
under

Sign this …….. day of ……..at ……..

For and on behalf of Bank

WITNESS.

1.

2.

PROFORMA OF BANK GUARANTEE (FOR MOBILIZATION ADVANCE)

(Judicial Stamp paper of appropriate value as per stamp Act-of respective state)

Bhopal Smart City Development Corporation Limited, Near Natraj Petrol Pump, Sector A, Berkheda, Bhopal, Madhya Pradesh 4620231.0 In consideration of the Bhopal Smart City Development Corporation Limited, having its Registered Office at BSCDCL, Near Natraj Petrol Pump, Sector A, Berkheda,Bhopal (hereinafter called "BSCDCL" which expression shall unless repugnant to the subject or context include his successor and assigns) having agreed under the terms and conditions of Contract No..... dated..... made between..... and BSCDCL in connection with..... (hereinafter called "the said contract") to make at the request of the Contractor a Mobilization Advance of Rs..... for utilizing it for the purpose of the Contract on his furnishing a guarantee acceptable to BSCDCL, we the ..... Bank Ltd., (hereinafter referred to the "the said Bank") and having our registered office at..... do hereby guarantee the due recovery by BSCDCL of the said advance as provided according to the terms and conditions of the Contract. We..... do hereby undertake to pay the amount due and payable under this Guarantee without any demur, merely on a demand from BSCDCL stating that the amount claimed is due to BSCDCL under the said Agreement. Any such demand made on the..... shall be conclusive as regards the amount due and payable by the..... under this guarantee and..... agree that the liability of the ..... to pay BSCDCL the amount so demanded shall be absolute and unconditional notwithstanding any dispute or disputes raised by the Contractor and notwithstanding any legal proceeding pending in any court or Tribunal relating thereto. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs..... We ……. Bank further agree that BSCDCL shall be the sole judge of and as to whether the amount claimed has fallen due to BSCDCL under the said agreement or whether the said Contractor has not utilized the said advance or any part thereof for the purpose of the Contract and the extent of loss or damage caused to or suffered by BSCDCL on account of the said advance together with interest not being recovered in full and the decision of BSCDCL that the amount has fallen due from contractor or the said Contractor has not utilized the said advance or any part thereto for the purpose of the contract and as to the amount or amounts of loss or damage caused to or suffered by BSCDCL shall be final and binding on us.

We, the said Bank, further agree that the Guarantee herein contained shall remain in full force and effect till the said advance has been fully recovered and its claims satisfied or discharged and till BSCDCL certify that the said advance has been fully recovered from the said Contractor, and accordingly discharges this Guarantee subject, however, that BSCDCL shall have no claims under this Guarantee after the said advance has been fully recovered, unless a notice of the claims under this Guarantee has been served on the Bank before the expiry of the said Bank Guarantee in which case the same shall be enforceable against the Bank.

BSCDCL shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee or indemnity from time to time to vary any of the terms and conditions of the said Contract or the advance or to extend time of performance by the said Contractor or to postpone for any time and from time to time of the powers exercisable by it against the said Contractor and either to enforce or forbear from enforcing any of terms and conditions governing the said Contract or the advance or securities available to BSCDCL and the said Bank shall not be released from its liability under these presents by any exercise by BSCDCL of the liberty with reference to the matters aforesaid or by reasons of time being given to the said Contractor or any other forbearance, act or omission on the part of BSCDCL or any indulgence by BSCDCL to

The said 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 bank from its such liability. 5.0 It shall not be necessary for BSCDCL to proceed against the Contractor before proceeding against the Bank and the Guarantee herein contained shall be enforceable against the Bank notwithstanding any security which BSCDCL may have obtained or obtain from the Contractor or shall at the time when proceedings are taken against the Bank hereunder be outstanding or unrealized.

We, the said Bank, lastly undertake not to revoke this Guarantee during its currency except with the previous consent of BSCDCL in writing and agree that any change in the constitution of the said Contractor or the said Bank shall not discharge our liability hereunder.

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

For and on behalf of Bank

(NAME AND DESIGNATION)

Dated:

PROFORMA OF BANK GUARANTEE

(IN LIEU OF SECURITY DEPOSIT)

(Judicial Stamp paper of appropriate value as per stamp Act-of respective state)

Bhopal Smart City Development Corporation Ltd., Near
Natraj Petrol Pump, Sector A, Berkheda,Bhopal

In consideration of the Bhopal Smart City Development Corporation Ltd., having its

Registered Office at Near Natraj Petrol Pump Sector A, Berkheda(hereinafter called "BSCDCL") which expression shall include its successors and assigns having awarded to M/s..... (hereinafter called "the Supplier/Contractor") which expression shall wherever the subject or context so permits includes its successors and assigns) a Contract in terms inter-alia of BSCDCL's letter No..... dated..... and the Contract/Purchase Conditions of BSCDCL and upon the condition of the Supplier/Contractor furnishing Security for the performance of the Supplier's obligations and /or discharge of the contractor's/supplier's liability under and/or in connection with the said supply contract upto a sum of Rs..... (Rupees..... only)

We,..... ((hereinafter called "The Bank") which expression shall include its successors and assigns) hereby undertake and guarantee payment to BSCDCL forthwith on the same day on demand in writing and without protest or demur of any and all moneys payable by the supplier/contractor to BSCDCL under, in respect or in connection with the said contract inclusive of all the losses, damages, costs, charges and expenses and other moneys payable in respect of the above as specified in any notice of demand made by BSCDCL to the Bank with reference to this guarantee upto and aggregate limit of Rs…....(Rupees.....only) and the bank hereby agree with BSCDCL that:

This Guarantee shall be continuing guarantee and shall …… remain valid and irrevocable for all claims of BSCDCL and liabilities of Supplier/Contractor arising upto and until midnight of.....

This Guarantee shall be in addition to any other Guarantee or Security whatsoever that BSCDCL now or at any time have in relation to the Supplier's obligations/liabilities under and/or in connection with the said supply/contract, and BSCDCL shall have full authority to take recourse or to enforce this Security in preference to any other Guarantee or Security which BSCDCL may have or obtain and no for bearance on the part of BSCDCL in enforcing or requiring enforcement of any other Security shall have the effect of releasing the Bank from its liability hereunder.

BSCDCL shall be at liberty without reference to the Bank and without affecting the full liability of the Bank hereunder to take any other security in respect of the Supplier's/Contractor's obligations and/ or liabilities under or in connection with the said supply/contract or to grant time and / or indulgence to the supplier / contractor or to increase or otherwise vary the prices or the total contract value or to release or to forbear from enforcement of all or any of the conditions under the said supply / contract and / or the remedies of BSCDCL under any other security/securities now or hereafter held by BSCDCL and no such dealings, increase(s) or other indulgence(s) or arrangement(s) with the supplier / contractor or releasing or forbearance whatsoever shall have the effect of releasing the Bank from its full liability to BSCDCL hereunder or prejudicing rights of BSCDCL against the Bank. This Guarantee shall not be determined or affected by the liquidation or winding up, dissolution or change of constitution or insolvency of the supplier / contractor but shall in all respects and for all purposes be binding and operative until payment of all moneys payable to BSCDCL in terms thereof.

The Bank hereby waives all rights at any time inconsistent with the terms of this Guarantee and the obligations of the Bank in terms hereof shall not be otherwise affected or suspended by reason of any dispute or disputes having been raised by the supplier /contractor (whether or not pending before any Arbitrator, Tribunal or Court) or any denial or liability by the supplier/ contractor stopping/ preventing or purporting to stop or prevent any payment by the Bank to BSCDCL in terms thereof.

The amount stated in any notice of demand addressed by BSCDCL to the Guarantor as liable to be paid to BSCDCL by the supplier/contractor or as suffered or incurred by BSCDCL on account of any losses or damages, costs, charges and / or expenses shall as between the Bank and BSCDCL be conclusive of the amount so liable to be paid to BSCDCL or suffered or incurred by BSCDCL as the case may be and payable by the Guarantor to BSCDCL in terms hereof subject to a maximum of Rs ..... (Rupees ..... only),

Unless demand or claim under this Guarantee is made on the Guarantor in writing within three months form the date of expiry of the Guarantee i.e upto ..... the Guarantor shall be discharged from all liabilities under this Guarantee there under.

Notwithstanding anything contained herein before our liability under this guarantee is restricted to Rs . ..... (Rupees .....only). This guarantee will expire on..... Any claim under this Guarantee must be received by us within three months from the date of expiry i.e. ..... (date, three months after the expiry date) and if no such claim has been received by us by that date all your rights under this guarantee will cease.

For and on behalf of the Bank

Place Date

WITNESS:

1. 2.

PROFORMA OF BANK GUARANTEE
(FOR MOBILIZATION ADVANCE WITH INTEREST BEARING)

(Judicial Stamp per Stamp Act - paper of appropriate value as respective state)

Bhopal Smart City Development Corporation Limited,
Bhopal, Pin- 462023

In consideration of the Bhopal Smart City Development Corporation Limited., having its Registered Office at Bhopal -462023 (hereinafter called "BSCDCL" which expression shall unless repugnant to the subject: or context Include his successor and assigns) having agreed under the terms and conditions of Contract No. dated made between (name of the contractor) and BSCDCL in connection with (name of work) (hereinafter called "the said contract") to make at the request of the Contractor a Mobilization Advance of Rs. carrying interest @ … % p.a. for utilizing it for the purpose of the Contract on his furnishing a guarantee acceptable to BSCDCL, we the Bank (hereinafter referred to the "the said Bank") and having our registered office at do hereby guarantee the due recovery by BSCDCL of the said advance alongwith interest as provided according to the terms and conditions of the contract. We ...

do hereby undertake to pay the amount due and payable under this Guarantee without any demur, merely, on a demand from BSCDCL stating that the amount claimed is due to BSCDCL under the said Agreement. Any such demand made on the said bank shall be conclusive as regards the amount due and payable by the said contractor under this guarantee and agree that the liability of the said bank to pay BSCDCL the amount so demanded shall be absolute and unconditional notwithstanding any dispute or disputes raised by the Contractor and notwithstanding any legal proceeding pending in any court or Tribunal relating thereto. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs ……. inclusive of interest @ …….% p.a.

We the said bank further agree that BSCDCL shall be the sole judge of and as to whether the amount claimed has fallen due to BSCDCL under the said agreement or whether the said Contractor has not utilized the said advance or any part thereof for the purpose of the Contract and the extent of loss or damage caused to or suffered by BSCDCL on account of the said advance together with interest not being recovered in full and the decision of BSCDCL that the amount has fallen due from' contractor or the said Contractor has not utilized the said advance or any part thereto for the purpose of the contract and as to the amount or amounts of loss or damage caused to or suffered by BSCDCL shall be final and binding on us.

We, the said Bank, further agree that the Guarantee herein contained shall remain

in full force and effect till the said advance has been fully recovered and its claims satisfied or discharged and till BSCDCL certify Contractor, and accordingly discharges this Guarantee subject, however, that BSCDCL shall have no claims under this Guarantee unless a notice of the claims under this Guarantee has been served on the Bank before the expiry of the said Bank Guarantee in which case the same shall be enforceable against the Bank.

BSCDCL shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee or indemnity from time to time to vary any of the terms and conditions of the said Contract or the advance or to extend time of performance by the said Contractor or to postpone for any time and from time to time of the powers exercisable by it against the said Contractor and either to enforce or forbear from enforcing any of terms and conditions governing the said Contract or the advance or securities available to BSCDCL and the said Bank shall

not be released from its liability under these presents by any exercise by BSCDCL of the liberty with reference to the matters aforesaid or by reasons of time being given to the said Contractor or any other forbearance, act or omission on the part of BSCDCL or any indulgence by BSCDCL to the said 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 bank from its such liability.

It shall not be necessary for BSCDCL to proceed against the Contractor before proceeding against the Bank and Guarantee herein contained shall be enforceable against the Bank notwithstanding any security which BSCDCL may have obtained or obtain from the Contractor or shall at the time when proceedings are taken against the Bank hereunder be outstanding or unrealized.

We, the said Bank, lastly undertake not to revoke this Guarantee during its currency except with the previous consent of BSCDCL in writing and agree that any change in the constitution of the said Contractor or the said Bank shall not discharge our liability hereunder.

Dated this…..…. day of…….....

Place:

Date:

Witness:

1.

PROFORMA OF
INDENTURE FOR SECURED ADVANCE OR CREDIT

THIS INDENTURE made this day of _____ Between __ (hereinafter called the contractor) which expression shall where the Context as admits or implies be deemed to include his executor/administrators and assign of the one part and National Buildings Construction Corporation Ltd., having its Registered Office at BSCDCL, Bhopal (hereinafter called the Engineer) which expression shall where the context so admits or implies be deemed to include its successors and assign of the other part.

Whereas by an agreement dated (hereinafter called the said agreement). The

Contractor has agreed to construct.....

And whereas the Contractor has applied to the Engineer that he may be or be given credited for materials brought by him to the site of the work subject to the said agreement for use in construction of the work.

NOW THIS INDENTURE WITNESSETH that in pursuance of the said agreement and in consideration of the sum of Rs._____ (Rupees _____ only) paid to the contractor by the Engineer. The receipt where the Contractor hereby acknowledges and of such advance or credited (if any) as may be made to him as aforesaid the Contractor hereby covenants and agrees with The Engineer and declares as follows:

That all sums given as advance or credit by The Engineer to the Contractor as aforesaid shall be employed by the Constructor in or toward the execution of the said works and for no other purpose whatsoever.

That the material for which the advance or credit is given are offered to and accepted by The Engineer as security and are absolutely the Contractor's own property and free from encumbrances of any kind the Contractor will not make any application for or receives further advance or credit on the security or material which are not absolutely his own property and free from encumbrances of any kind and the Contractor shall indemnify The Engineer against any claims to any material in respect of which advance or credit has been made to him as aforesaid.

That the said material and all other material on the security of which any further advance or advances or credit may be given as aforesaid (hereinafter called the said materials) shall be used by the Contractor s solely in the execution of the said works in accordance with the direction of the Engineer and in terms of said agreement.

That the Contractor shall make at his own cost all necessary and adequate arrangement for the proper safe custody and protection against all risks of the said material and that until used in the construction as aforesaid the material shall remain at the site of the said works in Contractor's custody and on his responsibility and shall at all times be open to inspection by The Engineer. In the events of the materials or any part thereof being stolen, destroyed or damaged or becoming deteriorated in greater degree than in due to reasonable use and wear thereof the Contractor will replace the same with other materials of like quality of repair and make good the same as required by The Engineer. That said material shall not on any account be removed from the site of work expect with the written permission of The Engineer.

That the advance shall be repayable in full when or before Contractor receives payment from The Engineer of the price payable to him for the said work under the term and provisions of the said agreement. Provided that if any intermediate payments are made to the Contractor on account of work done then on the occasion of each payment

The Engineer will be at liberty to make a recovery from the Contractor's bill from such payments by deducting there from the value of the said materials than actually used in the contraction and in respect of which recovery has not been made previously. The value of this purpose being determined in respect of each description of materials at the rates at which the amounts of the advance as made under these presents was calculated.

That if the Contractor shall at any time make at any default in the performance of observance in respect of any of the terms and provisions of the said agreement or of that provisions the total amount of the advance or advances that may still be owing to The Engineer, shall immediately on the happening of such default be repayable by the Contractor to The Engineer together with interest thereon at 12% p.a. from the date of respective dated to such advance or advances to the date of payment and with all costs. Damages and expenses incurred by The Engineer in or for recovery hereof or the Contractor hereby covenants and agrees with The Engineer to repay and pay the same respective to him accordingly.

That the Contractor hereby charges all the said materials with the repayment to The Engineer of all sums advances or credit as aforesaid and all costs. Charges, damages and expenses payable under these presents PROVIDED ALWAYS it is hereby agreed and declared that notwithstanding anything in the said agreement and without prejudice to the powers contained therein if and wherever the covenant for payment and repayment herein before contained shall be become enforceable and the money owing shall not be paid in accordance therewith. The Engineer may at any time thereafter adopt all or any of the following courses he may deem best:

Seize the utilize the said material or any part thereof in the completion of the said works in accordance with the provision in that behalf contained in the said agreement debating the Contractor with the actual cost of effecting such completion and the amount due in respect of advance or credit under these presents and crediting the Contractor with value of work done as if he has carried it out in accordance with the said agreement and the rates thereby provided if the balance is against the Contractor is to pay the same to the engineer on demand.

Remove and sell by public action the seized materials or any part thereof and out of the money arising from the sale repay the engineer under these presents and pay over the surplus (if any) to the Contractor.

Deduct all or any part of the moneys owing from any sums due to the contractor under said agreement..Expect in the event of such default on the part of contractor as aforesaid, interest or the said advance shall not be payable.

That in the event of conflict between the provisions of these presents and the said agreements, the provision of these presents shall prevail and in the event of any dispute or difference arising over the construction or effect of these presents, the settlement of which has not been hereinbefore expressly provided for the same shall so far as is lawful be subject to jurisdiction of BHOPAL courts only.

IN WITNESS whereof the said the engineer and the contractor hereunto set their respective hands and seals the day year first above written.

Signed Sealed and delivered by

Contractor The Engineers

AGREEMENT FORM

This agreement made on day of DD-MM-YY, between the Bhopal Smart City Development Corporation Limited (BSCDCL), a company incorporated under the Companies Act, 2013 having its Registered Office at BSCDCL Zone -14, Bhopal Municipal Corporation, BHEL, Govindpura Bhopal 462023, (hereinafter referred to as the "BSCDCL" which expression shall include its administrators, successors, executors and assigns) of the one part and M/s…….(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, BSCDCL, has desirous of ……under Smart City Project (hereinafter referred to as the "PROJECT") had invited tenders as per tender documents vide Tender No……. AND WHEREAS M/s ……. And Contractors had participated in the above referred tender vide their tender opened on DD.MM.YY and BSCDCL has accepted their aforesaid tender and issued Letter of Intent for ……. under Smart City Project on the terms and conditions contained in its Letter of Intent No. Ref. ……Date.DD.MM.YY and the documents referred to therein, which have been unequivocally accepted by M/s ……..vide their acceptance letter along with performance bank guarantee dated DD.MM.YY resulting into a contract. NOW THEREFORE THIS DEED WITNESSETH AS UNDER:

ARTICLE 1.0 – AWARD OF CONTRACT

SCOPE OF WORK BSCDCL has awarded the contract to M/s …… for the work of ……
under Smart City Project on the terms and conditions in its Letter of Intent No. Ref. …… Bhopal, Date: DD.MM.YY and the documents referred to therein.
The award will take effect from the date of issue of work order. 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

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").BSCDCL Notice Inviting Tender No……BSCDCL's tender documents consisting of:

Section 1 to 5 -General Conditions of Contract (GCC) & others
Section 6-8 - Special Conditions of Contract including Appendices & Annexures and others
Section- 9 – Bill of quantity
Section-10- Drawings
Amendments/errata
Financial proposal-Bill of quantity quoted by M/s ……
Letter Of Intent Ref. No……/BSCDCL/2017, Bhopal, Date: 24/10/2017 ISSUED BY BSCDCL

Acceptance letter and performance guarantee submitted by M/s ……..
All the aforesaid contract documents referred to in Para above shall form an integral part of this Agreement, in so far as the same or any part thereof column, to the tender documents and what has been specifically agreed to by BSCDCL 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 BSCDCL in its Letter of Intent, shall be deemed to have been withdrawn by the Contractor without any cost implication to BSCDCL. For the sake of brevity, this Agreement along with its aforesaid contract documents and work order(Letter of award) shall be referred to as the "Contract".

ARTICLE 3.0 – CONDITIONS & CONVENANTS

The scope of Contract, Consideration, terms of payments, advance, security deposits, taxes wherever applicable, insurance, agreed time schedule, compensation for delay and all other terms and conditions contained in contract document and BSCDCL's Letter of award(Work order) are to be read in conjunction with other aforesaid contract documents. The contractor shall duly perform the contract strictly and faithfully in accordance with the terms of this contract. 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. Contractor shall adhere to all requirements stipulated in the Contract documents. 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. 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. Only a written instrument shall effect any modification of the Agreement signed by the authorized representative of both the parties. The total contract price for the entire scope of this contract is item rate quoted by M/s …….. Totaling to Rs. ……which shall be governed by the stipulations of the contract documents.

ARTICLE 4.0 – NO WAIVER OF RIGHTS

Neither the inspection by BSCDCL or the Engineer-in- Charge or Owner or any of their officials, employees or agents nor order by BSCDCL 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 BSCDCL 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 BSCDCL, or any right to damage herein provided, nor shall any waiver of any breach in the contract be held to be a waiver or any other or subsequent breach.

ARTICLE 5.0 – GOVERNING LAW AND JURISDICTION

The Laws applicable to this contract shall be the laws in force in India and jurisdiction of BHOPAL Court (s) only. 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 W ITNESS W HEREOF, 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 BHOPAL.

For and Behalf of:- For and Behalf of:-

Bhopal Smart City Development
Corporation Limited (BSCDCL)
BSCDCL Zone -14, Bhopal Municipal
Corporation, BHEL, Govindpura
Bhopal 462023

M/s ……..

WITNESS: WITNESS:
1. 1.

SECTION-6

SCOPE OF WORK
&
SPECIAL CONDITION OF CONTRACT

SCOPE OF WORK

1. "Design, Supply, Installation, Testing and commissioning of 33/0.4 KV, 2x1500KVA Dry type Indoor transformer Substation with 2x500KVA DG set and other Electrical Works for Incubation Centre Building Bhopal"

2. The contractor will be responsible for complete operation & maintenance of this new completed work for 03 years. (Operators to be provide- 2 Skilled, 2 Unskilled in each shifts for Three Shift Total 12 Nos.)

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 BSCDCL 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 this scope of work, envisaged at the time of tendering and as actually required to be executed.

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 given in tender document.

1. The contractor is to give the guarantee for Three year against all installation and equipment defects.

2. The contractor will be responsible for complete operation & maintenance as mentioned in the tender document for Three (3) years.

3. The successful bidder needs to submit performance guarantee 5% (Five per cent) of the quoted price and security deposit 5% (Five per cent), which will be released after completion of 5 years.

4. The agency should avail service persons for three shifts.

5. The Rate should be quoted including All taxes and GST nothing shall be paid extra except Quoted rates.(If any rise in tax or if new tax is imposed by central or State Govt, or any Govt authority after Tender the contractor is to bear the same)

6. All the Civil work Should be repaired with original material including coloring if any breakage or dismantling work is done during installation of the system, including cleaning of the site, for which no extra payment shall be made to the contractor.

7. The rates to be given for furnished complete work, all material, labor wastage, royalties, taxes , lease rent , scaffolding , transportation charges, breakage, making good any damage to wall, ceiling, fitting etc, to make the original finish including painting, transportation, replacement, of any defective material, theft, insurance, variation in market rates, removal of rubbish dismantled material, cleaning of site be included in the quoted rates.

8. The contractor is to arrange for storage of material & its Security arrangement During the installation & commissioning of work.

9. The contractor should submit the one year defective part replacement guarantee, caused due to any reason & two year maintenance services of the system for which no extra payment will be made except quoted rate.

10. The contractor will be fully responsible for any accident, damages, losses, that occurs during the installation & commissioning of work. No compensation will be made by the BSCDCL.

11. The contractor is to take all measures for safety and security for man & material and also to follow all labour laws.

12. The Rates should be quoted for at site Bhopal.

13. Bidder should visit the site as mentioned in the Tender Document for detailed survey before Bidding

SPECIAL CONDITIONS OF CONTRACT (SCC)

GENERAL-

6.1. The following special conditions shall be read in conjunction with General conditions of contract. If there are any provisions in these Special Conditions, which are at variance with the provisions of General Conditions of Contract, the provisions in the Special Conditions shall take precedence.

6.2. Where any portion of Special Conditions of Contract is repugnant to or at variance with any provision of the instructions to Bidder 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 Special Conditions of Contract shall be deemed to override the provisions of the general conditions of contract and / or the other documents forming part of the contract only to the extent such repugnant/various in the special conditions of contract as are not possible of being reconciled with the provisions in the special conditions of contract as are not possible of being reconciled with the provision with instructions to Bidder or General Conditions of contract and / or the other documents from part of the contract.

6.3. Working drawing shall be according to the drawing given in the Tender document.

6.4. Items mentioned in the BOQ may vary or any changes is needed then it should bring to the attention of BSCDCL.

6.5. Working drawings are given by BSCDCL in tender document; if any deviations found and correction required then it should be brought to BSCDCL for rectification.

6.6 The items which are missing or not defined in the given BOQ in this Tender Document, then the contractor has to submit the items for approval to BSCDCL.

6.7. The contractor has to submit sample of the items defined in BOQ the same to be approved by BSCDCL, before use.

6.8. Internal wiring work should be done as per UADD/MPPWD/CPWD/MPPWD Specifications.

6.9 The working drawings shall be weighted from authorized certified Laboratory or from any NIT.

6.10 Bidder has to be submitted all kind of Testing reports related to material, commissioning and installation.

SECTION-7

TECHNICAL SPECIFICATIONS

CONTENTS

SECTION 1

GENERAL

1.1 SCOPE

These general specifications cover the details of Sub Station Equipments (Transformers, HT Panels, Bus Trunkings/ Rising Mains and other related items) to be supplied, the inspection as may be necessary before dispatch, delivery at site, installations, testing, commissioning, putting into operation and handing over in working condition of the equipment for sub-stations for working voltage of 33000/433 volts. The general specifications are subject to revision from time to time. The tender specifications for a particular job shall clearly indicate the applicable version of these specifications.

1.2 CONFORMITY WITH STATUTORY ACTS, RULES, REGULATIONS, STANDARDS AND SAFETY CODES :

1.2.1 Indian Electricity Act and Rules:

All electrical works in connection with installation of electric sub-stations shall be carried out in accordance with the provisions of Indian Electricity Act, 2003 and the Indian Electricity Rules 1956 amended upto date. Wherever I.E. rule numbers have been indicated, they are based on I.E. rules 1956 amended upto date.

1.2.2 CPWD Specifications

The electrical works shall also conform to CPWD. General Specifications for Electrical Works Part I (Internal) 2013 and Part II (External) 1994 as amended upto date wherever relevant and applicable.

1.4.3 Indian Standards

The sub-station equipments and their installation shall conform to relevant Indian standards.

SECTION 2

HIGH VOLTAGE PANEL

2.1 SCOPE

These specifications cover the detailed requirements for supply, installation, testing and commissioning of High Voltage Panels.

2.2 TYPE OF PANELS:

(a) Vacuum circuit breaker.

(b) Gas filled Circuit Breaker: These breakers are new in the market and are being used for 33KV and above in power distribution. These may used on selective basis based on their availability, serviceability and cost.

(c) Gas insulated compact Switchgears with Vacuum Circuit Breakers . These are recently introduced and may be used in cases of space crunches judiciously . However the discussions shall be limited to only Vacuum Circuit Breakers.

(A) VACUUM CIRCUIT BREAKER

2.3 H.V. PANEL

2.3.1 The Panel board shall be of indoor type, having the incoming sectionalisation and outgoing switch gears as per IS 13118-1991 of VCB, IEC 62271-100 for Breakers and -200 for Panels/IS 3427 of switch board. The degree of enclosure protection shall be IP-4X.

Detailed requirements shall be in accordance with the schedule of works at Appendix-II.

2.3.2 Rating: All panels assembled to form a board shall be suitable for the nominal operation voltage and rupturing capacity as specified. They should be rated as specified with a minimum of 630 Amps. And suitable for operation on 33 KV, 3 phase 50 Hz system. Type test certificate for the breaking capacity of the panel shall be supplied. A circuit breaker for a given duty in service is best selected by considering the individual rated values required by load conditions and fault condition.

2.3.3 Type: The HV panel Board shall be metal clad, indoor, floor mounting, free standing type. It shall be totally enclosed dust, damp and vermin proof.

2.3.4 General Construction: Separately earthed compartments shall be provided for circuit breakers, bus bars, relay & instruments, CT&PT and cable boxes, fully and effectively segregating these from one another so that fault in any one compartment do not cause damage to equipment(s) in other compartment(s).

The housing shall be of bolted construction to ensure compact and rigid structure, presenting a neat and pleasing appearance. The sheet steel used should not be less than 2mm thick.

The panels shall be bolted together to form a continuous flush front switch gear suitable for front operation of board and for extension at both ends.

2.3.5 General Design Aspects: The HV panel board shall be designed such that the switchgear, instruments, relays, bus bars, small wiring etc. are arranged and mounted with due consideration for the followings:-

- Facility for inspection, maintenance and repairs of testing terminals and terminal boards for ease of external connection.
- Minimum noise and vibrations.
  - Risk of accidental short circuits and open circuits.
  - Secured and vibration proof connections for power and control circuits.
- Risk of accidental contact and danger to personnel due to live connections.
- Mountings at approachable height

2.4 CIRCUIT BREAKER:

2.4.1 General Arrangements: The circuit breaker panels shall be complete with the following:

- Racking in / Racking out mechanism.
- Isolating plugs and sockets.
- Mechanical inter-locks and safety shutters.
- Mechanical ON/OFF indicator.

- Minimum of 4 NO and 4 NC Auxiliary contacts directly operated by the circuit breaker. Additional NO & NC contacts can be provided with auxiliary contactors.
  - Anti condensation space heaters suitable for operation on 240V, 1Ö 50 Hz A.C. for each panel wherever specified.
  - Suitable tripping arrangement
  - Mechanical counter to assess the total number of operations of the breaker (if asked for specifically).

2.4.2 Type: The circuit breaker shall be of horizontal/ vertical isolation, horizontal draw out pattern.

2.4.3 Breaker Truck: The breaker carriage shall be fabricated from steel, providing a sturdy vehicle for the circuit breaker and its operating and tripping mechanism. The carriage shall be mounted on wheels, moving on guides, designed to align correctly and allow easy movement of the circuit breaker and for removing the carriage for inspection and maintenance purposes. Vacuum interrupters shall be hermetically sealed and shall be designed for minimum contact erosion, fast recovery of dielectric strength, maintenance free vacuum interrupter, suitable for auto-reclosing. The drive mechanism shall preferably be provided with facility for pad locking at any position namely, “Service”, “Test” and “Fully Isolated”. It should be possible for testing the circuit breaker for its operation without energizing the power circuit in the “Testing” position. The contacts shall be made only after the breaker is inserted into service position .Interlocking should prevent contacts from being disconnected if circuit breaker is tried to be moved from service position.

2.4.4 General Features: Single break contacts are provided in sealed vacuum interrupter.

2.4.5 Rating: The circuit breakers shall be continuously rated as specified with a minimum rated current of 630 Amps. With voltage rating and breaking capacity as specified.

2.4.6 Operating Mechanism: The operating mechanism shall be one of the following as specified:-

Manually operated spring charged / motor wound spring charged with both mechanical and electrical release for closing. The operating mechanism shall be trip free.

2.4.7 External auxiliary supply shall be made available for charging motors & heaters operation.

2.5 BUS BAR SECTION:

2.5.1 General Requirement: The switch board shall be single bus bar pattern with air insulated encapsulated bus bars housed in a separate compartment, segregated from other compartments.

Material: The bus bars shall be of high conductivity electrolytic copper/ Aluminium as and rated as specified with a minimum rated current of 630 Amps. The bus bars shall be sized for carrying the rated and short circuit current without over-heating. Maximum bus bar temperature shall not exceed 95 degree C.

2.6 CURRENT TRANSFORMER:

2.6.1 General Requirements: Accommodation shall be provided in the circuit breaker panel to mount one set of three numbers dual core dual ratio CTs for metering and protection purposes. Access to the CTs for cleaning, testing or changing shall be from the front, back or top of the panel.

2.6.2 Rating: Dual core & dual ratio CTs of suitable burden (but not less than 15 VA) shall be preferred with 5 Amps secondary. The ratio shall normally be one of the following as specified and required at site.

Note: CT ratio shall be compatible with the loading pattern on HV side.

The CTs shall conform to relevant Indian Standards. The design and construction shall be robust to withstand thermal and dynamic stresses during short circuits. Secondary terminals of CTs shall be brought out suitably to a terminal block which will be easily accessible for testing and terminal connections. The protection CTs shall be of accuracy class 5 P 10 of IS 2705-Part III-1992.

The metering CTs shall conform to the metering ratio and accuracy class 0.5 of IS 2705-1992 for incomer and class 1 for outgoing Panels.

2.7 VOLTAGE TRANSFORMER:

2.7.1 General Requirements: A voltage transformer of burden not less than 100 VA and of proper ratio as specified shall be provided at the incoming panel.

The accuracy class for the VT shall be class 0.5 as per IS 3156 parts I to III for incomer and class 1 for outgoing Panels.

The transformer shall be of cast epoxy resin construction. It shall be fixed /withdraw able type. HRC fuses/MCBs shall be provided on both HV and LV sides.

2.8 PROTECTION AND TRIPPING ARRANGEMENT:

2.8.1 Protection: The Relays shall be microprocessor based numerical relays with O/L,E/F and S/C protection Tripping relay shall be used for tripping signal to the Shunt Trip Coil of Circuit Breaker operating on 24V/30V D C supply / Power pack / 110 V VT supply.

Note: - 24V/30V DC shall be provided through 2 No. SMF batteries of 12/15 volts of minimum 26 AH capacity with a battery charger as per recommendation of the manufacturer both for protection as well as indications.

Alternatively Power Pack converters fed through PT/230V externally could be provided with 2 Nos., 12/15 volt, 7 AH SMF batteries (Power pack with condenser / capacitor backup are also available which do not need batteries, these should not be used) for tripping. In cases where tripping is fed through PT, VA burden of PT shall be suitably increased (say 200 VA) as recommended by the manufacturer depending upon the number of panels and connected controls. In addition external 24 volt / 30 volt DC supply shall be provided for indications etc. through 2 No. SMF batteries of 12/ 15 volts of minimum 26 AH capacity with a battery charger as per recommendation of the manufacturer.

2.8.2 Relays: Over current Relays shall have adjustable setting for current from 50% to 200% and earth fault from 10% to 40% or 20% to 80%. These should be of manual reset type. All relays shall have a LED indicator which will indicate operation for each function. It shall be possible to reset it only by manual operation. The number and types of relays shall be as specified.

2.9 SMALL WIRING

The small wiring shall be carried out with minimum1.5sq. mm FRLS/HFFR insulated copper conductor cables. CT wiring shall be done with minimum 2.5 sq mm wires with colour code: RYB, Gray for auxiliary DC circuits and Black for auxiliary AC circuits The wiring shall be securely fixed and neatly arranged to enable easy tracing of wires. Identification tags shall be fitted to all wire terminals to render identification easy and to facilitate checking in accordance with IS 375. Necessary terminal blocks and cable entries shall be provided for RTD relay wiring, power supply etc.

2.10 METERING INSTRUMENT, PANEL ACCESSORIES (DIGITAL):

2.10.1 Metering: Energy metering shall be done either on the incomers or on the feeders as specified in Appendix II.

2.10.2 Voltage Selection Scheme: Where a bus coupler is incorporated and only one incomer feeder (out of two available) is intended to be operated at a time, a VT Transfer Relay shall be incorporated to provide necessary potential for metering. This will be necessary when energy metering is done on individual feeders or where VT supply is used for trip circuits. Alternatively PTs shall be provided on both the bus sections (incomers) with individual metering on each incomer.

2.10.3 Instrument Panels: The instrument panel shall form part of the housing. Relays, meters and instruments shall be mounted as per general arrangement drawings to be submitted by the tenderer. They shall be preferably of flush mounting type at a maximum height of 1800 mm.

2.10.4 Instrumentation:

- A voltmeter of class 1.5 accuracy as per IS-1248 shall be provided at each incomer panel, with selector switch. The instrument shall be calibrated for the ranges specified.
- Energy meters of class 1.0 conforming to IS. 722 (Part IX) and power factor meter of class of accuracy of 2 shall be provided, if specified.
- Ammeter of specified range of class 1.5 accuracy as per IS-1248 shall be provided at both incomer and outgoing panels alongwith necessary selector switches.

- The panel assembly shall also take care of the following requirements:

  (i) Lamp indication shall be provided to indicate ON/OFF (BY red green respectively) of switch gear.

  (ii) Panel illuminating lamp.

- Mechanical indication for spring charged status. If possible an indicating lamp could be provided.
- Lamp indicating tripping at fault status.
- Healthy trip supply shall be indicated by clear lamp.
- Separate fuses/MCBs shall be provided for lamps, heaters, voltmeters and other instrumentation etc. on each panel.
- Anti-condensation space heaters shall be provided, and shall be suitable for operation on 240 V, 1 phase, 50 Hz A.C. for each panel if specified.
- Where there is more than one incomer and bus sections, these shall be castle key interlocked as per interlocking scheme as specified.

2.11 CABLE BOXES: Cable boxes shall be situated in a compartment at the rear / side of the housing as specified.

2.12 Cable Entry: provision for top (bus ducts preferred for top entry) / bottom or such other side entry shall be made as per requirement with sufficient head room for cable termination. 3mm thick removable gland plate shall be provided for cable termination.

2.13 Earthing: The earthing of the breaker body and moving portion shall be so arranged that the earthing of the non-current carrying structure to the frame earth bar is completed well before the main circuit breaker plugs enter the fixed house sockets.

The entire panel board shall have a common tinned copper earth bar of suitable section with 2 earth terminals for effectively earthing metallic portion of the panels. The frame earthing of panel shall be in accordance with Section 7 of this specifications.

2.14 Installation: The installation work shall cover assembly of panels lining up, grouting the units etc. In the case of multi panels switch boards after connecting up the bus bar all joint shall be insulated with HV insulation tape or with approved insulation compound. A common earth bar shall be run

preferably at the back of the switch board connecting all the sections for connecting the earth system. All protection, indications & metering connections and wirings shall be completed.

Where trip supply battery is installed the unit shall be commissioned, completing initial charging of the batteries. All relay instruments and meters shall be mounted and connected with appropriate wiring. Calibration checks of units as necessary and required by the licensee like CTs , VTs Energy Meters etc. shall be completed before pre-commission checks are undertaken.

2.15 TESTINGAND COMMISSIONING

Procedure for testing and commissioning of relay shall be in general accordance with good practice.

Commissioning checks and tests shall include in addition to checking of all small wiring connections, relays calibration and setting tests by secondary injection method and primary injection method. Primary injection test will be preferred for operation of relay through CTs. Before panel board is commissioned, provision of the safety namely fire extinguishers, rubber mats and danger board shall be ensured. In addition all routine megger tests shall be performed. Checks and test shall include following.

- Operation checks and lubrication of all moving parts.
- Interlock function checks.
- Continuity checks of wiring, fuses etc. as required.
- Insulation tests.
- Trip test and protection gear tests.
- The complete panel shall be tested with 5000V megger for insulation between poles and poles to earth. Insulation test of secondary of CTs and VT to earth shall be conducted using 500V megger.
- Any other tests as may be required by the Licensee / Inspector shall be conducted.
- Where specified, the entire switch board shall withstand high voltage test after installation.
- Any other test required by the consignee/inspecting officer.

SECTION-3

Technical Specification for 33kV Compact Substation

A) 33KV Compact Substation for Outdoor Application with the following equipment enclosed in one single continuous enclosure

- 33 KV Air Insulated VCB Switchgear ICOG Module rated for 630A 25KA/3sec with Numerical relay protection OC+EF & Metering

  Or

- 33KV SF6 Insulated VCB Switchgear rated for 630A 25KA/3sec with manual operation with Numerical relay OC+EF & Metering

- 33KV /433 V Dry Type Transformer of 1500 KVA Rating

- 415 V 3200A ACB ICOG Module for Low Voltage Side

B) 415 V 3200A Copper Bus 50 Hz Low Voltage Fully Type tested OEM Factory Made Assemblies with fully withdrawable modules – Main LT PCC Panel

1.0.0 CODE & STANDARDS:

1.1.0 The 33KV compact substation Design must be as per IEC61330/62271-202.

1.2.0 The Compact Sub-station offered shall in general comply with the latest issues including amendments of the following standards.

Title	Standards
High Voltage Low Voltage Pre-Fabricated Substation	IEC:61330/ 62271-202
High Voltage Switchgear	IEC 60694
Metal Enclosed High Voltage Switchgear	IEC 60298/ IEC62271-200
Low Voltage Switchgear and Control gear	IEC 60439
Distribution Transformers	IEC 60076

2.0.0 Design Criteria

2.1.0 Compact Sub-station consisting of 33KV HT Compartment with ICOG Module (ICOG module shall be AIS type or SF6 Insulated type) + Transformer + Low Voltage Switchgear with all connection accessories,

fitting & auxiliary equipment in an Enclosure to supply Low-voltage energy from high-voltage system as detailed in this specification. The complete unit shall be installed on a substation plinth (base) as Outdoor substation located at very congested places.

2.2.0 The prefabricated-package substation shall be designed for a) Compactness, b) fast installation, c) maintenance free operation, d) safety for worker/operator & public.

2.3.0 The Switchgear and component thereof shall be capable of withstanding the mechanical and thermal stresses of short circuit listed in ratings and requirements clause without any damage or deterioration of the materials.

2.4.0 Service Conditions:

The Compact substation shall be suitable for continuous operation under the basic service conditions indicated below

Ambient Temperature: 40 Deg C
Relative Humidity up to 95%
Altitude of Installation up to 1000m

The Enclosure of High Voltage switchgear-control gear, Low Voltage switchgear-control gear & Transformer of the Compact substation shall be designed to be used under normal outdoor service condition as mentioned.

3.0.0 Specific Requirement

3.1.0 The main components of a prefabricated- Compact substation are Transformer, High-voltage switchgear-control gear, Low-voltage switchgear-control gear and corresponding interconnections (cable, flexible , bus bars) & auxiliary equipment. The components shall be enclosed, by either common enclosure or by an assembly of enclosure. All the components shall comply with their relevant IEC standards.

3.1.1 Ratings:

Description	Unit	Value
Rated Voltage / Operating Voltage	kV rms	33

Rated frequency & Number of phases	Hz & nos.	50 & 3
maximum power of substation	kVA	1500 KVA
Ingress protection class of Enclosure	IP:	IP-23D for Transformer Compartment and IP:54 for LT & HT Switchgear Compartment.
temp Class of Transformer Compartment		K20
ısulation Level		
Rated withstand voltage at power frequency of 50 Hz	kV rms	70
Rated Impulse withstand Voltage	kV peak	170
etwork & Busbar		
Rated current	Amp	630A
Rated short time withstand current	kA rms / 3 sec	25 KA for 3 sec
LV Network		1 Nos ACB ICOG

OUTDOOR ENCLOSURE

3.2.0 Outdoor enclosure:

3.2.1 The enclosure of substation shall be made of Galvanized steel,the enclosure should have IP 23 protection .The enclosure should have modular construction with GI sheets fastened with clinching or equivalent techniques .The enclosure shall be painted with polyurethane paint or better painting process to be applied

3.2.2 The enclosure should house the HT , Transformer & LT in one single continuous enclosure. No equipment to be placed outside the enclosure

3.2.3 Excessive use of bolting on the outer side of enclosure shall not be accepted – to avoid rusting & to upload the IP rating of enclosure

3.2.4 The metal base shall ensure rigidity for easy transport & installation.

3.2.5 Base frame should sufficient to carry the load of HT switchgear, transformer and LT switchgear while lifting. (Unit should dispatch as a one unit)

3.2.6 The protection degree of the Enclosure shall be IP54 for LT & HT switchgear compartment & IP23D for Transformer compartment. Proper / adequate ventilation aperture shall be provided for natural ventilation by way of Louvers etc.

3.2.7 To avoid the entry of rodent in the transformer compartment, stainless steel mesh should be provided from inner side of louvers.

3.2.8 Considering the outdoor application of the substation the doors shall be provided with proper interlocking arrangement for safety of operator and to avoid corrosion door should have stainless steel hinges. Door should be provided with stoppers.

3.2.9 The doors shall be provided with proper interlocking arrangement for safety of operator. The doors shall be lockable type with cylindrical shooting bolt and the locking arrangement shall be covered by magnetic flap. Use of Al Drops for door locking shall not be acceptable.

3.2.10 Interconnection between HT switchgear and transformer shall be using 1Cx3x95 sq.mm al. unarmoured XLPE cable and between transformer and Lt switchgear shall be using busbar.

3.2.11 Internal Fault : Failure within the compact substation due either to a defect, an exceptional service condition or mal-operation may initiate an internal arc. Such an event may lead to the risk of injury, if persons are present. It is desirable that the highest practicable degree of protection to persons shall be provided.

3.2.12 Covers & Doors : Covers & doors are part of the enclosure. When they are closed, they shall provide the degree of protection specified for the enclosure. Ventilation openings shall be so arranged or shielded that same degree of protection as specified for enclosure is obtained. Additional wire mesh may be used with proper Danger board for safety of the operator. All covers, doors or roof shall be provided with locking facility or it shall not be possible to open or remove them before doors used for normal operation have been opened. The doors shall open outward at an angle of at least 900 & be equipped with a device able to maintain them in an open position. The doors shall be lockable type with cylindrical shooting bolt and the locking arrangement shall be covered by magnetic flap. Use of Al-Drops shall be avoided.

3.2.13 The roof of the transformer compartment shall be detachable type to access the transformer for maintenance purpose

3.2.14 Earthing : All metallic components shall be earthed to a common earthing point. It shall be terminated by an adequate terminal intended for connection to the earth system of the installation, by way of flexible jumpers/strips & Lug arrangement. The continuity of the earth system shall be ensured taking into account the thermal & mechanical stresses caused by the current it may have to carry. The components to be connected to the earth system shall include :

a) The enclosure of Compact substation,
b) The enclosure of High voltage switchgear & control gear from the terminal provided for the purpose,
c) The metal screen & the high voltage cable earth conductor,
d) The transformer tank or metal frame of transformer,
e) The frame &/or enclosure of low voltage switchgear,

3.2.15 There shall be an arrangement for internal lighting activated by associated switch for HV , Transformer & LV compartments separately.

3.2.16 Labels: Labels for warning, manufacturer’s operating instructions etc. shall be durable & clearly legible.

3.2.17 Cleaning & Painting :

The paints shall be carefully selected to withstand tropical heat and rain. The paint shall not scale off or crinkle or be removed by abrasion due to normal handling.

HT Switchgear
33KV Air Insulated Switchgear

4.0 CONSTRUCTION

4.1 The breakers should be able to be drawn out in horizontal position with horizontal isolation .When breaker is drawn out in horizontal position none of the live components inside the 33 KV switchgear panel should be accessible. The safety shutters shall be metallic, robust and shall automatically cover the live components when the breaker is drawn out. The switchgear shall have complete interlocking arrangements at the fully inserted and fully drawn out and test positions. Withdrawal of the breaker should not be possible in ON position, it should not be possible to close the circuit breaker in service unless the entire auxiliary and control circuit are connected.

4.2 Enclosure and internal: partitioning of the cubicles are of high quality Alu-Zinc steel sheets or better material of 2mm thick

4.3 Breaker should have three distinct positions inside the cubical; i.e. service, test and isolated.

5.0 BUS BARS AND CONNECTORS

5.1 Bus bars and all other electrical connection between various components shall be
made of electrolytic copper. The busbars & jumpers shall be full voltage sleeved.

5.2 All bus bars connections shall be firmly and rigidly mounted on suitable insulators to withstand short circuit stresses and vibrations.

5.3 Adequate clearance between 33 KV point and earth and between phase shall be provided to ensure safety as per provision in Indian Electricity Rule 1956 and its amendment thereof and also in accordance with the relevant Indian standard specification and the same shall be capable of withstanding the specified high voltage tests as per IS-13118/IEC-56 and amendment thereof.

5.4 Sharp edges and bends either in the bus bars or bus bar connections shall be avoided. Wherever such bends or edges are un-avoidable, suitable compound or any other insulation shall be supplied to prevent local ionization and consequent flashover.

5.0 CIRCUIT BREAKER

6.1 The vacuum circuit breaker shall be draw out type suitable for installation in the switchgear cubicles (indoor). The breaker shall comply with IEC62271-100 and latest amendment thereof. Construction of breaker shall be such that the points, which require frequent maintenance, shall be easily accessible.

6.2 The circuit breakers shall be spring operated, motor/manually charging of the spring feature, manually released. VCB shall have spring closing mechanism for 3 pole simultaneous operation. The speed of closing operation shall be independent of the speed of hand operating level. The indication device shall show the OPEN and CLOSE position of breaker visible from the front of cubical. The Spring Charging handle shall be an integral part of the Circuit Breaker.

6.3 The breakers shall be capable of making and breaking the short time current in accordance with the requirement of IEC62271-100 and latest amendment thereof and shall have three phase rupturing capacity of 25kA for 3 second at 33 KV. The continuous current rating of breaker shall not be less than 630 Amp for all items. The vacuum bottles shall be encapsulated in epoxy housings. The make of the vacuum bottles shall be same as the make of breaker.

6.4 The Circuit Breaker shall be provided with a built-in Mechanical Anti-pumping feature

6.5 The vacuum circuit breakers shall ensure high speed extinction and adequate control of pressure during breaking of current and also designed to limit excessive over voltages.

6.6 Comprehensive interlocking system to prevent any dangerous or inadvertent operation shall be provided. Isolation of circuit breaker from bus bar or insertion into bus bar shall only be possible when the breaker is in the open position.

6.7 Vacuum Circuit Breaker shall have completely sealed interrupting units for interruption of are inside the vacuum.

6.8 Power pack shall be provided with the switchgear panel, input shall be made available from PT's.

6.9 The Vacuum interrupters shall be completely enclosed with epoxy or better insulation. Open vacuum interrupters shall not be acceptable

7.0 PROTECTION RELAYS

The numerical protection relay shall be supporting IEC mod bus protocol
It should have LCD display
The relay shall have ability to be withdrawable from front
The numerical relay shall have plug –in CT connections with facility of automatic CT shorting
The protections: 50, 50N, 51, 51N, 86, 95 & metering functions

8.0 CURRENT TRANSFORMERS

8.1 Short time rating of CTs shall be 25 KA for 3 second. CTs shall be double core.

8.2 The CT ratings shall be 400/1-1A Cl-0.5 15VA & 5P20 15VA.

9.0 Potential transformer

Potential transformer: 33KV: Metering CL-0.5 / Protection: 3P 30 VA
The HT fuses shall be enclosed in epoxy / equivalent material housed. Open PT fuses shall not be accepted.

HT Switchgear
33KV SF6 Insulated VCB Switchgear

4.2 DIELECTRIC MEDIUM

SF6 GAS shall be used for the dielectric medium for 36KV RMUs in accordance with IEC376. It is preferable to fit an absorption material in the tank to absorb the moisture from the SF6 gas and to regenerate the SF6 gas following arc interruption. The SF6 insulating medium shall be constantly monitored via a temperature compensating gas pressure indicator offering a simple go, no-go indication.

5. DESIGN CRITERIA

5.1 Service conditions

The offered switchgear and control gear should be suitable for continuous operation under the basic service conditions indicated below. Installation should be in normal indoor conditions in accordance with IEC 60694.
Ambient temperature -5 C to +40 C
Relative humidity up to 95%

5.2 General structural and mechanical construction

The offered RMU should be of the fully arc proof metal enclosed, free standing, floor mounting, flush fronted type, consisting of modules assembled into one or more units. Each unit is made of a cubicle sealed-for life with SF6 and contains all high voltage components sealed off from the environment. The overall design of the switchgear should be such that front access only is required. It should be possible to erect the switchboard against a substation wall, with HV and LV cables being terminated and accessible from the front

IP Protection as follows
- IP 67 for the tank with high voltage components
- IP 2X for the front covers of the mechanism
- IP 3X for the cable connection covers
- IP 67 for the Fuse canisters

6. TECHNICAL DATA

6.1 Ring Main Unit, Electrical data

Electrical data and service conditions

1 Rated voltage	KV	36
2 Power frequency withstand voltage	KV	70
3 Impulse withstand voltage	KV	170
4 Rated frequency	Hz	50
5 Rated current (busbar)	A	630
6 Rated current (cable switch)	A	630

Breaking capacities:

7 Active load	A	630
8 Earth fault cable charging (cable switch)	A	35
9 Rated making capacity	kA	40
10 Rated short time current 3 sec.	kA	25

Ambient temperature:

14 Maximum value	°C + 40
15 Maximum value of 24 hour mean	°C + 35
16 Minimum value	°C - 25

17 Altitude for erection above sea level 1000 m
18 Relative humidity Max 95%

6.2 Ring Main Unit Technical data (36KV) INDOOR

General data, enclosure and dimensions

1 Standard to which Switchgear complies	IEC
2 Type of Ring Main Unit	Metal Enclosed
3 Number of phases	3
4 Whether RMU is type tested	Yes
5 Whether facility is provided with pressure relief	Yes
6 Insulating gas	SF6
7 Nominal operating gas pressure	1.4 bar abs. 20° C
8 Gas leakage rate / annum %	0.1 % per annum
9 Expected operating lifetime	30 years
10 Whether facilities provided for gas monitoring	Yes, temperature compensated manometer can be delivered
11 Material used in tank construction	Stainless steel sheet – 304 Grade
12 Welding Methodology	Robotic in OEM factory

** It is mandatory that manufacturer should submit certificate of 304 grade during drawing approval or stage inspection for purpose of verification

Degree of protection:

5 High Voltage live parts,	SF6 tank IP 67
6 Front cover mechanism	IP 2X
7 Cable covers	IP 3X
8 Fuse canisters	IP 67

Colors:

10 Front cover	RAL 7035

11 Side and cable cover RAL 7035

7. PANEL(MODULE) DESCRIPTION

7.1 Incoming Module [VCB]

It should be consist of an SF6 cubicle housing a VCB and an ear thing switch. Bus bars and all electrical connections are located inside the tank. The operating shafts for the switches should be have rotary seals where they enter the SF6 cubicle. The operating mechanisms should be located outside on the front of the SF6 tank. Cable bushings should be located on the front of the SF6 cubicle in a separate cable compartment. Front covers containing the mimic diagram and having a degree of protection IP2X close the fronts.

8. OTHER MAIN FEATURES

8.1 Bus bars

Comprising the 3 single phases copper bus bars and the connections to the switch or fuse canister. The bus bar should be integrated in the cubicle Bus bars should be rated to withstand all dynamic and thermal stresses for the full length of the switchgear.

8.2 Earthling Switch

Ear thing switches should be rated equal to the switchgear rating.
Ear thing switches should be quick make type capable of making Rated Fault Current.
Ear thing switch should be operated from the front of the cubicle by means of a removable handle.

8.3 Front covers

The front cover contains the mimic diagram of the main circuit with the position indicators for the switching devices. The voltage indicators are situated on the front panels. Access to the cable bushings is in the lower part of each module.

8.4 Position indicators

The position indicators are visible through the front cover and are directly linked to the operating shaft of the switching devices.

8.5 Voltage indicator

The voltage indicators are situated on the front cover, one for each module, and indicate the voltage condition of each incoming cable. Identification of the phases is achieved with labels L1, L2 and L3 on the front of the voltage indicators. The voltage indicator satisfies the requirements of IEC61243.

8.6 Cable compartment

It should be possible to terminate up to a maximum of two single core HV cables per phase. The access to the compartment will be possible by removing the cable cover, bolted to the main frame. Removable steel covers close the cable compartments. Cable Compartments of RMU should be Arc Proof and interlocked with respective Earth Switches. Each module has a separate cable compartment that is segregated from each other by means of a partition wall. A partition wall should be fitted to divide the cable compartment from the rear side of the switchgear. In case of an arc inside the tank, followed by the opening of the pressure relief, the partition wall prevents the hot gases flowing out from the pressure relief to enter the cable compartments. All covers are removable. The cable bushings shall be bolted or plug-in or any other manufacturer design where site replacement feature of bushings is available.

8.10 Power connection

The cables are installed in the dedicated compartment below the mimic front cover. At the bottom of the cable compartment, an earthing bar system made of copper/GI with a minimum cross section of 120 mm2 should be fitted. In each compartment the earthing bar should be fitted with screws of M10. The earthing system is connected to the tank by a copper/GI bar, which rises up to the connecting point of the tank behind the rear partition wall on the middle of the switchgear.

8.12 Fault Passage Indicators

These shall facilitate quick detection of faulty section of line. The fault indication may be on the basis of monitoring fault current flow through the device. The unit should be self-contained requiring no auxiliary power supply. The FPI shall have clear display, automatic reset facility

10.0 Cast Resin Dry Type Transformer Distribution Transformer

10.1 CODES & STANDARDS

The equipment covered by this specification shall, unless Other wise stated to be designed, constructed and tested in accordance with latest revisions of relevant Indian standards / IEC publications.

IS 1271	-	Classification of Insulating Materials.
IS 2026	-	Power transformers (part I - V)
IS 2099	-	Bushing for alternating voltages above 1000 V
IS 2705	-	Current transformers
IS 3202	-	Code of practice for climate proofing
IS 3639	-	Power transformer fittings and accessories

IS 4257	-	Porcelain bushings for transformers
IS 11171	-	Dry type Transformer
IS 8478	-	Application guide for tap-changers
IS 10028	-	Code of practice for selection, installation and maintenance of transformers.

10.2 GENERAL DESIGN FEATURES

10.2.1 All transformers shall be of the latest design, dry type Cast Resin only.

10.2.2 The type of cooling shall be Natural Air cooled (AN) and the corresponding ratings for each transformer shall be as indicated in the specific requirements.

10.2.3 Each transformer shall be suitable for operation at full rated power on all tapings without exceeding the applicable temperature rise.

10.2.4 It shall be possible to operate the transformer satisfactorily, with the loading guide specified in IS-6600. There shall be no limitations imposed by bushings, tap changers, auxiliary equipment to meet this requirement.

10.2.5 The transformers shall be designed to be capable of with-standing, without injury, the thermal and mechanical effects of short-circuits between phases or between phase and earth at the terminals of any winding with full voltage applied across the other winding for periods given in relevant standards. There shall be no limitations imposed by any part/component of the transformer/off load tap links to meet the short circuit level Specified.

10.2.6 Each transformer shall be designed for minimum no-load and load losses within the economic limit and shall be able to have minimum loss at the rated load condition.

10.2.7 All electrical connections and contacts shall be of ample cross sections for carrying the rated current without excessive heating.

10.2.8 The transformer shall be capable of continuous operation at full load rating under the following conditions.

a) Voltage variation = ± 10%

b) Frequency variation = ± 5%

c) Combined voltage and frequency variation (Absolute sum) = 10%

10.3 CONSTRUCTION

10.3.1 The transformer shall be dry type, for Compact substation application.

10.3.2 The core-clamping frame shall be provided with lifting eyes having ample strength to lift the complete core and winding assembly.

10.3.3 Off circuit tapings shall be provided on the HV windings. Tap changing is done by means of off-circuit links accessible through openings provided.

10.3.4 The lifting lugs and rollers shall be provided. A winding temp. Scanner shall be provided and is actuated by means of resistance temperature detectors embedded in LV windings of all three phases. It should have alarm and trip contacts at a specified temperature.

10.3.5 The transformer shall be of IP00 protection class and will be installed in the transformer compartment of compact substation having IP23 protection class.

10.4 WINDINGS

10.4.1 The winding insulation shall be of Class 'H" and temperature rise limit to Class F. i.e. 115 deg. C

10.4.2 Windings shall be of electrolytic copper conductors (circular in shape) of high conductivity and 99.9% purity.

10.4.3 Windings shall be designed to withstand the specified thermal and dynamic short circuit stresses.

10.4.4 The windings shall be duly sectionalized. Accessible joints brazed or welded and finished smooth shall connect similar sections. No corona discharge shall result on the winding upon testing the transformer for induced voltage test as specified in IS.

10.4.5 The end turns of the high voltage windings shall have reinforced insulation to take care of the voltage surges likely to occur during switching or any other abnormal condition.

10.4.6 The high voltage and low voltage winding are shall be made of copper Conductors. HV winding will be always be resin casted under vacuum while LV winding can either be casted or pre-impregnated with resin.

10.5. CORE

10.5.1 The double wound Core shall be constructed from non-ageing cold rolled Grain oriented steel sheets. The built core shall be painted with high temperature resistant paint to prevent corrosion at the edges of core plates and to withstand high temperatures. By using different core material optimisation of core losses shall be achieved. The yokes shall be firmly clamped between yoke channels or plates. The top & bottom yoke frames shall be secured to each other by means of tie-rods, which help in securing the winding in place.

10.5.2 The design of the magnetic circuit shall be such as to avoid static discharges, development of short circuit paths within itself or to the earthed clamping structure and the production of flux component at right angles to the planes of laminations which may cause local heating.

10.6 OFF-CIRCUIT TAP CHANGING LINKS

10.6.1 Off circuit tapings are provided on HV windings. Tap changing is done by means off circuit links. Use of tap changing links eliminates any moving parts as against a manually operated tap changer.

10.7 Terminal Arrangement

HV side and LV side of transformer will have the top busbar arrangement for connection of HT side by means of cable and LT side by means of busbar.

10.8 Technical particulars of dry type transformer

SR. NO.		PARTICULARS
01	Type	Three Phase, 50 Hz, Core type, two winding, Cast Resin Dry type Transformer
	Make of transformer	Same as the make of compact substation
02	Rating (KVA)	1500kVA
03	Winding material	Copper

04	No load voltage ratio	33 / 0.433
05	Connection a) HV b) LV	 Delta Star with neutral
06	Vector group	Dyn 11
07	Insulation level (KVp/ KVrms) a) HV b) LV	 170 / 70 -/ 03
09	Type of Tap Changer for giving voltage variation to HV	Off ckt tap links
10	Tapping range	+5 % to –5 % in step of 2.5%
11	Temperature rise winding over ambient temperature	115 °C
12	Class of Insulation	Class 'H'
13	Enclosure	IP 23 (With Enclosure)
14	Method of Cooling	AN (Air Natural)
15	No load losses at rated voltage & frequency	As per the latest IS standards. Manufacturer to indicate the losses in the offer as per the latest IS standards
16	Full load loss at principle tap at 75 º C (IS Tol.)	As per the latest IS standards. Manufacturer to indicate the losses in the offer as per the latest IS standards
17	Termination HV LV	 Busbar or Cable Busbar
18	Fittings for Dry type	2 Numbers Earthing Terminals, Rating and Diagram Plate, Lifting Lugs, Winding Temp Scanner.
19	Paint	Enamel-RAL 7032 (Siemens Grey)

10.8 PAINTING

10.8.1 All steel surfaces shall be thoroughly cleaned by sand blasting or chemical agents as required to produce a smooth surface free of scale, grease and rust

10.8.2 The external surface, after cleaning, shall be given a cost of high quality red oxide or yellow quoted primer, followed by filler coats.

Low Voltage Switchear

11.0 System:-

a) Declared voltage :– 3 Phase,400V (±6%) 50 Hz,
b) Neutral :– Solidly earthed at substation.
c) Busbar : Aluminum

11.1 General finish:- Tropical, totally enclosed, metal-clad, weather-proof, vermin and dust proof.

11.2 Construction :

Enclosure:- the enclosure of ACB shall be powder coated with IP4X degree of protection.

It should be completely enclosed standalone module with No “Open to Air” Upper & Lower

Power terminations. All power contacts, jumpers, buses to be enclosed inside enclosure

11.3 Circuit Ways:

Single Incomer cum outgoing 433V, 50kA, 3P ACB with microprocessor based over current, short circuit and earth fault protection.
Current Rating – 3200A with ICOG module inside CSS

12.0 Type Tests For The COMPACT Substation:

12.1 The Compact Substations offered must be type tested as per IEC 61330/IEC62271-202. The copy of type test summary should be submitted along with the tender.

12.2 Routine Tests: The routine tests shall be made on each complete prefabricated substation.

a) Voltage tests on auxiliary circuit.
b) Functional test.
c) Verification of complete wiring.

12.3 Test Witness: Routine test shall be performed in presence of Owner’s representative if so desired by the Owner. The Contractor shall give at least fifteen (15) days advance notice of the date when the tests are to be carried out.

12.4 Test Certificates:

Certified reports of all the tests carried out at the works shall be furnished in three (3) copies for approval of the Owner

MAKE OF EQUIPMENTS

COMPACT SUBSTATION	SCHNEIDER / ABB / SIEMENS/L&T/C&S
Dry Transformer inside Compact SS	ABB / SCHNEIDER/ SIEMENS /VOLTAMP / RAYCHEM/KIRLOSKAR
HT Switchgear inside Compact SS	ABB /SIEMENS /SCHNEIDER/ L&T/C&S
LV Switchgear inside Compact SS	ABB Emax / SIEMENS 3WL / SCHNEIDER MasterPack NW/ L&T/C&S
Numerical Relays	ABB Relion / SIEMENS Siprotec/ SCHNEIDER Micom

Low Voltage Switchgear for Main LT Panel

This specification details the requirement for design, manufacture, testing and supply of a Low Voltage Switchgear draw out type Main LT Panel PCC 433V 50HZ

Codes and standards

The Main LT Panel / PCC offered shall comply with the following local and international standards.

IEC 61439-1: Low voltage switchgear and control gear assemblies Part 1: General rules
IEC 61439-2: Low voltage switchgear and control gear assemblies Part 2: Power switchgear and control-gear assemblies
IEC 60947-1: Low voltage switchgear and control-gear Part –I: General Rules
IEC 60947-2: Circuit breakers
IEC 60947-3: Switches, disconnectors, switch-disconnectors, and fuse combination unit
IEC 60947-4: Contactors and motor starters.
IEC 60947-5: Control circuit devices and switching elements.
IEC 60947-7: Terminal blocks for copper conductors.

IEC 60529 : Degree of protection provided by enclosures (IP Code)
IEC 60044-1: Instrument Transformers. Part I: Current transformers.
IEC 60044-2: Instrument Transformers. Part II: Inductive Voltage Transformer
IEC 60255: Electrical Relays

Electrical Specification

The Main LT Panel / PCC shall be designed to operate in the following service conditions.

System rated Voltages:		
Rated operating Voltage	Ue	: 433 V 3ph AC
Rated frequency		: Upto 50Hz
Rated Currents Main Bus-bars	Ie	: Upto 3200A
Rated Peak withstand current	Ipk	: Upto 125 kA
Rated Short time withstand Current	Icw	: Up to 50 kA
Distribution bars		
Rated Current	Ie	: As per SLD
Form of separation		: Form 4B
Arc Fault Containment		
Rated Operational Voltage		: 690V
Prospective short circuit current		: 100 Ka (as per IEC 61641)
Duration		: 300 ms (0.3 sec)
Criteria		: 1 to 5
Standard cross-section for internal wiring		Control: 1.5mm2min.
		Current: 2.5mm2 min.
		Power: 4.0mm2 min.

Mechanical Characteristics

Height of Switchgear	: 2200mm + plinth
Protection degree, external (except floor)	: IP4X .
Protection degree, internal	: IP2X
Thickness of steel sheets for enclosure	: 1.5mm
Frames	: 2.0mm
LV Enclosure Material	: GSM Galvanized Sheet Metal 275 or better
Internal subdivisions	: Device compartment – device compartment
Subdivision	: Bus-bar compartment – cable compartment
	: Bus-bar compartment – device compartment
	: Device compartment – cable compartment
	: All compartments to be completely segregated.
Ambient Temperature :	
Short time maximum Value	: +450C&Temperatue
Relative humidity	: 90% (no condensation)
Accessibility	: Front access

Cable entry : TOP & BOTTOM (as per SLD)

Horizontal Main Bus-bars : Rear, Copper

Vertical Distribution Bus-bars : Copper encapsulated Fire Retardant / Self Extinguishing insulation that provide full phase Segregation

Module Power Contacts : Complete phase to phase segregation

Modules Type : Fully withdrawable type with closed door operation

& plug-in contact blocks for safe & easy withdraw

Construction

General Description

The Main LT Panel - PCC shall consist of a Factory assembled with Fully Type tested design in manufacturer's own works

The Main LT Panel- PCC shall be metal enclosed fully drawout, free standing, floor mounting, compartmentalized, modular type suitable for indoor installation .The Main LT Panel - PCC shall be assembled out of vertical panels of uniform height in a single line up .

The Main LT Panel / PCC shall be designed to ensure maximum safety during operation, inspection, connection of cables, relocation of outgoing circuits and maintenance, with the bus-bar system energized and without taking any special precautions. Means shall be provided to prevent shorting of power and /or control terminals due to accidental dropping of maintenance tools etc. inside the Main LT Panel / PCC. Checking and removal of components shall be possible without disturbing adjacent equipment. All auxiliary equipment shall be easily accessible. All identical equipment and corresponding parts shall be fully interchangeable without any need for resorting to structural modification. Suitable removable type lifting hooks shall be provided on each shipping section for ease of lifting.

The Main LT Panel / PCC shall be formed using distinct vertical panels each comprising of following compartments.

- Main bus-bars located and running horizontally at the rear (made of Copper & Fully Sleeved)
- Individual feeder modules in multitier mode.
- Vertical bus-bars serving all feeder modules in the vertical panel fully segregated from the main bus-bars with Fire Retardant Non Hydroscopic Insulating Material that also provided phase segregation between the vertical RYB phases
- Cable termination compartment.

The enclosure frame shall have punched holes at regular pitch intervals throughout the vertical length to adjust & flexibly attach modules at desired intervals.

Metal sheet shall be provided between two adjacent vertical panels running upto full useful height of the Main LT Panel / PCC. These panels shall be of single front

The framework profiles shall be manufactured from non –corrosive GSM 275 or better material - 2mm thick, it should be a weld free design enclosure.
The internal sub division shall be made of partitions or barriers (metallic) to form separate compartments or enclosed space and the degree of protection for such partitions shall be minimum IP2X. Frame work shall be pre– drilled based on the modular design to allow future addition/alteration of outgoing of functional units to be performed at site. The frame being the basic element shall be made up of profiles with holes at predefined intervals to give a basic grid dimension, to suit construction for every requirement. The mechanical construction shall be maintenance free.

The switchgear shall be enclosed on all sides (enclosed floor are optional). The enclosure shall be made of sheet steel, with powder coated surface for maximum durability.

The cubicles shall be divided into following functional units:

- Equipment compartment
- Bus-bar compartment
- Cable compartment

All electrical equipment, including the withdrawable modules, ACB/MCCB shall be situated in the equipment compartment. The bus-bar compartment shall contain only the main bus-bars. The distribution bus-bars shall be segregated from the main bus-bars and the distribution bus-bars phases shall be isolated from each other embedded preferably in a separate insulator.

Cable entry shall be from bottom. Power and control cables shall be separated and installed in two different compartments, thus providing communication cable connection independent from power cable to avoid electromagnetic interference.

The Main LT Panel / PCC panel shall be internal arc tested for 100 KA for 0.3 sec duration. The type test report for the same shall be submitted –in event of technical scrutiny pre-order or post order.

Painting

The standard switchgear color shall be RAL 7035.The paint film thickness shall be minimum 60microns powder coated or better available design by manufacturer

Bus-bars

All Bus bars shall be manufactured from Tinned Plated Copper.

The main bus bars shall be located in a separate bus bar compartment in the rear of the switchgear to that of the individual Tier Distribution bus bars. In addition the main Bus bar system shall be fully segregated and insulated from the individual Tier Distribution Bus-bar system.

The Bus-bar connections shall be accessible from the front of the switchgear. Bus-bar connection bolts shall be high tensile bolts with locking of threads provided.

Distribution Bus-bars shall be fully encapsulated & embedded in a non-hygroscopic insulating multifunction separator wall providing full height segregation with main horizontal bus-bars. The multifunction separator wall material shall be flame resistant and act as an arc barrier in the event of an internal arcing fault. This multifunctional wall should completely segregated main busbars from equipment compartments
Bakelite / ordinary polymer / acrylic / metal partition walls are not allowed.
The insulating wall design should provide a creepage distance of >40mm between phase distribution bus-bars and to nearest earth. Distribution bus-bars shall to fully shrouded to prevent accidental contact with bus-bars upon withdrawal of a functional unit, the degree of protection shall be minimum IP 2x to IEC 60439-1.

The protective Earth Bus-bar (Copper) is to be mounted directly to the frame in the lower section of the equipment compartment with a vertical earth bar being provided in each tier.

The draw out module power contacts shall be so designed that it can withstand at least 1000 withdraw operations

Earth busbars:

All vertical panels/cubicles shall be connected to a common horizontal copper earth bus-bar running on bottom or top for the complete length of the Main LT Panel / PCC. The size of the earth bus-bar shall be as specified in IEC 60439-1. Each Main

LT Panel / PCC panel shall also be provided with vertical earth bus-bar of appropriate size bonded to the horizontal earth bus-bar .The vertical earth bus-bar shall be provided with holes at appropriate intervals for connecting the fourth core of the outgoing power cables.

Equipment Earthing:

All doors carrying electrical equipment shall be earthed with PVC colored yellow green flexible copper wire of 2.5mm2 to the framework. For doors without any electrical equipment, the metal screwed connections and the metal hinges can be considered sufficient to ensure continuity.

Cable Compartment
A full height vertical cable alley of minimum 400 mm should be provided for power & control cables

Internal wiring:

All internal wiring shall be with black PVC insulated multi-strand flexible copper conductor with minimum cross section of 1.5mm2 for control and 2.5mm2 for current circuit.

Draw-out Modules for power distribution

Draw out modules shall be provided for all the incomer, bus coupler & outgoing feeders. The draw out modules shall have the following features.

The design of drawout feeder modules shall not change for single front /duplex execution. Separate vertical bus-bars shall be provided for each front side modules. All identical feeder modules shall be interchangeable.

Each vertical panel shall have a separate cable compartment. The width of this cable compartment shall be sufficient to accommodate all the cables and shall have free access for cable terminations. Cable compartments shall be provided with suitable doors. Maintenance and connection of cables to any modules shall be possible without having to take out the modules from its position from the panel. For intelligent Main LT Panel / PCC solutions separate cable compartments for control and power shall be provided.

There shall be provision to withdraw the draw out module without having to unbolt or unscrew any power and control connections to the equipment mounted on the module. Main LT Panel / PCC where control plugs are required to be physically separated by operator before withdrawal of drawers are not acceptable. Both power and control connections shall be draw-out type.

Various compartment sizes in a vertical panel / cubicle shall be multiples of a basic dimension. Unused modules in the panel shall be provided with hinged door to close all openings as per Main LT Panel / PCC protection class.

The design of draw out modules shall be such as to make it easily possible exchange under operational conditions thus assuring maximum flexibility. To maximize the overall usage of available space and in turn reduce the overall footprint of the motor control center,it shall be possible for the smaller drawers to be provided in half or quarter size of the width of the equipment compartment.

The main and auxiliary connections shall be self locating without the need of additional tools.It shall be possible for full module functionality with external operation.The withdrawable modules shall have the following module positions/situations:

- ON: Module is inserted, main switch closed, main and control circuit connected.
- OFF: Module is inserted, main switch open, main and control circuit disconnected, and padlocking shall be possible.
- TEST: Module is inserted, main switch open, main circuit disconnected, control circuit connected, padlocking possible.
- ISOLATED: Module shall be withdrawn from the vertical distribution bars and the distance between the inserted position and isolated position shall be minimum 30mm.
- DRAW OUT: Module completely withdrawn from the Main LT Panel / PCC.

Air Circuit Breaker

All air circuit breakers shall as a minimum have the following features:

- Manual charging lever and ‘charged’ indication.
- Manual Open/Close push buttons.
- Mechanical Open/Closed indications
- Mechanical signaling of over current release
- 4 Auxiliary contacts

Air circuit breakers whenever provided as a withdrawable solution shall have 3 distinct positions:

(a) Connected: In connected position, with the moving part fully inserted in the fixed part (cassette), the moving terminals of the power and auxiliary terminals shall make connection with the respective fixed terminals. The circuit breaker shall be operational and the mechanical indicator shall show ‘CONNECTED’.

(b) Test /Isolated: In this position, it shall be possible for the circuit breaker to be operated for offline tests without the connection of the power terminals but with

connection of the auxiliary terminals. The mechanical indicator shall show ‘TEST ISOLATED’.

(c) Disconnected: In this position, with the moving part inserted into the fixed part, there shall not be any connection of the power and auxiliary terminals. In this position all electrical operation of the ACB is prevented .The mechanical indicator shall show ‘DISCONNECTED’. It shall be possible for the switchgear compartment door to remain closed, so as not to compromise the IP rating of the switchgear.
The ACB cassette (fixed part) shall be with shutters which are positively driven closed during the racking out process to prevent the possibility of contacts with live parts.

TEST

Type Test

Arc –Proof Design

The Main LT Panel PCC shall be tested for active and passive arc fault prevention according to IEC 61641.

Fully Type tests Factory made assemblies according to IEC 61439

Samples of a particular assembly or a part of the assembly manufactured in series in the same or similar form and equipped in the same or similar way should have been type tested for the following:

- Verification of temperature –rise limits
- Verification of short circuit withstand strength
- Verification of dielectric properties
- Verification of the effectiveness of the protective circuit.
- Verification of clearances and creep age distances
- Verification of mechanical operation
- Verification of the degree of protection
- Verification of internal arc test 100 KA for 0.3 sec

These tests may be carried out in any order and /or different samples of the same type.

Earthquake Vibration and Shock Test

Samples of a particular assembly or a part of the assembly manufactured in series in the same or similar form and equipped in the same or similar way should have been type tested for vibration test as per IEC 60068-2-6 and single shock test as per IEC 60068-2-27.

The Main LT Panel / PCC when erected with floor connection, i.e., without any additional reinforcement of the frame, the modules etc, shall be resistant to stress caused by vibration and shock up to 0.7g (vertical, horizontal, diagonal).

Routine tests according to IEC 61439-1 & 2

1) A general visual check shall be carried out. This shall cover measurement of overall dimension, location, number and type of devices, terminals, location and connection of terminals etc.

2) Manual operation of all circuit breakers, switches etc for their operation and interlock and draw in / draw out operations of drawers and draw-out circuit breakers.

3) Electrical operation of circuit breakers /relays etc.

4) Operation check shall be carried out for every control function / interlocks as per the schematic diagrams by manually simulating fault conditions and operation of control switches/relays etc.

5) Protection relays and protection units of circuit breakers shall be tested with secondary injection test equipment.

6) Primary injection test to check winding of current transformers, ammeter, ammeter selector switch and correctness of wiring connection between them.

7) Dry insulation test with power frequency voltage.

8) Insulation resistance shall be checked before and after the high voltage withstand test.

MAKES OF LOW VOLTAGE SWITCHGEAR – MAIN LT PCC

LV Switchgear Panels	ABB MNS / SIEMENS SIVACON S8 / SCHNEIDER BLOKSET

SECTION 4 - M.V. PANELS

4.1 Scope

This Section covers the detailed requirements of medium voltage switch Panel for 433V, 3 phase 50Hz 4 wire system. These shall be branded and/or assembled/ fabricated from a factory of repute. All switchgears shall be fully rated at an ambient of 400 C.

4.2 Type of Panel

The medium voltage switch board panel shall comprise of any one of the following types of switchgears or combination thereof as specified.

(a) Air Circuit breakers draw out or fixed type.

(b) Switch Disconnector Fuse Units fixed type, MCCBs of suitable Ics ratings. MCCBs shall invariably be Current Limiting type. Features like Double Break, Positive Isolation functions shall be preferred.

The Panel shall be indoor type having incoming sectionalization and outgoing switchgears as specified. The design shall be cubical type. The degree of enclosure protection shall be IP 42 as per IS:13947 (Part-I).

4.3 M.V Panel

4.3.1 General Construction

The switchboard shall be floor mounted free standing totally enclosed and extensible type. The switch board shall be dust & vermin proof and shall be suitable for the climate conditions as specified. The design shall include all provisions for safety of operation and maintenance personnel. The general construction shall conform to IS: 8623/1993 for factory assembled switch board.

4.3.2 Cubical Type Panels

4.3.2.1 Cubical type panels shall be fabricated out of sheet steel not less than 2.0 mm thick. Wherever necessary, such sheet steel members shall be stiffened by angle iron frame work. General construction shall employ the principle of compartmentalization and segregation for each circuit. Unless otherwise approved, incomer and bus section panels or sections shall be separate and independent and shall not be mixed with sections

required for feeders. Each section of the rear accessible type panel shall have hinged access doors at the rear. Overall height of the panel shall not exceed 2.4 meters. Operating levers, handle etc. of highest unit shall not be higher than 1.7 meters. Multi-tier mounting of feeder is permissible. The general arrangement for multi tier construction shall be such that the horizontal tiers formed present a pleasing and aesthetic look. The general arrangement shall be approved before fabrication. Cable entries for various feeders shall be either from top or bottom. Through cable alleys located in between two circuit sections ,either in the rear or in the front of the panel. All cable terminations shall be through gland plates. There shall be separate gland plate for each cable entry so that there will not be dislocation of already wired circuits when new feeders are added. Cable entry plates shall therefore be sectionalized. The construction shall include necessary cable supports for clamping the cable in the cable alley or rear cable chamber.

Cubicle panels with more than 1000 Amps BUS shall be made of tested structural modular sections.

4.3.2.2 Bus Bar and Connections The bus bars shall be of Copper/Aluminium of high conductivity electrolytic quality and of adequate section. Current density shall not exceed 160 amps for Copper /sq. cm. or 130 Amps for Aluminium/sq.cm The bus bar system may comprise of a system of main horizontal bus bars and ancillary vertical bus bars run in bus bar alleys on either side of which the circuit could be arranged with front access cable entries. In the case of rear access, horizontal bus system shall run suitably either at the top or bottom. All connections to individual circuits from the bus bar shall preferably be solid connections; however flexible connections shall also be permitted as per recommendations of the Panel Manufacturer. All bus bars and connections shall be suitably sleeved / insulated in approved manner.

4.3.2.3 Incomer / Termination

Incomer termination shall be suitable for receiving bus trunking /underground cables. Cable terminations shall invariably be through terminal blocks (Polyamide or superior) or brought out solid terminals.

4.3.2.4 Instruments

All voltmeters and ammeters shall be flush mounted of size minimum 96
mm conforming to class 1.5 of IS:1248 for accuracy. All voltmeters shall be protected with MCB.

4.3.2.5 Indicating Lamps

On all the incomers of M.V panels, ON/OFF indicating LED lamps shall be provided and shall be suitable for operation on AC supply. Phase indicating LED lamps shall be associated with necessary ON/OFF toggle switch.

4.3.2.6 Small Wiring

All small wiring for Controls, Indication etc. shall be of with suitable FRLS/HFFR (halogen free fire retardant) copper conductor cables. Wiring shall be suitably protected within switch board. Runs of wires shall be neatly bunched, suitably supported and clamped. Means shall be provided for easy identifications of the wires. Where wires are drawn through steel conduits, the works shall conform to CPWD General Specifications for Electrical works (Part I- Internal) - 2013 and IS:732 as the case may be. Identification ferrules shall be used at both ends of the wires. All control wiring meant for external connections are to be brought out of terminal board.

OPERATIONALREQUIREMENTS

The indoor type MV panel shall conform to the following: -

(a) The panel shall comprise of incomers, outgoing feeders and bus coupler as specified. The incomer shall be either a double break / contact repulsion MCCB or an Air Circuit Breaker. The bus coupler shall be either a circuit breaker or a double break / contact repulsion MCCB or switch disconnector fuse unit as specified. The outgoing feeders shall be circuit breakers/MCCBs as specified.

(b) Bus bars for phase and neutral shall have a rating as specified in the format of Appendix II.

(c) The entire switch panel shall be cubical type generally conforming to IS:8623/1993 for factory assembled switch board.

(d) The incomer panel shall be suitable for receiving bus trunking or MV cable of size specified either from top or from bottom.

(e) All incoming AIRCIRCUIT BREAKER/MCCB shall have suitable adjustable tripping current and the time delay settings.

(f) The entire panel shall have a common earth bar of size as specified with two terminals for earth connections.

4.5 Rating and Requirements

4.5.1 Air Circuit Breaker

All Air Circuit Breakers shall be 3/4 pole with minimum 50 KA breaking capacity (35 MVA at 433V) conforming to IS: 13947 (Part-II). Rated current shall be as per capacities specified. The equipment shall be complete with the following: -

(a) Necessary circuit breaker carriage with 3 position (isolate, test, service) draw-out mechanism.

(b) Necessary isolating plugs and sockets.

(c) Necessary mechanism interlock and automatic safe shutters gear with arrangement for pad locking.

(d) Necessary independent manual spring mechanism with mechanical On/Off indication as well as electrical On/Off indication.

(e) Necessary bus bars with bolted type neutral links.

(f) ACB shall be provided with microprocessor based releases having built in over load, short circuit & earth fault protection. Microprocessor release shall be EMI(electro magnetic induction)/EMC(electro magnetic compatible) certified.

(g) Necessary set of auxiliary switches.

(h) Necessary set of CTs with ratios as specified.

(i) Necessary identification, metering requirements as specified i/c. ON/ OFF indication lamps, selector switches, fuses, ammeter, voltmeter etc.

(j) In case of 4 pole breaker neutral shall be fully rated with adjustable settings from 50% to 100% of In.

(k) ACB terminals shall be suitable/suitably brought out for direct aluminum termination as per IS 13947 Part-II.

Note: Wherever fixed type circuit breakers are required, it shall be clearly specified in Appendix II. Also refer Appendix V for further guidelines.

4.5.2 Switch Disconnector Fuse Units /MCCB:

4.5.2.1 Switch Disconnector Fuse Units: All SDF units for feeders or outgoing circuits shall be suitable for a Breaking capacity of 80 KA (57 MVA 433V) capacity at 433V 3 phase 50 Hz AC system conforming to IS: 4064. The number of units and rated current shall be as per detailed requirements specified. Switch Disconnector Fuse unit shall be double break front operated type. The units shall be complete with following: -

(a) Necessary HRC cartridge fuses conforming to IS:9224 (Part-II).

(b) Necessary operating mechanism quick break make type.

(c) Necessary set of CTs together with an ammeter and selector switch as specified.

(d) Necessary interconnections to bus bars.

(e) Necessary neutral link inside the SDF unit.

(f) All SDF units shall be AC23A utilization category.

4.5.2.2 MCCB : All MCCBs shall be current limiting type with features of load line reversibility and suitable for Horizontal/Vertical mounting without any derating. Beyond 300Amps capacity MCCBs shall have positive isolation and preferably double break / contact repulsion & double insulation features.

The MCCBs shall invariably be used with terminal spreaders.

4.6 TEST AT MANUFA CTURERS WORK

All routine tests shall be carried out and test certificates produced to the department.

4.7 INSTALLATION

The installation work shall cover assembly of various sections of the panels lining up, grouting the units etc. In the case of multiple panel switch boards after connecting up the bus bars etc., all joints shall be insulated with necessary insulation tape or approved insulation compound. A common earth bar as per section 7 of these specifications shall be run inside at the back of switch panel connecting all the sections for connection to frame earth system. All protection and other small wirings for indication etc. shall be completed before calibration and commissioning checks are commenced. All relays, meters etc. shall be mounted and connected with appropriate wiring.

TESTINGAND COMMISSIONING

Commissioning checks and tests shall include all wiring checks and checking up of connections. Relay adjustment/setting shall be done before commissioning in addition to routine Megger tests. Checks and tests shall include the following: -

(a) Operation checks and lubrication of all moving parts.

(b) Interlock function checks.

(c) Continuity checks of wiring, fuses etc. as required.

(d) Insulation test: When measured with 500V Megger the insulation resistance shall not be less than 100 mega ohms.

(e) Trip tests and protection gear test.

SECTION 5

CABLE WORKS

5.1 SCOPE

This section covers supply, laying and jointing as required and testing and energizing all cable work.

5.2 SPECIFICATION OF CABLE

5.2.1 33 KV grade XLPE insulated PVC sheathed armoured Aluminum/Copper cable shall be

3 core earthed of sizes as specified. The cable shall conform to IS-1554, Part II

5.2.2 1.1 KV grade XLPE insulated PVC sheathed armoured Aluminum / Copper cable shall be 3 ½ /4 core of sizes as specified. The cable shall conform to IS:1554 Part I.

5.2.3 All control wires shall be 650V grade copper conductor Halogen free fire retardant or FRLS PVC insulated, conforming to IS:1554 Part I. The minimum size of the control wires shall be 1.5 sq. mm.

5.3 INSTALLATION

Cable shall be laid in ground, trenches, cable trays and on walls as specified. Installation shall include all supports and clamps as required. The complete work shall be in accordance to CPWD General Specifications for Electrical works - Part II (External) 1994 amended upto date. As far as possible cables shall not be fixed on walls directly but laid on cable trays.

5.4 JOINTING FOR 33 KV GRADE CABLE GLANDS

Jointing work shall be carried out only by licensed experienced cable jointer and shall be in accordance to CPWD General Specifications for Electrical works - Part II (External) 1994 amended upto date.

5.5 EARTHING FOR 33 KV GRADE CABLE GLANDS

All HV cable glands shall be connected to the earth with 2 Nos. 38.6 mm copper or equivalent G.I conductors.

5.6 Selection shall be made as per tables given under table-V of CPWD General Specification for Electrical Works Part-II (External)- 1994 amended upto date.

5.7 TESTING

Testing of the complete cable installation shall be as per clause 2.8.2 and 2.8.3 of CPWD General Specifications for Electrical works - Part II (External) 1994 amended upto date.

5.8 POWER DISTRIBUTION SYSTEM LOSSES

The power cabling shall be adequately sized as to maintain the distribution losses not to exceed 1% of the total power usage. Record of design calculation for the losses shall be maintained.

The cables be designed as per the voltag drop regulations at peak load, and the losses be calculated on the basis of the assessed load during the day, week and year and should not be limited to the peak load.

SECTION 6

BUS TRUNKING

Scope

This section covers manufactures, supply installation, testing and commissioning of enclosed type bus ducts indoor type tor connection between the Transformer and MV panels. Bus Trunking shall be used for all sub-stations to capacity 500 KVA and more. These may be used even for smaller sub- stations judiciously.

SANDWITCH INSULATED BUS- TRUNKING AND RISING MAINS

6.1 SUPPLY VOLTAGE

For 3 phase, 4 wire, 50 cycles AC supply, operation voltage 415/440 volts.

6.2 STANDARD FOR COMPLIANCE

IS : 8623/1993 I &II and IED 60439 / I & II.

6.3 CONSTRUTION

The enclosure will be made from 16 SWG GI/ CRCA sheet steel powder coated to shade RAL 7032 (or such other shade). Bus bars would be in 'Sandwich' construction and the conductors will be individually insulated with 4 layers of insulation film. Inner layer will be of glass MICA and outer layer of polyester material Class 'F'. alternatively extrusion of Class 'F' material in form of epoxy insulation may be provided. No drilling of bus bars is permitted. Aluminium conductors will be of 19501 grade and copper conductor of 99.9% purity and ETP grade with radialised edges. Length of section will be limited to max 3 Mtrs. Bus bars of one section will be connected to bus bars of adjacent section by uniblock joint system removable as separate sub-assembly, So that it can inserted or removed with out disturbing the adjacent sections.

Installation: Normally manufacturer's recommendations should be followed.

For installation as Rising Mains / Vertical installation, at each floor, a set consisting of two Spring Hangers will be provided for fixing it on channels grouted in wall. At the start of run, Hangers without springs may be used for rigid support. In addition Horizontal supports will be provided (2 Nos. per floor) to hold bus bars in position. On Rising Mains, on front face of the bus bar trunking tap off points will be provided for inserting plug in boxes. Number of tap off points at each floor will be as per requirement given in BOQ but minimum distance between tap off points may be

kept around 500mm. Each Tap off opening will be closed by insulated shutters forming part of BBT, when not occupied by Plug in Boxes. Neutral cross section will be same as phase cross section.

Enclosure will be tested for protection degree IP – 54.

Necessary Vertical / Horizontal bends / Tees will be provided as required by layout.

Bus bars turnking will be rigidly fixed to the side walls or suspended from ceiling.
by supports as per requirement detailed in the layout.

At the termination either on the transformer side or on generator end or on switchgear panel, busduct will be provided with flange ends, adopter Box and copper flexible (preferably multispeed types) to connect Bus bars of bus duct to busbars of switchgear panel or transformer terminals or generator terminals.

All the components like Busbar ducting, Bends, hanger ends, Adopter Boxes etc. will be made from CRCA or GI sheets. Two earth strips of copper or aluminum of size as mentioned in IEC 60439, dependent on short circuit withstand capacity required will be provided throughout the length.

Expansion units are to be installed after every uninterrupted run of 50 Mtrs. For composite expansion of complete Bustrunking run.

6.17 TECHNICAL PARAMETERS FOR COMPLIANCE:

- Bus trunking will be designed to withstand short circuit current for one second.
- Bus bar system should be designed for an ambient temperature of 40 deg. C and temperature rise restricted to 55 Deg. C max above ambient on conductors above ambient.

  Temperature rise of the enclosure 40 deg. C maximum. Temperature rise at terminals 70 Deg. C max.
- Maximum operating voltage = 1000 Volts. (600 Volts)

4. Insulation voltage = 1000 Volts.

5. Bus trunking will be suitably chosen to give permissible voltage drop.

6. Rated impulse withstand voltage 12 KV at 1000 V (600 Volts)

6.18 PLUG IN BOXES

Plug in Boxes will be of draw out type. Contacts will be of silver plated copper and spring loaded. Earth connection will be the first to make and last to break during insertion and withdrawal. Plug in Box will be made from 1.6mm CRCA sheet steel powder coated or GI. Inside the plug in Boxes MCCB or SFU with fuses will be located as per requirements. The operation handle will be interlocked with plug in Box cover so that MCCB can be operated only with suitable cover in closed position. If required the plug in Box will be interlocked with Bus bar trunking so that it can not be inserted or removed with the plug in Box lid opened. MCCB / SFU will be of 4 pole type unless otherwise specified in BOQ. Short circuit breaking capacity of MCCB in PIB should preferably be same as short circuit withstand for one second of Bus Bar Trunking.

6.19 LIST OF TEST TO BE CARRIED OUT

Type Tests : Copies of the following certificates should be submitted.

1. Verification of Temperature Rise limits.
2. Verification of dielectric properties.
3. Verification of short circuit strength.
4. Verification of degree of protection.

6.20 ROUTINE TESTS

1. Verification of insulation. Resistance.
2. Inspection of assembly, interlocks, locks etc.
3. Check on wiring if provided.
4. Dielectric test.

SECTION 7

EARTHING SYSTEM

7.1 SCOPE

This section covers the general requirements of the earthing system for Sub-station installation. G.I. plate earthing with G.I. strip for sub-stations of 500 KVA capacity and copper plate earthing for sub-stations of higher capacity shall preferably be used.

7.2 SYSTEMS

Earthing system shall comprise earth electrodes in accordance with clause 8.2.1 of General specifications for Elect. Works (part I Internal) 2013. For every additional transformer 2 more separate and distinct earth electrodes shall be provided for neutral earthing. The body earthing for transformers, HV & MV panels shall be done to a common earth bus connected to two separate and distinct earth electrodes.

Note: For a single transformer Sub-station, the total number of earth electrodes shall be 4 (2 for neutral and 2 for connection to a common earth bus for body earthing). For a two transformer sub- station total number of earth electrodes shall be 6 (4 for neutral earthing, two each for two transformers, and 2 for connection to a common earth bus for body earthing)

7.3 ELECTRODES

The earth electrodes shall be as per CPWD General Specifications for Electrical Works (Part I Internal) 2013.

7.4 LOCATION OF EAFRTH ELECTRODES

Normally an earth electrode shall not be situated less than 1.5m from any building. Care shall be taken that the excavation of earth electrode may not affect the column footings or foundation of the building. In such cases electrodes may be farther away from the building.

The location of the electrode earth will be a place where the soil has reasonable chance of remaining moist. As far as possible, entrances, pavements and road ways, are to be definitely avoided for locating the earth electrode.

7.5 WATERING ARRANGEMENT

Method of watering arrangement shall comply with CPWD general specifications.

7.6 SIZE OF EARTH LEAD

The recommended sizes of copper earth bus lead in case of sub-stations shall be accordance with clause 8.2.2 of general specifications for electrical works (Part – I Internal) 2013 amended upto date. The minimum size of earth lead shall be 25 mm x 5 mm copper of equivalent GI strip.

7.7 INSTALLATION

All joints shall be riveted and sweated. Joints in the earth bar shall be bolted and the joints faces tinned. Where the diameter of the bolt for connecting earth bar to apparatus exceeds one quarter of the width of the earth bar, the connection to the bolt shall be made with a wider piece of flange of copper jointed to earth bar. These shall be tinned at the point of connection to equipment and special care taken to ensure a permanent low resistance contact to iron or steel. All steel bolts, nuts, washers etc. shall be cadmium palated, main earth bars shall be spaced sufficiently on the surface to which they are fixed such as walls or the side trenches to allow for ease of connections. Copper earthing shall not be fixed by ferrous fittings. The earthing shall suitably be protected from mechanical injury by galvanized pipe wherever it passes through wall and floor. The portion within ground shall be buried at least 60 cm deep. The earthing lead shall be securely bolted and soldered to plate or pipe as the case may be. In the case of plate earthing the lead shall be connected by means of a cable socket with two bolts and nuts. All washers shall be of the same materials as the plate or pipe. All iron bolts nuts and washers shall be galvanized.

7.8 TESTING

After installation, the tests as specified in CPWD General Specifications for Electrical work (Part I Internal) 2013 shall be carried out and results recorded.

SECTION 8

POWER FACTOR IMPROVEMENT

8.1 SCOPE

This section covers the specification for supply. Installation, testing and commissioning of 433 volts, 3 phase, 50 Hz capacitor banks and other such devices.

8.2 REQUIREMENTS

Capacities of the capacitor banks/RLC panels shall be indicated in the BOQ.

8.3 CONSTRUCTION

8.3.1 The capacitor bands shall generally conform to IS: 13341-1992, 13340-1993.

8.3.2 The capacitor units shall be indoor type, air – cooled with low viscosity impregnated paper dielectric hermitically sealed. The impregnation used shall be non- inflammable, non- oxidizing, lower freezing point type synthetic compound. Each individual cell shall be provided with pressure sensitive disconnectors / devices.

8.3.3 Main connections from the active element shall be brought out through porcelain bushing. Care shall be taken to solder the bushing to the cover to ensure perfect hermetic sealing.

8.3.4 Capacitor units shall be provided with externally mounted discharge resistors to reduce the residual voltage to less than 50 volts in one minute of switching off.

8.3.5 Individual unit shall be provided with HRC fuses/ adequate capacity of MCBs/MCCBs, contactors (capacitor duty) bus bars and terminal chambers to make bank of required KVAR. Terminal chamber shall be suitable for bottom/top cable entry. Two earth terminals shall be provided to each capacitor bank.

8.4 TESTS AT MANUFACTURERS WORK

All routine and type tests as per IS: 2834 relevant to capacitor banks as amended upto date shall be carried out at manufacturer’s works and test certificates shall be furnished to the department.

8.5 INSTALLATION

Capacitor banks shall be installed at least 30CM away from the walls on suitable metal frame work of welded construction. The earth terminals provided on the body of capacitor bank shall be bonded to the main capacitor panel earth bus with 2 Nos. 8 SWG copper or 6 SWG GI earth wires.

8.6 TESTS AT SITE

Insulation resistance with 500V DC Megger shall be carried out test results recorded.

8.7 POWER CONDITIONER SAVERS

Recently RLC circuit operated power factor improvement panels (power correction &saver system) are available in the market. These are more suitable for installations with electronic equipments (computers, servers, medical equipments, electronic ballasts etc.). capacitor banks are prone to introduce additional harmonics at such installations and therefore their use should be restricted at such installations.

The equipments are called power conditioner savers. These are waveform correction and power factor improvement devices using Rapid Instruction Semi Conductor (RISC) micro controllers / capacitor duty contactor switching.

These work on principle of using low loss continuously variable reactance & adjustable phase wise capacitance to provide optimum impedance to the circuit for transfer efficiently.

Technical Features:

1. A micro controller & RISC processor.
2. Intelligent switching operation, fast response, high break relays (imported).
3. Polarity reversal indication.
4. Phase wise dynamically reactive compensation.
5. Operating power factor 0.6 – 0.99Lag.

These devices may save upto 30% energy &provide pure near true, quality power.

SECTION 9

SAFETY REQUIREMENTS

9.1 SCORE

This section covers the requirements of items to be provided in the sub-station for compliance with statutory regulations. Safety and operational needs.

9.2 REQUIREMENTS

Safety provisions shall be generally in conformity with appendices (A) and (C) of CPWD General Specifications of Electric Works (Par I Internal) 2013. In particular following items shall be provided:

(a) Insulation mats

Insulation mats conforming to IS: 15652-2006 shall be provided in front of main switch boards as well as other control equipments as specified.

(b) Firs Aid Charts and First Aid Box

Charts (one' in English, one in Hindi, one in Regional language), displaying methods of giving artificial respiration to a recipient of electrical shock shall be prominently provided at appropriate place. Standard first aid boxes containing materials as prescribed by St. John Ambulance brigade or Indian Red Cross should be provided in each sub-station.

(c) Danger Plate

Danger Plates shall be provided on HV and MV equipments. MV danger notice plate shall be 200 mm x 150 mm made of mild steel at least 2mm thick vitreous enameled white on both sides and with the descriptions in signal red colour on front side as required. Notice plates of other suitable materials such as stainless steel, brass or such other permanent nature material shall also be accepted with the description engraved is signal red colour.

(d) Fire Extinguishers

Portable Co2 conforming to IS: 2878-1976/ chemical conforming to IS: 2171-1976 extinguishers, HCFC Blend A (P-IV) shall be installed in the sub-station at suitable places. Other extinguishers recommended for electric fires may also be used.

(e) Fire Buckets

Fire buckets conforming to IS: 2546-1974 shall be installed with the suitable stand for storage of water and sand.

(f) Tool Box

A Standard tool box containing necessary tools required for operation and maintenance shall be provided in the sub-station.

(g) Caution Board

Necessary number of caution boards such as “Man on Line” ‘Don’t Switch on’ etc. shall be available in the sub-station.

(h) Key Board

A keyboard of required size shall be provided at a proper place containing castle keys, and all other keys of sub-station and allied areas.

10.1 Scope: This section deal with unloading procedures, location, standard capacities and climatic conditions for DG set installation.

10.1.1 UNLOADING:

10.1.1.1 Gensets without Acoustic Enclosure:

10.1.1.1.1 Genset should not be lifted from engine and alternator hooks. These are designed for lifting individual items only. Normally, provision for Genset lifting is provided on base-rails. The Genset should be unloaded from base rail by lifting with proper Genset lifting tackle or nylon sling/steel rope of suitable capacity and crane so as to ensure no damage to oil sump, air cleaner, radiator pipes etc.

10.1.1.1.2 Genset should be covered with polyethylene or tarpaulin during installation to ensure that water does not enter inside.

10.1.1.1.3 Spreader bar/ spacer plate of suitable size may be required to avoid damages to Genset components.

10.1.1.2 DG set with Acoustic enclosures are provided with lifting hooks.

10.1.2 Location

10.1.2.1 DG Sets with acoustic enclosure

DG sets up to 1000 KVA capacity are required to be supplied with acoustic enclosure as per CPCB norms. DG Set with acoustic enclosure shall preferably be installed outside the building (including terrace subject to structural feasibility) & location should be finalized in consultation with the Architect. However, DG set should be as near to the substation as possible i.e. as near to Essential LT Panel as possible. Associated AMF panel/ Electrical panel of the DG Set can be located inside the acoustic enclosure or outside the acoustic enclosure as per manufacturer standard. In case, AMF/ Electrical panel has to be installed outside the acoustic enclosure, location of room to house AMF/ Electrical panel should be decided in consultation with the Architect so that it shall be as near to the acoustic enclosure as possible. Specially, in case of connection through bus trunking, care should be taken for aesthetics.

10.1.2.2 DG Sets without acoustic enclosure

2.1.2.2.1 In case of DG Sets beyond 1000KVA capacity i.e. when DG set is supplied without acoustic enclosure, room of appropriate size should be provided to house the DG Set. The DG set room should be as near to the substation as possible (i.e. as near to Essential LT Panel as possible). While deciding the room layout, typical 2-meters free space around Genset is recommended for proper heat dissipation and ease of service. However, to avoid hot air re-circulation, radiator cooled engines should have maximum possible space in the front. Minimum 1.5 meter free space is must. A typical Genset room is shown in Figure 1.

2.1.2.2.2As far as possible, installation of DG Set should be avoided in basement. In Cases where installation of D.G. Set in basement is unavoidable, due care of supply of adequate amount of air required for proper operation of D.G. Set shall be taken.

10.1.3 Nominal ratings of DG Sets:

DG Sets are normally available in following standard capacities:

(Ratings in KVA)

7.5	10	12.5	15	17.5	25	30	35	40	50	62.5
75	82.5	110	125	140	200	225	250	320	350	380
415	450	500	550	600	625	700	750	1010	1250	1500

Capacity output of DG Set should be specified in tender in terms of "Prime Power Rating at 0.85 load factor" as per Clause 13.3.2 of ISO-8528 (Part-1). Titled 'Reciprocating internal combustion engine driven alternating current generating sets: Part-1: Application, ratings and performance'.(See Appendix 'I'). However, depending upon the particular application & use, 'Continuous' or 'Standby' rating can be specified.

10.1.4 Climatic Conditions:

The output of DG Set shall be specified in tender documents under actual site conditions. The tenderer has to certify that the engine & alternator meets the capacity requirement after de-ration as per IS/ BIS.

10.1.5 DG Set upto 1000KVA capacity should be type tested for Noise and Emission norms/standards as per CPCB as per Appendix 'II' and Appendix 'III' .

10.2 Diesel Engine

Scope: This section covers engine rating, standard components of a diesel engine including exhaust piping.

10.2.1 Diesel Engine

10.2.1.1 Engine Rating:

The engine shall be of standard design of the original manufacturers. It should be 4 stroke cycles, water cooled, naturally aspirated/ turbo charged (as per manufacturer standard), diesel engine developing suitable BHP for giving a power rating as per ISO 8528- Part-1 in KVA at the load terminals of alternator at 1500 rpm at actual site conditions.

The engine shall be capable for delivering specified Prime Power rating at variable loads for PF of 0.8 lag with 10% overload available in excess of specified output for one hour in every 12 hours. The average load factor of the engine over period of 24 hours shall be 0.85 (85%) for prime power output.

The testing procedure shall be as mentioned in para 1.15.

The engine shall conform to IS;10000/ ISO 3046/ BS;649 /BS 5514 amended up to date.

10.2.1.2 Necessary certificate indicating the compliance of the above capacity requirement for the engine model so selected along with compliance of Noise and Emission norms as per latest CPCB guidelines for DG set capacity up to 1000KVA, should be furnished from the manufacturers along with the technical bid.(Refer Appendix 'II' for noise norms and Appendix 'III' for emission norms). However above 1000 KVA DG set, manufacturers shall furnish certificate that the Engine for the DG set complies with the CPCB Emission norms.

10.2.1.3 The engine shall be fitted with following accessories subject to the design of the manufacturer:

- Dynamically balanced Fly wheel
- Necessary flexible coupling and guard for alternator and engine (applicable only for double bearing alternator)
- Air cleaner(dry/ oil bath type) as per manufacturer standard,
- A mechanical/ electronic governor to maintain engine speed at all conditions of load.(see Clause 2.2.1.4)
- Daily fuel service tank of minimum capacity as per Table below, fabricated from M.S. sheet with inlet, outlet connections air vent tap, drain plug and level indicator (gauge) M.S. fuel piping from tank to engine with valves, unions, reducers, flexible hose connection and floor mounting pedestals, twin fuel filters and fuel injectors. The location of the tank shall depend on standard manufacturers design.

Table -I Recommended minimum capacity of daily fuel service tank:

S.No.	Capacity of DG set	Minimum Fuel Tank Capacity
(i)	Upto 25 KVA	100 Litres

(ii)	Above 25 to 62.5 KVA	120 Litres
(iii)	Above 62.5 KVA to 125 KVA	225 Litres
(iv)	Above 125 KVA to 200 KVA	285 Litres
(v)	Above 200 KVA to 380 KVA	500 Litres
(vi)	Above 380 KVA to 500 KVA	700 Litres
(vii)	Above 500 KVA to 750 KVA	900 Litres

- Dry exhaust manifold with suitable exhaust residential grade silencer to reduce the noise level.
- Suitable self-starter for 12 V/ 24 V DC.
- Battery charging alternator unit and voltage regulator, suitable for starting batteries, battery racks with interconnecting leads and terminals.
- Necessary gear driven oil pump for lubricating oil, priming of engine bearing as well as fuel systems as per manufacturer recommendations.
- Naturally aspirated/ turbo charger (as per manufacturer standard)
- Lubrication oil cooler
- Lubrication oil filters with replaceable elements.
- Crank case heater as per manufacturer recommendations.

- Fuel injection: Engine should have suitable fuel injection system in order to achieve low fuel consumption.
- Fuel control solenoid
- Fuel pump with engine speed adjustment.
- Engine Control Panel: fitted and having digital display for following:-
  - Start/stop key switch. (b) Lube oil pressure indication
  - Water temp. indication (d) RPM indication
  - Engine Hours indications (f) Battery charging indication
  - Low lub. Oil trip indication (h) High water temp. indication
  - Over speed indication.

- All moving parts of the engine shall be mechanically guarded in such a manner that a human finger cannot touch any moving part.
- Radiator/ Heat Exchanger System/ Remote Radiator(delete whichever is not applicable)
- Any other item not included/ specified but is a standard design of the manufacturer

10.2.1.4 Governor:

Mechanical governor of class A2 for up to and including 200 KVA capacity and Electronic governor of class A1 for capacity above 200KVA, as per ISO 3046/ BS5514 with actuator shall be provided as per standard design of manufacturer. Governor shall be a self contained unit capable of monitoring speed.

10.2.1.5 Frequency variation:

The engine speed shall be so maintained that frequency variation at constant load including no load shall remain within a band of 1% of rated.

10.2.1.6 Fuel System:

It shall be fed through engine driven fuel pump. A replaceable element of fuel filter shall be suitably located to permit easy servicing. The daily service tank shall be complete with necessary supports, gauges, connecting pipe work etc. In case of Top Mounted tanks, non return valves are must in fuel supply and return line of specified value. Pipe sealant should be used for sealing for all connections. No Teflon tape to be used. If piping length is more than 10 meters, detail engineering is required in consultation with OEM/ Manufacture

10.2.1.7 Lubricating oil system:

It shall be so designed that when the engine starts after a long shut down lubrication failure does not occur. Necessary priming pump for the lub. oil circuit as per recommendation of manufacturer shall be installed, to keep bearings primed. This pump shall be normally automatically operative on AC/ DC supply available with the set.

10.2.1.8 Starting system:

This shall comprise of necessary set of heavy duty batteries 12V/ 24V DC (as per manufacturer standard), and suitable starter motors, axial type gear to match with the toothed ring on the fly wheel. A timer in the control panel to protect the starter motor from excessively long cranking runs shall be suitably integrated with the engine protection system and shall be included within the scope of the work. Battery capacity

shall be suitable for meeting the needs of starting system (as three attempt starting), as well as the requirements of control panel, indications and auxiliaries such as priming pump as applicable etc. The scope shall cover all cabling, terminals, including initial charging etc. The system shall be capable of starting the DG set within 20-30 sec., even in winter condition with an ambient temperature down to 00C.

10.2.1.9 Battery Charger:

The battery charger shall be suitable to charge required numbers of batteries at 12V/ 24 volts complete with, transformer, rectifier, charge rate selector switch, indicating ammeter & voltmeter etc. Connections between the battery charger & batteries shall be provided with suitable copper leads with lugs etc.

10.2.1.10 Piping Work:

All pipe lines and fittings and accessories requirement inside the room/ enclosure and outside for exhaust piping shall be provided by the contractor. This shall include necessary flexible pieces in the exhaust, fuel, lub. oil and water lines as are necessary in view of the vibration isolation requirement in the installation. Piping of adequate size shall be used for lub. oil of the material as per manufacturer standard. However, only M.S. pipes for the exhaust shall be used. For fuel lines within the acoustic enclosure, PVC braided pipe as per manufacturer recommendations can be used.

However, for fuel lines outside the acoustics enclosure only MS pipe be used.

The pipe work shall be inclusive of all fittings and accessories required such as bends, reducers, elbows, flanges, flexible connections, necessary hardware etc. The installation shall cover clamps, supports, hangers etc. as are necessary for completing the work. However, the work shall be sectionalized with flanged connections as are necessary for easy isolation for purposes for maintenance of unit as approved by Engineer-in-charge.

10.2.1.11 Common bed plate:

Engine and alternator shall be directly coupled or coupled by means of flexoplate/ flexible coupling as per manufacturer standard design and both units shall be mounted on a common bed plate together with all auxiliaries to ensure perfect alignment of engine and alternator with minimum vibrations. The bed plate shall be suitable for installation on suitable anti-vibration mounting system.

10.2.1.12 Exhaust System: (wherever Applicable)

10.2.1.12.1 Exhaust Piping:

All M.S. Pipes for exhaust lines shall be conforming to relevant IS. The runs forming part of factory assembly on the engine flexible connections up to exhaust silencer shall be exclusive of exhaust piping item. The work include necessary cladding of exhaust pipe work using 50mm thick Loosely bound resin(LBR)mattress / mineral wool/

Rockwool, density not less than 120kg/m3 and aluminium cladding (0.6mm thick) for the complete portion. The exhaust pipe work includes necessary supports, foundation etc. to avoid any load & stress on turbo charger / exhaust piping. . The exhaust pipe shall be *run along the existing wall of the building duly clamped/ *supported on independent structure for which, the design and Drawing for such structure shall be got approved from the Engineer in charge.

10.2.1.12.2

- Exhaust system should create minimum back pressure.
- Number of bends should be kept minimum and smooth bends should be used to minimize back pressure.
- Pipe sleeve of larger dia. should be used while passing the pipe through concrete wall & gap should be filled with felt lining.

- Exhaust piping inside the Acoustic Enclosure/ Genset room should be lagged with asbestos rope along with aluminium sheet cladding / insulated as per clause 2.2.1.12.1 to avoid heat input to the room.
- Exhaust flexible shall have it's free length when it is installed. For bigger engines, 2 flexible bellows can be used.
- For engines up to 500KVA, only one bellow is required. However, if exhaust pipe length is more than 7 m then additional bellow/ provision for expansion should be provided.
- 'Schedule B' MS pipes and long bend/elbows should be used.
- The exhaust outlet should be in the direction of prevailing winds and should not allow exhaust gases to enter air inlet/ windows etc.
- When tail end is horizontal, 45 Degree downward cut should be given at the end of the pipe to avoid rain water entry into exhaust piping.
- When tail end is vertical, there should be rain trap to avoid rain water entry. If rain cap is used, the distance between exhaust pipe and rain cap should be higher than diameter of pipe. Horizontal run of exhaust piping should slope downwards away from engine to the condensate trap. Silencer should be installed with drain plug at bottom.

10.2.1.12.3 Optimum Silencer Location:

Location of the silencer in exhaust system has very definite influence on both reduction of noise and back pressure imposed on the system. The preferred silencer locations are given in the Table below, where L is length of the total exhaust system measured from exhaust manifold in meters. Please note that locating the silencer as per optimum silencer location is not mandatory. For high rise buildings, suitable arrangements may have to be provided in consultation with acoustics engineer.

Optimum Location of Silencer (In meters)		
	In-line Engine	'V' Engine
Best	2L/5	(4L – 1.5) / 5
Second best	4L/5	(2L – 4.5) / 5
Worst Location of Silencer	L/5 or 3L/5 or at tail end of Exhaust piping	(3L - 10)/ 5 or at the tail end of Exhaust piping

10.2.1.12.4 Exhaust stack height:

In order to dispose exhaust above building height, minimum exhaust stack height should be as follows:-

(a) For DG set up to 1000KVA :-$H = h + 0.2\times \sqrt{KVA}$

Where H = height of exhaust stack

h = height of building

(a) For DG set above 1000KVA :-

30m High or 3m above the building height, which ever is higher.

10.2.1.12.5

Care should be taken to ensure that no carbon particles emitted due to exhaust leakage enters and deposits on alternator windings and on open connections.

10.2.1.12.6 Support to Exhaust Piping:

Exhaust piping should be supported in such manner that load of exhaust piping is not exerted to turbocharger.

10.2.1.13 Air System:

It is preferable to provide vacuum indicator with all engines to indicate choked filter. Maximum air intake restrictions with clean and choked filters should be within prescribed limit as per OEM/ manufacturer recommendation for the particular model of the engine. Gensets should be supplied with medium duty/ heavy duty air cleaners (specify one only). (Heavy duty air cleaner should be used for installations in dusty or polluted surroundings.)

10.2.1.14 Cooling System

10.2.1.14.1 System should be designed for ambient temperature of 40 Deg.C.

10.2.1.14.2 Water softening/ demineralizing plants should be used, if raw water quality is not acceptable.

10.2.1.14.3 Coolant should be used mixed with additive (in suitable proportion) as per recommendation of OEM /Manufacturer for various engine models.

10.2.1.14.4 Radiator fan flow should be free from any obstruction.

10.2.1.14.5For radiator cooled DG Set, proper room ventilation should be planned at the time of construction of DG room.

10.2.1.14.6Remote Radiator can be used in case of basement installation where fresh air may not be available. The proper location of remote radiator is very essential for the successful and efficient operation of remote radiator. In this the cooling media is ambient air. So in order to obtain maximum efficiency from remote radiator, it is necessary to get fresh air in its surrounding. The horizontal distance of remote radiator from engine should not exceed 10 Meter.

10.2.1.14.7 For the dusty or polluted surroundings (as radiator gets clogged) and/ or bigger capacity Gensets (say 1000KVA and above), installation of Cooling System with Heat Exchanger system may be used.

10.2.1.14.8 Optional items as under may be included as per site requirement at the discretion of Technical Sanctioning authority;

- Cooling System

  Remote Radiator

  Jacket Water Heater

  Crankcase Oil Heater

  After cooler jacket turbo charger electrical pre heat systems.

- Fuel System

  Fuel Water Separator

  Auxiliary Fuel Pump

- Exhaust System

  Industrial Grade Muffler

  Residential Grade Muffler

  Critical Grade Muffler

  Super Critical Grade Muffler

- Start System

  Battery Warmer Plate

  Battery Charger

  Automatic Float Equalizing

  Trickle

10.3 Alternator

Scope : This section covers technical requirement of the alternator.

10.3.1 Synchronous Alternator :

Self excited, screen protected, self regulated, brush less alternator, Horizontal foot mounted in Single/Double bearing construction(specify one only) suitable for the following:

Rated PF.	:	0.8 (lag)
Rated voltage	:	415 volts
Rated frequency	:	50 Hz
No. of Phases	:	3
Enclosure	:	SPDP
Degree of protection	:	IP-23
Ventilation	:	Self ventilated air cooled
Ambient Temperature	:	400 C Maximum
Insulation Class	:	F/H
Temperature Rise	:	Within class F/H limits at rated load
Voltage Regulation	:	+/- 1%
Voltage variation	:	+/-5%
Overload duration/capacity	:	10% for one hour in every 12 hours of continuous use.
Frequency variation	:	As defined by the Engine Governor (+/- 1%)
Excitation	:	Self / separately excited (Self excitation upto 750 KVA and separately excited system above 750 KVA)
Type of AVR	:	Electronic

Type of Bearing and Lubrication arrangement	:	Anti-friction bearings with Grease lubrication
Standard	:	IS-4722 & IEC:34 as amended upto date.

10.3.2 Alternator should be able to deliver output rating at actual Site conditions.

10.3.3 The alternator above 500KVA capacity shall be fitted with suitable Nos. Resistance Temperature Device (RTD) & Bearing Temperature Device (BTD) alongwith space heaters. The terminal of space heaters will be wired to terminal box and the temperature scanner shall be provided in control panel for scaling the winding and bearing temperature.

10.3.4 Excitation: The alternator shall be brushless type and shall be self/ Separately excited, self-regulated having static excitation facility. The exciter unit be mounted on the control panel or on the alternator assembly. The rectifier shall be suitable for operation at high ambient temperature at site.

10.3.5 Automatic Voltage Regulators (AVR) : In order to maintain output terminal voltage constant within the regulation limits i.e. +/- 1%, Automatic voltage regulator unit shall be provided as per standard practice of manufacturer.

10.3.6 Fault tripping: In the event of any fault e.g. over voltage/ high bearing temperature/ high winding temperature or an external fault, the AVR shall remove the excitation voltage to the alternator. An emergency trip shall also be provided.

10.3.7 Standards: The alternator shall be in accordance with the following standards as are applicable.

(i) IS:4722/BS : 2613/1970. The performance of rotating electrical machine.

(B) IS: 4889/BS: 269 rules for method of declaring efficiency of electrical machine.

10.3.8 Performance: Voltage dip shall not exceed 20% of the rated voltage for any step load or transient load as per ISO:8528 (Part-1). The winding shall not develop hot spots exceeding safe limits due to imbalance of 20% between any two phases from no load to full load.

The generator shall preferably be capable of withstanding a current equal to 1.5 times the rated current for a period of not more than 15 seconds as required vide clause 14.1.1 of IS 4722:1992.

The performance characteristics of the alternator shall be as below:

		Efficiency at full load 0.8 P.F.	
(a)	(i)		Upto 25 KVA – not less than 82%
	(ii)		Above 25 KVA and upto 62.5 KVA -

		not less than 86% (iii) above 62.5 KVA & upto 250 KVA – not less than 90% above 250 KVA – not less than (iv) 93.5%
(b)	Total distortion factor	Less than 3 %
(c)	(i) 10% overload	One hour in every 12 hrs of continuous use.
	(ii) 50% overload	15 seconds.

10.3.9 Terminal Boxes:

Terminal boxes shall be suitable for U.G. cables/ Bus Trunking. The terminal box shall be suitable to withstand the mechanical and thermal stresses developed due to any short circuit at the terminals.

10.3.10 Earth Terminals :

2 Nos. earth terminals on opposite side with vibration proof connections, non-ferrous hardware etc. with galvanized plate and passivated washer of minimum size 12mm dia. hole shall be provided.

10.3.11 Space Heaters:

Alternators of capacity more than 500KVA shall be provided with suitable space heaters to maintain the winding temperature automatically such that it does not absorb moisture during long idle periods. The heater terminals shall be brought to a separate terminal box suitable for 230 V AC supply and a permanent caution notice shall be displayed.

SYNCHRONIZATION

10.1 Scope

This section covers synchronization of DG sets as required(to be decided by NIT approving authority) and comprises of running of DG set in parallel i.e. their synchronization on common bus bar, auto load sharing and auto load management.

10.2 PLC panel

Operation of DG sets shall be monitored and controlled by PLC panel i.e. Programmable logic controller based logic panel. In case of mains failure, this logic panel shall control auto changeover from mains to DG Sets supply and interlocking of ACBs, auto synchronizing and auto Load management functions along with annunciation for alternator control and protection.

The logic Panel shall be provided with a total manual over ride facility. There shall be Smooth transfer of DG set operation from PLC to manual system & vice versa without any interruption/tripping .The logic panel shall be complete with all Auxiliary Relays. Timers, Contactors, Programmable logic controller, control wiring, interconnections etc. with 2.5 sq.mm. PVC insulated, 1.1 KV grade copper conductor wires.

10.3 CONTROL PHILOSOPHY

10.3.1Automatic Start & Stop of Engine:

The system should come in operation after sensing of grid failure and automatically control the start & stop of engines, depending on the predefined load setting in the PLC. In case engine does not start in the first cranking, two more auto commands should be given with proper intervals. Even then if engine fails to start, indication must appear on MMI(Man Machine interface). In the event the engines are under loaded i.e. load sensed is capable of being catered by less than the capacity of running DG sets then command must be given to stop required number of excess DG sets after running idle for short duration. Provision to select no. of DG sets to be started and synchronised at no load to cope up with sudden load without tripping the DG's should also be inbuilt into the system.

10.3.2 Automatic Synchronisation:

The facility of synchronisation will be available in both Auto & Manual mode. In normal circumstances the auto synchronisation will work, however if due to any reason auto synchronisation fails repeatedly the facility for Closer of ACB must be available automatically. In manual mode ACB will be closed by panel push button.

10.3.3 Automatic Load Sharing:

The load sharing will also be automatic, by sensing both active & reactive power.

10.3.4 Back up Protection:

The system should also have following inbuilt protection other than external relays in synchronization panel:

Reverse power, Reverse KVAR, Over Current, Under voltage, Over voltage, Under frequency, Over frequency, synchro-check & earth fault relay except differential relay. Due to any electrical fault PLC shall trigger the master trip relay.

These PLCs will be state of the art equipments using latest technology and of most rugged and reliable design. Since they shall be operating in the harsh & unfriendly environment of DG room, they will be suitable to operate trouble free in those conditions. The chosen equipment should be able to withstand high temperature, humidity & voltage fluctuations, thus making it suitable for the operating conditions described above.

10.5 Sequence of operation: The following sequence of operation shall be achieved through PLC based logic panel in addition to hardware interlocks as well as software interlocks:

- Selection of any generator as a lead generator to achieve the uniform running hours of all generators.
- Three attempts to start the engine of lead generator. In case the engine fails to start or does not achieve the requisite speed within the predetermined time, PLC system declares engine of generator faulty. In this event PLC automatically selects next generator as the lead generator.
- The PLC system automatically selects starting sequence of other generators on the basis of the lead generator being selected by the operator. Before issuing close command to lead generator air circuit breaker, PLC checks that ACB of any other generator is not in close position. Then PLC system gives close command to lead generator ACB. The PLC system tries two times with interval of 5 secs. to close the ACB. Simultaneously, it also gives starting command to next generator engine in queue depending upon load.

  The speed, excitation, frequency and voltage of incoming generator is controlled identically as per the lead generator starting sequence described above, except closing of ACB.

  When the lead generator KW crosses more than the 85% of rated capacity of DG set, the PLC system performs synchronization sequence for paralleling of generator prior to switching on of the ACB of 2nd generator. When the KW of 2nd generator crosses 80% of rated capacity of DG set then the PLC system performs synchronization sequence for paralleling of next generator prior to switching on the ACB of 3rd generator and similar sequence to be followed for other DG sets.
- The last incoming generator ACB is tripped when PLC system senses that the total load on the system is less than the specified load and stops the engine after 5 minutes of idle running.
- DG sets will start and stop automatically depending on the pre defined load setting in the PLC & also all DG sets will operate in load sharing mode.

SECTION 10

Appendix -I

LIST OF INDIAN STANDARDS

I : ELECTRO –TECHNICAL VOCABULARY:

(1)	Fundamental definition	IS: 1885 (Part-I) 1961
(2)	Secondary cells and batteries (Superceding IS: 1147-1957)	IS: 1885 (Part-VIII) 1986
(3)	Electrical power system protection	IS: 1885 (Part-X) 1993
(4)	Electrical Measurement	IS: 1885 (Part-XI) 1966
(5)	Switchgear and control gear (First revision)	IS: 1885 (Part-XVII) 1979
(6)	Overhead transmission and distribution of electrical energy	IS: 1885 (Part-XXX) 1971
(7)	Cables, conductor and accessories for Electrical supply (Superseding IS : 1591-1960)	IS: 1885 (Part-XXXII) 1993

(8)		Transformers (First revision)	IS: 1885 (Part-XXXVIII) 1993

II : GRAPHICAL SYMBOLS USED IN ELECTRO TECHNOLOGY :

(1)		Guide for preparation of diagrams, charts & tables for electro technology. Defenitions and classification (Superceding IS: 2032 (Part-I) 1962	IS: 8270 (Part-I) 1976
(2)		Item designation	IS: 8270 (Part-II) 1976
(3)		General requirements for diagrams	IS: 8270 (Part-III) 1977
(4)		Circuit diagrams	IS: 8270 (Part-IV) 1977
(5)		Inter connection diagrams and table	IS: 8270 (Part-V) 1976

III : CONDUCTOR AND POWER CABLES :

(1)		PVC insulated cable for working voltages upto and including 1100 volts (Second revision) (Superceding IS: 3035 Part I 1965)	IS: 694/1990
(2)	(i)	PVC insulate (Heavy duty) working dielectric cables for voltage upto & i/c. 1100 volts (Second revision)	IS:1554 (Part-I)/ 1988
	(ii)	For working voltage from 3.3 KV upto and including 11KV	IS: 1554 (Part II)/1988
(3)	(i)	Recommended current ratings for cables: Paper insulated lead sheathed cables.	IS:3961 (Part I) 1967
	(ii)	PVC insulated and PVC sheathed heavy duty cables.	IS: 3961 (Part II) 1967
(4)		Application guide for non linear resistor type Surge arrester for alternating current system (First revision)	IS: 15086 (Part-5).
(5)		Recommended short circuit ratings of high voltage PVC cable	IS: 5819-1970
(6)		Conductors for insulated electric cables and	IS: 8130/1984

	flexible cords.	
(7)	Busbar trunking system (Air insulated & sand witch insulated type)	IS: 8623 Part I & II/ 1993, IS: IEC 60439-Part I & II

IV : ELECTRICAL INSTALLATION CODE OF PRACTICES :

(1)	Installation and maintenance of transformers	IS: 10028 (Part-II & III)
(2)	Insulation oil in service, maintenance and supervision code of practice for	IS: 1866/2000
(3)	Earthing	1S : 3043/1987
(4)	Guide for short circuit calculations	IS: 13234
(5)	Electrical wiring installation (system voltage not exceeding 650 volts)	IS: 732/1989
(6)	Paper insulated power cables (Upto and including 33KV (first revision)	IS: 1255/1983

V : SWITHC GEAR AND CONTROL GEAR :

(1)		Degree of protection provided by the (enclosure for low voltage switchgear and control gear)	IS: 13947 (Part-I)
(2)		HRC cartridge fuse links upto 650 volts.	IS: 9224 (Part-II)
(3)	(i)	Circuit breaker AC requirements & tests for voltages not exceeding 1000 Volts a.c or 1200 volts d.c.	IS:13947 (Part -II)
	(ii)	General and definition. Section 2- Voltages above 1000 volt a.c.	IS: 13118-1991
	(iii)	Type tests & Routine test for voltage above 1000 Volt a.c.	IS: 13118-1991
(4)		Heavy duty air break switches and composite units of air break switches & fuses for voltages	IS: 4064

	not exceeding 1000 volts.	
(5)	General requirements for switch gear, control gear for voltage not exceeding 1000 volts.	IS: 13947 (Part-I)
(6)	(i) Factory built assemblies of switch gear and control gear for voltages upto & including 1200 V DC.	IS:1000 V AC or 8623/1993
	(ii) Particular requirements for bus bar trunking system (Bus ways)	IS: 8623 (Part II)/1993
(7)	High Voltage alternating current circuit breaker	IS: 13118-1991 IEC : 60056
(8)	High Voltage Switches –Part I : Switches for Rated Voltages Above I Kv and Less Than 52Kv	IS: 9920-2002
(9)	A.C Metal Enclosed Switchgear and Control gear for Rated Voltages Above I Kv and UP to and Including 52 Kv	IS : 3427-1997
(10)	Electrical Measuring Instruments and their Accessories	IS: 1248
VI : TRANSFORMERS ANDF REACTORS :		
(1)	Dry type power transformer	IS: 11171-1985
(2)	power transformer	
	(i) General	IS:2026 (Part-I) -1977
	(ii) Temperature rise	IS: 2026 (Part-II)-1977
	(iii) Insulation level and di-electric tests	IS: 2026 (Part-III)/1981
(3)	Distribution transformers	IS: 1180/1989
(4)	Gas operated relays	IS: 3637/1966
(5)	Power transformers fittings and accessories	IS: 3639/1966

(6)	Guide for loading of oil immersed transformers	IS: 6600/1972
(7)	(i) Current transformers Part I to III	IS: 2705/1992
	(ii) Voltage transformers Part I to III	IS: 3156/1992
(8)	Outdoor type three- phase distribution transformers	IS: 2099/1986
VII : CHEMICALS:		
(1)	Colours for ready mixed paints and enamels (Third revision)	IS: 5/1994
(2)	Ready mixed paint brushing zinc chrome priming (IInd revision)	IS: 104/1979
(3)	Enamel, synthetic exterior (a) under coating (b) finishing (Ist revision)	IS: 2932/2003
VIII : INSULATING LIQUIDS :		
(1)	Specific resistance (resistivity) or electrical insulating liquids, methods of tests for	IS: 6103/1971
(2)	Electric strength of insulating oils, methods for determination of	IS: 6792/1992
(3)	New insulation oils for transformers and switchgears (2nd revision)	IS: 335/1993
(4)	Insulating Mats	IS: 15625/2006
IX: SAFETY EQUIPMENTS:		
(1)	CO2 based Fire Extinguisher	IS: 2878/1976
(2)	Chemical based Fire Extinguishers	IS: 2171/1976
(3)	HCFC Blend- A Extinguishing System	IS: 15505-2004
(4)	Insulating Mats	IS: 15625-2006

LIST OF APPROVED MAKES

Sr. No	ITEMS	Approved Make
1	LT PANELS	ADLEC/TRICOLITE/ PEATON/ SPC ELECTROMECH
2	AIR CIRCUIT BREAKERS	L & T/ G.E POWER / SIEMENS/ ABB / SCHNEIDER/ LEGRAND
3	MOULDED CASE CIRCUIT BREAKERS	L & T/ SIEMENS/ SCHNEIDER/ GE POWER/ ABB / LEGRAND.
4	FUSE DISCONNECTOR SWITCH/ SWITCH FUSE UNITS	L & T / SIEMENS / GE POWER / ABB / INDO ASIAN/ SCHNEIDER/ CONTROL & SWITCH GEAR/HAVELLS/ STANDARD
5	HRC FUSES	L & T/ GE POWER / SIEMENS / ABB / CONTROL & SWITCHGEAR/INDO ASIAN/ HAVELLS/ STANDARD
6	AMMETER, VOLTMETER,	AE/MECO / UNIVERSAL / RISHAB / IMP/ TRINTY / ELMEASURE/ CONZERVE
7	KWH, PF, FREQUENCY METER	L & T / HAVELLS/ BHEL / SIMCO / UNIVERSAL /JAIPUR / METERS/ AE/HPL/ AREVA
8	DIGITAL METERS / INTELLIGENT MULTIFUNCTIONAL DIGITAL METER	CONSERVE / NEPTUNE / HPL / L&T / TRINITY / SCHNEIDER / MOTWANI / RISHAB/ ELMEASURE/ SECCURE. (The approved OEM of HT/LT Panel manufacturers shall be permitted).
9	TRIVECTOR METER	JAIPUR/IMP / L&T
10	SELECTOR SWITCH, PUSH, BUTTON SWITCH / EMERGENCY SWITCH	KAY CEE / CONTROL & SWITCH GEARS / L&T / GE POWER / SIEMENS / BCH/ SCHENIDER / ROCKWELL(ALLEN BRADELY)/ TEKNIC . (The approved OEM of LT/HT Panel manufacturers shall be permitted).
11	LED INDICATION LAMPS	AE / C&S / VINAY LED / EASUN / CONCORD / KAY CEE / SIEMENS / VAISHNOV / L&T/ SCHENIDER/ ROCKWELL (ALLEN BRADLEY) / PREFIFINE / BCH (The approved OEM of HT/LT Panel manufacturers shall be permitted).
12	CT'S	AE / KAPPA / UNIVERSAL / KAYCEE / IMP/ C &S / L&T/ MECO/ KAPCO /CROMPTON GREAVES /PRAGATI /INSTRANS. (The approved OEM of HT / LT Panel manufacturers shall be permitted).
13	PROTECTIVE RELAYS	AREVA / EASUN REYROLLE / L&T / ABB / SIEMENS/C&S
14	DRY TYPE TRANSFORMERS	CROMPTON GREAVES / VOLTAMP / KIRLOSKAR / ABB
15	11KV OR 33KV HT PANEL WITH VCB	CROMPTON GREAVES / SIEMENS / ABB / SCHNIDER / KIRLOSKAR
16	EARTHING	ASHLOK/OBO/GEPL

17	LIGHTINING ARRESTOR	LAMCO / ELPRO / INTERNATIONAL / ATLAS / OBLUM / ALPRO/ WS IND / JAIPURIA / JAYSHREF
18	ADVANCE LIGHTING ARRESTER (EARLY STREAMER EMMISSION TYPE / ONLINE SURGE ARRESTER)	INDELEC/ ERICO / DUVAL MASSIAN / PHEONIX / TERCEL / FRANKLIN / LPI
19	DIESEL ENGINE	KOEL / ASHOK LEYLAND / GREAVES / CUMMINS / CATERPILAR / MTU / VOLVO PENTA / PERKINS
20	ALTERNATOR	KIRLOSKAR / JYOTI / CROMPTON GREAVES / NGEF/KEL/STAMFORD/LEROY SOMER
21	BATTERIES	EXIDE / AMCO / PRESTOLITE / AMARON / GENPRO / STANDARD FURUKAWA / LUCAS / HBL NIFE
22	STREET LIGHT POLE	BAJAJ/ TRANSRAIL/
23	LED STREET LIGHT	PHILIPS/WIPRO/GE
24	HT/LT Cables	KEI/ Polycab/ HAvells/ Universal

SECTION-8

DRAWINGS

SECTION-9

BILL OF QUANTITY

SL NO.	DESCRIPTION OF ITEM	UNIT	QTY		AMOUNT
1.01	**CSS (Compact Sub Station)**	-	-		-
	Supply, Installation, Testing and Commissioning of CSS with 33/0.4, 1500KVA Dry type Transformer, 630A (Ref .Technical Specifications, Technical particulars & Single line Diagram)	Job	2		0.00
	A) INCOMER				
	i) 1 Nos.Vaccum Circuit Breaker/SF6 Breaker -33 KV, 630A,3 pole, 25 kA				
	B) OUTGOING				
	i) 1 nos. Air Circuit Breaker - 3200A ,4 pole, 50 kA				
	C) 33KV/0.433KV Dry type transformer				
	33/ 0.433 KV, 1500 KVA, 3Ph, 50 Hz, vector group Dyn-11, ANAN cooled, copper wound Transformer with off load tap changer (OFTC) to cater to voltage variation range of + 5% to - 15% in steps of 2.5%.	-			
1.03	**SUPPLY OF HT/LT CABLES**				
1.03.01	Supply of following sizes of XLPE insulated PVC sheathed aluminium conductor armoured **power cable** of **33 KV** grade (33KV earthed system) conforming to IS 7098 amended upto date.				
a)	3 Core, 300 Sq.mm.	Meter	150		0.00
b)	3 Core, 185 Sq.mm.	Meter	150		0.00
1.03.02	Supplying of following sizes of 1.1 KV grade PVC insulated copper conductor armoured solid **Control Cable** complete as required				
a)	2 core, 2.5 Sq.mm. Copper Conductor cable	Meter	150		0.00
b)	4 core, 2.5 Sq.mm. Copper Conductor cable	Meter	75		0.00
c)	10 core, 2.5 Sq.mm. Copper Conductor cable	Meter	100		0.00
d)	12 core, 2.5 Sq.mm. Copper Conductor cable	Meter	175		0.00
1.04	**LAYING OF HT & LT CABLES**	-			
1.04.01	Laying of one number armoured XLPE insulated and PVC sheathed power cable of grade exceeding 11KV but not exceeding **33 KV** of size above **120 Sq.mm. but not exceeding 400 Sq.mm., direct in ground** including excavation, sand cushioning, protective covering and refilling the trench etc. as required.	Meter	35		0.00
1.04.03	Laying of one number armoured XLPE insulated and PVC sheathed power cable of grade exceeding 11KV but not exceeding **33 KV** of size above **120 Sq.mm. but not exceeding 400 Sq.mm., in the existing RCC Hume Pipe Masonry chamber/ Duct/ etc**. as required.	Meter	65		0.00
1.05	**HT CABLE END TERMINATION**				
1.05.1	Supplying and making **outdoor cable end termination** with suitable jointing kit complete with all accessories, bimetallic washers and including lugs for the following size of 3 Core, XLPE alumimium conductor **cable of 33 KV** grade as required.				
a)	3 Core 300 Sq.mm.	Sets	4		0.00

1.05.2	Supplying & making **indoor cable end termination** with suitable jointing kit complete with all accessories, bimetallic washers and including lugs for the following size of 3 core XLPE aluminium conductor **cable of 33 KV** grade complete as required.				
a)	3 Core 300 Sq.mm.	Sets	2		0.00
b)	3 Core 185 Sq.mm.	Sets	6		0.00
1.06.2	Supplying and making **end termination** with single brass compression gland and Copper lugs for following size of PVC sheathed copper conducter armoured control **cable of 1.1 KV** grade as required.				
a)	2 C x 2.5 Sq.mm.	Sets	40		0.00
b)	4 C x 2.5 Sq.mm.	Sets	40		0.00
c)	10 C x 2.5 Sq.mm.	Sets	40		0.00
d)	12 C x 2.5 Sq.mm.	Sets	40		0.00
1.07	Providing and fixing following sizes of **class `B' GI pipe with ISI mark in surface/ wall** etc. as required.				
a	80 mm	Meter	45		0.00
b	50 mm	Meter	45		0.00
1.08	Providing and fixing following sizes of class `B' GI pipe with ISI mark in ground including excavation, refilling upto a depth of 1.2 metre etc as required.				
a	80 mm	Meter	45		0.00
b	50 mm	Meter	45		0.00
1.09	**LT BUS DUCT**				
1.09.01	Supply, Installation, Testing and Commissioning of **Indoor type**, **TPN Bus duct, 415V, AC supply, suitable for indoor installation of** following capacity made out of 2 mm thick sheet steel enclosure IP 54 with powder coating painting, aluminium bus bar with suitable RYBN colour coded heat shrinkable sleeve, bus bar supports, proper supporting arrangement with metal suspenders/ brackets etc., flexible end termination and complete with fittings & accessories like elbows, offset sections, tees, reducers, adaptor boxes, flanges, flexible connections & expansion joints, ground strips, and earthing with Two runs of GI strip etc. as required.(sandwitch type)				
a)	3200 Amp TPN Bus Duct (From TR to Main LT Panel TR)	Meter	15		0.00
b)	2500 Amp TPN Bus Duct (From Main LT Panel to Load Panel & DG Sync Panel to Load panel)	Meter	20		0.00
c)	1250Amp TPN Bus Duct (From Main LT Panel TR to Capacitor Panel)	Meter	20		0.00
d)	800Amp TPN Bus Duct (From DG Set to DG Sync Panel)	Meter	45		0.00
	CABLES				
1.10	Supply of following sizes of XLPE insulated PVC sheathed, aluminium conductor armoured, power cable of **1.1 KV grade** conforming to IS 1554 (Part I), 1988 amended upto date.				
1.10.01	3.5 Core, 300 Sq.mm.	Meter	200		0.00
1.10.02	3.5 Core, 240 Sq.mm.	Meter	80		0.00
1.10.03	3.5 Core, 185 Sq.mm.	Meter	250		0.00
1.10.04	3.5 Core, 150 Sq.mm.	Meter	100		0.00
1.10.05	3.5 Core, 70 Sq.mm.	Meter	50		0.00
1.1	3.5 Core, 35 Sq.mm.	Meter	60		0.00

0.06					
1.10.07	3.5 Core, 25 Sq.mm.	Meter	50		0.00
1.10.08	3.5 Core, 10 Sq.mm.	Meter	40		0.00
2.00	**LT PANELS**				
2.01	Main LT Panel (Transformer)		-	-	
	Design, manufacture Supply, Installation, Testing and Commissioning of main **LT panel**, cubicle type, made of 2 mm thick sheet steel, totally enclosed, IP 52, free standing, floor mounting, dust and vermin proof ,indoor, compartmentalised, powder coated painting suitable for operation on 3 Phase and neutral, 415v, 50 Hz AC system with Al.busbars extensible on both sides, interconnections including supply & installation of following items and as per Technical specification:	Job	1		0.00
	A) INCOMER				
	i) 2 Nos. ACB, 3200A, FP, 50 kA, (for Transformers) motor wound spring charged closing mechanism,drawout type ACB with Microprocessor based release having short circuit, over current, earth fault, zone selective interlocking features with communication port RS 485				
	iii) 2 nos. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses/MCBs.				
	v) 2 Sets Indication Lamps, LED type, R,Y,B and breaker 'ON' , 'OFF', 'TRIP' lamps				
	vii) 3 nos. of current transformer Class 0.5, 15 VA for IPFC Relay.				
	B) Bus Bars				
	i) 01 set of Bus bars, 3200 Amps, TPN, Aluminium Bus bars with 100% Neutral				
	C) Bus coupler				
	i) 1 Nos. ACB, 3200A, FP, 50 kA, motor wound spring charged closing mechanism,drawout type ACB with Microprocessor based release having short circuit, over current, earth fault zone selective interlocking features with communication port RS 485.				
	ii) 1 Sets Indication Lamps, LED type 'ON' , 'OFF', lamps with HRC control fuses/MCBs.				
	D) Accessories for Electrical Interlocking				
	i) Required number of accessories for suitable electrical interlock arrangement among 2 Nos Incomers for transformer and 1 Nos. Bus coupler.including interconnection etc as required.				
	E) Outgoing				

	i) 2 Nos. ACB, 2500A, FP, 50 kA, motor wound spring charged closing mechanism,drawout type ACB with Microprocessor based release having short circuit, over current, earth fault, zone selective interlocking features with communication port RS 485				
	ii) 2 Nos. ACB, 1250A, FP, 50 kA, motor wound spring charged closing mechanism,drawout type ACB with Microprocessor based release having short circuit, over current, earth fault, zone selective interlocking features with communication port RS 485				
	ii) 1 Nos. ACB, 1000A, FP, 50 kA, motor wound spring charged closing mechanism,drawout type ACB with Microprocessor based release having short circuit, over current, earth fault, zone selective interlocking features with communication port RS 485				
	iii) 2 Nos. ACB, 800A, FP, 50 kA, motor wound spring charged closing mechanism,drawout type ACB with Microprocessor based release having short circuit, over current, earth fault, zone selective interlocking features with communication port RS 485				
	iv) 2 Nos. MCCB, 400A,50 kA, Four Pole , with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	v) 2Nos. MCCB, 250A, 50 kA, Four Pole , with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module				
	vi) 6 Nos. MCB, 63A, 10 kA, Four Pole				
	ix) 11 nos. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses/MCBs.				
	x) 8 Sets (1 Set for each Outgoing ACB) of Indicating lamps, LED type, for breaker "ON", "OFF", "TRIP" indication with HRC control fuses/MCBs.				
	xi) 4 Sets (1 set for each MCCB) of Extended Rotary operating mechanism, terminal extension spreaders and 'ON' (Red) indication lamp (LED type) with HRC control fuse/MCBs				
	Make : Adlec, Tricolite, Peaton, SPC Electromech				
2.02	**Main Load LT Panel**	Job	1		0.00
	Design, manufacture Supply, Installation, Testing and Commissioning of main **LT panel**, cubicle type, made of 2 mm thick sheet steel, totally enclosed, IP 52, free standing, floor mounting, dust and vermin proof ,indoor, compartmentalised, powder coated painting suitable for operation on 3 Phase and neutral, 415v, 50 Hz AC system with Al.busbars extensible on both sides, interconnections including supply & installation of following items and as per Technical specification:				
	A) INCOMER				
	i) 2 Nos. ACB, 2500A, FP, 50 kA, (1 From Transformer LT Panel & 1 From DG Sync Panel) motor wound spring charged closing mechanism,drawout type ACB with Microprocessor based release having short circuit, over current, earth fault, zone selective interlocking features with communication port RS 485				
	iii) 2 nos. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses/MCBs.				
	v) 2 Sets Indication Lamps, LED type, R,Y,B and breaker 'ON' , 'OFF', 'TRIP' lamps				

	B) Bus Bars				
	i) 01 set of Bus bars, 2500 Amps, TPN, Aluminium Bus bars with 100% Neutral				
	C) Bus coupler				
	i) 1 Nos. ACB, 2500A, FP, 50 kA, motor wound spring charged closing mechanism,drawout type ACB with Microprocessor based release having short circuit, over current, earth fault zone selective interlocking features with communication port RS 485.				
	ii) 1 Sets Indication Lamps, LED type 'ON' , 'OFF', lamps with HRC control fuses/MCBs.				
	D) Accessories for Electrical Interlocking				
	i) Required number of accessories for suitable electrical interlock arrangement among 2 Nos Incomers for transformer and 1 Nos. Bus coupler.including interconnection etc as required.				
	E) Outgoing				
	i) 3 Nos. ACB, 1000A, FP, 50 kA, motor wound spring charged closing mechanism,drawout type ACB with Microprocessor based release having short circuit, over current, earth fault, zone selective interlocking features with communication port RS 485				
	ii) 3 Nos. MCCB 400A, FP, 50 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	iii) 9 Nos. MCCB 250A, FP, 35 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	iv) 6 Nos. MCCB 100A, FP, 25 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	iv) 4Nos. MCCB 63A, FP, 25 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	ix) 25 nos. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses/MCBs.				
	x) 3 Sets (1 Set for each Outgoing ACB) of Indicating lamps, LED type, for breaker "ON", "OFF", "TRIP" indication with HRC control fuses/MCBs.				
	xi) 22Sets (1 set for each MCCB) of Extended Rotary operating mechanism, terminal extension spreaders and 'ON' (Red) indication lamp (LED type) with HRC control fuse/MCBs				
	Make : Adlec, Tricolite, Peaton, SPC Electromech				
2.03	**CAPACITOR PANEL**				
	Design, Supply, Installation, Testing and Commissioning of **Automatic Power Factor Corrector Panel, 650 kVAR,** 3ph, 415v, totally enclosed, free standing, floor mounting, dust and vermin proof, cubicle type to be fabricated out of min. 2 mm thick Sheet steel, with provision for capacitor mounting arrangement inside the panel with Aluminium Busbars, interconnections, adequate number of louvers and powder coated with approved shade including supply & installation of following components and as per technical specifications:	Job	2		0.00
	A) INCOMER				

	i) 1 No. ACB, 1250A, FP, 50 kA, Manual wound spring charged closing mechanism, Drawout type with Thermal magnetic release,				
	ii) 1 no. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses.				
	i) 01 set of Bus bars, 1250 Amps, TPN, Aluminium Bus bars with 100% Neutral				
	iv) 1 Set of Digital Voltmeter suitable range for 3 phase, 4 wire operation with LED display and built-in selector switch along with 3 nos of HRC control fuses/MCBs.				
	v) 1 Set of Indication Lamps, LED type, R,Y,B and breaker 'ON' , 'OFF' & 'TRIP' lamps				
	vi) 1 Set of Digital Ammeter of suitable range for 3 phase 4 wire operation with LED display and selector switch and suitable CT ratio programmable and auto ranging along with 3 nubmers of class 1.0, 15 VA CTs.				
	vii) Microprocessor based intelligent, 14 step IPFC relay with PF display and adjustable setting				
	B) CAPACITORS				
	i) 4 Nos. 100 KVAR Heavy duty capacitor units.				
	ii) 4 Nos. 50 KVAR Heavy duty capacitor units.				
	iii) 1 Nos. 25 KVAR Heavy duty capacitor units.				
	iv) 2 Nos. 10 KVAR Heavy duty capacitor units.				
	v) 1 Nos. 5 KVAR Heavy duty capacitor units.				
	C) OUTGOING SWITCHGEARS & OTHER COMPONENTS				
	i) 4 Nos. 250A, TP MCCB, 50 KA.thermal magnetic release with overload setting				
	ii) 4 Nos. 160A, TP MCCB, 50 KA.thermal magnetic release with overload setting				
	iii) 4 Nos. 63A TP MCCB 50 KA thermal magnetic release with overload setting				
	iv) 100 kVAr capacitor duty contactor with illuminated ON- OFF push buttons (LED type)- 4 Nos.				
	v) 50 kVAr capacitor duty contactor with illuminated ON- OFF push buttons (LED type)- 4 Nos.				
	vi) 25 kVAr capacitor duty contactor with illuminated ON- OFF push buttons (LED type)-1 No.				
	vii) 10 kVAr capacitor duty contactor with illuminated ON- OFF push buttons (LED type)- 2 Nos.				
	viii) 5 kVAr capacitor duty contactor with illuminated ON- OFF push buttons (LED type)- 1 No.				
	ix) 2 Sets of Axial flow fans with thermostate.				
	x) 1 Set of Rotary operating mechanism and terminal extension / spreaders for all the MCCBs.				

	xi) Complete in all respect including all interconnections from the bus bars to MCCB and MCCB to contactor and contactor to terminal blocks for Automatic Switching "ON" and "OFF" capacitor panel described as above				
	Make: ABB, Unistar , Nepchune				
2.04	**First Floor Panel**	Job	2		0.00
	Design, manufacture Supply, Installation, Testing and Commissioning of main **LT panel**, cubicle type, made of 2 mm thick sheet steel, totally enclosed, IP 52, free standing, floor mounting, dust and vermin proof ,indoor, compartmentalised, powder coated painting suitable for operation on 3 Phase and neutral, 415v, 50 Hz AC system with Al.busbars extensible on both sides, interconnections including supply & installation of following items and as per Technical specification:				
	A) INCOMER				
	i) 630 Amps Auto Changeover (1 Supply From TR Panel & 1 supply From load panel)				
	ii) 2 Set of Indication Lamps, LED type, R,Y,B and breaker 'ON' , 'OFF' & 'TRIP' lamps				
	iii) 1 Set of Indication Lamps, LED type breaker 'ON' lamps				
	iv) 1 nos. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses/MCBs.				
	B) Bus Bars				
	i) 01 set of Bus bars, 630 Amps, TPN, Aluminium Bus bars with 100% Neutral				
	E) Outgoing				
	iii) 1 Nos. MCCB 250A, FP, 35 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	iv) 3 Nos. MCCB 100A, FP, 25 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	iv) 4 Nos. MCCB 63A, FP, 25 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	v) 4 Nos 6-32 Amps DP MCB				
	ix) 8 nos. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses/MCBs.				
	xi) 8 Sets (1 set for each MCCB) of Extended Rotary operating mechanism, terminal extension spreaders and 'ON' (Red) indication lamp (LED type) with HRC control fuse/MCBs				
	Make : Adlec, Tricolite, Peaton, SPC Electromech				
2.05	**Ground Floor Panel**	Job	2		0.00
	Design, manufacture Supply, Installation, Testing and Commissioning of main **LT panel**, cubicle type, made of 2 mm thick sheet steel, totally enclosed, IP 52, free standing, floor mounting, dust and vermin proof ,indoor, compartmentalised, powder coated painting suitable for operation on 3 Phase and neutral, 415v, 50 Hz AC system with Al.busbars extensible on both sides, interconnections including supply & installation of following items and as per Technical specification:				
	A) INCOMER				

	i) 1 Nos. MCCB 450A, FP, 35 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	ii) 1 nos. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses/MCBs.				
	ii) 1 Sets (1 set for each MCCB) of Extended Rotary operating mechanism, terminal extension spreaders and 'ON' (Red) indication lamp (LED type) with HRC control fuse/MCBs				
	B) Bus Bars				
	i) 01 set of Bus bars, 500 Amps, TPN, Aluminium Bus bars with 100% Neutral				
	E) Outgoing				
	iv) 2 Nos. MCCB 100A, FP, 25 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	iv) 4 Nos. MCCB 63A, FP, 25 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	v) 4 Nos 6-32 Amps DP MCB				
	ix) 6 nos. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses/MCBs.				
	xi) 6 Sets (1 set for each MCCB) of Extended Rotary operating mechanism, terminal extension spreaders and 'ON' (Red) indication lamp (LED type) with HRC control fuse/MCBs				
	Make : Adlec, Tricolite, Peaton, SPC Electromech				
2.06	**Second Floor Panel**	Job	2		0.00
	Design, manufacture Supply, Installation, Testing and Commissioning of main **LT panel**, cubicle type, made of 2 mm thick sheet steel, totally enclosed, IP 52, free standing, floor mounting, dust and vermin proof ,indoor, compartmentalised, powder coated painting suitable for operation on 3 Phase and neutral, 415v, 50 Hz AC system with Al.busbars extensible on both sides, interconnections including supply & installation of following items and as per Technical specification:				
	A) INCOMER				
	i) 1 Nos. MCCB 450A, FP, 35 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	ii) 1 nos. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses/MCBs.				
	ii) 1 Sets (1 set for each MCCB) of Extended Rotary operating mechanism, terminal extension spreaders and 'ON' (Red) indication lamp (LED type) with HRC control fuse/MCBs				
	B) Bus Bars				
	i) 01 set of Bus bars, 500 Amps, TPN, Aluminium Bus bars with 100% Neutral				
	E) Outgoing				
	iv) 2 Nos. MCCB 100A, FP, 25 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	iv) 4 Nos. MCCB 63A, FP, 25 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	v) 4 Nos 6-32 Amps DP MCB				

	ix) 6 nos. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses/MCBs.				
	xi) 6 Sets (1 set for each MCCB) of Extended Rotary operating mechanism, terminal extension spreaders and 'ON' (Red) indication lamp (LED type) with HRC control fuse/MCBs				
	Make : Adlec, Tricolite, Peaton, SPC Electromech				
2.07	**Third Floor Panel**	Job	2		0.00
	Design, manufacture Supply, Installation, Testing and Commissioning of main **LT panel**, cubicle type, made of 2 mm thick sheet steel, totally enclosed, IP 52, free standing, floor mounting, dust and vermin proof ,indoor, compartmentalised, powder coated painting suitable for operation on 3 Phase and neutral, 415v, 50 Hz AC system with Al.busbars extensible on both sides, interconnections including supply & installation of following items and as per Technical specification:				
	A) INCOMER				
	i) 1 Nos. MCCB 450A, FP, 35 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	ii) 1 nos. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses/MCBs.				
	ii) 1 Sets (1 set for each MCCB) of Extended Rotary operating mechanism, terminal extension spreaders and 'ON' (Red) indication lamp (LED type) with HRC control fuse/MCBs				
	B) Bus Bars				
	i) 01 set of Bus bars, 500 Amps, TPN, Aluminium Bus bars with 100% Neutral				
	E) Outgoing				
	iv) 2 Nos. MCCB 100A, FP, 25 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	iv) 4 Nos. MCCB 63A, FP, 25 kA,with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	v) 4 Nos 6-32 Amps DP MCB				
	ix) 6 nos. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses/MCBs.				
	xi) 6 Sets (1 set for each MCCB) of Extended Rotary operating mechanism, terminal extension spreaders and 'ON' (Red) indication lamp (LED type) with HRC control fuse/MCBs				
	Make : Adlec, Tricolite, Peaton, SPC Electromech				
	EARTHING-				
3.01	Supply & fixing of 50 mm x 6mm copper strip in 80 mm dia GI pipe from earth electrode as required.	Meter	90		0.00
3.02	Providing & fixing of 50mm x 6mm G.I. strip on surface or recess for earth connection as required.	Meter	200		0.00

3.03	Providing & fixing of 75mm x 6mm G.I. strip on surface recess for earth connection as required.	Meter	100		0.00
3.04	Supplying and laying 25 mm x 6 mm GI strip at 0.50 m below ground level as strip earth electrode, including soldering etc. as required.	Meter	60		0.00
3.05	Providing & fixing of 25mm x 6mm GI strip on surface recess for earth connection as required.	Meter	450		0.00
4.00	**BATTERY CHARGER & BATTERIES**				
4.01	Supply, Installation, Testing and Commissioning of 1 (One) number 24 V Battery Charger & 2 (Two) numbers of 12V 180 AH maintenance free sealed lead acid batteries, Battery Charger shall be solid state, full wave fully controlled bridge, input suitable for single phase 230V AC suppply, conforming to degree of protection IP-42, Sheet steel enclosure 14 SWG thick, with automatic voltage regulation, current limiting circuitary, auto cut facility, smooth filter circuit switches, Ammeter & voltmeter on DC side, phase indicating lamps (LED type) on AC side complete in all respect with float and boost/ buck charging, switchgear, earthing, powder coated painting etc as required.	Job	2		0.00
5.00	**SAFETY EQUIPMENTS**				
5.01	Supplying of Rubber hand gloves suitable for 33 KV.	Pair	4		0.00
5.02	Supplying and fixing of glass framed Shock treatment chart both in Hindi & English.	Each	6		0.00
5.03	Supply and fixing single line diagram, schematic diagrams etc. of A1 size on suitable Aluminium sheet including lamination etc. as required complete on wall.	Job	1		0.00
5.04	Supply and fixing single line diagram, schematic diagrams etc. of A0 size on suitable Aluminium sheet including lamination etc. as required complete on wall.	Job	1		0.00
5.05	Preparation and providing Information Booklet on HT/LT power distribution system with soft copy in CD.	Job	1		0.00
5.06	Preparation and providing power point presentation on HT/LT power distribution system with soft copy in CD.	Job	1		0.00

5.07	Supply and fixing Carbon dioxide fire extinguishers of 4.5 kg each as per IS : 2878-1976 and mounting the same on wall by means of suitable hooks.	Each	4		0.00
5.08	Supply and fixing Dry chemical fire extinguishers 5 kg as per IS : 2171-1976.	Each	10		0.00
5.09	Supply and fixing of following fire extinguishers chemical foam type:				
a)	9 ltr chemical foam type fire extinguisher	Each	4		0.00
b)	9 ltr chemical foam type fire extinguisher with trolley suitable for Petroleum Fires Protection conforming to IS : 5507.	Each	2		0.00
5.10	Supply and fixing G.I. Fire buckets 13 litre capacity filled with dry sand and fixed on wall hook made out of 13mm dia MS rod & conforming IS 2546 - 1974.	Each	16		0.00
5.11	Fabrication, Supply and installation of Canopy type MS structure for fixing 8 numbers of 13 litre capacity fire buckets.	Set	3		0.00
5.12	Supply of First aid box containing material as prescribed by St. John Ambulance brigade OR Indian Red Cross complete as required.	Each	4		0.00
5.13	Supply & fixing of fire retardant / extinguishing Electrical Insulated synthetic mat of 3.0 mm thick ± 10% conforming to latest BIS: DOC NO. ET-02 (5440) meeting requirements of IS 3043, IS 5216 (part-1, 2&3), IS 8437 and IEC 479, suitable for all voltages not exceeding 33 KV AC and having minimum width of 1000 mm +/- 20 mm and including supply of required quantity of adhensive / compound and fixing the same at site as per site requirement.	Meter	10		0.00
5.14	Supply & fixing of fire retardant / extinguishing Electrical Insulated synthetic mat of 2.0 mm thick ± 10% conforming to latest BIS: DOC NO. ET-02 (5440) meeting requirements of IS 3043, IS 5216 (part-1, 2&3), IS 8437 and IEC 479, suitable for all voltages not exceeding 3.3 KV AC and 220 V DC supply and having minimum width of 1000 mm +/- 20 mm and including supply of required quantity of adhensive / compound and fixing the same at site as per site requirement.	Meter	20		0.00
5.15	Supplying and Fixing of the following danger/ Caution notice boards as per the I.E. specifications.				
a)	Danger board for 33KV size 250mm x 200mm x 2mm thick.	Each	8		0
b)	Danger board for 433V size 200mm x 150mm x 2mm thick.	Each	10		0
c)	Caution board printed in signal red "Man on Line".	Each	4		0
d)	Caution board printed in signal red "Don't switch on".	Each	4		0

9	Supply and erecting fabricated support works / stands etc complete fabricated as per details given from MS flat / angle / plates etc complete with 2 coats of red oxide and 2 coats of paint on the same along with mounting of supports with use of necessary hardwares complete.	KG	500		0
6	500 KVA D.G Set				
6.01	Supply, Installation, Testing and Commissioning of 500 KVA (Minimum) D.G Set with acoustic enclosure conforming to latest environment protection regulations for emmission and noise levels complete with Diesel Engine of suitable BHP (considering de-rating factor if any) at 1500 RPM, water cooled, (Radiator type), four stroke, electric start, turbo-charged & after cooled conforming to BS: 5514 with all standard accessories,coupled with Alternator of 500 KVA rating (minimum), brushless, self excited, self regulated and suitable for continuous operation , generating 415 V+/-5% Volts at 0.8 PF (lag), 50Hz, 3 phase, 4 wire system generally conforming to BS: 2613 & IS: 4722.	Job	2		0
	Both Engine and Alternator shall be mounted on common channel iron base frame, with fuel pipe line upto 10 meter (to be concealed under floor), exhaust pipe line (to be erected with sufficient M.S supports and insulated, hood on top) , Antivibration mountings, residential type silencer, electric starter, batteries & battery charger, fuel tank of 990 ltrs. capacity with level indicator, other standard accessories etc complete as required. (Refer Technical specification)				
	Engine Make : Kirloskar/Cummins/Volvo/Perkins/Greaves				
	Alternator Make : Stamford/Greaves/Lorey Somer				
6.02	Exhaust Piping				
	Supply, installation, testing and commissioning of following MS exhaust piping, heavy duty class B complete with all accessories such as bends flanges, flexible connections at a suitable distance etc. and insulated with75 mm thick layer of LRB rock wool having 100 kg/m3 density, cladding with 24 gauge aluminium sheet all-round the exhaust pipe complete as required at site including MS supports properly painted,fixing of residential grade silencers, flexible bellows, terminating the pipe in chimney complete as per technical specifications & instructions of EIC.				
	250 mm dia (I/D)	Meter	30		0
6.03	Exhaust Stack:				
	Supply, Installation, Testing and Commissioning of the Self supported Mild steel exhaust stack (chimney) as required by pollution control board norms.	KG	10000		0
6.04	DG Synchronizing Panel	Job	1		0
6.05	Design, manufacture Supply, Installation, Testing and Commissioning of main **LT panel**, cubicle type, made of 2 mm thick sheet steel, totally enclosed, IP 52, free standing, floor mounting, dust and vermin proof ,indoor, compartmentalised, powder coated painting suitable for operation on 3 Phase and neutral, 415v, 50 Hz AC system with Al.busbars extensible on both sides, interconnections including supply & installation of following items and as per Technical specification:				
	A) INCOMER				

	i) 2 Nos. ACB, 800A, FP, 50 kA, (for Transformers) motor wound spring charged closing mechanism,drawout type ACB with Microprocessor based release having short circuit, over current, earth fault, zone selective interlocking features with communication port RS 485				
	ii) 2 nos. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses/MCBs.				
	v) 2 Sets Indication Lamps, LED type, R,Y,B and breaker 'ON' , 'OFF', 'TRIP' lamps				
	B) Bus Bars				
	i) 01 set of Bus bars, 4000 Amps, TPN, Aluminium Bus bars with 100% Neutral				
	C) Bus coupler				
	i) 1 Nos. ACB, 3200A, FP, 50 kA, motor wound spring charged closing mechanism,drawout type ACB with Microprocessor based release having short circuit, over current, earth fault zone selective interlocking features with communication port RS 485.				
	ii) 1 Sets Indication Lamps, LED type 'ON' , 'OFF', lamps with HRC control fuses/MCBs.				
	D) Additional Accessories				
	2 Nos Synchronizing relay with all other accessories like PLC, battery charges, UPS of suitable Capacity, Load analysers, Relays etc complete as required.				
	E) Outgoing				
	i) 2 Nos. ACB, 2500A, FP, 50 kA, motor wound spring charged closing mechanism,drawout type ACB with Microprocessor based release having short circuit, over current, earth fault, zone selective interlocking features with communication port RS 485				
	iv) 2 Nos. MCCB, 630A,50 kA, Four Pole , with microprocessor based release having over Current,Short Circuit,Earth Fault Protection module.				
	ix) 4 nos. Intelligent multi function digital meter to read V,A,KVA, KW, KVAR, PF, Hz etc with communication facility (RS485 port) and LED display with 3 Nos CTs, 15 VA, class 1.0 and control circuit wiring with HRC control fuses/MCBs.				
	x) 2Sets (1 Set for each Outgoing ACB) of Indicating lamps, LED type, for breaker "ON", "OFF", "TRIP" indication with HRC control fuses/MCBs.				
	xi) 2Sets (1 set for each MCCB) of Extended Rotary operating mechanism, terminal extension spreaders and 'ON' (Red) indication lamp (LED type) with HRC control fuse/MCBs				
	Make : Adlec, Tricolite, Peaton, SPC Electromech				
7	Advanced type Lightning arrestors for substation				
7.01	Supply, installation, testing and commissioning of CPRI tested ,fully autonomous, Early Streamer Emission Lightning Conductor (ESELC) having gain in triggering time (delta t) of minimum 60 microsecond and radius of protection 79 m in level 1 protection zone , 5 m mast (2 m FRP mast (OD68mm,ID 60 mm , wall thickness 4 mm & 3 m GI mast (50 mm dia) along with all other accessories for installation of air terminal to protect the sub-station from direct lightning strikes .	Job	1		0
7.02	Supply of portable ESE test meter with carrying case for routine maintenance and testing	No	1		0
7.03	Supply & laying of 70 sqmm copper down conductor flexible cable from air terminal to the earth pit including suitable clamps and other accessories as required.	Meter	25		0

7.04	Supply, installation, testing and commissioning of CPRI tested lightening transient event counter resettable 6 digit LCD display within built lithium battery in IP 67 rating enclosure with transparent lid,mounting arrangement etc as required	No	1		0
8	Supply, installation, testing Street light pole 8 Metet long, conical power coated with templet with foundation bolt.	Nos	20		0.00
9	LED street light fittings 90W, PLUG and Play luminaire installation with individual control	Nos	40		0.00
10	Lithtening arreaster (Cu rod)	Nos	2		0.00

SL NO.	DSR REFERENCE	DESCRIPTION OF ITEM	UNIT	QTY	RATE	AMOUNT
1	7.5	Laying of one number PVC insulated and PVC sheathed / XLPE				
		power cable of 1.1 kV grade of following size in the existing				
		RCC/ HUME/ METAL pipe as required.				
	7.5.1	Upto 35 sq. mm meter	Meter	50	18	900
	7.5.2	Above 35 sq. mm and upto 95 sq. mm meter	Meter	10	28	280
	7.5.3	Above 95 sq. mm and upto 185 sq. mm meter	Meter	35	37	1295
	7.5.4	Above 185 sq. mm and upto 400 sq. mm meter	Meter	200	65	13000
2	7.6	Laying of one number PVC insulated and PVC sheathed / XLPE				
		power cable of 1.1 kV grade of following size in the existing				
		masonry open duct as required.				
	7.6.1	Upto 35 sq. mm meter	Meter	50	14	700
	7.6.2	Above 35 sq. mm and upto 95 sq. mm meter	Meter	10	22	220
	7.6.3	Above 95 sq. mm and upto 185 sq. mm meter	Meter	35	31	1085
	7.6.4	Above 185 sq. mm and upto 400 sq. mm meter	Meter	300	56	16800
3	7.8	Laying and fixing of one number PVC insulated and PVC				
		sheathed / XLPE power cable of 1.1 kV grade of following size				
		on cable tray as required.				
	7.8.1	Upto 35 sq. mm (clamped with 1mm thick saddle) meter 21	Meter	250	21	5250
	7.8.1	Above 35 sq. mm and upto 95 sq. mm (clamped with 25x3mm				
		MS flat clamp) meter	Meter	30	49	1470
	7.8.3	Above 95 sq. mm and upto 185 sq. mm (clamped with 25/				
		40x3mm MS flat clamp) meter 61	Meter	30	61	1830
	7.8.4	Above 185 sq. mm and upto 400 sq. mm (clamped with 40x3mm				
		MS flat clamp) meter	Meter	180	96	17280
4	7.1	Supplying and fixing cable route marker with 10 cm X 10 cm X				
		5 mm thick G.I. plate with inscription there on, bolted /welded to				
		35 mm X 35 mm X 6 mm angle iron, 60 cm long and fixing the				
		same in ground as required. Each	Meter	25	269	6725

5	19.06	L.T. CABLE END TERMINATION				
6	19.06.1	Supplying and making end termination with single brass compression gland and Aluminum lugs for following size of XLPE insulated PVC sheathed aluminium conductor armoured power **cable of 1.1** KV grade as required.				
	a)	3.5 Core 300 Sq.mm.	Set	8	1,106	8848.00
	b)	3.5 Core 240 Sq.mm.	Set	4	989	3956.00
	c)	3.5 Core 185 Sq.mm.	Set	14	804	11256.00
	d)	3.5 Core 150 Sq.mm.	Set	8	592	4736.00
	e)	3.5 Core 70 Sq.mm.	Set	4	394	1576.00
7	9.10	**CABLE TRAY**				
		Fabrication, supply and installation of following size of hot dip perforated **GI cable** trays including fitting and accessories like horizontal and vertical reducers, tees, bends, cross members etc. as required with suitable supporting arrangement with GI brackets, suspenders etc. for suspension from ceiling/ fixing in trenches, wall and painting etc as per drawing/ site requirements.				
	2716	600mm width x 75mm depth x 2.0mm thickness.	Meter	125	632	79031.25
	2710	450mm width x 62.5mm depth x 2.0mm thickness.	Meter	100	464	46400.00
	2704	300mm width x 50mm depth x 1.6mm thickness.	Meter	100	279	27900.00
		150mm width x 50mm depth x 1.6mm thickness.	Meter	50	225	11250.00
		100mm width x 50mm depth x 1.6mm thickness.	Meter	30	200	6000.00
		EARTHING FOR (SUB Station Equipments & DG Set)		-	-	
8	5.6	Earthing with copper earth plate 600 mm X 600 mm X 3 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 meter long etc. with charcoal/ coke and salt as required.	Sets	12	8,289	99468.00
9	5.4	Earthing with G.I. earth plate 600 mm X 600 mm X 6 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 meter long etc. with charcoal/ coke and salt as required.	Sets	10	4,327	43270.00
10	5.20	Providing and fixing earth bus of 50 mm X 5 mm copper strip on surface for connections etc. as required.	Meter	80	1,283	102640.00
11	1914.6	Providing and fixing 25 mm X 5 mm copper strip on surface or in recess for connections etc. as required.	Meter	160	698	111680.00

O&M Charges

O&M Rates to be quote for 2 Skilled and 2 Unskilled operators in each shifts for 3 (Three) Shifts 24x7

Year	Qoute (Amount in Rs.)
Year-1	0
Year-2	0
Year-3	0
Total	0