NOIDA METRO RAIL CORPORATION (NMRC) LIMITED

REQUEST FOR PROPOSAL (RFP)

E tender No. 66/NMRC/JGM(C)/2019

For Proposed Gate for NMRC Bus Depot

February 2019

Issued by:

Noida Metro Rail Corporation (NMRC) Limited
Block-III, 3rd Floor,
Ganga Shopping Complex, Sector-29, Noida -201301,
District Gautam Budh Nagar, Uttar Pradesh, India

Disclaimer

This Request for Proposal (RFP) Document (or "E-Tender" or "E-Bid") for "Proposed Gate for NMRC Bus Depot" contains brief information about the scope of work and selection process for the Bidder ('the Contractor" or "the Tenderer"). The purpose of the Document is to provide the Bidders with information to assist the formulation of their Bidding Documents.

While all efforts have been made to ensure the accuracy of information contained in this RFP Document, this Document does not purport to contain all the information required by the Bidders. The Bidders should conduct their own independent assessment, investigations and analysis and should check the reliability, accuracy and completeness of the information at their end and obtain independent advice from relevant sources as required before submission of their Bid/s. Noida Metro Rail Corporation Ltd. ("NMRC" or "the Corporation") or any of its employees or advisors shall incur no liability under any law, statute, rules or regulations as to the accuracy or completeness of the RFP Document.

NMRC reserves the right to change any or all conditions/information set in this RFP Document by way of revision, deletion, updating or annulment through issuance of appropriate addendum as NMRC may deem fit without assigning any reason thereof.

NMRC reserves the right to accept or reject any or all Bids without giving any reasons thereof. NMRC will not entertain or be liable for any claim for costs and expenses in relation to the preparation of the Bid/s to be submitted in terms of this RFP Document.

Glossary

a) "**Addendum / Amendment**" means any written amendment / addendum /corrigendum to this RFP, from time to time issued by NMRC to the prospective bidders
b) **"Agreement"** means the Contract Agreement to be executed between NMRC and the Selected Bidder
c) **"Applicable Laws"** means all the laws including local, state, national or other laws, brought into force and effect by Govt. of India, State Governments, local bodies, statutory agencies and any other, and rules / regulations / notifications issued by them from time to time. It also include judgments, decrees, injunctions, writs and orders of any court or judicial authority as may be in force and effected from time to time
d) **"Bidder"** or **"Tenderer"** means any entity which is a sole proprietorship firm, a partnership firm or a company, in title and assigns which is submitting its bid pursuant to RFP Documents
e) **"Bid Due Date" means** Bid Submission end date and time given in the E-tender
f) **"e-Bid Security / Earnest Money Deposit (EMD)"** means the refundable amount to be submitted by the Bidder along with RFP documents to NMRC
g) **"Performance Bank Guarantee/ Security Deposit"** means interest free amount to be deposited by the Contractor with NMRC as per terms and conditions of Contract Agreement as a security against the performance of the Contract agreement
h) **"NMRC"** means Noida Metro Rail Corporation Limited (or "Corporation" or "Purchaser" or "Employer")
i) **"Party"** means Contractor or Corporation (together they are called **"Parties"**)
j) **"Permits"** shall mean and include all applicable statutory, environmental or regulatory Contracts, authorization, permits, consents, approvals, registrations and franchises from concerned authorities
k) **"Re. or Rs. or INR"** means Indian Rupee
l) **"Revenue Operations Date (ROD)"** means the date of operation of Metro
m) **"Selected Bidder"** means the bidder who has been selected by NMRC, pursuant to the bidding process for award of Contract
n) "**Work**" means all the work specified or set forth and required in and by the said specifications, hereto annexed or to be implied there from or incidental thereto, or to be hereafter specified or required in such explanatory instructions and drawings (being in conformity with the said original specifications)

The words and expressions beginning with capital letters and defined in this document shall, unless repugnant to the context, have the meaning ascribed thereto hereinabove.

Data Sheet

1	Name of the Bid	RFP for Proposed Gate for NMRC Bus Depot **Approximate Cost of Work = INR 35.31 lakh**
2	Time-period of contract	6 Months
3	Method of selection	Cost Based Selection (Lowest –L1)
4	Bid Processing Fee	Rs. 5,900/- (Rupees Five Thousand Nine Hundred Only) (inclusive of GST) through RTGS/NEFT only payable in favour of Noida Metro Rail Corporation Limited
5	Earnest Money Deposit (EMD)	Rs. 82,000 /- (Rupees Eighty Two Thousand Only)
6	Bid System	Two Bid System (Technical and Financial)
7	Name of the Corporation and Official	Executive Director Noida Metro Rail Corporation, Block-III, 3rd Floor, Ganga Shopping Complex, Sector-29, Noida 201301 Email: nmrcnoida@gmail.com Website:www.nmrcmoida.com, http://etender.up.nic.in
8	Bid Validity Period	180 days
9	Bid Language	English
10	Bid Currency	INR
11	Key Dates	Schedule
(a)	Uploading of Bid	01/03/2019
(b)	Date of pre-bid meeting	
(c)	Last Date of Bid Submission	11/03/2019 up to 1500 hrs (IST)
(d)	Date of Technical Bid Opening	12/03/2019, 1100 hrs (IST)
12	Consortium to be allowed	No
13	Account details	**For Bid Processing Fee & EMD** State Bank of India (04077) – Sector 18, Noida Gautam Budh Nagar, Uttar Pradesh - 201301 IFSC Code: SBIN0004077 **A/c No. 37707840592** **Noida Metro Rail Corporation Ltd.**

Content

1. Section 1: General Information

1.1. Background

a. Noida and Greater Noida are being developed as the satellite towns to New Delhi and more and more people from Delhi and other areas are shifting to these towns in search of fresh air, greenery and better infrastructure. There is a need of providing an efficient, reliable and comfortable transportation system for the population intending to settle in these towns and also the public coming to these areas for education, service and business.

b. Noida Metro Rail Corporation is a Special Purpose Vehicle (SPV) formed by Noida and Greater Noida Authorities for planning and executing urban transport projects in Noida, Greater Noida regions. The Corporation desires to provide a world-class Public Transportation System with state-of-the-art technology. As such, the overarching criterion for setting up of the Corporation is to help create an efficient, safe, reliable, economical and affordable public transport system.

c. An elevated metro line between Noida and Greater Noida is already under advanced stages of testing.

d. NMRC invites E-Bids for selection of Contractor for Proposed Gate for NMRC Bus Depot

e. In this regard, the Corporation now invites the interested Bidder/s to submit their proposals as per provisions of this RFP Document.

f. NMRC will shortlist the Bidders on the basis of evaluation criteria mentioned in this RFP Document. On the basis of the minimum evaluation criteria, qualified Bidders will be shortlisted and Financial proposal of only qualified Bidders will be opened.

1.2. About Locations

The metro corridor is 29.7 km long in first phase and is known as Noida Greater Noida Metro Rail Corridor. It comprises 21 metro stations starting from Noida Sector 51 in Noida and ends up at Depot Station in Greater Noida. The map is in Appendix 1: Metro Alignment.

1.3. Communication

All communications should be addressed to -

Executive Director
Noida Metro Rail Corporation (NMRC) Limited
Block-III, 3rd Floor, Ganga Shopping Complex, Sector-29,
Noida -201301
District Gautam Budh Nagar, Uttar Pradesh

Email: nmrcnoida@gmail.com

2. Section 2: Terms of Reference

2.1. Scope of Work

a. The work covered in the tender includes below mentioned location

   Proposed Gate for NMRC Bus Depot

b. The technical specifications is set forth in Section 6 of this RFP.

3. Section 3: Instructions to Bidders

3.1. General instructions

a. A Bidder is eligible to submit only one Tender for the Project. A Bidder applying shall not be entitled to submit another Tender, as the case may be. Any Bidder, which submits or participates in more than one tender/proposal would be disqualified.

b. The Bidder shall initiate, and actively pursue and involve itself in all investigations and enquiries, Corporation feedbacks, information, convening of and attendance at meetings, and in any other activities as are or may be necessary for producing high quality work as per the requirements.

c. The Bidder shall carry out the services in compliance with the provisions of this Agreement. Any and all changes necessary to ensure that the Bidder's documents conform to the intent and purpose set out in the Agreement, shall be made at the Bidder's own expense. The Bidder represents that it is a professional and experienced company providing services related to tender, and hereby agrees to bear full responsibility for the correctness and technical merit of the services performed.

d. Bidders shall be evaluated on the basis of the Evaluation Criteria specified in this document. Bidders shall be deemed to have understood and agreed that no explanation or justification for any aspect of the Selection Process will be given and that NMRC's decisions are without any right of appeal whatsoever.

e. Any entity which has been barred by the Central/State Government in India or by any entity controlled by them, from participating in any project, and the bar subsists as on the date of Bid, would not be eligible to submit an e - Bid.

f. An Bidder should have, during the last five years, neither failed to perform on any agreement, as evidenced by imposition of a penalty by an arbitral or judicial authority or a judicial pronouncement or arbitration award against the Bidder, nor been expelled from any project or agreement nor have had any agreement terminated for breach by such Bidder.

g. Bidders are encouraged to inform themselves fully about the assignment and the local conditions before submitting the e-Bid by paying a visit to the Corporation and/or by sending written queries to NMRC before the last date for receiving queries/clarifications.

h. NMRC shall not be liable for any omission, mistake or error on the part of the Bidder in respect of any of the above or on account of any matter or thing arising out of or concerning or relating to e-Bid or the Selection Process, including any error or mistake therein or in any information or data given by NMRC.

i. Any new taxes or any statutory variation [which comes into effect after the last date of submission of Bid on any item] during the contractual completion shall be to the Employer's account for which the Bidder shall furnish the documentary evidence in support of their claims. However, any increase in cost due to new taxes or change in existing taxes introduced during extended contractual period due to Bidder's fault shall be to his account.

j. The currency for the purpose of the Proposal shall be the Indian Rupee (INR).

3.1.1. Cost of Bid Document / e-Tender processing Fee

a. The tenderer shall bear all costs associated with the preparation and submission of its e-Bid and Noida Metro Rail Corporation Ltd. ("NMRC" or "the Corporation"), will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the e-Bid process.

b. This tender document is available on the web site http://etender.up.nic.in or on NMRC website (www.nmrcnoida.com) to enable the tenderers to view, download the e-Bid document and submit e-Bids online up to the last date and time mentioned in e-Tender notice/e-tender document against this e-Tender. The tenderers shall have to pay cost of bid document/ e-Tender processing fee of as mentioned in **Data Sheet** through RTGS/NEFT only payable in favour of Noida Metro Rail

Corporation Limited in the A/c No. mentioned in **Data Sheet**. The scanned copy of RTGS/NEFT receipt with transaction Id certified by the same bank must be enclosed along with the e-Bid. This cost of bid document/ e-Tender processing fee as mentioned in **Data Sheet** will be non-refundable. Tender without cost of bid document/ e-Tender processing fee in the prescribed form, will not be accepted.

3.1.2. Acknowledgement by Bidder

It shall be deemed that by submitting the e-Bid, the Bidder has:

a. made a complete and careful examination of the e-Bid;

b. received all relevant information requested from NMRC;

c. acknowledged and accepted the risk of inadequacy, error or mistake in the information provided in the e-Bid or furnished by or on behalf of NMRC;

d. satisfied itself about all matters, things and information, necessary and required for submitting an informed Application and performance of all of its obligations thereunder;

e. acknowledged that it does not have a Conflict of Interest; and

f. agreed to be bound by the undertaking provided by it under and in terms hereof.

3.1.3. Availability of Bid Document

This Bid document is available on the web site http://etender.up.nic.in and on Noida Metro website www.nmrcnoida.com to enable the Bidders to view, download the e-Bid document and submit e-Bids online up to the last date and time mentioned in e-Bidder notice/ e-Bid document. The Bidder`s shall have to pay e-Bid document fee and EMD as mentioned in Data sheet through RTGS/NEFT on addresses given in data sheet. The scanned copy of RTGS/NEFT with transaction ID certified by the same bank must be enclosed along with the e-Bid. This e-Bid document fee will be non-refundable. Bid without Bid fee in the prescribe form will not be accepted.

3.1.4. Clarifications of e-Bid

a. During evaluation of e-Bid, NMRC may, at its discretion, ask the Bidder for a clarification of his/her e-Bid. The request for clarification shall be in writing.

b. Any queries or request for additional information concerning this RFP shall be submitted in writing or by fax and e-mail to the Executive Director, NMRC only within seven days of issuance of tender. The envelopes/ communication shall clearly bear the following identification/ title: **"Queries/ Request for Additional Information: RFP for Proposed Gate for NMRC Bus Depot ".** The responses will be posted to all such queries on the official Website www.nmrcnoida.com. NMRC reserves the right not to respond to any questions or provide any clarifications, in its sole discretion, and nothing in this Clause shall be taken or read as compelling or requiring NMRC to respond to any question or to provide any clarification.

c. In case the Bidder seeks for any queries, he shall send letter or e-mail to the correspondence address given in Data Sheet.

d. However, NMRC shall not entertain any correspondence from the Bidders during the period of e-Bid opening to selection of the successful Bidder. Any wrong practice shall be dealt in accordance with the Section of this e-Bid document under Fraud and Corrupt Practices.

3.1.5. Amendment of e-Bid Document

a. At any time prior to the deadline for submission of e-Bid, NMRC may, for any reason, whether at its on in iterative or in response to a clarification requested by a prospective Bidder, modify the e-Bid document by amendments. Such amendments shall be uploaded on the e-procurement website http://etender.up.nic.in. The relevant clauses of the e-Bid document shall be treated as amended accordingly.

b. It shall be the sole responsibility of the prospective Bidder to check the web site http//etender.up.nic.in or NMRC's website www.nmrcnoida.com from time to time for any amendment in the e-Bid documents. In case of failure to get the amendments, if any, NMRC shall not be responsible for it.

c. In order to allow prospective e-Bids a reasonable time to take the amendment into account in preparing their e-Bids, NMRC, at the discretion, may extend the deadline for the submission of e-Bids. Such extensions shall be uploaded on the e-procurement website http://etender.up.nic.in or NMRC's website www.nmrcnoida.com.

3.2. Preparation and submission of Bids

3.2.1. Language of e-Bid

The e-Bid prepared by the Bidder, as well as all correspondence and documents relating to the e-Bid exchanged by the Bidder and NMRC shall be written in English language. Only English numerals shall be used in the e-Bid. The correspondence and documents in any other language must be accompanied by transcripts verified by the Embassy of Home Country or equivalent.

3.2.2. Documents constituting the e-Bid

The e-Bid prepared by the Bidder shall comprise the following components:

a. Technical e-Bid- Technical e-Bid will comprise of -

i. **Fee details -** Details of Bid processing fee and prescribed EMD

ii. **Eligibility details -** Includes copies of required documents in PDF format justifying that the Bidder is qualified to perform the contract if his/her bid is accepted and the Bidder has financial & technical capability necessary to perform the contract and meets the criteria outlined in the Qualification requirement and technical specification and fulfill all the conditions of the contract.

iii. **Technical evaluation -** Details of all documents needed for Technical evaluation as mentioned in this RFP

b. Financial e-Bid -

i. **Price bid –** Bill of Quantities in XLS format to be filled in after downloading from the e-Procurement website for this e-tender. There shall be a single quote.

3.2.3. Documents establishing Bidder's Qualification

a. The Bidder shall furnish, as part of its technical e-Bid, documents establishing the Bidder's qualification to perform the contract if its e-Bid is accepted. The documentary evidence should be submitted by the Bidder electronically in the PDF format.

b. The documentary evidence of Bidder's qualification to perform the contract if its e-Bid is accepted shall be as per qualification requirements specified in e-Bid document.

3.2.4. E-Bid form

The Bidder shall complete the e-Bid form and the appropriate price schedule/BOQ furnished in the e-Bid document. Financial Quote shall comprise of the rate of Total Price for RFP for Proposed Gate for NMRC Bus Depot in the Bid form in figures.

3.2.5. E-Bid Currency

Prices shall be quoted in Indian Rupees only.

3.2.6. Formats and Signing of e-Bid

a. The Bidder shall prepare one electronic copy of the technical e-Bid and financial e-Bid separately.

b. The e-Bid document shall be digitally signed, at the time of uploading, by the Bidder or a person or persons duly authorized to bind the Bidder to the contract. The later authorization shall be indicated

by a scanned copy of written power-of attorney accompanying the e-Bid. All the pages/documents of the e-Bid that are to be uploaded shall be digitally signed by the person authorized to sign the e-Bid.

c. Bidders should provide all the information as per the RFP and in the specified formats. NMRC reserves the rights to reject any proposal that is not in the specified formats.

d. In case the Bidders intends to provide additional information for which specified space in the given format is not sufficient, it can be furnished in duly stamped and signed PDFs.

3.2.7. Deadline for submission of e-Bid

E-Bid (Technical and financial) must be submitted by the Bidder at e-procurement website http://etender.up.nic.in not later than the time specified on the prescribed date (as the server time displayed in the e-procurement website). NMRC may, at its discretion, extend this deadline for submission of e-Bid by amending the e-Bid document, in which case all rights and obligations of NMRC and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

3.2.8. Submission of e-Bid

a. The bid submission module of e-procurement website http://etender.up.nic.in enables the Bidders to submit the e-Bid online in response to this e-Bid published by NMRC.

b. Bid submission can be done only from the bid submission start date and time till the bid submission end date and time given in the e-Bid. Bidders should start the bid submission process well in advance so that they can submit their e-Bid in time.

c. The Bidder should submit their e-Bid considering the server time displayed in the e- procurement website. This server time is the time by which the e-Bid submission activity will be allowed till the permissible time on the last/end date of submission indicated in the e-Bid schedule.

d. Once the e-Bid submission date and time is over, the Bidders cannot submit their e-Bid. For delay in submission of e-Bid due to any reasons, the Bidders shall only be held responsible.

The Bidders have to follow the following instructions for submission of their e-Bid:

a. For participating in e-Bid through the e-Biding system it is necessary for the Bidders to be the registered users of the e-procurement website http://etender.up.nic.in. The Bidders must obtain a user login Id and password by registering themselves with U.P. Electronics Corporation Ltd., Lucknow if they have not done so previously for registration.

b. In addition to the normal registration, the Bidder has to register with his/her digital signature certificate (DSC) in the e-Biding system and subsequently he/she will be allowed to carry out his/her e-Bid submission activities. Registering the digital signature certificate (DSC) is a one-time activity. Before proceeding to register his/her DSC, the Bidder should first log on to the e-Biding system using the user login option on the home page with the login Id and password with which he/she has registered.

For successful registration of DSC on e-procurement website http://etender.up.nic.in the Bidder must ensure that he/she should possess class-2/class-3 DSC issued by any certifying authorities approved by controller of certifying authorities, Government of India, as the e-procurement website http://etender.up.nic.in is presently accepting DSC issued by these authorities only. The Bidder can obtain user login Id and perform DSC registration exercise given above even before the e-Bid submission date starts. NMRC shall not be held responsible if the Bidder tries to submit his/her e-Bid at the moment before end date of submission but could not submit due to DSC registration problem.

c. The Bidder can search for active Bids through "search active tenders" link, select a Bid in which he/she is interested in and then move it to 'My Tenders' folder using the options available in the e-Bid submission menu. After selecting and the Bid, for which the Bidder intends to e-Bid, from "My tenders" folder, the Bidder can place his/her e-Bid by clicking

"pay offline" option available at the end of the view Bid details form. Before this, the Bidder should download the e-Bid document and price schedule/bill of quantity (BOQ) and study them carefully. The Bidder should keep all the documents ready as per the requirements of e-Bid document in the PDF format except the price schedule /bill of quantity (BOQ) which should be in the XLS format (excel sheet).

d. After clicking the 'pay offline' option, the Bidder will be redirected to terms and conditions page. The Bidder should read the terms & conditions before proceeding to fill in the Bid fee and EMD offline payment details. After entering and saving the Bid fee and EMD details form so that "bid document preparation and submission" window appears to upload the documents as per technical (fee details, qualification details, e-Bid form and technical specification details) and financial (e-Bid form and price schedule/BOQ) schedules/packets given in the Bid details. The details of the RTGS/NEFT should tally with the details available in the scanned copy and the date entered during e-Bid submission time otherwise the e-Bid submitted will not be accepted.

e. Next the Bidder should upload the technical e-Bid documents for fee details (e-Bid fee and EMD), Qualification details. Before uploading, the Bidder has to select the relevant digital signature certificate. He may be prompted to enter the digital signature certificate password, if necessary. For uploading, the Bidder should click "browse" button against each document label in technical and financial schedules/packets and then upload the relevant PDF/XLS files already prepared and stored in the Bidder's computer. The required documents for each document label of technical (fee details, qualification details, e-Bid form and technical specification details) and financial (e-Bid form and price schedule/BOQ) schedules/packets can be clubbed together to make single different files for each label.

f. The Bidder should click "Encrypt" next for successfully encrypting and uploading of required documents. during the above process, the e-Bid document are digitally signed using the DSC of the Bidder and then the documents are encrypted/locked electronically with the DSC's of the bid openers to ensure that the e-Bid documents are protected, stored and opened by concerned bid openers only.

g. After successful submission of e-Bid document, a page giving the summary of e-Bid submission will be displayed confirming end of e-Bid submission process. The Bidder can take a printout of the bid summary using the "print" option available in the window as an acknowledgement for future reference.

h. NMRC reserves the right to cancel any or all e-Bids without assigning any reason.

3.2.9. Late e-Bid

a. Bids received by NMRC after the specified time on the Bid Due Date shall not be eligible for consideration and shall be summarily rejected.

b. The server time indicated in the bid management window on the e- procurement website http://etender.up.nic.in will be the time by which the e-Bid submission activity will be allowed till the permissible date and time scheduled in the e-Bid.

c. Once the e-Bid submission date and time is over, the Bidder cannot submit his/her e-Bid. Bidder has to start the bid submission well in advance so that the submission process passes off smoothly. The Bidder will only be held responsible if his/her e-Bid is not submitted in time due to any of his/her problems/faults, for whatsoever reason, during e-Bid submission process.

3.2.10. Withdrawal and resubmission of e-Bid

a. At any point of time, a Bidder can withdraw his/her e-Bid submitted online before the bid submission end date and time. For withdrawing the Bidder should first log in using his/her login id and password and subsequently by his/her digital signature certificate on the e-procurement website http://etender.up.nic.in. The Bidder should then select "My bids" option in the bid submission menu. The page listing all the bids submitted by the Bidder will be displayed. Click "View" to see the

details of the bid to be withdrawn. After selecting the "bid withdrawal" option the Bidder has to click "Yes" to the message "Do you want to withdraw this bid?" displayed in the bid information window for the selected bid. The Bidder also has to enter the bid withdrawing reasons and upload the letter giving the reasons for withdrawing before clicking the "Submit" button. The Bidder has to confirm again by pressing "OK" button before finally withdrawing his/her selected e-Bid.

b. No e-Bid may be withdrawn in the interval between the deadline for submission of e-Bids and the expiration of period of e- bid validity. Withdrawal of an e-Bid during this interval may result in the forfeiting of Bidder's e-Bid security.

c. The Bidder can re-submit his/her e-Bid as when required till the e-Bid submission end date and time. The e-Bid submitted earlier will be replaced by the new one. The payment made by the Bidder earlier will be used for revised e-Bid and the new e-Bid submission summary generated after the successful submission of the revised e-Bid will considered for evaluation purposes. For resubmission, the Bidder should first log in using his/her login Id and password and subsequently by his/her digital signature certificate on the e-procurement website http://etender.up.nic.in. The Bidder should then select "My bids" option in the bid submission menu. The page listing all the bids submitted by the Bidder will be displayed. Click "View" to see the detail of the e-Bid to be resubmitted. After selecting the "bid resubmission" option, click "Encrypt & upload" to upload the revised e-Bids documents.

d. The Bidder can submit their revised e-Bids as many times as possible by uploading their e-Bid documents within the scheduled date & time for submission of e-Bids.

e. No e-Bid can be resubmitted subsequently after the deadline for submission of e-Bids.

3.2.11. NMRC's right to accept any e-Bid and to reject any or all e-Bids.

a. Notwithstanding anything contained in this e-Bid, NMRC reserves the right to accept or reject any Bid and to annul the Selection Process and reject all Bids, at any time without any liability or any obligation for such acceptance, rejection or annulment, and without assigning any reasons thereof.

b. NMRC reserves the right to reject any Bid if:

- At any time, a material misrepresentation is made or uncovered, or
- The Bidder does not provide, within the time specified by NMRC, the supplemental information sought by NMRC for evaluation of the e-Bid.

c. Such misrepresentation/ improper response may lead to the disqualification of the Bidder. If such disqualification /rejection occurs after the e-Bid have been opened and the highest ranking Bidder gets disqualified / rejected, then the NMRC reserves the right to consider the next best Bidder, or take any other measure as may be deemed fit in the sole discretion of NMRC, including annulment of the Selection Process.

3.2.12. Period of validity of e-Bid

a. e-Bid shall remain valid for 180 days after the date of e-Bid opening prescribed by NMRC. An e-Bid valid for a shorter period shall be rejected by NMRC as non-responsive.

b. In exceptional circumstances, NMRC may solicit the Bidder's consent to an extension of the period of e-Bid validity. The request and the response thereto shall be made in writing.

3.2.13. Correspondence with the Bidder

a. Save and except as provided in this e-Bid, NMRC shall not entertain any correspondence with any Bidder or its Technical Partners in relation to acceptance or rejection of any e-Bid.

b. Subject to Clause 3.4.5 no Bidders or its Technical Partners shall contact NMRC on any matter relating to his e-Bid from the time of Bid opening to the time contract is awarded.

c. Any effort by the Bidder or by its Technical Partners to influence NMRC in the Bid evaluation, Bid comparison or contract award decisions, may result in the rejection of his Bid.

3.3. Earnest Money Deposit

3.3.1. Earnest money deposit (EMD)

a. The tenderer shall furnish, as part of its e-Bid, an e-Bid security/ EMD as stated in Data Sheet in form of RTGS/NEFT only in favour Noida Metro Rail Corporation Limited in the A/c No. mentioned in **Data Sheet**. The scanned copy of RTGS/NEFT receipt of Security/ EMD with transaction Id certified by the same bank must be enclosed along with the e-Bid. Tender without Earnest Money in the prescribed form, will not be accepted.

b. Any e-Bid not secured in accordance with above shall be treated as non-responsive and rejected by NMRC.

c. Unsuccessful Bidder's EMD will be returned promptly as possible after opening of the Price Bid.

d. No interest will be paid by the Purchaser on the Earnest Money Deposit.

e. The successful Bidder's e-Bid EMD will be adjusted with Performance Bank Guarantee, if applicable, to be submitted by the Bidder upon signing the contract.

f. The EMD may be forfeited:

   i. If Bidder (a) withdraws its e-Bid during the period of e-Bid validity specified by the Bidder on the e- bid form: or (b) does not accept the correction of errors or (c) modifies its e-Bid price during the period of e-Bid validity specified by the Bidder on the form.

   ii. In case of a successful Bidder, if the Bidder fails to sign the contract with the Corporation.

3.4. Opening and Evaluation of Bids

3.4.1. Opening of technical e-Bid by NMRC

a. NMRC will open all technical e-Bids, in the presence of Bidder`s representatives who choose to attend on the prescribed date of opening at NMRC Office. The Bidder's representatives who are present shall sign a register evidencing their attendance. In the event of the specified date e-Bid opening being declared a holiday for the Corporation, the e –bids shall be opened at the appointed time and place on the next working day.

b. The Bidder who is participating in e-Bid should ensure that the RTGS/NEFT of Bid Processing Fee and EMD must be submitted in the prescribed account of NMRC within the duration (strictly within opening & closing date and time of individual e-Bid) of the work as mentioned in Bid notice, otherwise, in any case, e-Bid shall be rejected.

c. The Bidders names and the presence or absence of requisite e-Bid security and such other details as NMRC at its discretion may consider appropriate, will be announced at the opening.

3.4.2. Opening of financial e-Bid

a. After evaluation of technical e-Bid, through the evaluation committee NMRC shall notify those Bidders whose technical e-Bids were considered non-responsive to the conditions of the contract and not meeting the technical specifications and qualification requirements indicating that their financial e-Bids will not be opened.

b. NMRC will simultaneously notify the Bidders, whose technical e-Bids were considered acceptable to the Corporation. The notification may sent by e-mail provided by Bidder.

c. The financial e-Bids of technically qualified Bidders shall be opened in the presence of technically qualified bidders who choose to attend. The date and time for opening of financial bids will be communicated to the technically qualified Bidders subsequently after completion of technical bids evaluation through e-mail provided by the Bidder. The name of Bidders, percentage price quoted for various items etc. will be announced at the meeting.

3.4.3. Correction of Errors

a. Financial Bids determined to be responsive will be checked by NMRC for any arithmetic errors. Where there is a discrepancy between the rate quoted in the Financial Bid, in figures and in words, the amount in words will prevail over the amounts in figures, to the extent of such discrepancy.

b. The amount stated in the Financial Bid will be adjusted by NMRC in accordance with the above procedure for the correction of errors and shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected quoted rate of e-Bid, his e-Bid will be rejected, and his Bid Security shall be liable for forfeiture in accordance with Clause 3.3.1f

3.4.4. Examination of e-Bid document

a. The NMRC will examine the e-Bid to determine if:

   i. They are complete;

   ii. They meet all the conditions of the contract;

   iii. The required e-Bid Processing fee, EMD and other required documents have been furnished;

   iv. The documents have been properly digitally signed; and

   v. The e-Bids are in order.

b. Any e-Bid or e-Bids not fulfilling these requirements shall be rejected.

3.4.5. Contacting NMRC

a. No Bidder shall contact NMRC on any matter relating to his/her e-Bid, from the time of the e-Bid opening to the time the contract is awarded. If the Bidder wishes to bring additional information to the notice of NMRC, he/she can do so in writing.

b. Any effort by a Bidder to influence NMRC in its decisions on e-Bid evaluation, e- bid comparison or contract award may result in rejection of the Bidder's e-Bid.

c. In the event of any information furnished by the Bidder is found false or fabricated, the minimum punishment shall be debarring /blacklisting from Noida Metro works and legal proceeding can also be initiated. EMD of such bidders will be forfeited.

3.4.6. Confidentiality

a. Information relating to the examination, clarification, evaluation, and recommendation for the Bidders shall not be disclosed to any person who is not officially concerned with the process or is not a retained professional advisor advising NMRC in relation to or matters arising out of, or concerning the Bidding Process. Any effort by a Bidder to exert undue or unfair influence in the process of examination, clarification, evaluation and comparison of Proposal shall result in outright rejection of the offer, made by the said Bidder.

b. NMRC shall treat all information, submitted as part of Bid, in confidence and shall require all those who have access to such material to treat the same in confidence. NMRC may not divulge any such information unless it is directed to do so by any statutory entity that has the power under law to require its disclosure or is to enforce or assert any right or privilege of the statutory entity and/ or NMRC or as may be required by law or in connection with any legal process.

3.5. Award of Contract

3.5.1. Award Criteria

a. NMRC will award the contract as per evaluation criteria stated in the RFP Document.

b. NMRC will award the contract to the successful Bidder whose bid has been determined to be responsive to all the conditions of the contract and meeting the eligibility requirement of the bidding document.

3.5.2. Notice of Award (NOA)

a. Prior to the expiration of the period of e-Bid validity, NMRC will notify the successful Bidder in writing, by letter/e-mail/fax, that its e-Bid has been accepted.

b. The acceptance of NOA will constitute the formation of the contract.

3.5.3. Contract

a. This contract is for the supply, install, commissioning, training and maintenance of the equipment of the description, specifications and drawings, and in the quantities set forth in the contract on the date or dates specified therein. All equipment must be brand new and unused. Unpacking/seal opening has to be done in presence of NMRC.

b. The whole contract is to be executed in the most approved, substantial and workmanship manner, to the entire satisfaction of the Purchaser or his nominee, who, both personally and may his deputies, shall have full power, at every stage of progress, to inspect the equipment at such times as he may deem fit and to reject any of the equipment which he may disapprove.

3.5.4. Signing of contract

At the same time as NMRC notifies the successful Bidder that it's e-Bid has been accepted, the successful Bidder shall have to sign the contract agreement with relevant document as mentioned in the RFP. The agreement draft along with other related terms and conditions will be same as furnished in this e-Bid. Any refusal will not be allowed. The Bidder need not download and submit in hard copies of these documents.

3.5.5. NMRC's right to accept any e-Bid and to reject any or all e-Bids

NMRC reserves the right to accept or reject any e-Bid, and to annul the e-Bid process and reject all e-Bids at any time prior to contract award, without thereby incurring any liability to the affected tenderer or tenderers.

4. Section 4: Qualification, Evaluation and Selection Process

4.1. Eligibility Criteria

The Bidder's competence and capability is proposed to be established by the following parameters. The Bidder should meet all the criteria given in this section.

a. The Bidder should be Sole proprietorship/ partnership firm/ public limited company/ private limited company.

b. The Bidder should have successfully completed in India during last **7 (seven) years** period ending last day of month previous to the one in which the bids are invited with Govt./ Semi Govt./ PSU only should be either of the following:

   i. One order of similar nature of value not less than **Rs. 29 lakh** (Rupees Twenty Nine Lakh only) or

   ii. Two orders of similar nature of value not less than **Rs. 22 lakh** (Rupees Twenty Two lakh only) each or

   iii. Three orders of similar nature of value not less than **Rs. 15 lakh** (Rupees Fifteen lakh only) each

   Definition of Similar Works – Experience in only building construction inclusive of civil work and electrical work will be acceptable.

c. The Bidder should submit the solvency certificate issued by Nationalized / Scheduled bank (issued within a period of minimum six months) and it should not be less than **Rs. 15 lakh** (Rupees Fifteen lakh only)

d. The Bidder should have minimum **average annual turnover** from construction works of **Rs. 29 lakh** (Rupees Twenty Nine Lakh only) in the last 3 (three) Financial Years **(2015-2016, 2016-17, 2017-18)** preceding the Bid Due Date.

e. The Bidder should have positive profit before tax in the last 3 (three) Financial Years (2015-2016, 2016-17, 2017-18) preceding Bid Due Date.

f. The Bidder requires to provide proof of employment of technical staff, which will consist of a declaration by the Bidder as per Form 10: General Guidelines for Fixing Requirement of Technical Staff for Work.

g. The Bidder shall submit affidavit duly verified by Notary for having arrangement of required machinery, tools & plants, centering & shuttering, etc.

   The minimum requirement of T&P possessed by the firm shall be as follows:

S.No.	Particulars	Quantity
1	Road Roller	NIL
2	Vibratory Road Roller	NIL
3	Truck/ Tipper	1
4	Water Tanker	1
5	Water Pumps	1
6	Hot Mix Plant & Paver (Hiring of hot mix plant shall not be permitted in case the cost of DBM/ BM/ BC/ SDC work is more	NIL

S.No.	Particulars	Quantity
	than one crore. Bidder will have to submit the purchase bill of plant as a proof). The bituminous work of DBM/ BM/ BC/ SDC will have to be done by hot mix plant and paver only.	
7	Excavator	NIL
8	Concrete Mixture with hopper	1
9	Vibrator	
a	Needle Vibrator	1
b	Surface Vibrator	1
10	Concrete Batch Mix Plant of Capacity 15 Cum/Hr.	NIL

h. The Bidder shall submit the Character certificate issued by District Magistrate in the names of partners in case it is partnership firm, proprietor, in case it is proprietorship firm, directors in case it is company.

i. The Bidder should submit the notarized affidavit that the bidder has not been blacklisted by any state/ central government/ organization in last 7 (seven) financial years.

NMRC, if required, may seek clarifications from bidders during the technical evaluation.

The Bidder shall also furnish the following:

a. For above criteria 4.1a
   i. Statutory proof of existence as the legal entity
   ii. Power of attorney as in Form 8: Power of Attorney
   iii. Memorandum and Articles of Association showing the objectives of the company/ firm (as per applicability)

b. For above criteria 4.1b
   i. A statement as in Form 4: Work Experience with documentary proof

c. For above criteria 4.1c
   i. Solvency certificate should be issued within a period of minimum 6 months of nationalized/ Schedule Bank. In case it is issued more than 6 months, it should be revalidated after 6 months
   In case of firm, proof of solvency of the bidder will consist of a certificate signed by the District Magistrate or Manager of the Bank as per Form 9: Banker's Solvency Certificate regarding the cash assets of the bidder.
   In case of company, the proof of the company solvency will be its last balance sheet audited and certificate by the Chartered Accountant or certificate/ reference of a Bank.

d. For above criteria 4.1d and 4.1e
   i. Form 5: Financial Capability Details
   ii. A copy of the Annual Reports (Profit and Loss Account and Balance Sheet) for the last 3 (three) Financial Years of Bidder
   A copy of the Audited balance sheets and Profit and Loss Statements for the last 3 (three) financial years.

In case the Financial Statements for the latest financial year are not audited and therefore the Bidder cannot make it available, the Bidder shall give an undertaking to this effect and the statutory auditor/charted accountant shall certify the same. In such a case, the Bidder shall provide the Audited Financial Statements for 2 (two) years preceding the year for which the Audited Financial Statement is not being provided. Also, pertaining to latest financial year, the bidder shall submit an affidavit certifying that "The Annual Accounts have not been audited so far. We are submitting the CA certified provisional accounts, which shall be substantiated by the Audited Accounts, when prepared."

iii. A self-attested copy of current valid ITR
iv. A self-attested copy of PAN, GST registration

e. For above criteria 4.1f
   i. Form 10: General Guidelines for Fixing Requirement of Technical Staff for Work

f. For above criteria 4.1g
   i. Form 11: Proforma for Equipment available

g. For above criteria 4.1i
   ii. Form 7: Undertaking - 1

4.2. Compliance with Technical Specifications

The equipment offered by the bidders must comply with the stipulated technical specifications as mentioned in the tender documents.

4.3. Information of the Technical and Financial Proposal

a. The Bidder satisfying technical and financial eligibility criteria under Clause 4.1 shall be considered as technically and financially qualified.

b. The financial proposal of only technically qualified Bidders shall be opened for evaluation.

c. The Bidder with the lowest quoted price for "**Proposed Gate for NMRC Bus Depot "** in the financial quote (L1 bidder) shall be selected for the award of contract.

4.4. Selection of Bidder

After the above evaluation process, the Technically Qualified Bidder, who is declared as L1 (lowest quoted price) may be declared as the selected Bidder ("Selected Bidder") for the Project.

a. In case, two or more technically qualified bidders quote the same percentage in the Bid, and become Lowest (i.e. L-1), then the tender would be awarded to the bidder who has the highest / higher Average Annual Turnover from 'Similar Works' (as per Minimum Eligibility Criteria defined in Section 4 under "Definition of Similar Work") during the last 3 years ending on the last day of the month preceding the month in which the tender has been floated.

b. Prior to the expiry of the period of bid validity, NMRC will notify the successful bidder in writing, either through Notice of Award (NOA), that his bid has been accepted.

c. The NOA would be sent in duplicate to the successful bidder, who will return one copy to NMRC duly acknowledged, signed and stamped by the authorized signatory of the bidder, as an unconditional acceptance of the NOA, within 10 (ten) days from the date of issue of NOA.

d. No correspondence will be entertained by NMRC from the unsuccessful bidders.

4.5. Notice of Award and Execution of Contract Agreement

a. NMRC will notify the Successful Bidder by a NOA that its bid has been accepted.

b. The Selected Bidder shall, within 10 (ten) days of the receipt of the NOA, sign and return the duplicate copy of the NOA in acknowledgement thereof along with letter of acceptance of NOA. In

the event, the duplicate copy of the NOA duly signed by the Selected Bidder and letter of acceptance of NOA is not received by the stipulated date, NMRC may, unless it consents to extension of time for submission thereof, appropriate the Bid Security of such Bidder as mutually agreed genuine pre-estimated loss and damage suffered by NMRC on account of failure of the Selected Bidder to acknowledge the NOA.

c. The Successful Bidder shall execute the Contract Agreement within 30 (thirty) days of the letter of acceptance of NOA or such extended period as may be decided by the Corporation.

d. Failure of the Successful Bidder to comply with the requirement of acknowledgement of NOA shall constitute sufficient grounds for the annulment of the NOA, and forfeiture of the bid security.

4.6. Performance Bank Guarantee / Security Deposit

a. Contractor has to deposit additional performance guarantee/ Security in the shape of FDR/ CDR/ Bank Guarantee/ NSC in case rate quoted below of Bill of Quantity (BOQ) at 0.5% per one percent up to 10% below rate and 1% per one percent on rate quoted beyond 10% below rate, valid for the complete contract period by the Contractor before entering in to the contract bond.

b. A Contract agreement will have to be signed by the Contractor at his cost on proper stamp paper. Without performance guarantee by Contractor, Contract agreement shall not be signed.

c. NMRC reserves the right for deduction of NMRC dues from Contractor's Performance Bank Guarantee/ Security Deposit (interest free) for – Any penalty imposed by NMRC for violation of any terms and conditions of agreement committed by the Contractor.

   i. Any amount which NMRC becomes liable to the Government/Third party due to any default of the Contractor or any of his director/ employees/ representatives/ servant/ agent, etc.

   ii. Any payment/ fine made under the order/judgment of any court/consumer forum or law enforcing Contractor or any person duly empowered in his behalf.

   iii. Any outstanding payment/ claims of NMRC remained due after completion of relevant actions as per agreement.

d. Once the amount under above Clause is debited, the Contractor shall replenish the Security Deposit/ Performance Bank Guarantee to the extent the amount is debited within 15 days period, failing which, it shall be treated as Contractor Event of Default and will entitle NMRC to deal with the matter as per the provisions of RFP and Contract Agreement.

4.7. Contract during Proposal Evaluation

a. Proposals shall be deemed to be under consideration immediately after they are opened and until such time NMRC makes official intimation of award/ rejection to the Bidders. While the Proposals are under consideration, Bidders and/ or their representatives or other interested parties are advised to refrain from contacting by any means, NMRC and/ or their employees/ representatives on matters related to the Proposals under consideration till the time Contract is awarded.

b. Any effort by a Bidder to influence NMRC in its decisions on e-Bid evaluation, e-Bid comparison or contract award may result in rejection of the Bidder's e-Bid.

c. In the event of any information furnished by the Contractor is found false or fabricated the minimum punishment shall be debarred/ blacklisting and the legal proceeding may also be initiated.

d. If the Bidder wishes to bring additional information to the notice of NMRC, he/she can do so in writing. All correspondence/ enquiry should be submitted to the following in writing by fax/ post/courier:

Executive Director
Noida Metro Rail Corporation (NMRC) Limited
Block-III, 3rd Floor, Ganga Shopping Complex, Sector-29,
Noida -201301
District Gautam Budh Nagar, Uttar Pradesh

Email: nmrcnoida@gmail.com

e. No interpretation, revision, or other communication from NMRC regarding this solicitation is valid unless in writing and signed by the competent authority from NMRC.

4.8. Other Instruction

a. Canvassing in connection with the tenders is strictly prohibited and the tenders, submitted by Bidder, who resort to canvassing, are liable to be rejected. EMD will be forfeited of those tenders who will be found non serious and if it is felt by the tender committee that the Bidders submitted their tender only to influence the tendering process.

b. On acceptance of the tender, the name of the accredited representative of the Contractor, who would be responsible for taking instructions from the NMRC or the official deputed by NMRC, shall be communicated to the NMRC or the official deputed by NMRC in writing.

5. Section 5: Special Conditions of Contract (SCC)

5.1. Conditions Governing the Contract

The special conditions of contract contained herein shall be supplemented to the general conditions of the contract and in event of any conflict or inconsistency between them; Special conditions of the contract will supersede the General conditions of the contract.

a. The Bidders are advised before bidding to see carefully the site of work & study architectural & structural drawings for the buildings/ roads to be constructed under the scope of this tender.

b. In giving their rates, the Bidders should take into account all fluctuations of market construction rates of materials, as no claim shall be entertained on this account during the acceptance of the tender and the currency of the contract.

c. The tendered rates shall be for all completed items of the work and shall include all quarry royalties, testing, screening, tools & plants, railways freight, carriage of materials to site, stacking, removal charge of any rejected material, etc. labour cess and all other taxes in force from time to time.

d. Within fifteen days of the signing of Agreement, the contractor shall have to notify in writing the name of his two authorized representatives one of them will always be available at the site of work to receive the orders / instructions by Engineer in charge and the other for issue of materials and other miscellaneous works. The contractor shall be fully responsible for the orders / instructions received by his representatives regarding quality, progress and materials from the Engineer-in-charge or any higher officer of NMRC.

e. Contractor shall have to make their own arrangement of water and electricity for construction work at site. All the building material for the work shall be arranged by the contractor at his own cost.

f. The contractor shall be fully responsible for setting out the works and for the correctness of the positions, levels, dimensions and alignments strictly according to the plan / architectural and structural drawings (shall be provided without any charge) and all necessary instruments, pegs poles and other material required for the purpose, failing which the contractor will be penalized as applicable.

g. A Cement consumption register shall be maintained at the site by the department for material brought by contractor as per CPWD Manual/Specification. The contractor or his authorized representative / agent shall have to sign the register daily in token of the consumption of material consumed daily at work site.

h. The contractor (in self) shall give sufficient supervision to the work using his best skill and attention. He shall provide necessary qualified staff to supervise the execution of the work. The contractor or a competent authorized agent or representative should be got approved in writing by the Engineer-in-charge (whose approval at any time can be withdrawn or changed) for supervising the work and to receive directions and instructions from Engineer-in-charge of the work on the behalf of the contractor. The supervisory staff of the contractor will not be changed without the approval of Engineer-in-charge.

i. The contractor shall be responsible for the damage to any property or any injury to person whatsoever caused by him or anybody in his employment or caused in consequence of his work. He will indemnify and keep the Government un-indemnified against all claims, demands, proceedings, charges and expenses and compensation, whatsoever, in respect of the or in relation to any such injuries or damages. The contractor shall take all necessary precautions for the safety of his employees on the work site and shall comply with all applicable provisions of safety law and building codes to prevent accident or injuries to person on the work site.

j. The contractor shall keep at his own, whole of the excavated area free from water; however, if excavation is filled with water the contractor shall provide all pumping equipment temporary drain and such cuts / excavation shall be made good at the completion of work at his own cost.

k. The contractor shall at all times keep the premise free from accumulated waste material or rubbish caused by his employees on the work and on completion of the work he shall clear away whole site from such material and fill up the borrow pits / cuts dug by him. He will leave whole of the site and work clear in a workman like. Nothing extra shall be paid to contractor for this clearing up.

l. The contractor shall maintain and keep the area in agreed sanitary condition for the use of men engaged in the work by him and shall remove and clear all structures etc. which may have been setup by the contractor for accommodating his staff / labour on the completion of work to the satisfaction of the Engineer in charge.

m. All the material and workmanship and its working procedure shall be strictly as per specification of described in the contract and in case not covered in the contract then in accordance with the Engineer in charge / ISI code. Instructions shall be issued from time to time to tests the material as the Engineer in charge may direct at places of manufacture, at the work site. Contractor shall provide conveyance, labour and material required for examining, measuring and testing for the work and quality of material used. Contractor shall supply sample of the material get them approved before using in the work. The cost of such, like conveyance, labour and material provide for testing purpose and for examining the work and for proper completion of the same shall be borne by the contractor and no extra payment shall be made for the same. In addition to above, the contractor shall establish a field laboratory to carry out day to day tests of all material at his own cost. The contractor shall submit a list of the all the laboratory equipment's, quality control Engineer of the contractor who will work under direction and control of Engineer-in-charge.

n. The contractors shall have to make their own arrangements of water for construction work, for temporary accommodations for the office staff and for the labourers' residence at the site of work. The water should be fit for drinking. In case the water is supplied by the department, the contractor shall have to bear charges at rates fixed by the authority.

o. The contractor will have to follow all existing rules and regulations of the Government & labour department or as amended from time to time regarding the labour employed by him without entitling him for any extra claim on this account.

p. Works to be open to inspection : All works under or in course of execution or executed in pursuance of the contractor shall at time be opened to the inspection and supervision of the Engineer-in-charge and other corporation’s officials and the contractor shall present at work site at all times during the inspection and usual working hours. At all other times, notice for the inspection of site by the Engineer-in-charge or any other official is given to the contractor, contractor should either himself be present to receive orders and instructions of a responsible authorized agent be present for the 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. The contractor shall also provide all facilities necessary for inspection of the work by the Engineer-in-charge or other officials for which no payment shall be made to the contractor.

q. The contractor will arrange the water for consolidation of stone ballast and compaction of earth and nothing extra will be paid for the same.

r. The contractor is to stack the metal at the road berms first according to the size of template with stack number as decided by the Engineer in charge and no metal shall be stocked on road embankment. The metal shall be only allowed to spread for consolidation after recording measurements and taken into road metal account register.

s. The quantity measured in stacks shall be final & binding on the contractor and no claim will be entertained thereafter.

t. A deduction of 7.5% (for voids) shall be made after stack measurements of stone aggregate for payment.

u. Deduction shall be made for earthwork in filling without compaction up to 95% proctor density as per C.P.W.D. specification.

v. The stone ballast and grit will be blue textured and free from soft stone pieces. The size / gauge of the ballast shall be as per detailed specification of C.P.W.D.

w. In case of earth work in filling is being done in layers of 20cm thickness, the compaction must be done with heavy machinery such as road roller of 8 tonne or above capacity at the optimum moisture content. The dry density must be achieved to the extent or not less than 95% of proctor's density. In this area when the compaction is achieved to the desired density no deduction shall be made from the measured cubical content.

x. In case of earth work in filling is being done in layers of 20cm thickness, the compaction must be done with heavy machinery such as road roller of 8 tonne or above capacity at the optimum moisture content. The dry density must be achieved to the extent or not less than 95% of proctor's density. In this area when the compaction is achieved to the desired density no deduction shall be made from the measured cubical content.

In case of patries (shoulder of road) the compaction should be done with road roller of 8 tonne capacity. However, 95% proctor's density at optimum moisture contents is not necessary. The deduction of this area must be made 10% on the measured cubical content of compacted earth.

y. For cement storage at work site, double lock system will have to be followed.

z. The dust emissions from the construction site should be completely controlled and all precautions taken in that behalf.

aa. Every worker working on the construction site and involved in loading, unloading and carriage of construction material and construction debris shall be provided with mask to prevent inhalation of dust particles.

bb. Every Project proponent shall be under obligation to provide all medical help, investigation and treatment to the workers involved in the construction of building and carry of construction material and debris relatable to dust emission.

cc. All builders/owners should take appropriate measures and strictly comply with by fixing sprinklers and creations of green air barriers on construction site.

dd. Compulsory use of wet-jet in grinding and stone cutting.

ee. Wind breaking walls around construction site and proper maintenance of greenbelt should be answered.

ff. All builders shall ensure that C&D waste is transported and disposed to the C&D waste site only and due record in that behalf shall be maintained by the builders and transporters.

gg. It shall be the responsibility of every builder that all the construction material and debris shall be carried in the trucks or other vehicles which are fully covered and protected so as to ensure that the construction debris or the construction material does not get dispersed into the air or atmosphere, in any form whatsoever.

hh. The vehicles carrying construction material and construction debris of any kind should be cleared before it is permitted to ply on the road after unloading of such material.

ii. The entry and exit points design is very important as it should not disturb the existing traffic. This clear demarcation of entry and exit points is important.

jj. Fitness certification is a statutory requirement for commercial vehicles and public transport vehicles. Periodicity for certification is once in a Year.

kk. Pollution-Under-Control (PUC) certificates are required to be obtained every three months for all categories of vehicles and Life of vehicle should be inspected to avoid further air pollution.

ll. Viable emission control technologies exist to reduce diesel exhaust emissions designed to control particulate matter (PM) should be installed/used such as Diesel oxidation catalysts (DOCs), Diesel particulate filters (DPFs), Exhaust gas recirculation (EGR), Selective catalytic reduction (SCR), Lean NOx catalysts (LNCs), Lean Nox traps (LNTs).

mm. The Vehicles carrying garbage should be covered with polythene/Tripal otherwise contractor will be suitably penalized.

nn. Garbage, dry leafs burning is a serious offence. If it is found at site, respective contractor will be suitably penalized.

5.2. Time for Completion of Work

The Work needs to be completed within a period of **6 (six) months** from the date of acceptance of NOA.

6. Section 6: Technical Specifications

6.1. Specifications for Civil Works

6.1.1.Puf Panel Insulated Roof

Fixing of Puff Panel Roofing shell be constructed of 60+30 mm thick PUF (Poly Urethane Foam) & density of 40 + 2 kg/m3 laminated with 0.5mm Pre-coated GI outside and 0.5mm inside of roof. Over the perlin over main trusss as / structure. The roofing panel shall have overlap joinery systems. The top coat of the panels shall preferably be AWT color & Bottom AWT. Complete in all respect.

6.1.2.Polycarbonate Sheet

Fixing of Polycarbonate sheet (4 mm thick) inserted in 50 mm Aluminium Extrusion standard tightened with EPDM RUBBER GASKET with SDS screws and fasteners over steel structure as / drawing complete in all respect. Transparent silicone 789 shall be used to fill the joints.

6.1.3.Terrace Garden

Laying of grass Selection No 1 over Growing Medium Soil (200 mm thick) over 0.8 to 0.9 mm thick Geotextile of GSM 140 (+-5%) of Quality Code ST-14 over Drainage Board 8 to 9 mm thick of GSM 400 (+-5%) Quality Code DB-04 over 1 mm APP membrane over RCC slab complete in all respect.

6.2. Specifications of Electrical and other works

6.2.1.Section - I Lt Distribution Boards

6.2.1.1. Scope

This section covers specification of Distribution Boards (DBs) suitable for operation on 415 V 3 Phase 4 wire 50 Hz supply feeding final lighting and power sub circuits.

6.2.1.2. Standards And Codes

Updated and current Indian Standard Specifications and Codes of Practice will apply to the equipment and the work covered by the scope of this contract. In addition the relevant clauses of the Indian Electricity Act 2003, Indian Electricity Rules 1956, National Building Code 1997, National Electric Code 1985, Code of Practice for Fire Safety of Building (general): General Principal and Fire Grading – IS 1641 - 1988 as amended up to date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and/or IEC Standards shall be applicable.

- Miniature Circuit Breakers for AC circuits IS 8828 : 1996 & IEC 947
- Residual current operated Circuit Breakers IS 12640 : 1988
- Low voltage switchgear and control gear Part II IS 13947 : 1993
- Degrees of Protection provided by enclosures for low voltage switchgear IS 2147 : 1962
- Code of Practice for installation and maintenance of switchgear not exceeding 1000 volts IS 10118 : 1982
- General requirements for switchgear and control gear for voltages not exceeding 1000 volts IS 4237 : 1982
- Specification for Low-voltages switchgear & control gear assembly (Part-1,2 & 3) IS 8623 : 1993

6.2.1.3. Miniature Circuit Breakers

The MCB's shall be of the completely moulded design suitable for operation at 240/415 Volts 50 Hz system. The MCB's shall have a rupturing capacity of 10 KA Ics. The MCB's shall have inverse time delayed thermal overload and instantaneous magnetic short circuit protection. The MCB time current characteristic shall coordinate with PVC cable characteristic. Watt loss per pole of MCB shall confirm to value specified in IS 8828 – 1996. Type test certificates from independent authorities shall be submitted with the tender or before approval.

6.2.1.4. Residual Current Circuit Breakers (RCCB)

RCCBs shall comply with IS 12640 – 1988 and shall be of the current operated type. The RCCB shall be designed to trip within 20 mili sec at a current sensitivity of 30 mA. The RCCB shall be of 2 pole construction for single phase and 4 pole construction for 3 phase. All RCCB shall be complete with test buttons. RCCB shall have a minimum life expectancy of 10,000 operations.

6.2.1.5. Distribution Boards

1. DBs shall be wall mounting, recessed/surfaced type, totally enclosed,16 SWG, dust and vermin proof and shall comprise of miniature isolator, miniature circuit breakers, earth leakage circuit breakers, busbars, neutral link etc. as required, of ratings detailed in the schedule of quantities.
2. DBs shall be double door type. Access to the wiring shall be possible without removing the outer hinged door. The door shall be earthed with insulated copper braded flexible wires.
3. Components forming a part of the DBs shall comply with the relevant Standards and Codes of the Bureau of Indian Standards.
4. As a general practice only prewired MCB type DBs shall be used, on account of their superior technical features, compared to conventional DBs, which don't allow for proper wiring space and wiring terminations. Rewirable fuse type DBs shall not be used.
5. Prewired DBs shall have following features :
    a. Recess / surface type with integral loose wire box
    b. Phase / neutral / earth terminal blocks for termination of incoming and outgoing wires.
    c. Din channel for mounting MCBs
    d. Arrangement for mounting incomer MCB/RCCB/RCBO/MCCB as required.
    e. Copper bus bar
    f. Earthing terminals
    g. Wiring from MCB's to phase terminal block
    h. Interconnection between terminal block/incoming switch / bus bar/neutral terminal block / earth terminal connector with specified size of FRLS pre-insulated copper conductor cable duly fitted with copper lugs / thimbles
    i. Terminal blocks should be suitable for termination of conductor / cable of required size but minimum rated cross section of the terminal blocks should be 6 sq mm
    j. Terminal block shall be made of flame retardant polymide material
    k. Colored terminal blocks and FRLS wires for easy identification of RYB phases, neutral and earth
    l. Prewired DB shall be provided with a detachable cassette for safe removal of MCBs, RCCBs. Terminal connectors from the DB without loosening the internal cable connections of phase and neutral circuits (This is an optional feature).
    m. The prewired DB shall have peel able poly layer on the cover for protection from cement, plaster, paints etc. during the construction period.
    n. Detachable plate with Knock out holes shall be provided at the top/bottom of board. Complete board shall be factory fabricated and prewired in factory ready for installation at site. The box and cover shall be fabricated from 1.6 mm sheet steel, properly pre-treated, phosphatized with powder coated finish.

    Where specified it shall be out double door construction provided with hinged cover in the front.

6.2.1.6. Name Plates and Labels

Suitable engraved white on black name plates and identification labels of metal for all Switchboards and Circuits shall be provided. These shall indicate the feeder number and feeder designation.

6.2.2.Section - II Cable Tray/Raceway

6.2.2.1. Cable Trays

1. **Ladder type Cable tray** – for Power Cables only
    a. Cable trays shall be ladder type fabricated out of mild steel/slotted angles and flats of required width as per design.
    b. Bends shall be prefabricated. The cable tray shall be hot dip galvanized or primed and painted with powder coating as asked for in BoQ or as approved by Owner/Consultant.
    c. The minimum weight of the zinc coating shall be 460 gm/sq.m and minimum thickness of coating shall not be less than 75 microns.
2. **Perforated Cable tray** – for Cables for Low current service only
    a. The perforated cable trays are fabricated out of 2.0 mm thick CRCA sheet steel having minimum 50mm depth or as called for in BOQ, hot dip galvanized or epoxy coated of approved shade.
    b. Perforations are maximum 10mm spaced at maximum 20mm distance. The cables shall be tied with the cable tray with nylon strip/aluminium clamps/M.S. clamps as per requirements.
    c. Suitable provision shall be made where a tray crosses expansion joints. The width of the tray shall allow for a suitable separation between cables the design shall allow for adequate bending radius for the sizes of cables.
    d. No sharp bend to be allowed in cable tray. Joints between sections shall be bolted.
    e. The tray shall be suspended from the surface of the concrete slab by means of approved steel hangers spaced at a distance of not more than 125cms. Suitable bushes shall be provided where cables pass through apertures in the tray.
    f. Cables must be securely fixed to the tray with clamps or cable ties. In routing necessary barrier and spacing shall be maintained for cables of different voltages in case they lie side by side.
    g. Telephone cables shall cross the power cables only at about right angle and these two shall not run in close proximity.
    h. Full details of the tray shall be approved by the Consultant/Site Engineer before fabrication. Earth continuity shall be maintained between each section of cable tray and each total run of tray shall be effectively bonded to the nearest earth continuity 0 conductor.
    i. All nuts and bolts used shall be of galvanised steel.
    j. Depending on the size of cable trays space of 20-33% has to be maintained for future expansion.
    k. Cable tray is manufactured to comply with the specifications of National Electrical Code (NEC) and National Electrical Manufacturer's Association (NEMA).

6.2.2.2. Hot Dip Galvanizing Process for Mild Steel Used for Earthing, Cable Trays or Junction Boxes for Electrical Installation.

GENERAL REQUIREMENTS

1. Quality of Zinc: Zinc to be used shall conform to minimum Zn 98 grade as per requirement of IS: 209-1992.

2. Coating Requirement

    a. Minimum weight of zinc coating for mild steel flats with thickness up to 6 mm in accordance with IS:6745-1972 shall be 400 g/sqm.

    b. The weight of coating expressed in grams per square metre shall be calculated by dividing the total weight of Zinc by total area (both sides) of the coated surface.

    c. The Zinc coating shall be uniform, smooth and free from imperfections as flux, ash and dross inclusions, bare patches black spots, pimples, lumpiness, runs, rust stains bulky white deposits, blisters.

    d. Mild steel flats / wires shall undergo a process of degreasing pickling in acid, cold rinsing and then galvanizing.

6.2.2.3. Fire Retardant Cable Paint & Fire Barrier:

1. The fire retardant paint / barrier shall be listed by independent test agencies such as UL, FM or OPL and be tested to, and pass the criteria of ASTM E 814 (UL1479) standard test method for fire test through- penetration fire stops and ASTM E 1996 (UL 2079) standard test method for fire resistive joint system/

    Fire retardant cable Paint

    a. The Fire resistant cable coating / painting shall be intumescent / ablative, water based compound, and the coating shall expand up to 10 times, supplied in a manufacturer seal container indicating manufacturing and expiry dates. The coating material shall be non-toxic, asbestos free, & halogen free and shall have good mechanical strength. The colour of paint shall be white and density of coating shall be 1.3kg/ltr, coating shall have a snap time of 30 minutes, the expansion shall begin at 230 deg.C and it shall have an oxygen index of 41%.

    b. Coating shall be applied by ordinary paint brush after cleaning the cables of dust and oil deposition. A minimum textured finish of 3 mm wet film thickness shall be achieved by applying the material in 2-3 layers leaving intervals of 2 to 8 hours depending upon the moisture and thickness, moisture and temperature hours between each coat.

    Fire Barrier sheet for floor and wall sealing

    c. The framing & fixing part of fire barrier sheet shall be very simple & directly fixed around walls & floors by help of anchored bolts & washer. For 2 hour fire rating the fire barrier sheet shall be minimum 7.62 mm thick and shall be cut as per the profile of penetration and opening. The small gap left around the penetration shall be closed with fire rated soft & mouldable putty. Fire barrier must be design on the intumescent technology to seal larger penetration through the fire rated walls & floors. Fire barrier must be a composite construction with the quality incorporated with organic/ inorganic fire resistive elastomeric sheet with specific gravity of 1.6 gm/ cubic centimeter.

6.2.2.4. Testing of Cables

1. Cables shall be tested at works for the following tests before being dispatched to site by the project team.

    a. Insulation Resistance Test.

    b. Continuity resistance test.

    c. Sheathing continuity test.

    d. Earth test.(in armoured cables)

    e. Hi Pot Test.

2. Test shall also be conducted at site for insulation between phases and between phase and earth for each length of cable, before and after jointing. On completion of cable laying work, the following tests shall be conducted in the presence of the Owner's site representative.
    a. Insulation Resistance Test(Sectional and overall)
    b. Continuity resistance test.
    c. Sheathing continuity test.
    d. Earth test.
3. All tests shall be carried out in accordance with relevant Standard Code of Practice and Electricity Rules. The Contractor shall provide necessary instruments, equipment and labour for conducting the above tests and shall bear all expenses in connection with such tests. All tests shall be carried out in the presence of the Owner's site representative.

6.2.2.5. Floor Cable Trunking

1. General
    a. Trunking and fittings shall comply with BS 2989 or Indian Standard of IS277 with a GI coating thickness of 275GSM.
    b. Trunking shall be top accessed. Inverted trunking is not acceptable.
    c. All multi-compartment trunking systems shall maintain the stated segregation throughout, including all accessories.
    d. Trunking shall be manufactured using pregalvanised sheet steel. Trunking shall be spot welded & arc welded throughout its length for better impact resistant and to prevent concrete seepage during installation. The trunking shall normally be supplied in 2500mm lengths with a material thickness of 1.6mm. Lengths of trunking, shall be coupled together by means of joint sleeves, made of pre galvanized GI with 275 GSM GI coating. At each joint in the trunking, continuity shall be maintained by means of copper links, not less than 25 x 3 mm to achieve an acceptable earth loop impedance level in compliance with BS 2989, fixed with brass nuts, bolts and serrated washers. Removal of any lid no matter how it is fitted shall not affect the earth continuity of the trunking. LSZH copper cable link with cable lugs may be used, if the proper connection method is provided to avoid long term corrosion and electrolytic action. The LSZH cable shall have an equivalent cross sectional area to the copper links. Bonding link shall be fixed on external surfaces.
    e. Manufacturer's standard fittings shall be used for all connections and changes of direction. All vertical bends, Crossover boxes, access outlets, and junction boxes shall be of the same manufacturer as the trunking. Trunking shall not be cut or bent to form bends, flanges or attachments. Gusset bends shall be used wherever necessary to provide sufficient bending radius for the cables. Site fabricated items shall not be accepted.

2. The minimum size shall be 50mm by 40mm with single compartment. The maximum recommended size for the trunking is up to 300mm by 40mm with triple compartments.
3. All inside edges of trunking shall be smooth and provision shall be made to prevent abrasion at bends.
4. Cable retaining straps supplied by the trunking manufacturer shall be fitted at intervals not exceeding 1m. Where trunking passes through walls, floors and ceilings, proprietary fire barriers shall be installed in the trunking. The fire barrier shall have a rating not less than that of the original construction of the opening.

5. Trunking shall be adequately supported throughout its length. Trunking support and channel shall be quick-fixing type and shall be such as to space the trunking a minimum of 13mm from any part of the wall or bulkhead.
6. A minimum of two fixings shall be provided between joints in the trunking except where the distance between is less than the maximum spacing.
7. Where trunking is cut or drilled, the cut edges of the trunking shall be smoothed to prevent abrasion of the cables and shall be painted with anti-corrosion paint like aluminium coating, to the same colour as the adjacent surfaces, such painting to be carried out as the work proceeds. In no circumstances will rough screw edges and nuts be allowed in the interior of the trunking.
8. Flush or buried trunking and under floor metal ducts shall comply with BS 2989.
9. The space factor for cables installed in trunking shall not exceed 35% as per IEE regulations.
10. All lengths of vertical run trunking in excess of 3000mm shall contain cable supports made of insulating, non-hygroscopic, non-combustible material. The spacing between such supports shall not exceed 1800mm.
11. An additional support shall be provided at the top of all vertical runs exceeding 3000mm, to support the weight of the cable and distribute the cables within the trunking to prevent undue compression of the installation.
12. Where trunking crosses expansion joints, a trunking fitting shall be used which shall allow for expansion and maintain earth continuity.
13. Suitable cutout on underfloor trunking at ticket barriers shall be provided to suit Automatic Fare Collection System Contractor's requirement. The cutout shall not have a sharp edge or abrasive effect on cables. The location and route for the cutout and under floor trunking shall be according to Working Drawings.
14. Trunking installed externally shall be manufactured from galvanized sheet steel in accordance with BS 2989 protection Class 3, or other international standards. Trunking installed internally shall be of Class 2.
15. Partitions or dividers shall be of the same material and finish as the trunking. The method of fixing shall not cause any long-term corrosion or electrolytic action.
16. Connections to multiple boxes, switchgear and distribution boards shall be made with multi compartment vertical access boxes. Expansion joints in long continuous runs shall be provided as recommended by the manufacturer.

6.2.2.6. Access Outlets

1. Access Outlets are made of very high quality materials to withstand heavy load and corrosion.
2. Manufactured from high-pressure die cast material for strength &durability.
3. The trap frame & trap are made of flame retardant Engineering Plastic - ABS & Polyamide ratchet for strength & durability.
4. The Trap Frame can be easily removed by pulling either one of the Nylon Bars to detach & remove the unit for servicing or installation of accessories to save installation & servicing time.
5. Patented screw less ratchet bar level adjusting system to match with screed / floor height. The trap lid is self-adjustable to any floor finish thickness.
6. Trap cover must be reinforced with a 2.5mm thick pre-galvanized steel plate to provide rigidity & added strength. Trap lid to have a screw less knob-hinged design for quick mounting on to the frame requiring minimum maintenance.
7. The Trap cover must have 8 mm recessed for installation of carpet and tiles.
8. Trap trim design to protect carpet from damages and give the floor area added aesthetics.

9. Trap lid should be made of Electrostatic Polyester Epoxy Coating to provide excellent and enhanced protection on visible parts against chemical or saline corrosion.
10. Strong and durable trap lifting handle on the trap cover is made of similar color material and has special design for easy lifting, even with large fingers.
11. Cables are guided by Cable Retainers through generous cable outlet which open automatically and lock into position when cables are present.
12. Trap cover of Access box should be retained by Cable Grommets with high quality durable foam to prevent the cable damage from exit position & also prevent ingress of dust when closed.
13. Access Outlet should carry service plates for providing services i.e.: Power, Data & Telecom. The Access outlets must accommodate to have three compartments to run Mains Voltage & Extra Low Voltage cables.
14. The system must have Positive Double Earthing connections.
15. Earth wire connector should be provided in all the boxes, and complies with the requirement of current IEE regulation.
16. Access outlets are tested to a load bearing of 2 tons on the trap lid for heavy traffic areas
17. Four side blanks are made with removable perforations to suit ducts installation.
18. Standards & Approvals – The system must comply with the relevant specification & IEC 61084 standards.

6.2.2.7. Crossovers/Junction Boxes

1. Cross Overs/Junction boxes are made of very high quality materials to withstand heavy load and corrosion.
2. Manufactured from high-pressure die cast material for strength &durability.
3. The trap lid is self-adjustable to any floor finish thickness using the levelling screws on all the four corners.
4. The Trap cover is made of 2.5mm thick pre-galvanized steel plate to provide rigidity & added strength.
5. The Trap covers to have flexibility for quick mounting on to the base box requiring minimum maintenance.
6. The Trap cover must have 8mm recessed for installation of carpet and tiles.
7. The Flyover units, trap frame and traps should be made of Electrostatic Polyester Epoxy Coating to provide excellent and enhanced protection on visible parts against chemical or saline corrosion.
8. The Cross Overs should carry fly-over made of Electrostatic Polyester Epoxy Coating for cables passage to ensure segregation of service
9. Crossovers are tested to a load bearing of 3.6 tons on the trap lid for heavy traffic areas. The Cross Overs should have provision to Power, Data & Telecom services.
10. The system must accommodate to run Mains Voltage & Extra Low Voltage cables.
11. The trap cover screws must be made from Stainless Steel for extra protection.
12. The system must have Positive Double Earthing connections.
13. Earth wire connector should be provided in all the boxes, and complies with the requirement of current IEE regulation.
14. The complete system must have excellent protection against rust.

15. Four side blanks are made with removable perforations to suit ducts installation of up to 38-mm height.
16. The one-piece base frame design ensures minimum openings to prevent concrete seepage into the box during casting of concrete or screeding.
17. Standards & Approvals – The system must comply with the relevant specification & IEC 61084 standards.

6.2.2.8. Vertical Access Boxes

1. Vertical access boxes are made of very high quality materials to withstand heavy load and corrosion.
2. Vertical access boxes facilitate the connectivity of floor raceways to the equipment on the wall like the distribution boards, so the product should be designed as “L” shaped
3. The Vertical access boxes should have provision to carry Power, Data & Telecom services
4. The vertical access boxes should have the duct entry knockouts of up to 38mm and also provision for carrying the conduits to the wall
5. The vertical access boxes are made of electrostatic polyester epoxy coating to prevent the rust accumulation.

6.2.3.Section III- Light Fixtures

6.2.3.1. Light Fittings

Technical parameters to be followed by all light fixtures unless specified in:

1. Efficacy of the fixture must be minimum 95 lumen/Watt,
2. Service Life of the fixture should be minimum 50,000 burning hours,
3. The LED used should be of following makes- Nichia/Cree/Philips-Lumiled/Osram/Sharp/Seoul.
4. The CRI of the fixture should be minimum 80 for indoor applications and 70 for outdoor applications,
5. The THD should be less than 10%.
6. The housing of the indoor fixtures should be extruded aluminum/standard alloy housing,
7. For outdoor fixtures the housing shall be of high pressure die cast aluminium housing,
8. The IP category should be IP20 or higher for indoor applications and IP65 or higher for outdoor applications,
9. The Surge Protection to be provided conforming to relevant IS standards/IEC 61643-II Class-2 & EN 61643-II Type-2,
10. The manufacturers name/logo should be engraved/embossed on the housing/body or Name/Logo on aluminium plate labels or Name/logo printed on housing/body,
11. The warranty period on complete luminaire including driver/control gear, LED, all accessories should be 5 years from the actual date of completion of work.
12. The Power factor should be 0.95 or higher,
13. The total power consumption of the fitting should not be more than 110% of rated capacity of LED light.

6.2.3.2. Lighting Fixtures & Accessories

The light fixtures and fittings shall be assembled and installed in position complete and ready for service, in accordance with details, drawings, manufacturer’s instructions and to the satisfaction of the Engineer-in-Charge.

1. **Scope:** Scope of work under this section shall include inspection at suppliers/ manufacturer's premises at site up to satisfaction of Engineer-in-Charge or authorized representative. Light fixture can only be supplied after getting approval from Engineer-in Charge. Supplying at site, receiving at site, safe storage, transportation from point of storage to point of erection, erection and commissioning of light fittings, fixtures and accessories including all necessary supports, brackets, down rods and painting etc. as required as per .
2. **Standards:** The lighting and their associated accessories such as reflectors, housings, drivers etc., shall comply with the latest applicable standards, more specifically the following:

   Light Fittings-General Requirements:
3. Fittings shall be designed for continuous trouble free operation under atmospheric conditions without reduction in lamp life or without deterioration of materials and internal wiring. Degree of protection of enclosure shall be IP-65 or above and as per for outdoor fittings.
4. Fittings shall be so designed as to facilitate easy maintenance including cleaning, replacement of drivers.
5. Outdoor type fittings shall be provided with weather proof junction boxes (IP-55) and IP-54 Control gear boxes. All Medium bay and high bay fixtures shall be supplied with junction box as per site requirement and as per.
6. Each fitting shall have a terminal block suitable for loop-out connection by 1100 V PVC insulated copper conductor wires up to 4 sq.mm. The internal wiring should be completed by the manufacturer by means of standard copper wire and terminated on the terminal block.
7. All hardware used in the fitting shall be suitably plated or anodized and passivated.
8. Earthing: Each lighting fitting shall be provided with an earthing terminal. All metal or metal enclosed parts of the housing shall be bonded and connected to the earthing terminal so as to ensure satisfactory earthing continuity throughout the fixture.
9. Painting/Finish: All surfaces of the fittings shall be thoroughly cleaned and degreased and the fittings shall be free from scale, rust, sharp-edges, and burns.
10. The housing shall be powder coated as required and as per. The surface shall be scratch resistant.
11. Luminaire shall have dual optics with primary optics distribution of 120 degree or higher and secondary optics as per site/ requirement.
12. Luminaire shall be designed to operate continuously for minimum 12 hours without deviation in the output parameters.
13. All the luminaires shall have LM-79, LM-80 and certificates from NABL accredited lab.
14. Luminaires and driver both shall be BIS certified individually.
15. Metal used in BODY of lighting fixtures shall be not less than 22 SWG or heavier if so required to comply with specification of standards. Sheet steel reflectors shall have a thickness of not less than 20 SWG. The metal parts of the fixtures shall be completely free from burns and tool marks. Solder shall not be used as mechanical fastening device on any part of the fixture.
16. Luminaire should be covered with suitable Glass or diffuser with High Transitivity. Outdoor luminaire shall be with clear toughened glass or clear polycarbonate cover.
17. Heat sink used should be extruded Aluminium or Pressure Die-Cast Aluminium having high conductivity preferably ADC 12 or LM 6.
18. Lighting fixtures and accessories shall be designed for continuous trouble free operation of minimum of 12 hrs under diverse atmospheric conditions without deterioration of materials.

19. Gasket: An extruded silicon loop gasket shall be provided in the lantern body to ensure a weather proof seal between the cover and the metal housing to exclude the entry of dust, water, insects, etc. Luminaire should conform to degree of protection of IP 65 or above. Felt gasket will not be accepted. This point is applicable only for highbays and outdoor type lumianires.
20. The fixture shall be suitable to work under following ambient conditions. Maximum ambient air temperature of 45 deg C (For Indoor products) Maximum ambient air temperature of 35 deg C (For Outdoor products).
21. For outdoor type luminaire it shall consist of separate optical and control gear compartment. Driver should be easily replaceable in the field conditions. Driver shall be integrated inside the luminaire and should not be kept behind light engine.
22. The Luminaire should be compliant to the following standards:
    - IEC 60529 - Classification of degree of protections provided by enclosures
    - 16103(Part 1) : 2012 Led Modules for General Lighting- Safety Requirements
    - 16103(Part 2) : 2012 Led Modules For General Lighting Part 2 Performance Requirements
    - IS 16107 (Part 1) : 2012 Luminaires Performance Part 1 General Requirements
    - IS 16107 (Part 2) : 2012 Luminaires Performance Part 2 Particular Requirements Section 1 LED Luminaire
    - IS 16104 : 2012 - d.c. or a.c. Supplied Electronic Control Gear for LED Modules - Performance Requirements
    - IS 16105 : 2012 Method of Measurement of Lumen Maintenance of Solid - State Light LED Sources
    - IS 16106 : 2012 - Method of Electrical and Photometric Measurements of Solid-State Lighting (Led) Products
    - IES LM-79-08 - Electrical and Photometric Measurements for Solid State Lighting Products
    - IES LM-80-08 - Measuring Lumen Maintenance of LED Light Sources
    - IEC 60598-1 - General requirement and tests
    - IEC 60068-2-38 - Specification for Permitted Humidity Test
    - Immunity to interference EN 61547
    - Safety EN 60928 / IEC 928 / IS 13021 (Part I)
    - Performance EN 60929 / IEC 929 / IS 13021 (Part II)
    - Vibrations & Bump tests IEC 68-2-6 FC / IEC 9001
    - Quality Standard ISO 9001
    - Environmental Standard ISO 14001
    - DC Operation EN 60924
    - Emergency Lighting Operation VDE 0108

6.2.3.3. Electronic driver

Driver shall comply with the following:

- EN 6 1000-3-2 – Harmonics
- EMI – Confirming to CISPR-15

- No Stroboscopic Effect
- Constant Wattage / Light output between 240 V ± 10%.
- Circuit protection for surge current and inrush current.
- Short circuits, open lamp protection
- RFI < 30 MHz EN 55015
- RFI > 30 MHz EN 55022
- Total Harmonic Distortion (THD) ≤10%
- Output voltage ripple should be within 3%
- Full Load Efficiency of the driver ≥ 90%
- Current waveform should meet EN 61000-3-2

6.2.3.4. Installation

1. Fixtures shall be installed at mounting heights as detailed on the Drawings or as instructed on site by the Engineer.
2. Pendent fixtures within the same room or area, shall be installed plumb and at a uniform height from the finished floor. Adjustment of height shall be made during installation. Flush mounted recessed fixtures, shall be installed so as to completely eliminate leakage of light within the fixture and between the fixture and adjacent finish.
3. Fixtures mounted outlet boxes shall be rigidly secured to a fixture stud in the outlet box. Hickeys or extension pieces shall be installed where required to facilitate proper installation.
4. Fixtures located on the exterior of the building shall be installed with non-ferrous metal screws finished to match the fixtures.
5. All light fittings shall be supported with appropriate fixing accessories such as clips, supporting brackets, suspension sets, nuts, washers, screws etc. for their proper installation on different types of ceiling panels. Suspension sets shall be of adjustable type suitable to carry the weight of the lighting fittings unless otherwise stated or indicated on drawings.

6.2.3.5. Testing of installations:

After all lighting fixtures are installed and are connected their respective switches, test all fixtures to ensure operation on their correct switch in the presence of the Engineer. All un-operating fixtures or ones connected to the wrong or inconveniently located switch shall be correctly connected as directed by the Engineer.

6.2.4.Section IV- Earthing

6.2.4.1. Scope

1. This section covers specifications for earthing systems comprising of earth electrodes, earth leads and loop earthing conductors.
2. Separate earthing systems shall be provided for neutral earthing (of transformers and generators) and body earthing.
3. All the non-current carrying metal parts of electrical installations including metal conduits, trunkings, cable armour, switchboards, DBs, light fittings and all other non-current carrying parts made of metal shall be bonded together and connected by means of specified earthing conductors to an efficient earthing system.
4. All three phase equipment shall have two separate and distinct body earths and single phase equipment shall have a single body earth.
5. Separate earth leads of appropriate size shall be provided for.

a. Main switchboards

b. UPS system earth bus

c. Computer system earth bus

d. Telephone system earth bus

Wherever so specified the earth lead shall be PVC sheathed to provide a “clean” earth.

6. All metallic components and pipes within bathrooms, toilets and kitchens shall be connected to the earthing system by means of minimum 4 sq mm PVC insulated (green/yellow) copper conductor wires.

6.2.4.2. Standards

The earthing system shall be carried out in conformity with the updated and current edition of IS 3043: 1987. In addition, relevant clauses of Indian Electricity Act 2003, India Electricity Rules 1956 and IEE Wiring Regulations (16th edition), as amended up-to-date, shall also be applicable.

6.2.4.3. Earth Electrodes

1. Plate Earth Electrodes: The plate electrodes shall be of copper or GI as called for in the schedule of quantities. Minimum dimensions of the electrodes shall be 600 mm x 600 mm. Thickness of copper electrodes shall not be less than 3 mm and of GI electrodes not less than 6 mm.
2. Pipe Earth Electrode: Pipe electrode shall be fabricated from a 40 mm dia 4500 mm long class B (medium) GI pipe. The GI pipe shall be tapered at the bottom and shall be provided with 12 mm dia holes drilled at every 75 mm.
3. Galvanizing: Galvanizing of Earth Electrodes and Earthing Conductors shall conform to class – IV of IS 4736: 1986.

6.2.4.4. Earth Pit

1. For plate electrodes: Plate electrode shall be buried in ground with its face vertical and top not less than 500 mm below ground level. The depth shall be increased if required so that permanently moist soil level is reached. The electrode shall be surrounded by alternate layers of charcoal and salt. A 20 mm dia class B GI pipe shall be provided for watering of the soil surrounding the electrode. The watering pipe shall have a watering funnel attachment with a wire mesh which shall be housed in the masonry inspection chamber. Main earth lead shall be securely terminated at the electrode by means of 2 bolts, nuts, checknuts and spring washers. The earth lead from the electrode up to the test link in masonry chamber shall be drawn in a suitable diameter class B GI pipe for mechanical protection. The GI pipe shall be provided with a coat of bituminous paint or bituminized jute wrapping for additional corrosion protection. The lead shall terminate in a test link provided in the inspection chamber to enable the earth electrode to be isolated for measuring earth resistance.
2. For pipe electrodes: Pipe electrode shall be installed with its stop not less than 200 mm below ground level. The top shall be provided with a 40 mm x 20 mm reducer to fix watering funnel with mesh on top. The entire length of pipe below the inspection chamber shall be surrounded by alternate layers of charcoal and sand. Earth lead shall be provided as for plate electrode and shall be terminated using a though bolt, nuts, check nuts, spring washers etc.
3. Masonry inspection chamber: The watering funnel arrangement as also earth test links shall be accessible and shall be housed in a 400 mm x 400 mm x 400 mm deep masonry inspection chamber having a lockable 10 mm thick cast iron hinged cover plate attached to a galvanized steel frame work embedded in the chamber walls. The hinged cover shall be suitably marked on top so that it is conspicuously identifiable as an earth station.
4. Location of earth electrodes: Location of earth electrodes shall be based on following guidelines.

    a. Minimum distance between any electrode and building structure shall be 1.5 m.

b. Minimum distance between two adjacent electrodes shall be 2 m.

c. Electrodes shall be located in accessible locations. Entrances, pavements and roads shall not be used for locating earth electrodes.

6.2.4.5. Earthing Conductor

Main Earth Lead

1. Interconnections between earth bus provided on the main switchboard inside the building for body earthing / neutral terminals of transformers / generators for neutral earthing and test link provided in the earth electrode inspection chamber shall be laid at minimum 300 mm depth below ground (minimum 600 mm below road crossings and paved pavements).
2. For small installations where this lead is by means of GI / copper wire, the earth lead shall be drawn in a 15 mm dia class B GI pipe. For larger installations the GI pipe size shall be suitable for drawing the earth strip. GI pipe shall be provided with a coat of bituminous paint on the outside for minimizing corrosion. In locations where GI pipe protection cannot be provided, the earth conductor shall be wrapped with bituminous jute wrapping.

Earthing conductors

3. Earthing conductors shall be connected to form the earthing network throughout the installation for earthing of all non-carrying metal parts as below. Materials and sizes shall be as per schedule of quantities

    a. Main earthing conductors shall be taken from the earth connections at the main switchboards to all other switchboards in the network.

    b. Sub-mains earthing conductors shall run from the main switchboard to the sub distribution boards and to the final distribution boards.

    c. Loop earthing conductors shall run from the distribution boards and shall be connected to any point on the main/sub-main earthing conductor, or its distribution board or to an earth leakage circuit breaker.

    d. Conduiting systems and cable armouring shall be earthed at the ends adjacent to switchboards at which they originate, or otherwise at the commencement of the run by separate loop earthing conductors in effective electrical contact with cable armour, switch boxes, accessories, lighting fitting etc.

Installation and Jointing of earthing conductors

4. Earthing conductors shall be provided in longest possible unbroken length to minimize jointing of the conductors in between terminations.
5. Strip conductors shall be secured to the building walls etc. with appropriate size of saddles at intervals not exceeding 900 mm. The saddle shall be gun metal for copper and GI for GI strips.
6. Copper earth strips shall be joined by butt welding /brazing or the mating surfaces shall be tinned, riveted and soldered.
7. GI earth strips shall be joined by GI bolts, nuts, checknuts and spring washers of appropriate size.
8. All exposed joints shall be provided with 2 coats of anti-corrosive paint.
9. Wires shall be joined by means of lugs of appropriate size connected by bolts, nuts, checknuts and washers. If the connection is on a painted surface, the paint shall be thoroughly removed and the metal exposed for making effective electrical contact. Lugs and bolts shall be of brass for copper wires and for GI wires.

6.2.4.6. Prohibited Connections

Neutral conductor, sprinkler pipes, or pipes conveying gas, water, or inflammable liquid, structural steel work, metallic enclosures, metallic conduits and lighting protection system conductors shall not be used as a means of earthing an installation or even as a link in an earthing system.

6.2.4.7. Resistance To Earth

1. No earth electrode shall have a greater ohmic resistance than 3 ohms as measured by an approved earth testing apparatus. In rocky soil the resistance may be up to 5 ohms.
2. The electrical resistance measured between earth connection at the main switchboard and any other point on the completed installation shall be low enough to permit the passage of current necessary to operate circuit breakers, and shall not exceed 1 ohm.

6.2.4.8. Maintenance Free Earthing Electrode System/ Chemical Earthing

1. In maintenance free earthing copper bonded earthing rod electrode shall be of minimum 14.35 mm in diameter and 3 meter length. The rod shall be placed in a 150 mm dia an augured hole in the ground and then surrounded by ground enhancement material in either a dry form or pre mixed in a slurry. Once set, ground enhancement material becomes hard and as such holds positively to the rod as well as surrounding ground. Earth rod offered shall have passed the test required of BS7430/ ANSI/ UL467 and confirm to the adhesion of the copper coating to the steel core (Design feature that prevents the ingress of moister and subsequently the integrity of the rod.
2. Minimum 0.25 mm thickness of copper shall be deposited over the steel core as per BS 7430/ UL 467. Average life of the ground rod shall be 30 years in most soil.
3. Ground enhancement material shall be as per IEEE-80 clause 14.5d with a resistivity of less than 0.12 ohm-meter. The ground enhancement material shall be permanent and not leach any chemicals in to the ground.
4. Minimum 30 Kg of ground enhancement material shall be provided for each earth electrode.
5. Inspection chamber shall be of 400 x 500 mm with concrete base CI manhole cover with frame painted with bitumastic paint. 2 Nos. of 50 x 6 mm cross section & 300 mm long copper strip to be clamped with copper claded rod electrode have sufficient nos (But not less than 4 Nos.) of 10□ mm GI nuts & bolts for connection to the equipment / interconnection to the other pits to form equi-potential bonding.

6.2.4.9. Testing At Site

1. Testing Of Earth Continuity Path: The earth continuity conductor including metal conduits and metallic envelopes of cable in all cases shall be tested for electric continuity and the electrical resistance of the same along with the earthing lead but excluding any added resistance of earth leakage circuit breaker measured from the connection with the earth electrode to any point in the earth continuity conductor in the completed installation shall not exceed one ohm.
2. Earth Resistivity Test: Earth resistivity test shall be carried out in accordance with IS Code of Practice for earthing IS 3043.

6.2.5.Section V- Wiring

6.2.5.1. General

1. Technical Specifications in this section cover the Internal Wiring Installation in concealed/surface conduit/raceways pertaining to:
    a. Lights and fans
    b. Convenience socket outlets
    c. Submain wiring

6.2.5.2. Standards and codes

1. Updated and current Indian Standard Specifications and Codes of Practice as stipulated below shall apply to the equipment and the work covered in this section. In addition the relevant clauses of the Indian Electricity Act 1910, Indian Electricity Rules 1956, National Building Code 1994, National Electric Code 1985, Code of Practice for Fire Safety of Building (general) : General Principal and Fire Grading – IS 1641 and IEE wiring regulation 16th edition as amended up to date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and/or IEC Standards shall be applicable.

a.	660/1100 V grade FRLS PVC insulated wires.	IS	694 : 1990
b.	MS conduits for electrical wiring.	IS	9537 : Part I 1980
		IS	9537: Part II 1981
c.	Accessories for rigid steel conduits	IS	3837 : 1990
d.	Flexible steel conduits for electrical wiring	IS	3480 : 1990
e.	Switch socket outlets	IS	4615 : 1990
f.	3 pin plugs and socket outlets up to 250 volts	IS	1293 : 1988
g.	General and safety requirements for fluorescent lamps luminaries	IS	1913 : 1978
h.	Switches for domestic and similar purposes	IS	3854 : 1997
i.	Boxes for the enclosure of electrical accessories	IS	5133 : Parts I &II 1969
j.	Danger notice plates	IS	2551 : 1982
k.	Code of practice for personal hazard fire safety of buildings	IS	1644: 1998
l.	Code of practice for electrical installation fire safety of buildings	IS	1646 : 1997
m.	Code of practice for electrical wiring installations	IS	732 : 1989
n.	Code of practice of fire safety buildings (General- Electrical installations)	IS	1646 : 1982
o.	Guide for safety procedure and practices in electrical works	IS	5216 : 1982

6.2.5.3. Materials (conduits & accessories)

1. MS Conduits

   All conduits shall be of heavy gauge solid drawn ERW welded manufactured out of 16 (1.6mm) gauge MS Sheet up to 32mm dia and of 14 (2 mm) gauge for sizes higher than this. Both inner and outer surfaces shall be smooth without burrs, dents and kinks. Conduits shall be black stove enameled inside and outside. The cross section of conduit shall be uniform throughout. The welding shall be uniform such that welded joints do not yield when subjected to flattening test. Welded joint shall not break when threaded or bent at an angle. Conduit shall conform to specifications of IS: 9537 (Part-II) and the capacity of conduits shall be in accordance with the standards and shall never be exceeded. The minimum size of the conduit shall be 20mm dia. Care shall be taken to ensure that all conduits are adequately protected while stored at site prior to erection and no damaged conduit shall be used.

2. Joints

   All jointing shall be subject to the approval of the Owner's site representative. The threads and sockets shall be free from grease and oil, Connections between screwed conduit and GI boxes shall be by means of hexagon brass check nut, fixed outside and brass bush from inside the box. The joints in conduits shall be free of burrs to avoid damage to insulation of conductors while pulling them through the conduits.

3. Recessed or Exposed conduit

All conduits shall be as per Schedule of Quantities.

4. Flexible Conduit

   Wiring for short extensions to outlets in hung ceiling or to vibrating equipment, motors etc. shall be installed in flexible conduits. Flexible conduits shall be formed from a continuous length of spirally wound interlocked wire steel with a fused zinc coating on both sides. The conduit shall be provided with approved type adaptor. A separate and accessible earth connection shall bond across the flexible conduit.

5. Conduit Accessories.

   a. Standard accessories

      Heavy duty black enamel painted / galvanized standard conduit fittings and accessories like standard/extra-deep circular boxes, looping in boxes, junction boxes, solid /inspection elbows , solid/inspection tees, couplers, nipples, saddles, check nuts, earth clips, ball socket joints, bushes etc. shall be of superior quality and of approved makes. Heavy duty covers screwed with approved quality screws shall be used. Samples of all conduits fittings and accessories shall be got approved by Engineer-in-Charge before use.

   b. Fabricated accessories

      Wherever required, outlet/junction boxes of required sizes shall be fabricated from 1.6 mm thick MS sheets excepting ceiling fan outlet boxes which shall be fabricated from minimum 3 mm thick sheets. The outlet boxes shall be of approved quality, finish and manufacture. Suitable means of fixing connectors etc., if required, shall be provided in the boxes.

      The boxes shall be protected from rust by zinc phosphate primer process. Boxes shall be finished with minimum 2 coats of enamel paint of approved colour. A screwed brass stud shall be provided in all boxes as earthing terminal.

   c. Outlet Boxes for Light Fittings.

      These shall be minimum 75mm x 75mm x 50mm deep and provided with required number of threaded collars for conduit entry. For ceiling mounted florescent fittings, the boxes shall be provided 300 mm off centre for a 1200 mm fitting and 150 mm off centre for a 600 mm fitting so that the wiring is taken directly to the down rod. 3 mm thick perspex/hylam sheet cover of matching colour shall be provided.

   d. Outlet Boxes For Ceiling Fans

      Outlet boxes for ceiling fans shall be fabricated from minimum 3 mm thick MS sheet steel. The boxes shall be hexagonal in shape of minimum 100 mm depth and 60 mm sides. Each box shall be provided with a recessed fan hook in the form of one 'U' shaped 15 mm dia rod welded to the box and securely tied to the top reinforcement of the concrete slab for a length of minimum 150 mm on either side. 3 mm thick Perspex/hylam sheet cover of matching colour shall be provided.

6. PVC Conduit and Accessories

   Conduits and accessories shall conform to latest edition of IS-9537 part 3 and shall be heavy duty with minimum wall thickness of 2.0 mm rigid tubes which are unscrewed without coupling and with plain ends. All sections of conduit and relevant boxes shall be properly cleaned and glued by using epoxy resin glue and the proper connecting pieces. All conduits used shall be ISI-marked and shall not be less than 20 mm diameter.

   a. PVC conduit shall be used for all concealed / embedded installation.

   b. PVC Conduit Accessories

c. Accessories used for conduit shall be of an approved brand and type complying with relevant IS code.

d. All accessories used shall be of standard white or black colour, identical to conduit used.

e. Plain conduits shall be joined by slip type of couplers with manufacturer's standard sealing cement.

f. All conduit entries to outlet boxes, trunking and switchgear are to be made with adaptors female thread and screwed male bushes.

g. PVC-switch and socket boxes with round knockouts are to be used. The colours of these boxes and the conduits shall be the same.

h. Standard PVC circular junction boxes are to be used with conduits for intersection, Tee-junction, angle-junction and terminal. For the drawing-in of cables, standard circular through boxes shall be used.

i. Samples of accessories shall be submitted for approval prior to installation.

j. All jointing of PVC conduits shall be by means of adhesive jointing. Adequate expansion joints shall be allowed to take up the expansion of PVC conduits.

7. Bends in Conduit

Where necessary, bends or diversions may be achieved by means of bends and / or circular cast iron inspection boxes with adequate and suitable inlet and outlet screwed joints. In case of recessed system each junction box shall be provided with a cover properly secured and flush with the finished wall surface.

No bends shall have radius less than 7.5 cms or three times the outside diameter of the conduits. No run of conduit shall have more than four right angle bends from outlet to outlet. Bends in multi runs of conduits shall be parallel to each other and neat in appearance, maintaining the same distance as between straight runs of conduits.

8. Conduit Installation

a. System

The whole conduit system shall be installed to comply fully with relevant provision in Indian Standard Specifications, Indian Electricity Rules and IE wiring regulations. Conduits shall be laid either recessed in walls and ceilings or on surface on walls and ceilings or partly recessed and partly on surface, as required. Same rate shall apply for recessed and surface conduiting in this contract. Stranded copper conductor insulated wire of size as per schedule of quantities shall be provided in entire conduiting for loop earthing. Steel wire of suitable size to serve as a fish wire shall be left in all conduit runs to facilitate drawing of wires after completion of conduiting.

b. Installation

Conduits shall be laid before casting in the upper portion of a slab or otherwise, as may be instructed or in accordance with approved drawings, so as to conceal the entire run of conduits and ceiling outlet boxes. Vertical drops shall be buried in columns or walls. Wherever necessary, chases will be cut by the contractor with the help of chase cutting m/c or by hand. Nothing extra shall be paid to the contractor on this account. In case of exposed brick/ rubble masonry work special care shall be taken to fix the conduit and accessories in position along with the building work. Sufficient depth of the chases will be made to accommodate the required number of conduits. The chase will be filled with cement, coarse sand mortar (1:3) and properly cured by watering for one week.

c. If a chase is cut in an already finished surface the contractor shall fill the chase and finish it to match the existing finish. Contractor must not cut any iron bars to fix conduits. Conduits shall be kept at a minimum distance of 100mm from the pipes of other non-

electrical services. Where the conduit is to be embedded in a concrete member it shall be adequately tied to the reinforcement to prevent displacement during casting, conduits in chases shall be held by steel hooks of approved design at maximum of 100 cm centres. The embedding of conduits in walls shall be so arranged as to allow at least 12mm plaster cover the same. All threaded joints of conduit pipes shall be treated with some approved 'preservative compound' to secure protection against rust.

d. Suitable expansion joints fittings of approved make and design shall be provided at all the points where the conduit crosses the expansion joint in the building.

   Separate conduit shall be used for:

   i. Normal light, fan call bell
   ii. 16 A power outlets
   iii. Emergency Light Point
   iv. Fire alarm System
   v. Computer Outlets
   vi. P.A System
   vii. Telephone system
   viii. TV Network
   ix. Or any other services not mentioned here.

e. Conduit runs on surfaces shall be supported with metal 1.2 mm thick saddles, which in turn are properly secured on to GI spacer to the wall or ceiling. Fixing screws shall be with round or cheese head and of rust proof materials. Exposed conduits shall be neatly run parallel or at right angles to the walls of the building and shall be painted in color matching the adjoining area.

   Cross cover of conduits shall be minimum and entire conduit installation shall be clean and with good appearance. For surface work, the boxes shall be raised back pattern type, designed for use with distance saddles to give clearance of 6mm between the back of conduit and the fixing surface.

f. Where conduits are run on steel work, they will be fixed by means of purpose made GI Caddy clips in manner meeting with the approval of the Engineer prior to the installation being carried out. Other methods of fixing may be agreed in special circumstances, but approval must first be obtained from the site engineer.

g. The spacing of saddles shall be not more than 600mm centers for up to 32mm diameter conduits and at 750mm for conduit sizes of 40mm diameter and above in case of MS conduit and not more than 600 mm for PVC conduit. In addition, saddles shall be fixed at each side of any bend/Tee, or set at a distance of 200mm from the bend/Tee.

h. Suitable size of boxes shall be provided a minimum of 2 adjustable fixing lugs on vertical sides. Suitable earth terminal inside each box shall be provided. All fixing lugs shall be threaded to receive standard machined chromium plated brass screws. Sufficient number of knockouts shall be provided for conduit entry. Conduits carrying wires of different circuit can terminate in common J.B having metal compartments. Necessary GI pull wires shall be inserted into the conduit for drawings wires. In case conduit pipe is required to cross any RCC beam special adopter boxes shall be provided for crossing & nothing shall be paid extra.

i. Particular care shall be taken during the progress of the work to prevent the ingress of dirt and rubbish such as plaster droppings into erected conduits. Conduit which has become so clogged shall be entirely freed from these accumulations or will be replaced.

Screwed plastic or metal caps or turned wooden plugs shall be employed to protect all open ends. Plugs of waste wood, paper, cotton or other fibrous matter shall not be used. All unused conduit entries shall be blanked off in an approved manner and where conduits terminate in adaptable boxes, all removable box covers shall be firmly secured to provide complete enclosure.

j. All conduit installations must be completed and erected in their totality before they are wired and must be fully rewireable from outlets to distribution boards or trunking systems etc. to which they connect. No wiring of any part of the installation shall be commenced until instructions are received to do so by the Engineer-in-charge at such time as he is satisfied that the wiring will not be damaged due to building operations.

k. Conduits shall be installed so that they are self draining in the event of ingress of moisture due to condensation or any other reason. A suitable drainage hole shall be drilled at the bottom of the lowest conduit box in every 9-meter of horizontal run.

l. PVC bush of good quality shall be used in each conduit termination in a switch box, draw box, lighting fixtures and circular junction boxes.

m. Exposed conduits running above false ceilings shall be suitably clamped independently along with the dropped ceiling. Perforated straphangers or twisted attachment shall not be acceptable. In no case shall raceways be supported or fastened to other pipe for repair and maintenance. They shall be arranged symmetrically and in the cost compact design, in no way unduly criss-crossing each other. Proper spacing shall be maintained when two or more conduits run side by side. The layout of the pipes shall be coordinated with other services if any. The junction boxes and conduits used in hazardous areas shall be flameproof type with cast iron construction complete with threaded covers.

n. The conduit of each circuit or section shall be completed before conductors are drawn in. The entire system of conduit after erection shall be tested for mechanical and electrical continuity throughout and permanently connected to earth conforming to the requirements by means of special approved type of earthing clamp efficiently fastened to conduit pipe in a workman like manner for a perfect continuity between the earth and conduit.

o. The conduit system shall be so laid out that it will obviate the use of tees, elbows and sharp bends. No length of conduit shall have more than the equivalent of two-quarter bends from inlet to outlet. The conduit itself being given required smooth bend with radius of bends suiting to the site conditions but not less than 6 times overall diameter.

p. Outlet boxes shall be of heavy-duty sheet steel installed as to maintain continuity throughout. These shall be so protected at the time of laying that no mortar finds its way inside during concrete filling or plastering. For fluorescent fittings, the outlet boxes heavy duty shall be provided 300mm off centre for a 1200mm fitting and 150mm off centre for a 600mm fittings or as per B.O.Q.

q. Draw boxes of ample dimensions shall be provided at convenient points to facilitate pulling of long runs of cables. They shall be completely concealed with MS covers flush with plasterwork painted to match the wall.

6.2.5.4. Wiring capacity of conduits

1. Maximum number of PVC insulated 650/1100 V grade/copper conductor cable conforming to IS: 694-1990.

Conduit size	**20mm**		**25mm**		**32mm**		**40mm**		**50mm**		**60mm**	
Wire size in sq.mm.	**S**	**B**	**S**	**B**	**S**	**B**	**S**	**B**	**S**	**B**	**S**	**B**
1.5	7	5	12	10	20	14	-	-	-	-	-	-
2.5	6	5	10	8	18	12	-	-	-	-	-	-
4	4	3	7	6	12	10	-	-	-	-	-	-
6	3	2	6	5	10	8	-	-	-	-	-	-
10	2	-	4	3	6	5	8	6	-	-	-	-
16	-	-	2	-	4	3	7	6	-	-	-	-
25	-	-	-	-	3	2	5	4	8	6	9	7

2. Notes:

   a. The above table shows the maximum capacity of conduits for a simultaneous drawing in of cables.

   b. The columns heads ‘S’-Straight - apply to runs of conduits which have distance not exceeding 4.25 m between draw in boxes and which do not deflect from the straight by an angle of more than 15 degrees. The columns heads ‘B’- Bends - apply to runs of conduit which deflect from the straight by an angle of more than 15 degrees.

   c. Conduit sizes are the nominal external diameters.

6.2.5.5. Switch outlets and junction boxes

All outlet boxes for switches, sockets and other receptacles shall be rust proof and shall be of 2 mm thick mild steel sheets with HOT dipped galvanizing (or as specified in BOQ), having smooth external and internal surfaces to true finish. All outlet boxes for receiving plug sockets and switches shall be fabricated to approved sizes. All boxes shall have adequate number of knock out holes of required diameter and earthing terminal screws. Outlet boxes shall be of a maximum depth of 65 mm.

6.2.5.6. Inspection boxes

Inspection boxes of 50 mm dia of cast iron shall have smooth external and internal finish to facilitate removal and replacement of wires, where required.

6.2.5.7. Fish wire

For drawing of wires in the conduit, GI fish wires of 2.0 mm (14 SWG) shall be provided along with the laying of recessed conduit.

6.2.5.8. Conductors

PVC insulated, Flame Retardant Low Smoke (FRLS) wires shall be single core unsheathed in voltage grade 1100 V as per IS 694 – 1990 with 99.97% pure electrolytic grade bright annealed stranded bare copper conductors. Special parameters of FRLS PVC insulation like critical oxygen index, temperature index, smoke density and flammability test shall conform to relevant IEC and ASTM Standards. Coil packing shall be ISI marked as stipulated in IS 694

6.2.5.9. Bunching of wires

Wires carrying current shall be so bunched that the outgoing and return wires are drawn into the same conduit. Wires originating from two different phases shall not run in the same conduit. All wires shall have ferrules for identification. Lighting and power circuits shall be separate.

6.2.5.10. Drawing conductors

1. The drawing and jointing of PVC insulated copper conductor wires shall be executed with due regard to the following precautions. While drawing wires through conduits, care shall be taken to avoid scratches and kinks which may cause breakage of conductors. There shall be no sharp bends. Wire reel stands to be used for pulling of wires to avoid kinks.
2. Insulation shall be removed by insulation stripper only. Strands of wires shall not be cut for connecting terminals. The terminals shall have sufficient cross sectional area to take all strands and connecting brass screws shall have flats ends. All looped joints shall be connected through terminal block/connectors. The pressure applied to tighten terminal screws shall be just adequate, neither too much nor too less. All light points shall be terminated through a connector.
3. All light points will terminated through a connector. Conductors having nominal cross sectional areas exceeding 10 sq.mm shall always be provided with cable sockets. At all bolted terminals brass flat washer of large area and approved steel spring washer shall be used. Brass nuts and bolts shall be used for all connections.
4. Only licensed wiremen (Before doing the work or before appointing him on site contractor has to submit his wiring license to Owner) and cable jointers shall be employed to do jointing work. All wires and cables shall bear the manufacturer's label and shall be brought to site in original packing.
5. For all internal wiring. PVC insulated wires of 1100 volts grade shall be used. The sub-circuit wiring for point shall be carried out in loop system and no joints shall be allowed in the length of the conductors. No wire shall be drawn into any conduit until all work of any nature that may cause injury to wire is completed. Care shall be taken while pulling out the wires so that no damage occurs to conduits/wire itself, the conduits shall be thoroughly cleaned of moisture, dust, dirt or any other obstruction. The minimum size of PVC insulated copper conductor wires for all sub-circuit wiring for light points shall be minimum 2.5 sq.mm copper Separate neutral to be pulled for each circuit.

6.2.5.11. Joints

All joints shall be made at main switches, distribution boards, socket outlets, lighting outlets and switches boxes only. No joints shall be made in conduits and in junction boxes. Conductors shall be continuous from outlet to inlet.

6.2.5.12. Load balancing

Balancing of circuits in three phase installation shall be planned by the Consultants and shall be checked by the contractor before the commencement of wiring and shall be strictly adhered to.

6.2.5.13. Colour code of conductors

1. **Colour code for normal supply** – Red, Yellow, Blue for three Phases, Black for Neutral and Green for Earth – shall be maintained for the electrical wiring installation
2. **Colour code for UPS supply** – Red/white, Yellow/white, Blue/white for three Phases, white for Neutral and Green/yellow for Earth

6.2.5.14. Switches, receptacles (modular)

1. SWITCHES

   All switches shall be enclosed type flush mounted suitable for 240 volts AC. All switches shall be fixed inside the switch boxes on adjustable flat M S strips/plates with tapped holes and brass machine screws, leaving ample space at the back and sides for accommodating wires. Switch controlling the light point shall be connected to the phase wire of the circuit and not more than ten lights shall be connected on one circuit and load shall be restricted to 800 watts. All wiring accessories shall be BIS approved.

2. WALL SOCKET OUTLET

   Wall socket outlets shall be of the three pin. The switch controlling the socket outlet shall be on the phase wire of the circuit and not more than two socket outlets of 16 amps shall be connected

on one circuit. An earth wire shall be provided along with the circuit wires and shall be connected to earthing screw inside the box. The earth terminal of the socket shall be connected to the earth terminal provided inside the box. All sockets shall be shuttered type.

a. Every socket outlet shall be controlled by an individual switch unless mentioned otherwise.

b. The switch controlling the socket outlet shall be on the `Live' side of the line.

c. 6 amps and 16 amps socket outlet shall normally be fixed at any convenient height above the floor level based on request of Architect/Interior designer. The switch for 6 and 16 amps, socket outlet shall be kept along with the socket outlet.

16 amps socket outlet in the kitchen of the residential or commercial buildings shall be fixed at any convenient height above working platform or as specified in drawings / schedule of equipment.

In a room containing a fixed bath or shower, there shall be no socket outlet and there shall be no provision for connecting a portable appliance. Any stationary appliance connected permanently in the bath room shall be controlled by an isolator switch or circuit breaker having outlets at such location where water / moisture does not effect.

d. Where socket outlets are placed at lower level, they shall be enclosed in a suitable metallic box with the system of wiring adopted or shutter type sockets shall be provided as specified.

e. In an earthed system of supply, a socket outlet and plug shall be of three pin type, the third terminal shall be connected to earth.

f. Conductors connecting electrical appliance with socket outlet shall be flexible twin cord with an earthing cord which shall be secured by connecting between the earth terminal of plug and the metallic body of the electrical appliance.

g. Where use of shutter type of interlocking type of socket is required for any special installation, the items should be separately and specifically listed in the Schedule of Quantities of that particular work.

6.2.5.15. Measurement of wiring

1. Wiring for lights, fans and convenience socket outlets shall be measured and paid for on **Point Basis** as itemized schedule of quantities and as elaborated as below (unless otherwise stated).

2. Average wiring Length.

   a. The point wiring basis for wiring for lights, fans and convenience socket outlets shall assume average wiring length and average conduiting length per point based on parameters stipulated in below. The average wiring length and average conduiting length forming the basis of point wiring payment, shall take the electrical layouts of the entire project into consideration.

   b. Tenderers are advised to seek clarifications, if they so desire, on this aspect before submitting their tenders. No claim for extra payment on account of electrical layouts in part or whole of the project requiring larger average wiring and conduiting length per point, whether specifically shown in tender drawings or not, shall be entertained after the award of contract.

3. Point wiring for Lights – Primary and Secondary Light Points.

   In respect of group control of lights (more than one light controlled by one switch or MCB), wiring up to the first light in the group shall be measured and paid for as a primary light point. Wiring for other lights looped in one group for switch controlled as also MCB controlled lights shall be measured and paid for as secondary light points. Primary light points for switch controlled lights shall include the cost of control switch whereas primary light points controlled by MCBs shall not

include the switch cost. The cost of MCB controlling such lights shall not be included in the primary light point rate since the MCB shall be paid for in the item of DB. Primary light points shall include the cost of circuit wiring (wiring from DB terminal to the first switch in the sub circuit)

4. Design Parameters

   Wiring shall be carried out as per following design parameters in recessed/ surface conduit/conduit cum raceway system.

   a. Only looping system of wiring shall be adopted throughout. No joints excepting at wiring terminals shall be permitted.

   b. All accessories shall be flush type unless otherwise stated.

   c. For estimation of load, following loads per point shall be assumed.

Light points	60/100 Watts.
6 amps socket outlet points	100 Watts.
Fan points	60 Watts.
Exhaust fan points	100 Watts unless otherwise specified.
16 amp socket outlet points	500/1000 Watts. Unless otherwise specified

   d. Light and fan points shall be wired on a common final sub-circuit. Each sub circuit shall not have more than a total of 10 nos. lights and fans or a load of 800 watts whichever is lesser unless specifically stipulated otherwise. Wiring shall be carried out in MS conduiting system.

5. Scope of Point Wiring

   Wiring for Lights

   a. **Primary Light Points :** Wiring for Primary light points, as defined above, shall commence at the DB terminals and shall terminate at the ceiling rose/connector in ceiling box/lamp holder via the control switch (for switch controlled lights). Rates for Primary light point wiring shall be deemed to be inclusive of the cost of entire material and labour require for completion of Primary light point thus defined including : .

   b. Recessed/surface conduiting system with all accessories, junction/draw/inspection boxes, bushes, check nuts etc. complete as required,

   c. Wiring with stranded copper conductor FRLS PVC insulated 660/1000 volt grade wires including terminations etc. complete as required.

   d. Control switch with switch box and cover plate of specified type including fixing screws, earth terminal etc. complete as required. Cost of this switch is applicable only for switch controlled points. This cost shall not be applicable for DB controlled Primary light points.

   e. Loop earthing with insulated copper wires.

6. Secondary Light points :

   Secondary light points shall cover the cost of interconnection wiring between group controlled light fittings and shall be deemed to be inclusive of the cost of entire materials and labour required for completion of the secondary light point thus defined including

   a. Recessed / surface conduiting system with all accessories, junction/draw/inspection boxes, bushes, check nuts etc. complete as required,

   b. Wiring with stranded copper conductor FRLS PVC insulated 660/1000 volt grade wires including terminations etc. complete as required.

   c. Loop earthing with insulated copper wires.

7. Wiring for Ceiling Fans

   Wiring for ceiling fan points shall be same as for Primary light points and shall, in addition, include ceiling outlet box with recessed fan hooks and installation of fan regulator.

8. Wiring for Exhaust Fans

   Wiring for exhaust fan points shall be same as for Primary light points and shall in addition include the cost of providing a 3/5 pin 6 amp socket outlet near the fan along with plug top and a separate 6 amp control switch.

9. Wiring for Convenience Socket Outlets

   Wiring for 6 amps socket outlets on work tables shall be carried out partly in MS conduits and partly in MS raceways as indicated in electrical layout drawings. Wiring for socket outlets (6 amps as well as 16 amps) in locations other than workstations shall be carried out in MS conduits only.

10. Point wiring for 3 pin 6 amps convenience socket outlets

    Point wiring for 3 pin 6 amps socket outlets on point wiring basis shall be the same as Primary light points defined in para 3.17.4.1 and shall in addition include 3 pin 6 amp socket outlet with 6 amp control switch in GI box with cover. Including loop earthing of the third pin complete as required and as itemized in scheduled of quantities.

11. Point wiring for 3 pin 16 amps convenience socket outlets

    Point wiring for 3 pin 16 amps socket outlets on point wiring basis shall be the same as Primary light point defined in para 3.17.4.1 and shall in addition include 3 pin 16 amp socket outlet with 16 amp control switch in MS box with cover. Including loop earthing of the third pin complete as required and as itemized in scheduled of quantities.

12. Sub-mains Wiring

    Sub-mains wiring shall be measured and paid for on linear basis as per the length of conduit actually installed between terminations. This shall include conduit system with all accessories, wires and insulated loop earthing conductors as itemised in schedule of quantities. The quoted rates shall include termination of wiring at either end. Cost of wires only without conduits at either end required for end terminations and taken inside switchboards etc. shall be deemed to be included in the liner running meter rate of Submain wiring in conduit and no extra shall be paid for such additional wiring without conduit.

6.2.5.16. Routine and completion tests

1. Installation Completion Tests

   At the completion of the work, the entire installation shall be subject to the following tests:
   i. Wiring continuity test
   ii. Insulation resistance test
   iii. Earth continuity test
   iv. Earth resistivity test

2. Besides the above, any other test specified by the local authority shall also be carried out. All tested and calibrated instruments for testing, labour, materials and incidentals necessary to conduct the above tests shall be provided by the contractor at his own cost.

3. Wiring Continuity Test

   All wiring systems shall be tested for continuity of circuits, short circuits, and earthing after wiring is completed and before installation is energized.

4. Insulation Resistance Test

   The insulation resistance shall be measured between earth and the whole system conductors, or any section thereof with all protection in place and all switches closed and except in concentric

wiring all lamps in position of both poles of the installation otherwise electrically connected together, a direct current pressure of not less than twice the working pressure provided that it does not exceed 1100 volts for LT circuits. Where the supply is derived from AC three phase system, the neutral pole of which is connected to earth, either direct or through added resistance, pressure shall be deemed to be that which is maintained between the phase conductor and the neutral.

5. The insulation resistance measured as above shall not be less than 50 megohms divided by the number of points provided on the circuit the whole installation shall not have an insulation resistance lower than one megohm.
6. The insulation resistance shall also be measured between all conductors connected to one phase conductor of the supply and shall be carried out after removing all metallic connections between the two poles of the installation and in those circumstances the insulation shall not be less than that specified above.
7. The insulation resistance between the frame work of housing of power appliances and all live parts of each appliance shall not be less than that specified in the relevant Standard specification or where there is no such specification, shall not be less than half a megohm or when PVC insulated cables are used for wiring 12.5 megohms divided by the number of outlets. Where a whole installation is being tested a lower value than that given by the above formula subject to a minimum of 1 Megohms is acceptable.

6.2.5.17. Testing of earth continuity path

The earth continuity conductor including metal conduits and metallic envelopes of cable in all cases shall be tested for electric continuity and the electrical resistance of the same along with the earthing lead but excluding any added resistance of earth leakage circuit breaker measured from the connection with the earth electrode to any point in the earth continuity conductor in the completed installation shall not exceed one ohm.

6.2.5.18. Testing of polarity of non-linked single pole switches

In a two wire installation a test shall be made to verify that all non-linked single pole switches have been connected to the same conductor throughout, and such conductor shall be labelled or marked for connection to an outer or phase conductor or to the non-earthed conductor of the supply. In the three of four wire installation, a test shall be made to verify that every non-linked single pole switch is fitted to one of the outer or phase conductor of the supply. The entire electrical installation shall be subject to the final acceptance of the Engineer-in-Charge as well as the local authorities.

6.2.5.19. Earth resistivity test

Earth resistivity test shall be carried out in accordance with IS Code of Practice for earthing IS 3043.

6.2.5.20. Performance

Should the above tests not comply with the limits and requirements as above the contractor shall rectify the faults until the required results are obtained. The contractor shall be responsible for providing the necessary instruments and subsidiary earths for carrying out the tests. The above tests are to be carried out by the contractor without any extra charge.

6.2.5.21. Tests and test reports

The Contractor shall furnish test reports and preliminary drawings for the equipment to the Engineer-in-Charge for approval before commencing supply of the equipment. The Contractor should intimate with the tender the equipment intended to be supplied with its technical particulars. Any test certificates etc., required by the local Inspectors or any other Authorities would be supplied by the Contractor without any extra charge. All test reports shall be approved by the Engineer-in-Charge prior to energizing of installation.

6.2.6.Section – VI: Cabling For Voice, Data System

6.2.6.1. Scope

This document defines the cabling system and subsystem components to include cable, termination hardware, supporting hardware, and miscellany required to furnish, and to install a complete cabling infrastructure supporting voice and video. The intent of this section is to provide pertinent information to

allow the vendor to bid the labour, supervision, tooling, materials, and miscellaneous mounting hardware and consumables to install a complete system. However, it is the responsibility of the vendor to propose any, and, all items required for a complete system whether or not it is identified in the specification, drawings and bill of materials attached to this specification.

6.2.6.2. Applicable documents

The cabling system described in this specification is derived in part from the recommendations made in industry standard documents. The list of documents below (or the latest revisions) has bearing on the desired cabling infrastructure are incorporated into this specification by reference:

a. This Technical Specification and Associated Drawings

b. ANSI/TIA/EIA 568-B Commercial Building Telecommunications Cabling Standard – March 2001

c. ANSI/EIA/TIA-569-A Commercial Building Standard for Telecommunications Pathways and Spaces - February, 1998

d. ANSI/EIA/TIA-606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings - February, 1993

e. ANSI/TIA/EIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications - August, 1994

6.2.6.3. Telephone network

Telephone Tag Block:

General

8. The telephone tag blocks shall be suitable for the multi core telephone cables and shall have two terminal blocks, cross connect type. All incoming and outgoing cables shall be terminated on separate terminal blocks and termination shall be silver soldered. The cross connecting jumpers shall be insulated wires of same diameter and screw connected.
9. The tag blocks shall be mounted inside fabricated sheet steel boxes with removable hinged covers and shall be fully accessible. The enclosure shall be painted with 2 coats of red oxide and stove enamelled.
10. CAT-5e (enhanced) unshielded twisted pair cable in MS/PVC conduit shall be used to have modern structured cabling network for telephone system, to have latest facilities for Internet and also data cabling. All the telephone Jack must terminated on RJ-11 jacks and installed onto a dual Jack faceplate. Telephone RJ-11 Jacks must be terminated with a Connector/Jack.

6.2.6.4. Equipment room

The equipment room shall be defined as an area within the building where telecommunications systems shall be housed along with the mechanical termination of one or more portions of the telecommunications wiring system. Equipment room shall be considered to be distinct from telecommunications closets because of the nature or complexity of the equipment they contain. Any or all of the functions of a telecommunications closet shall be alternatively provided by an equipment room.

6.2.6.5. Cable specifications

11. UTP cabling system

Unshielded twisted pair cabling system, TIA / EIA 568-B.1 addendum Category 5e Cabling system	
a. Networks Supported	10 / 100 Ethernet, 155 Mbps ATM, 1000 Mbps IEEE 802.3ab Ethernet, and proposed Cat 6 Gigabit Ethernet
b. Warranty	25-year systems warranty; Warranty to cover Bandwidth of the specified and installed cabling system, and the installation costs

c. Performance characteristics to be provided along with bid	Attenuation, Pair-to-pair and PS NEXT, ELFEXT and PSELFEXT, Return Loss, ACR and PS ACR for 4-connector channel
Unshielded Twisted Pair, Category 6, TIA / EIA 568-B.2	
a. Material:	
b. Conductors	23 AWG solid bare copper or better
c. Insulation	Polyethylene
d. Jacket	Flame Retardant PVC
e. Pair Separator	Cross-member fluted Spline.
f. Approvals	UL Listed
	ETL verified to TIA / EIA Cat 6
g. Operating temperature	-20 Deg. C to +60 Deg. C
h. Frequency tested up to	Minimum 600 MHz
i. Packing	Box of 305 meters
j. Delay Skew	45ns MAX.
k. Impedance	100 Ohms + / - 15 ohms, 1 to 600 MHz.
l. Performance characteristics to be provided along with bid	Attenuation, Pair-to-pair and PS NEXT, ELFEXT and PSELFEXT, Return Loss, ACR and PS ACR

12. Category 5 Riser Cable

    This cable shall consist of solid copper conductors insulated with expanded polyethylene covered by a PVC sheet.

    The core shall be covered with a layer of plastic tape and overlaid with a corrugated PVC plastic. It shall be suitable to be used without conduit. The cable shall meet. EIA/TIA -568, C S A T -529, IEEE 802.3 & 10 B A S E -T. The pair sizes shall be as per the schedule of quantities. The cable shall meet the following specifications.

    a. Maximum DC Resistance — 26.5 ohm per 100 ft.
    b. Maximum DC Unbalanced Resistance — 17%
    c. Mutual Capacitance at 1 Khz — 16 nF per 1000 ft.

6.2.6.6. Testing

All the ports post termination should be tested to avoid any future data packet loss using Penta scanning.

1. All the test result with complete documentation should be taken from cabling vendor.
2. Testing of network site should be as per EIA/TIA standard for 20/25 years network guarantee and certification on passive components.
3. Testing & labelling:
    a. All fiber-optic cables and connectors shall be tested.
    b. All voice cables and connectors shall be tested for continuity and pin-out as well as live circuit operation.
    c. All date cables, connectors and patch cables shall be tested to EIA /TIA *568 specification using a Penta Scanner.
    d. All Cables, racks, enclosures, patch panels, blocks and faceplate shall be professionally and clearly labelled using an electronic labelling devise in accordance with planned network labelling scheme.

6.2.6.7. Warranty

Owner seeks warranty for the installed cable plant from the OEM equipment supplier. Bidder shall ensure that the OEM norms for supply, installation, testing and documentation as specified by the OEM supplier shall be adhered to, provided those are in line with TIA / EIA standards and Owner requirement specifications. The warranty shall be provided by the OEM vendor to Owner and shall be administered in India. The duration of the warranty shall be for a minimum of 25 years and shall cover the system performance, application assurance and the costs of the supply of components and installation.

6.2.7.Section –VII: Cabling For Data System

6.2.7.1. Scope

This document defines the cabling system and subsystem components to include cable, termination hardware, supporting hardware, and miscellany required to furnish, and to install a complete cabling infrastructure supporting data and video. The intent of this section is to provide pertinent information to allow the vendor to bid the labour, supervision, tooling, materials, and miscellaneous mounting hardware and consumables to install a complete system. However, it is the responsibility of the vendor to propose any, and, all items required for a complete system whether or not it is identified in the specification, drawings and bill of materials attached to this specification.

6.2.7.2. Applicable documents

The cabling system described in this specification is derived in part from the recommendations made in industry standard documents. The list of documents below (or the latest revisions) has bearing on the desired cabling infrastructure are incorporated into this specification by reference:

1. This Technical Specification and Associated Drawings
2. ANSI/TIA/EIA 568-B Commercial Building Telecommunications Cabling Standard – March 2001
3. ANSI/EIA/TIA-569-A Commercial Building Standard for Telecommunications Pathways and Spaces - February, 1998
4. ANSI/EIA/TIA-606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings - February, 1993
5. ANSI/TIA/EIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications - August, 1994

6.2.7.3. Cabling system and component specifications

1. UTP Cabling System

Unshielded twisted pair cabling system, TIA / EIA 568-B.1 addendum Category 6 Cabling system

Networks Supported	1000 Ethernet, 155 Mbps ATM, 1000 Mbps IEEE 802.3ab Ethernet, and proposed Cat 6 Gigabit Ethernet
Warranty	25-year systems warranty; Warranty to cover Bandwidth of the specified and installed cabling system, and the installation costs
Performance characteristics to be provided along with bid	Attenuation, Pair-to-pair and PS NEXT, ELFEXT and PSELFEXT, Return Loss, ACR and PS ACR for 4-connector channel

Unshielded Twisted Pair, Category 6, TIA / EIA 568-B.2

Material:	
Conductors	23 AWG solid bare copper or better
Insulation	Polyethylene

Jacket	Flame Retardant PVC
Pair Separator	Cross-member fluted Spline.
Approvals	UL Listed
	ETL verified to TIA / EIA Cat 6
Operating temperature	-20 Deg. C to +60 Deg. C
Frequency tested up to	Minimum 600 MHz
Packing	Box of 305 meters
Delay Skew	45ns MAX.
Impedance	100 Ohms + / - 15 ohms, 1 to 600 MHz.
Performance characteristics to be provided along with bid	Attenuation, Pair-to-pair and PS NEXT, ELFEXT and PSELFEXT, Return Loss, ACR and PS ACR

2. UTP Jacks

Type	**PCB based, Unshielded Twisted Pair, Category 6, TIA / EIA 568-B.2**
Durability	
Modular Jack	750 mating cycles
Wire terminal	200 termination cycles
Accessories	Strain relief and bend-limiting boot for cable
	Integrated hinged dust cover
Materials	
Housing	Polyphenylene oxide, 94V-0 rated
Wiring blocks	Polycarbonate, 94V-0 rated
Jack contacts	Phosphorous bronze, plated with 1.27micro-meter thick gold
Approvals	UL listed
Performance Characteristics to be provided with bid	Attenuation, NEXT, PS NEXT, FEXT and Return Loss

3. UTP Jack Panels

Type	**24-port, PCB based, Unshielded Twisted Pair, Category 6, TIA / EIA 568-B.2**
Ports	24
Port arrangement	Modules of 6-ports each, arranged 1port x 6.
Category	Category 6
Circuit Identification Scheme	Icons on each of 24-ports
Port Identification	9mm or 12mm Labels on each of 24-ports (to be included in supply)
Height	1 U (1.75 inches)
Durability	
Modular Jack	750 mating cycles
Wire terminal (110 block)	200 termination cycles
Accessories	Strain relief and bend limiting boot for cable
Materials	
Housing	Polyphenylene oxide, 94V-0 rated
Wiring blocks	Polycarbonate, 94V-0 rated

Jack contacts	Phosphorous bronze, plated with 1.27micro-meter thick gold
Panel	Black, powder coated steel
Approvals	UL listed
Termination Pattern	TIA / EIA 568 A and B;
Performance Characteristics to be provided along with bid	Attenuation, NEXT, PS NEXT, FEXT and Return Loss

4. Faceplates

Type	**1-port, White surface box**
Material	ABS / UL 94 V-0
No. of ports	One

5. Workstation / Equipment Cords

Type	**Unshielded Twisted Pair, Category 6, TIA / EIA 568-B.2**
Conductor	24 AWG 7 / 32, stranded copper
Length	7-feet
Plug Protection	Matching colored snag-less, elastomer polyolefin boot
Warranty	25-year component warranty
Category	Category 5
Plug	
Housing	Clear polycarbonate
Terminals	Phosphor Bronze, 50 micron gold plating over selected area and gold flash over remainder, over 100 micron nickel under plate
Load bar	PBT polyester
Jacket	PVC
Insulation	Flame Retardant Polyethylene

Wireless Signal: The color of this parameter's progress bar provides a visual Interpretation of signal strength. Values are given below

Excellent (green) : -57 to -45 dBms (75 to 100 %)

Good (green) : -75 to -58 dBms (40 to 74 %)

Fair (Yellow) : -85 to -76 dBms (20 to 39 %)

Poor (Red) : -95 to -86 dBms (0 to 19 %)

The guest rooms should have excellent wireless coverage.

Note: Termination of active & Passive components shall be the part of system Integrator

6.2.7.4. Testing

6. All the ports post termination should be tested to avoid any future data packet loss using Penta scanning.
7. All the test result with complete documentation should be taken from cabling vendor.

8. Testing of network site should be as per EIA/TIA standard for 20/25 years network guarantee and certification on passive components.
9. Testing & labelling:
    a. All fiber-optic cables and connectors shall be tested.
    b. All voice cables and connectors shall be tested for continuity and pin-out as well as live circuit operation.
    c. All date cables, connectors and patch cables shall be tested to EIA /TIA *568 specification using a Penta Scanner.
    d. All Cables, racks, enclosures, patch panels, blocks and faceplate shall be professionally and clearly labelled using an electronic labelling devise in accordance with planned network labelling scheme.

6.2.7.5. Warranty

Owner seeks warranty for the installed cable plant from the OEM equipment supplier. Bidder shall ensure that the OEM norms for supply, installation, testing and documentation as specified by the OEM supplier shall be adhered to, provided those are in line with TIA / EIA standards and Owner requirement specifications. The warranty shall be provided by the OEM vendor to Owner and shall be administered in India. The duration of the warranty shall be for a minimum of 25 years and shall cover the system performance, application assurance and the costs of the supply of components and installation.

6.2.8.Section – VIII: LT Switchboards

6.2.8.1. General

This section covers specification of LT Switchboards

6.2.8.2. Standards and codes

Updated and current Indian Standard Specifications and Codes of Practice will apply to the equipment and the work covered by the scope of this contract. In addition the relevant clauses of the Indian Electricity Act 2003, Indian Electricity Rules 1956, National Building Code 2005, National Electric Code 1985, Code of Practice for Fire Safety of Building (general): General Principal and Fire Grading – IS 1641 - 1988 as amended up to date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and/or IEC Standards shall be applicable.

Low Voltage switchgear & control gear	IS/IEC 60947
Part I: General rules	
Part II: Circuit Breakers	
Part III: Switches, disconnectors, Switch disconnectors and fuse combination units	
Part IV: Contactors and Motor starters	
Part V: Control circuit devices and switching elements	
Marking of Switchgear busbars	IS 11353: 1985
Degree of Protection of Enclosures for low voltage switchgear.	IEC 60529
Electrical relays for power system protection	IS 3231: 1986
Code of Practice for selection, installation and Maintenance of switchgear & control gear	IS 10118: 1982
Low voltage switchgear & control gear assemblies	IEC 60349
Danger notice plates	IS 2551: 1982

6.2.8.3. Moulded Case Circuit Breaker (MCCB)

1. The MCCB should be current limiting type with trip time of less than 10 msec under short circuit conditions. The MCCB should be either 3 or 4 poles as specified in BOQ. MCCB shall comply

with the requirements of the relevant standards IEC 60947-2 and should have test certificates for Breaking capacities (Ics=ICU=100%) from independent test authorities CPRI / ERDA or any accredited international lab.

2. MCCB shall comprise of Quick Make -break switching mechanism, arc extinguishing device and the tripping unit shall be contained in a compact, high strength, heat resistant, flame retardant, insulating moulded case with high withstand capability against thermal and mechanical stresses
3. The breaking capacity of MCCB shall be as specified in the schedule of quantities. The rated service breaking capacity (Ics) should be equal to rated ultimate breaking capacities (Icu). MCCBs for motor application should be selected in line with Type-2 Co-ordination as per IEC-60947-2, 1989/IS 13947-2. The breaker as supplied with ROM should meet IP54 degree of protection.
4. MCCB shall be suitable for positive Isolation as per IEC 60947-2
5. MCCB shall comply with “Class-II front facia as per IEC 61140”
6. MCCB shall be provided with continuously ratio coils.
7. MCCB shall have cross bolted termination.

6.2.8.4. Current Limiting & Coordination

1. The MCCB shall employ maintenance free minimum let-through energies and capable of achieving discrimination up to the full short circuit capacity of the downstream MCCB. **The manufacturer shall provide both the discrimination tables and let-through energy curves for all. It shall be responsibility of Panel builder & OEM to carry out the discrimination study at the time of drawing approval.**
2. Protection Functions
    a. MCCBs with ratings up to 250 A shall be equipped with Thermal-magnetic (thermal for overload and magnetic for short-circuit protection) trip units
    b. Microprocessor MCCBs with ratings 250A and above shall be equipped with microprocessor based trip units. (both variable setting)
    c. Microprocessor and thermal-magnetic trip units shall be adjustable and it shall be possible to fit lead seals to prevent unauthorized access to the settings
    d. Microprocessor trip units shall comply with appendix F of IEC 60947-2 standard (measurement of rms current values, electromagnetic compatibility, etc.)
    e. Protection settings shall apply to all poles of circuit breaker.
    f. All Microprocessor components shall withstand temperatures up to 125 °C

6.2.8.5. Testing

3. Original test certificate of the MCCB as per IEC 60947-1 &2 or IS13947 shall be furnished.
4. Pre-commissioning tests on the switch board panel incorporating the MCCB shall be done as per standard specifications.

6.2.8.6. Interlocking

Moulded, case circuit breakers shall be provided with the following interlocking devices for interlocking the door of a switch board.

5. Handle interlock to prevent unnecessary manipulations of the breaker.
6. Door interlock to prevent the door being opened when the breaker is in ON position.
7. Defeat-interlocking device to open the door even if the breaker is in ON position.
8. The MCCB shall be current limiting type and comprise of quick make – Break switching mechanism. MCCBs shall be capable of defined variable overload adjustment. All MCCBs rated

250 Amps and above shall have adjustable over load & short circuit pick-up both in Thermal magnetic and Microprocessor Trip Units.

9. All MCCB with microprocessor based release unit, the protection shall be adjustable Overload, Short circuit and earth fault protection with time delay.
10. The trip command shall override all other commands.

6.2.9.Section IX: Switchboards

6.2.9.1. General

11. Switchboards shall be suitable for operation at three phase 4 wire, 415 volt, 50 Hz, neutral solidly grounded at transformer system with a short circuit level withstand as per schedule of quantities and drawings.
12. Switchboards shall comply to Form 3B for compartmentalized boards and Form 1 for non-compartmentalized boards as per BS 5486 Part I – 1990 and IEC 439-1
13. The enclosures shall be designed to take care of normal stress as well as abnormal electro-mechanical stress due to short circuit conditions. All covers and doors provided shall offer adequate safety to operating persons and provide ingress protection of IP 54 unless otherwise stated. Ventilating openings and vent outlets, if provided, shall be arranged such that same ingress protection of IP 54 is retained. Suitable pressure relief devices shall be provided to minimize danger to operator during internal fault conditions.
14. Entire switchgear used in switchboards shall be completely fuse free. No fuses shall be used anywhere in the installation.
15. All accessible bares terminals shall be provided with integral shrouds and shall be finger touch proof.
16. Bimetallic connectors shall be provided for termination of cable with aluminium conductors on copper bus bars.

6.2.9.2. Switchboard Configuration

17. The Switchboard shall be configured with Air Circuit Breakers, MCCB's, and other equipment as called for in the schedule of quantities.
18. The MCCB's shall be arranged in multi-tier formation whereas the Air Circuit Breakers shall be arranged in Single or Double tier formation only to facilitate operation and maintenance.
19. The Switchboards shall be of adequate size with a provision of 25% spare space to accommodate possible future additional switch gear.

6.2.9.3. Equipment Specifications

All equipment used to configure the Switchboard shall comply with the relevant Standards and Codes of the Bureau of Indian Standards and to the detailed technical specifications as included in this tender document.

6.2.9.4. Constructional Features

20. The Switchboards shall be metal clad totally enclosed, floor mounted free standing type of modular extensible design suitable for indoor mounting. The Switchboards shall be designed for a temperature rise restricted to 40 Deg C above ambient of 45 Deg C
21. Switchboards shall be either compartmentalized or non-compartmentalized as stipulated in schedule of quantities.
22. Switchboards shall be made up of requisite vertical sections, which when coupled together, shall for continuous dead front switchboards.
23. Switchboard shall be readily extensible on both sides by addition of vertical sections after removal of the end covers.

24. The switchboards shall be designed for use in high ambient temperature and humid tropical conditions as specified. Ease of inspections, cleaning and repairs while maintaining continuity of operation shall be provided in the design.
25. Metal based neoprene gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust and vermin proof to provide a degree of protection of IP 54 as stipulated in schedule of quantities.
26. 'U' Channels forming switchboard frames shall be fabricated from 2.5 mm thick electro galvanized MS sheets. All joints shall be neatly formed and finished flush with adjacent surfaces by grinding. No joints shall be located in corners. Bare edges shall be lipped. Structural members and bracings where ever required shall be welded or bolted to the frame. The frame shall be of modular design and extensible.
27. All doors and covers shall also be fully gasketed with metal based neoprene gaskets with fastners designed to ensure proper compression of the gaskets. The hinged door shall open a maximum of 150^0. All hinged doors shall have earth braid connected to the cubicle. Good quality door handles fitted with toggles to operate rods to latch with suitable slots in both top and bottom of switchboards shall be provided. Latching rods and associated brackets shall be cadmium plated.
28. Each vertical section shall be provided with a rear side cable chamber housing the cable end connections and power/control cable terminations. There should be generous availability of space for ease of installation and maintenance with adequate safety for working in one vertical section without coming into contract with any liver parts.
29. Switchboard panels and cubicles shall be fabricated with CRCA Sheet Steel of thickness not less than 2.0 mm and shall be folded and braced as necessary to provide a rigid support for all components. The doors and covers shall be fabricated from CRCA sheet steel of thickness not less than 1.6 mm. Joints of any kind in sheet metal shall be seam welded and all welding slag ground off and welding pits wiped smooth with plumber metal.
30. All panels and covers shall be properly fitted and square with the frame. The holes in the panel shall be correctly positioned.
31. Fixing screws shall enter holes tapped into an adequate thickness of metal or provided with hank nuts. Self-threading screws shall not be used in switchboards.
32. All electrical contacts between dissimilar metals (e.g.. aluminium conductor of cables connected to copper terminals of breakers etc..) shall be through bimetallic connection

6.2.9.5. Switchboard Dimensional Limitations

33. A base channel 75 mm x 5 mm thick shall be provided at the bottom.
34. A minimum of 200 mm blank space between the floor of switchboard and bottom most unit shall be provided.
35. The overall height of the switchboard shall be limited to 2300 mm unless otherwise stipulated.
36. The height of the operating handle, push buttons etc. shall be restricted between 300 mm and 2000 mm from finished floor level.

6.2.9.6. Switchboard Compartmentalization

37. For compartmentalized switchboards, separate totally enclosed compartments shall be provided for horizontal busbars, vertical busbars, ACBs, MCCBs and cable alleys.
38. Earthed metal or insulated shutters shall be provided between drawout and fixed portion of the switchgear such that no live parts are accessible with equipment drawn out. Degree of protection within compartments shall be at least IP 4X.

39. Sheet steel hinged lockable doors for each separate compartment shall be provided and duly interlocked with the breaker in "ON" and "OFF" position.
40. For all Circuit Breakers separate and adequate compartments shall be provided for accommodating instruments, indicating lamps, control contactors and control MCB etc. These shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker, busbars and connections.
41. Each switchgear cubicles shall be fitted with label in front and back identifying the circuit, switchgear type, rating and duty. All operating device shall be located in front of switchgear only. Minimum height from floor level for any device mounted on panel cover shall be 250 mm.
42. A horizontal wire way with screwed cover shall be provided at the top to take interconnecting control wiring between vertical sections.
43. Separate cable compartments running the height of the switchboard in the case of front access boards shall be provided for incoming and outgoing cables.
44. Cable compartments shall be of adequate size for easy termination of all incoming and outgoing cables entering from bottom or top.
45. Adequate and proper support shall be provided in cable compartments to support cables.

6.2.9.7. Spare Provision

25% spare cubicles/space shall be provided in all switchboards to cater for future use.

6.2.9.8. Switchboard Bus Bars

46. Busbars shall be made of high conductivity, high strength aluminium alloy, complying with requirements of grade E 91E of IS 5082 – 1981. Design of busbar system shall comply to IS 5578 and IS 11353. Busbars shall be of rectangular cross sections suitable for full load current for phase bus bars as also neutral bus bar. The maximum current density shall be 1 amp per Sq. mm. Busbar shall be suitable to withstand the stresses of fault level as specified in schedule of quantities.
47. Bus bars shall be insulted with heat shrunk PVC sleeving of 1.1 kV grade and bus bar joints provided with clip-on shrouds.
48. The bus bars shall be extensible on either side of the switchboard.
49. The bus bars shall be supported on non-breakable, non-hygroscopic epoxy resin or glass fiber reinforced polymer insulated supports able to withstand operating temperature of 110^{O} C at regular intervals, to withstand the forces arising from a fault level of 31 MVA at 415 volts for 1 second or as stipulated in schedule of quantities.
50. All bus bars shall be colour coded.
51. Auxiliary buses for control power supply, space heater power supply or any other specified service shall be provided. These buses shall be insulated, adequately supported and sized to suit specific requirement. The material for auxiliary supply bus will be electrolytic copper.
52. Additional cross sectional area to be added to the bus bar to compensate for the holes.

6.2.9.9. Switchboard Interconnection

53. All connection and tap offs shall be through adequately sized connectors appropriate for fault level at location. This shall include tap off to feeders and instrument/control transformers. Alternatively current limiters of approved make and type shall be used.
54. For unit ratings up to 100 amps, PVC insulated copper conductor wires of adequate size to carry full load current shall be used. The terminations of such interconnections shall be crimped. Solid connections shall be used for all rating of 100 amps and above.

55. All connections, tappings, clamping, shall be made in an approved manner to ensure minimum contact resistance. All connections shall be firmly bolted and clamp with .even tension. Before assembly joint surfaces shall be filed or finished to remove burrs, dents and oxides and silvered to maintain good continuity at all joints. All screws, bolts, washers shall be cadmium plated.
56. Approved spring washers shall be used with cadmium plated high tensile steel bolts with BSF threads.
57. All connectivity and tap offs shall have bimetallic connectors as required, finger touch proof terminals & integral switchgear shrouds.

6.2.9.10. Drawout Features

58. Air Circuit Breakers shall be provided in fully drawout cubicles, unless otherwise stated. These cubicles shall be such that drawout is possible without disconnection of the wires and cables. The power and control circuits shall have self-aligning and self-isolating contacts.
59. The fixed and moving contacts shall be easily accessible for operation and maintenance. Mechanical interlocks shall be provided on the drawout cubicles to ensure safety and compliance to relevant Standards. The MCCB's shall be provided in fixed type cubicles.

6.2.9.11. Instrument Accommodation

60. Instruments and indicating lamps shall not be mounted on the Circuit Breaker Compartment door for which a separate and adequate compartment shall be provided and the instrumentation shall be accessible for testing and maintenance without danger of accidental contact with live parts of the Switchboard.
61. For MCCB's instruments and indicating lamps can be provided on the compartment doors.
62. The current transformers for metering and for protection shall be mounted on the solid copper/aluminium busbars with proper supports.

6.2.9.12. Wiring

63. All wiring for relays and meters shall be with PVC insulated copper conductor wires. The wiring shall be coded and labelled with approved ferrules for identification. The minimum size of copper conductor control wires shall be 2.5 sq. mm.
64. Wiring shall be terminated with ferrules on terminal block. CTs shall be provided with shorting facilities

6.2.9.13. Cable Terminations

65. Knockout holes of appropriate size and number shall be provided in the Switchboard in conformity with the location of incoming and outgoing conduits/cables.
66. The cable terminations of the Circuit Breakers shall be brought out to terminal cable sockets suitably located in the cable chamber
67. The cable terminations for the MCCB's shall be brought out to the rear in the case of rear access switchboards or in the cable compartment in the case of front access Switchboards.
68. The Switchboards shall be complete with tinned brass cable sockets, tinned brass compression glands, gland plates, supporting clamps and brackets etc. for termination of 1100 volt grade aluminium conductor XLPE cables.
69. Removable gland plates shall be provided for power and control cables. The gland plates shall be 3 mm thick and for single core cables shall be of non-magnetic material.

6.2.9.14. Space Heaters

Anti- condensation heaters shall be fitted in each cubicle together with an ON/OFF isolating switch suitable for electrical operation at 230 volts A.C 50 Hz single phase of sufficient capacity to raise the internal ambient temperature by 5^{O} C. The electrical apparatus so protected shall be designed so that the maximum

permitted rise in temperature is not exceeded if the heaters are energized while the switchboard is in operation. As a general rule, the heaters shall be placed at the bottom of the cubicle.

6.2.9.15. Ventilation Fans

The Switchboard shall be provided with panel mounting type ventilation fans in each panel with switchgear rated for 2500 amp and above. The fan shall be interlocked with switchgear operation. If ventilation fans cannot be provided for maintaining the required degree of ingress protection, the design of switch board cubical shall incorporate suitable measures like decreasing current density of conductors, increasing cubical volume for effective heat dissipation etc. in order to restrict temperature rise to within the required limit.

6.2.9.16. Earthing

Continuous internal copper earth bus sized for prospective fault current to be provided with arrangement for connecting to station earth at two points. Hinged doors / frames to be connected to earth through adequately sized flexible braids.

6.2.9.17. Sheet Steel Treatment And Painting

Sheet steel used in the fabrication of switchboards shall undergo a rigorous cleaning and surface treatment seven tank process comprising of alkaline degreasing, descaling in dilute sulphuric acid and a recognised phosphating process after which a coat of primer paint compactively with the final paint shall be applied over the treated surface. Final paint coat of oven baked powder coating, of minimum 50 micron thickness, of sheet approved by Architects/Owners shall then be provided.

6.2.9.18. Name Plates And Labels

Suitable engraved white on black name plates and identification labels of metal for all Switchboards and Circuits shall be provided. These shall indicate the feeder number and feeder designation.

6.2.9.19. 19 Local Authorities Requirement

All other requirements by the local Authority that are imposed in course of execution of the work, particularly those listed below shall be provided.

a) Danger Signs
b) Rubber floor mat of 10 m thickness and 1 m width provided for the full length of the switchboard.
c) A dry chemical type fire extinguisher of 9 kg capacity with approved label
d) Framed single line diagram with minimum A1 size
e) First Aid Demonstration sign.

6.2.9.20. CPRI Testing

Switchboard configurations offered shall be CPRI tested. Copies of the CPRI test certificates shall be submitted with the tender.

6.2.9.21. Testing at works

Copies of type test carried out at ACB/MCCB manufacturers works and routine tests carried out at the switchboard fabricators shop shall be furnished along with the delivery of the switchboards. Architects/Owners reserves the right to get the switchboard inspected by their representative at fabricators works prior to dispatch to site to witness the routine tests

6.2.9.22. Installation

70. The foundations prepared as per the manufacturers drawings shall be levelled, checked for accuracy and the Switchboard installed. All bus bar connections shall be checked with a feeler gauge after installation. The cable end boxes shall be sealed to prevent entry of moisture. The main earth bar shall be connected to the sub-station earths.

71. Antistatic rubber matting of approved make conforming to IS 5424 – 1983, of minimum 1000 mm width 10 mm thickness shall be provided in front of and along the full length of the Switchboard. The rubber mat shall withstand 15 KV for 1 minute and leakage current shall not exceed 160 mA/sq. metre.

72. After installation the Switchboard shall be tested as required prior to commissioning.

6.2.9.23. Testing At Site

Pre-commissioning tests as required and as per manufacturers recommendations shall be carried out on each switchboards at site before energizing the switchboards including but not restricted to the following.

a) Physical checking of the switchboards including checking alignment of panels, interconnection of Bus bars, tightness of bolts/connections and evidence of damage/cracks in any components.
b) Physical checking and inspections of Inter panel wiring
c) Checking free movement of ACBs/MCCBs/SFUs
d) Checking of operation of breakers
e) Insulation tests of bus bar supports and control wiring etc. with 1.1 kV megger.
f) Primary & secondary injection tests of relays and CTs.
g) Checking of Interlocking function.

6.2.10. Section – X: Metering Equipment

6.2.10.1. General

This section covers specifications for Protection and Control Relays for breakers, Instrument Transformers, Measuring Instruments, Push Buttons, and Indicating Lamps etc. required in LT and HT switchboards.

6.2.10.2. Standards and codes

Updated and current Indian Standard Specifications and Codes of Practice will apply to the equipment and the work covered by the scope of this contract. In addition the relevant clauses of the Indian Electricity Act 2003, Indian Electricity Rules 1956, National Building Code 1994, National Electric Code 1985, Code of Practice for Fire Safety of Building (general) :General Principal and Fire Grading – IS 1641 as amended up to date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and/or IEC Standards shall be applicable.

Application guide for Current Transformers	IS 4201:
Application guide for Voltage Transformers	IS 4140:
Application guide for Relays	IS 3842:
Electromagnetic Relays	IS 5051

6.2.10.3. Protection and control relays

73. The Circuit Breaker shall have protection and control relays as specified in the schedule of quantities. Relays shall be approved types complying with relevant ISS and having approved characteristic. Relays shall be flush mounted in dust proof cases. Relays shall be arranged so that adjustments, testing and replacement can be affected with minimum of time and labour.

74. In case of C.T. operated thermal overload and magnetic instantaneous short circuit release, the overload releases shall be such that each phase can be individually set depending on the phase unbalanced currents. The releases shall have inverse time current characteristics and the magnetic release shall be time delayed with a minimum setting of 25 ms varying up to 300 ms for discrimination without effecting the breaking current capacity of the ACB.

6.2.10.4. Current transformers

75. Separate sets of CTs shall be provided for metering and protection. C/Ts shall confirm to IS 2705 (part -I, II and III) in all respects. All C/Ts used for medium voltage application shall be rated for 1 kV. C/Ts shall have rated primary current, rated burden and class of accuracy as specified in Schedule of Quantities/drawings. Rated secondary current shall be 5A unless otherwise stated. Minimum acceptable class for measurement shall be class 0.5 to 1 and for protection class 5P10. C/Ts shall be capable of withstanding magnetic and thermal stresses due to short circuit faults as applicable. Terminals of C/Ts shall be paired permanently for easy identification of poles. C/Ts shall be provided with earthing terminals for earthing chassis, frame work and fixed part of metal casing (if any). Each C/T shall be provided with rating plate indicating:

    a. Name and make

    b. Serial number

    c. Transformation ratio

d. Rated burden

e. Rated voltage

f. Accuracy class

76. CTs shall be mounded such that they are easily accessible for inspection, maintenance and replacement. Wiring for CT shall be with copper conductor FRLS PVC insulated wires with proper termination works and wiring shall be bunched with cable straps and fixed to the panel structure in a neat manner. Facilities for shorting terminal shall be provided.

6.2.10.5. Potential transformer

PT's shall conform to IS 3156 (Part I, II and III) in all respects. Primary and secondary circuit wiring star connected and voltage ratio shall be 11 kV /√3/110/√3 or 415/√3/110/√3 as specified in Schedule of Quantities. Class of accuracy shall be 1.0. Over voltage factor shall be 1.2

6.2.10.6. Measuring instruments

77. Direct reading electrical instruments shall conform to IS 1248 or in all respects. Accuracy of direct reading shall be 1.0 of voltmeter and 1.0 for ammeters. Other instruments shall have accuracy of 1.0. Meters shall be suitable for continuous operation between -10^{o} C and +45^{0}C. Meters shall be flush mounting and shall be enclosed in dust tight housing. The housing shall be of steel or phenolic mould. Design and manufacture of meters shall ensure prevention of fogging of instrument glass. Pointer shall be black in colour and shall have Zero position adjustment device operable from outside. Direction of deflection shall be from left to right. Suitable selector switches shall be provided for ammeters and volt meters used in three phase system unless otherwise stipulated, 96 mm x 96 mm instrument shall be used. The rating type and quantity of meters, instruments and protective device shall be as per Schedule of Quantities /drawings. Ammeter on motor circuit shall be provided with suppressed scales to take care of shorting surges.

78. Ammeters

    Digital type Ammeter of specified range to class 1.0 accuracy with necessary selector switches. Ammeters shall be manufacture and calibrated as per IS 1248. Ammeters shall normally be suitable for 5 A secondary of current transformers. Ammeters shall be capable of carrying substantial over loads during fault conditions. Ammeters of motor circuits shall be provided with suppressed scale to cater for starting current.

79. Voltmeters

    Voltmeters shall be digital type range of 3 phase 415 volt voltmeters shall be 0-500. Volt meters shall be provided with protection MCB.

80. Watt meter

    Wattmeter shall be of 3 phase digital type and shall be provided with a maximum demand indicator if required.

81. Power factor meters

    3 phase power factor meters shall be digital type with current and potential coils suitable for operation with current and potential transformers provided in the panel. Scale shall be calibrated for 50% lag - 100% - 50% readings. Phase angle accuracy shall be +4^{0}.

82. Energy and reactive power meters

    Trivector meters shall be two element, integrating type, KWH, KVA, KVARH meters. Meters shall confirm to IEC 170 in all respects. Energy meters, KVA, and KVARH meters shall be provided with integrating registers. The registers shall be able to record energy consumption of 500 hours corresponding to maximum current at rated voltage and unity power factor. Meters shall be suitable for operation with current and potential transformers available in the panel.

6.2.10.7. Indicating lamps

Cluster LED type indicating lamps shall be provided for indication of phases and Breaker position as required in the schedule of quantities. Lamps shall be easily removed and replaced from the front of the panel by manual means not requiring the use of extractors.

6.2.10.8. Push buttons

Push buttons shall be of non-hygroscopic material, non-swelling and fitted to avoid any possibility of sticking. Contacts shall be of adequate strength and have a positive whipping action when in operation

7. Section 7: Draft Contract Agreement

THIS AGREEMENT made on the …….day of …….. 2018 at Noida, District Gautam Budh Nagar, Uttar Pradesh Between **Noida Metro Rail Corporation Limited** (Hereafter referred to as "NMRC"), a company incorporated under Companies Act 2013, vide corporate identification Number: U60231UP2014SGC066849 and having its registered office at **Block-III, 3rd Floor, Ganga Shopping Complex, Sector-29, Noida -201301, District Gautam Budh Nagar, Uttar Pradesh, India** *represented by ……. of the company, by virtue of his designation and authorization by* ***Shri ……., Managing Director, NMRC*** (hereinafter called as the "Purchaser"), which expression shall unless excluded by or repugnant to the context or meaning thereof be deemed to include its successors and permitted assigns) of the one part,

AND

…….. having its registered office at **……**, represented by **……** (herein after called the **"Contractor",** which expression shall unless excluded by or repugnant to the context or meaning thereof be deemed to include its successors and permitted assigns) of the other part.
WHEREAS the Purchaser desires that the Works known as the **"……."** should be executed by the Contractor, and has accepted a contract by the Contractor for the execution and completion of these Works.

The Purchaser and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement -

Reference:

(i) Tender No. …… Dated ……..
(ii) Bid Documents duly accepted and submitted by …… dated ……..
(iii) The Bidding Documents which include all the Sections specified below:
   a. Section 1: General Information
   b. Section 2: Terms of Reference
   c. Section 3: Instructions to Bidders
   d. Section 4: Qualification, Evaluation and Selection Process
   e. Section 5: Special Conditions of Contract
   f. Section 6: Technical Specifications
   g. Section 7: Draft Contract Agreement
   h. Section 8: Appendix to Form of Tender and Forms
   i. General Conditions to Contract (GCC)
   j. Condition of Contract on Safety, Health & Environment Management
   k. Amendment/ Modification, if any
(iv) Notice of Award (…….) issued by NMRC
(v) Letter of Acceptance of NOA (…….) given by …….. to NMRC
(vi) Any other admitted correspondence documents between NMRC and the Bidder.

3. **Price Schedule**
   NMRC shall be as quoted by the contractor as part of financial bid i.e. INR _____.
   As per letter of acceptance no _____ dt _____.

4. The courts at District Gautam Budh Nagar, Uttar Pradesh shall have the exclusive jurisdiction to try all disputes arising out of this agreement between the parties.

5. In consideration of the payments to be made by the Purchaser to the Contractor as specified in this Agreement, the Contractor hereby covenants with the Purchaser to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract and Notice of Award issued. "**Any conditions, deviation, assumption, exclusion, suggestion of alternative clauses, request of amendments in conditions & specifications of work submitted by bidders along with his Technical Bid or Financial bid, which is different from the Tender Document, Corrigendum, Addendum uploaded by NMRC on the E-Tender Portal (http://etender.up.nic.in) and any other correspondence in this regard, shall not be treated as a part of the contract Agreement & shall not be binding upon NMRC in anyway whatsoever at any stage of work during execution or thereafter."**

6. The Purchaser hereby covenants to pay the Contractor in consideration of the execution and completion of the Works, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract and NOA.

IN WITNESS where of the parties hereto have caused this Agreement to be executed in accordance with the laws of India on the day, month and year specified above.

For and on behalf of the Contractor
Signature of the authorized official

Name of the official

Stamp/Seal of the contractor

In the presence of:

Sign of Witness 1_____

Name_____

Address_____

_____

Sign of Witness 2_____

Name_____

Address_____

_____

For and on behalf of the Purchaser
Signature of the authorized official

Name of the official

Stamp/Seal of the Purchaser

In the presence of:

Sign of Witness 1_____

Name_____

Address_____

_____

Sign of Witness 2_____

Name_____

Address_____

_____

8. Section 8: Appendix to Form of Tender and Forms

8.1. Appendix 1: Metro Alignment

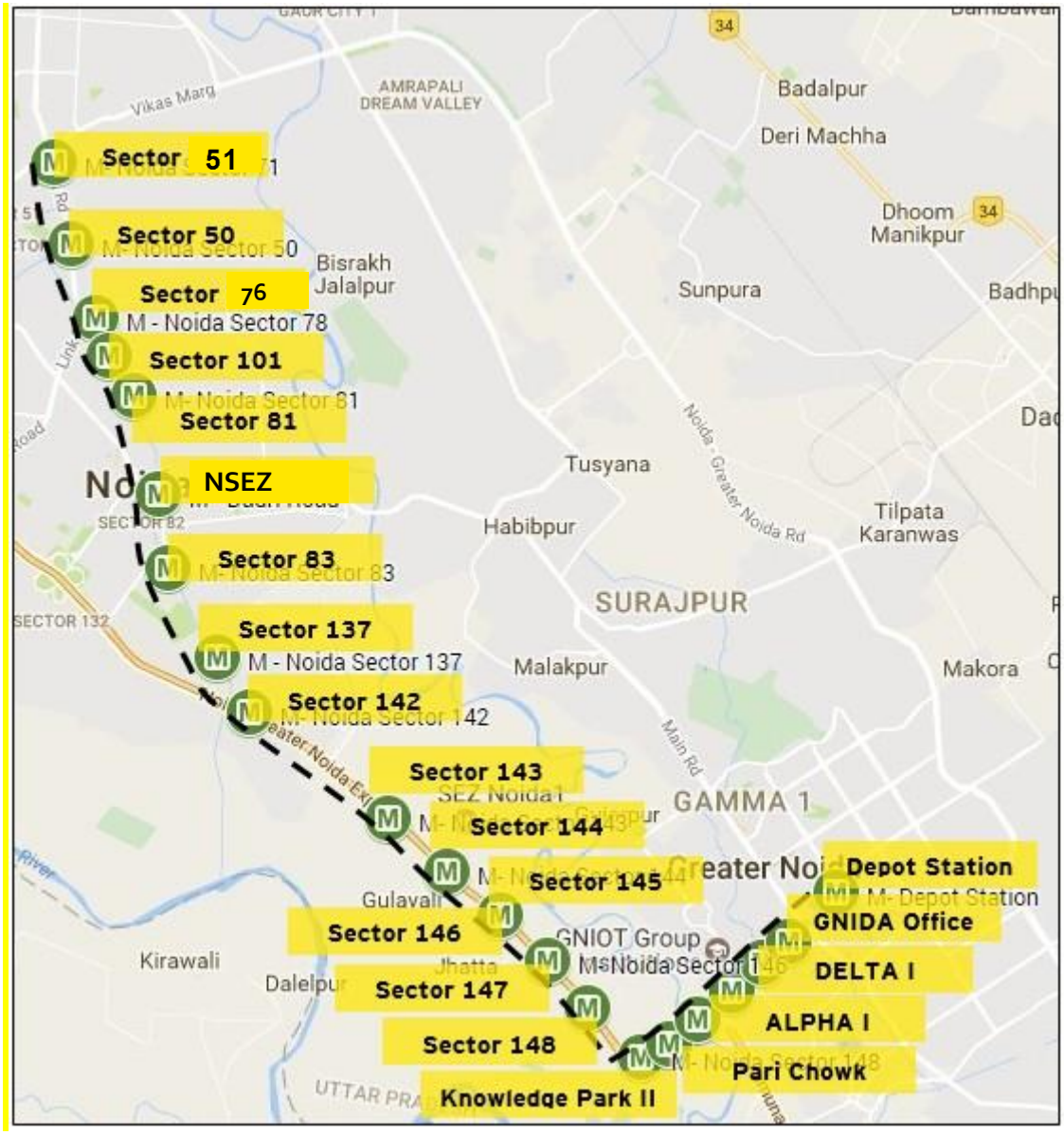

Fig: The Upcoming Metro Line

Please Note: The map shown above is indicative (not to scale)

S.NO.	Name of the Station
1.	Sector 51 Station
2.	Sector 50 Station
3.	Sector 76 Station
4.	Sector 101 Station
5.	Sector 81 Station
6.	NSEZ Station
7.	Sector 83 Station
8.	Sector 137 Station
9.	Sector 142 Station
10.	Sector 143 Station
11.	Sector 144 Station
12.	Sector 145 Station
13.	Sector 146 Station
14.	Sector 147 Station
15.	Sector 148 Station
16.	Knowledge Park II Station
17.	Pari Chowk Station
18.	ALPHA I Station
19.	DELTA I Station
20.	GNIDA Office Station
21.	Depot Station

8.2. Appendix 2: List of makes

8.2.1. Approved makes for Civil and other works

S. No.	Details of Materials / Equipment	Manufacturer's Name
	Civil items	
1	Cement	Ultratech/ Ambuja 53 Grade
2	White Cement	Birla White
3	Wall Tiles - Vitrified	Johnson/ Nitco/ Kajaria/ Regency
4	Floor tiles – toilet and pantry	Johnson/ Nitco/ Kajaria/ Regency
5	Plumbing fixtures	Jaguar
6	UPVC Pipes	Tata/ Zenith
7	CPVC Pipes	Tata/ Zenith
8	Sanitary wares	Hindware/ Parryware/ NYCER
9	Polycorbonate Sheet	Durotuf/ Tufflite/ Duroshine
10	Puff Panel	E-Pack/ Swarn Telecome/ E-Vision
11	Water Proofing	Bitumege/ Makphalt/ Torch Shield
12	Geotextile	Wishva/ Maccaferri/ Mirafi
13	Acp	Nice Bond/ Indo Bond/ Alstone
14	Ss Grating	Belly Drain/ Mifab/ Acodrain
15	Lift	Otis/ Schindler/ Kone
	Carpentry Items	
1	Commercial plywood	Century-Sainik/ Gamet/ Samrat or equivalent
2	MDF	Duratuff/ Nuwood
3	Flush door	Green/ Galaxy
	Hardware items	
1	Aluminum section	Jindal or equivalent Geeta/ Hinda
2	Floor spring	Hyper/ Archies or equivalent
3	Door closure	Hyper/ Hardware or equivalent
4	Door stopper	Local as per item
5	Glass handles	Local as per item
6	Door Hinges – Brass	Maruti
7	Shutter Hinges	Maruti
8	Latch	Godrej/ Tag
9	Tower Bolt	Godrej
10	Cylindrical lock	Godrej
11	Door lock	Godrej/ Vijayan
12	Drawer lock	Godrej
15	Pedestal lock	Godrej
16	Screws	Laxmi/ GKW
	Paint, Ceiling and Flooring	
1	Glazing	Modi/ Saint Gobain

S. No.	Details of Materials / Equipment	Manufacturer's Name
2	Gypsum	Gypsam /Arm Strong/ Anutone
3	Paint	Asian/ Berger/ Nerolac

8.2.2. Approved makes for Electrical, Fire-fighting and other works

S. No.	Details of Materials / Equipment	Manufacturer's Name
A	**Medium Voltage Equipment**	
1	Power Distribution Panel	Ambit Switchgear Precision System Control Tricolite Application Control Panel Pvt. Ltd
2	Final Distribution Board	Hager-Novello Legrand Ekinox3 Siemens Beta Guard 10KA Schneider - Acti9
3	Moulded Case Circuit Breaker (MCCB)	ABB Tmax Legrand - DPX3 L&T DU sine Schneider - NSX Siemens 3VL
4	Miniature Circuit Breakers	ABB Hager-H3 Legrand - DX3 Siemens Beta Guard 10KA Schneider - Acti9
5	Residual Current Circuit Breaker (RCCB)	ABB Hager-H3 Legrand - DX3 Siemens Beta Guard 10KA Schneider - Acti9
6	Power/Aux. Contactor	ABB AF L&T- MNX Legrand CTX3 Siemens Sirius RT Schneider Tesys K, D, F
7	Control Transformer/Potential Transformers	Automatic Electric Gilbert & Maxwell Indcoil Pragati Precise Matrix
8	Current Transformer (Epoxy Cast Resin)	Automatic Electric Gilbert & Maxwell Indcoil Pragati Precise
9	Protection Relay (Numeric Type)	ABB Areva L&T Siemens

10	Indicating Lamps LED type and Push Button	GE Power Controls Larsen & Toubro (ESBEE) Schneider Electric Siemens
11	Overload relays with built in Single Phase preventer	ABB GE Power Controls Larsen & Toubro Mitsubishi Electrical Schneider Electric Siemens
12	Electronic Digital Meters (A/V/PF/Hz/KW/KWH) with LED Display	Automatic Electric L & T Schneider Electric
13	Static Power Meter & Logger (SPML)With RS 485 port	Conzerv Larsen & Toubro Schneider Electric Automatic Electric
14	PVC insulated XLPE aluminium/copper conductor armoured MV Cables upto 1100 V grade	Finolex Universal Havells Paramount
15	LT Jointing Kit / Termination	Birla-3M Raychem REPL Safe Kit
16	Cable Glands Double Compression with earthing links	Baliga Lighting Comet Cosmos
17	Bimettalic Cable Lug	Comet Cosmos Dowell's (Biller India) Hax Brass (Copper Alloy India)
18	PVC insulated copper conductor stranded flexible wires (FRLS)	Finolex Universal Havells Paramount
19	Mettalic / GI Conduit (ISI approved)	RM-Con(AKG) BEC NIC Vimco
20	PVC Conduit & Accessoires (ISI approved)	AKG BEC Polypack Precision
21	Lead Coated Flexible GI Conduit	PLICA IndiaPvt. Ltd. Flexicon ABB – Lumina/ Classic
22	Switch & Socket	Legrand - Arteor Clipsal NEO C-Metro ABB - Concept BS

23	Industrial Socket Splash Proof	Legrand Gewiss Schneider Electric
24	Industrial Socket Metal Clad	Hansel MDS Legrand
25	Ceiling Fan	Crompton Greaves Havells Bajaj Usha
26	Lighting Fixture LED	Philips India Wipro Bajaj Polycab
27	UPS	APC Schneider Emerson Network Power ABB BPE
28	Lighting & Surge Voltage Protection	ABB Hager ObeoBetterman Schneider Electric
29	230/12 V Step Down Transformer with BUILTIN Isolation Transformer	Talema Volstat
30	Energy saving Units	FMS Inncom Inn Link Systems Pumba Electronics
31	Exit Signage's	Legrand MK Prolite Philips Thorn
32	Cable tray	Ricco Slotco Indiana Engineering
33	Raceway	Legrand - CMS MK Schneider
B	**Telephone**	
a)	Cat-6 Cable	Legrand - LCS2 Panduit(Pannet) Siemon
b)	Fiber Optic Cable	Legrand - LCS2 Panduit(Pannet) Siemon
c)	Telephone Tag Blocks	KRONE Om Enterprises
2.	Telephone Armoured Cables	DELTON CABLES FINOLEX

		SKYTONE
3.	Patch Cords, patch panels, Splitter Box, cross connect outlet	Legrand - LCS2 Panduit(Pannet) Siemon
4.	Data Switches, Receiver, Media Converter	ALCATEL CISCO EXTREME H.P
5.	WiFi(AP's)	ALTAI COMPEX MOTOROLA RADMAX RUCKUS
6.	Racks for Data Switches	Legrand - LCS2 Rittal APW
7.	EPABX	Avaya Honeywell Alcatel Siemens

8.3. Form 1: Letter of Proposal Submission

[Location, Date]

To

Executive Director

Noida Metro Rail Corporation (NMRC) Limited

Block-III, 3rd Floor, Ganga Shopping Complex,

Noida -201301,

District Gautam Budh Nagar, Uttar Pradesh

Subject: Proposed Gate for NMRC Bus Depot

Dear Sir,

We, the undersigned, offer to provide the Proposed Gate for NMRC Bus Depot in accordance with your RFP Document dated [Insert Date] and our Proposal. We are hereby submitting our Technical and Financial Proposal, in a sealed envelope. We confirm that we have read the RFP Document in totality and abide by the terms and conditions stated in the document.

We have filled the complete information correctly in **Form 15.**

We hereby declare that all the information and statements made in this Proposal are true and accept that any misinterpretation contained in it may lead to our disqualification. Our Proposal is binding upon us.

We understand you are not bound to accept any Bid you receive.

_____

Yours Sincerely,

Authorized Signature [In full and initials]:

Name and Title of Signatory:

Name and address of Firm:

8.4. Form 2: Firm Details

1.	**Title and name of the Project:** Proposed Gate for NMRC Bus Depot
2.	State the structure of the Bidder's organisation (Bidders to complete/delete as appropriate)
3.	For Bidders who are individual companies or firms, state the following: Name of Company or firm: …… Legal status: (e.g. incorporated private company, proprietorship, etc.) …… Registered address: ……..…… Year of incorporation…….…… Principal place of business: …….…… Contact person: …….. Contact person's title: …… Address, telephone, facsimile number and e-mail ID of contact person: …… …… ……...
4.	Authorized Representative …….

8.5. Form 3: Capability Statement

It is Compulsory for the bidder to fill this statement and the bidder must upload those document that support this statement

Tender Reference No : _____

Name of Work : _____

Name of Bidder: _____

S.No.	**ELIGIBILITY CRITERIA**		**(To be filled by the Bidder)**
1	Sole proprietorship/ partnership firm/ public limited company/ private limited company	Yes/ No	
2	The Bidder should have successfully completed in India should be either of the following: i. One order of similar nature of value not less than Rs. 29 lakh (Rupees Twenty Nine Lakh only) or ii. Two orders of similar nature of value not less than Rs. 22 lakh (Rupees Twenty Two lakh only) each or iii. Three orders of similar nature of value not less than Rs. 15 lakh (Rupees Fifteen lakh only) each	7 Years	
3	The Bidder should submit the solvency certificate issued by the bankers and it should not be less than Rs. 15 lakh (Rupees Fifteen lakh only)	Yes/ No	
4	The Bidder should have in the last 3 Financial Years preceding the Bid Due Date - i. Minimum average annual turnover of Rs. 29 lakh (Rupees Twenty Nine Lakh only)	FY 2017-18 | FY 2016-17 | FY 2015-16 | Total |	

<table>
<tr><th><u>S.No.</u></th><th><u>ELIGIBILITY CRITERIA</u></th><th>(To be filled by the Bidder)</th></tr>
<tr><td>5</td><td>The Bidder should have positive profit before tax in the last 3 (three) Financial Years preceding Bid Due Date
<table><tr><td>FY 2017-18</td><td></td></tr><tr><td>FY 2016-17</td><td></td></tr><tr><td>FY 2015-16</td><td></td></tr><tr><td>Total</td><td></td></tr></table></td><td></td></tr>
<tr><td>6</td><td>The Bidder requires to provide proof of employment of technical staff, which will consist of a declaration by the Bidder as per Form 10: General Guidelines for Fixing Requirement of Technical Staff for a Work.</td><td></td></tr>
<tr><td>7</td><td>The Bidder shall submit affidavit duly verified by Notary for having arrangement of required machinery, tools & plants, centering & shuttering, etc.</td><td></td></tr>
<tr><td>8</td><td>The Bidder shall submit the Character certificate issued by District Magistrate in the names of partners in case it is partnership firm, proprietor, in case it is proprietorship firm, directors in case it is company.</td><td></td></tr>
<tr><td>9</td><td>The Bidder should submit the notarized affidavit that the bidder has not been blacklisted by any state/ central government/ organization in last 7 (seven) financial years.</td><td></td></tr>
</table>

8.6. Form 4: Work Experience

The following format shall be used for statement of experience of Bidder:

Details of orders for the quoted item executed should be furnished in the following format.

S.No	Name and Full address of purchaser	Order No. and date	Client (Govt./ Semi Govt./ PSU)	Scope	Total Value of work done (INR)

Place

Date

Signature

Seal

Designation

NOTE:
Following needs to be submitted:
1. Completion Certificate /Experience certificate of past performance to be enclosed

8.7. Form 5: Financial Capability Details

Bidder should submit their financial details as per the following:

This is to certify that the Average Annual Turnover and Profitability of M/s ……

having registered office at ……

……..for last three years is as below:

S.No.	**Financial year**	**Name of the Bidder**	**Turnover** **(INR)**
1.			
2.			
3.			
	Average Annual Turnover		

S.No.	**Financial year**	**Name of the Bidder**	**Profitability** **(INR)**
1.			
2.			
3.			
	Total Profitability		

Certificate of the Chartered Accountants/Statutory Auditors

Based on Audited Accounts and other relevant documents of_____ (Name of Bidder), we M/s _____, Chartered Accountants/ Statutory Auditors, certify that the above information pertaining to FY 2015-16, 2016-17 and FY 2017-18 is correct.

Signature and Seal of
Chartered Accountants/Statutory Auditors (with membership no.)

Undertaking

I/ We _____(M/s _____) declare that the Annual Accounts have not been audited so far. We are submitting the CA certified provisional accounts, which shall be substantiated by the Audited Accounts, when prepared.

Authorised Signatory

(Name & Designation of Authorised Signatory)

In case the Financial Statements for the latest financial year are not audited and therefore the Bidder cannot make it available, the Bidder shall give an undertaking to this effect and the statutory auditor/charted accountant shall certify the same. In such a case, the Bidder shall provide the Audited Financial Statements for 2 (two) years preceding the year for which the Audited Financial Statement is not being provided. Also, pertaining to latest financial year, the bidder shall submit an affidavit certifying that "The Annual Accounts have not been audited so far. We are submitting the CA certified provisional accounts, which shall be substantiated by the Audited Accounts, when prepared."

8.8. Form 6: Memorandum

Name of Work: Proposed Gate for NMRC Bus Depot

I/We agree to keep the quoted rate open for acceptance for 180 days from the due date of submission thereof and not make any modification in its terms and conditions.

I/We hereby declare that I/We shall treat the quotation documents, drawings and other records connected with the works as secret/ confidential documents and shall not communicate information derived there from to any person other than the information in any manner prejudicial to the safety of NMRC.

_____

Signature of the bidder with seal
Dated:

Witness:

Address:

Occupation

8.9. Form 7: Undertaking - 1

Name of Work: Proposed Gate for NMRC Bus Depot

I confirm that M/S……..

a. Has not been banned /declared ineligible for corrupt and fraudulent practices by any government/government-undertaking/ semi-government/ govt. controlled institutions in India, any court of law having jurisdiction in India and do not have any disciplinary proceedings or pending litigations for the past 5 (five) years.

b. Does not have any pending litigation & non-performing contracts during last 5 (five) years. Further, has not been barred by any government/government-undertaking/ semi-government/ govt. controlled institutions/ private organizations in India.

c. Has not abandoned any work in last 5 (five) years.

d. Has not delayed in similar work completion during orders executed in last 5 (five) years.

e. Does not ever been terminated due to poor performance.

f. Has not suffered Bankruptcy/ insolvency in last 5 (five) years.

g. Has not been blacklisted by any organization.

h. Has not submitted any misleading information in the Bid.

i. Is financially sound to perform the work.

_____

Signature of the bidder with seal

Dated:

Witness:

Address:

Occupation

8.10. Form 8: Power of Attorney

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution.)
Power of Attorney to be provided by the Bidding Company in favour of its representative as evidence of authorized signatory's authority.

Know all men by these presents, We ……..(name and address of the registered office of the Bidding Company) do hereby constitute, appoint and authorize Mr./Ms……(name and residential address) who is presently employed with us and holding the position of _____, as our Attorney to do in our name and our behalf all or any of the acts, deeds or things necessary or incidental to submission of our Bid for **Proposed Gate for NMRC Bus Depot** in response to the RFP Document dated _____ issued by Noida Metro Rail Corporation ("NMRC" or "the Corporation"), including signing and submission of the Bid and all other documents related to the Bid, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document which the Corporation may require us to submit. The aforesaid Attorney is further authorized for making representations to the NMRC or any other authority, and providing information / responses to the NMRC, representing us in all matters before the NMRC, and generally dealing with the Corporation in all matters in connection with our Bid till the completion of the bidding process as per the terms of the RFP Document and further till the Contract is entered into with the NMRC and thereafter till the expiry of the Contract.

We hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall be binding on us and shall always be deemed to have been done by us.

All the terms used herein but not defined shall have the meaning ascribed to such terms under the RFP Document.

Signed by the within named
.....[Insert the name of the executant company]
through the hand of
Mr. …….
duly authorized by the Board to issue such Power of Attorney
Dated this ……. day of ……

Accepted
……
Signature of Attorney
(Name, designation and address of the Attorney)

Attested
……
(Signature of the executant)
(Name, designation and address of the executant)

……
Signature and stamp of Notary of the place of execution

Common seal of …… has been affixed in my/our presence pursuant to Board of Director's Resolution dated……
WITNESS
1. …….
(Signature)

Name ……

Designation.....……..

2. …….

(Signature)

Name ……

Designation.....……..

Notes:

(1) The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and the same should be under common seal of the executant affixed in accordance with the applicable procedure. Further, the person whose signatures are to be provided on the power of attorney shall be duly authorized by the executant(s) in this regard.

(2) In the event, power of attorney has been executed outside India, the same needs to be duly notarized by a notary public of the jurisdiction where it is executed.

(3) Also, wherever required, the executant(s) should submit for verification the extract of the charter documents and documents such as a board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).

8.11. Form 9: Banker's Solvency Certificate

To

Executive Director

Noida Metro Rail Corporation (NMRC) Limited

Block-III, 3rd Floor, Ganga Shopping Complex,

Noida -201301,

District Gautam Budh Nagar, Uttar Pradesh

SOLVENCY CERTIFICATE

This is to certify that to the best of our knowledge and information M/s. …… …… having a registered office at ……. ……, a customer of our Bank is has been dealing with us for last …… years and can be treated solvent up to a limit of INR …… (Rupees ……), as disclosed by the information and record which are made available to the Bank.

It is clarified that this information is furnished without any risk and responsibility on our part, or any of its officials in any respect whatsoever more particularly as a Guarantor or otherwise.

Signature & Seal of the Bank:

Date:

Note: This certificate is to be submitted on the banker's letterhead

Authorised Signatory
(Name & Designation of Authorised Signatory)

8.12. Form 10: General Guidelines for Fixing Requirement of Technical Staff for Work

I/We _____ S/o Shri _____ Partners/Authorized person of M/s _____ Resident of_____ Applicant for pre-qualification hereby declare that following person/persons are in my/our regular employee on the post and from the dates mentioned against them.

S. No.	Name & Address	Technical Qualification	Post held	Date of regular continuous employee

I/We undertake that if any of the post falls vacant or left unfilled for more than one month during the execution of the work entrusted to me/us by NMRC. NMRC, I/we shall inform the corporation to whom the application for pre-qualification is being made.

SEAL APPLICANT
(Notary Public)

Cost of work (Rs. In Lakh)	Requirement of Technical staff		Minimum experience (Years)	Designation
	Qualification	Number		
More than 1000	i) Project Manager with degree in corresponding discipline of Engineering. ii) Graduate Engineer iii) Graduate Engineer Or Diploma Engineer	1 1 2 2	10 5 Nil 5	Principal Technical Representative Technical represents Technical Representative
500 to 1000	i) Graduate Engineer ii) Graduate Engineer Or Diploma Engineer	1 2 2	5 Nil 5	Principal Technical Representative Technical represents
200 to 500	i) Graduate Engineer ii) Graduate Engineer Or Diploma Engineer	1 1 1	5 Nil 5	Principal Technical Representative Technical represents
50 to 200	Graduate Engineer	1	2	Principal Technical Representative
10 to 50	Graduate Engineer Or Diploma Engineer	1 1	Nil 5	Principal Technical Representative

Notes: 1. Rate of Recovery in case of non compliance of above be stipulated at following rates:-

S.No	Qualification	Experience (years)	Rate of recovery
i)	Project Manager with Degree	10	Rs. 20,000/- p.m.
ii)	Graduate Engineer	5	Rs. 15,000/- p.m.
iii)	Graduate Engineer Diploma Engineer	Nil 5	Rs. 10,000/- p.m.

8.13. Form 11: Proforma for Equipment available

(On Stamp Paper)

I/We _____ S/o Shri _____ Partners/Authorized person of M/s _____ Resident of_____
Applicant for pre-qualification hereby declare that I/we possess the following machinery, tools & plants, centering & shuttering.

S. No.	**Particulars of Machinery Tools & Plant Centering & Shuttering**	**Estimated Cost (Rs.)**	**Approximate Age (Yrs)**

I/We undertake that if there is any reduction in the equipment below the limit required for pre-qualification, I/we will inform Engineer in charge, NMRC to whom application for pre-qualification is being made.

SEAL APPLICANT
(Notary Public)

8.14. Form 12: Salable Form for Tender Document

Job No. ……..

The required fee of tender form has been deposited in _____ Bank A/c No. _____ RTGS/NEFT and the scanned copy of UTR receipt with Transaction Id is being enclosed with E-tender documents. If the copy of UTR receipt is not uploaded with the E-tender the tender shall be rejected.

DETAILS OF ERNEST MONEY ATTACHED

The required amount of Earnest money has been deposited in _____ Bank A/c No. _____ RTGS/NEFT and the scanned copy of UTR receipt with transaction Id is being enclosed with E-tender documents. If the copy of UTR receipt is not uploaded with the E-tender the tender shall be rejected.

BIDDER

8.15. Form 13: Declaration of Refund of Earnest Money

Noida Metro Rail Corporation (NMRC) Limited
Block-III, 3rd Floor,
Ganga Shopping Complex, Sector-29, Noida -201301,
District Gautam Budh Nagar, Uttar Pradesh, India

1	**Bidder Name**	
2	**Bidder Address**	
3	**Bank Name**	
4	**Bank Branch**	
5	**A/c No**	
6	**IFSC Code**	
7	**PAN No.**	
8	**Tin/TAN No.**	
9	**GST No.**	
10	**Phone No.**	
11	**Mobile No.**	
12	**Email-Id**	

For Office Use Only

13	**Party Unique Id**	

The above provided information is true to the best of my knowledge.

Date: **Signature with Stamp/Seal**

8.16. Form 14: Bid Offer/ BOQ (Format)

To

Executive Director

Noida Metro Rail Corporation (NMRC) Limited

Block-III, 3rd Floor, Ganga Shopping Complex

Noida -201301,

District Gautam Budh Nagar, Uttar Pradesh

THIS FORM IS NOT TO BE FILLED. THE BIDDERS ARE REQUIRED TO FILL THE FINANCIAL PROPOSAL IN XLS FORMAT AFTER DOWNLOADING THE FORM FROM THE E-PROCUREMENT WEBSITE FOR THIS TENDER DOCUMENT

Sub: Proposed Gate for NMRC Bus Depot

Dear Sir,

I/we have read and examined the RFP document, general terms and conditions.

I/we hereby quote for the Total Price for **Proposed Gate for NMRC Bus Depot** as specified below, payable by NMRC.

Price Schedule
(It is to be noted that BOQ corresponds to Section-6 Technical Specifications of Tender Document)

PRICE SCHEDULE

(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevent columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)

Sl. No.	Item Description	Quantity	Units	Estimated Rate in Rs. P	TOTAL AMOUNT Rs. P	TOTAL AMOUNT In Words
	ELECTRICAL WORK					
1.0	**SUB HEAD-1: WIRING & SUBMAIN**					
1.1	**Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper**					

	conductor single core cable etc. as required.					
i)	**Group C**	**8**	**Each**	**757.00**	**6,056.00**	
1.2	**Wiring for group controlled (looped) light point/fan point/exhaust fan point/ call bell point (without independent switch etc.) with 1.5 sq. mm FRLS PVC insulated copper conductor single core cable in surface/ recessed PVC conduit, and earthing the point with 1.5 sq. mm FRLS PVC insulated copper conductor single core cable etc. as required.**					
i)	**Group C**	**RO**	**Each**	**415.00**		
1.3	**Wiring for the MCB controlled Primary light points with 2.5 sq.mm PVC insulated copper conductor 1100 volts grade stranded**	**2**	**Each**	**1,495.00**	**2,990.00**	

	flexible FRLS wires of approved make in concealed or surface mounted 25 mm dia 2.0 mm thick PVC conduit but controlled by existing MCB provided in D.B. including earthing of fixtures with 2.5 sq.mm insulated copper wire.					
1.4	**Wiring for the MCB controlled Secondary light points with 1.5 sq.mm PVC insulated copper conductor 1100 volts grade stranded flexible FRLS wires of approved make in concealed or surface mounted 25 mm dia 2.0 mm thick PVC conduit including earthing of fixtures with 1.5 sq.mm insulated copper wire.**	**10**	**Each**	**690.00**	**6,900.00**	
	Wiring for 6A Sockets and 16A sockets					
1.5	**Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess,**	**2**	**Each**	**313.00**	**626.00**	

	including providing and fixing 3 pin 5/6 A modular socket outlet and 5/6 A modular switch, connections etc. as required.					
1.6	**Supplying and fixing modular blanking plate on the existing modular plate & switch box excluding modular plate as required.**	**2**	**Each**	**24.00**	**48.00**	
1.7	**Supply and fixing of power plug with 15A/250 volt flush type switch and 5 pin 15A/250V flush type universal socket in suitable M.S. box of 175mm x 100mm x 50mm size with phenolic laminated bakelite sheet cover 3mm thick fixed with brass machine screw and cup washer.**	**2**	**Each**	**270.00**	**540.00**	
1.8	**Supply & wiring of sub main with two number 4 sq. mm. FRLSH P.V.C. insulated 1100 volts grade single core**	**20**	**Metre**	**148.00**	**2,960.00**	

	copper conductor cable in 20 mm dia heavy duty(2 mm thick) PVC conduit with one number 2.5 sq. mm. FRLSH PVC insulated multistranded copper cable as earth continuity wire drawn in conduit partly concealed in wall and patly laid in slab along with reinforcement before concreating.					
1.9	**Supply & wiring of sub main with two number 6 sq. mm. FRLSH P.V.C. insulated 1100 volts grade single core copper conductor cable in 25 mm dia heavy duty(2 mm thick) PVC conduit with one number 4 sq. mm. FRLSH PVC insulated multistranded copper cable as earth continuity wire drawn in conduit partly concealed in wall and patly laid in slab along with reinforcement before concreating.**	**50**	**Metre**	**206.00**	**10,300.00**	

1.1	**Wiring for circuit/ submain wiring alongwith earth wire with the following sizes of FRLSH PVC insulated copper conductor, single core cable in surface/ recessed medium class PVC conduit as required.**					
	2 X 2.5 sq. mm + 1 X 2.5 sq. mm earth wire (For Circuit Wiring & Light Plug Wiring)	**100**	**Metre**	**137.00**	**13,700.00**	
1.11	**Supply fixing and concealing rigid steel conduit pipe in the wall including cutting of brick work, laying of conduit and fixing it with M.S. hooks and then plastering with cement, sand motar finished to the level, with matching color wash including cost of proper threading of the conduit and providing necessary sockets, bends and chuck nuts as directed by the**					

	engineer-in-charge with supply of all material labour and T&P required for proper completion of work. (for Telephone / Television / circuits)					
a)	**20 mm dia. conduit (16 SWG) 1.5mm thick**	**10**	**Metre**	**107.00**	**1,070.00**	
b)	**25 mm dia. conduit (16 SWG) 1.5mm thick**	**10**	**Metre**	**125.00**	**1,250.00**	
c)	**32 mm dia. conduit (16 SWG) 1.5mm thick**	**10**	**Metre**	**175.00**	**1,750.00**	
2.0	**SUB HEAD -II : DISTRIBUTION BOARD**					
2.1	**Supply and fixing surface/flush mounting SPN distribution board(Legrand Lexic) without MCB with additional metal door complete in all respect, as directed at site by Engineer in charge. (CAT A)**					
b)	**12 way SPN**	**1**	**Each**	**2,100.00**	**2,100.00**	
2.2	**S & F of 6Amp. To 32 Amp.**	**6**	**Each**	**250.00**	**1,500.00**	

	SPMCB(10KA)(Legrand Lexic) C curve					
2.3	**Supplying and fixing single pole blanking plate in the existing MCB DB complete etc. as required.**	**2**	**Each**	**7.00**	**14.00**	
2.4	**Supplying and fixing 40Amp. D.P. isolator)(Legrand Lexic)**	**1**	**Each**	**450.00**	**450.00**	
2.5	**Supplying, fixing & making connection of 40A 2 pole 30mA ELCB/RCCB of din rail mounting complete in all respect as per direction and satisfaction to the engineer in charge.**	**1**	**Each**	**2,245.00**	**2,245.00**	
3.0	**SUB HEAD - IV : LIGHTING FIXTURE & FAN**					

	Supply, Installation, testing & Comissioning of Lights fixtures shall be complete with LED lamps complete with all required accessories. Samples of all the fixtures with all available colour shall be submitted to the architect/ client/ Project Manager before supply & approval is taken. Please check the fixtures final quantity from the Architect / Project Manager before ordering and be sure of actual requirement prior to ordering.					
3.1	**Supply & fixing of 20 Watt LED Surface MountingLuminaire with PC Housing and opal finish cover confirming to IP 65 Complete in all respect. Cat AAA**	**6**	**No.**	**3,800.00**	**22,800.00**	

3.2	**Supply and fixing of LED Tube Light with batten suitable for up to 1X22 watt LED tube light complete including tube etc on surface complete in all respect. CAT-AAA**	**3**	**No.**	**1,920.00**	**5,760.00**	
3.3	**Supply and fixing of factory wired integral LED flood light luminaires with die cast aluminium housing built with driver set suitable for 40 to 50 Watt. Confirming to IP 65 protection complete in all respect. CATT-AAA**	**6**	**No.**	**5,930.00**	**35,580.00**	
3.4	**Supply and fixing of water tight oblong 10 Watt LED bulkhead luminaire with driver set confirming to IP 65 and above Protection . complete in all respect. CATT-AA**	**2**	**No.**	**1,770.00**	**3,540.00**	

3.5	**Supply and fixing of 3 Watt LED Path/Walkover luminaire having powder coated die cast aluminium body with driver set. Confirming to IP 65 & above protection complete in all respect. CAT-AAA**	**8**	**No.**	**2,470.00**	**19,760.00**	
4.0	**SUB HEAD - V: SERVER, DATA & VOICE NETWORKING**					
4.1	**Supplying and drawing following pair 0.5 sq mm FR PVC insulated annealed copper conductor, unarmored telephone cable in the existing surface/ recessed steel/ PVC conduit as required.**					
a)	**2 Pair**	**100**	**Metre**	**19.00**	**1,900.00**	
4.2	**Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but**					

	excluding modular plate etc. as required.					
a)	**Telephone socket outlet**	**2**	**Each**	**96.00**	**192.00**	
4.3	**Supplying and fixing following size/ modules, GI box alongwith modular base & cover plate for modular switches in recess etc as required.**					
a)	**1 or 2 Module (75mmX75mm)**	**2**	**Each**	**175.00**	**350.00**	
4.4	**Supply, fixing and concealing 20mm dia. 2mm thick PVC conduit pipe with ISI mark embossed and with PVC accessories confirming to IS no. 3419 for drawing wires duly sealed at joints with original resin/adhesive to make the complete piping rigid, plastering with cement sand motar finished to the level with matching colour wash including cost of all material labour and**					

	T & P etc required for proper completion of the work as per directions and to the satisfaction of Engineer in charge.					
a)	**25 mm dia 2 mm thick PVC Conduit.**	**200**	**Metre**	**60.00**	**12,000.00**	
2.0	**Earth Work-**					
2.8.1	**Earthwork in excavation by mechanical means (Hydraulic excavator)/ manual means in foundation trenches or drains (not exeeding 1.5 m in width or 10 sqm on plan) including dressing of sides and ramming of bottoms,lift upto 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 mtr.- ALL KINDS OF SOIL**	**55.409**	**Cum**	**166.40**	**9,220.00**	

2.10	**Excavating trenches of required width for pipes cables, etc, including excavation for sockets, and dressing of sides, ramming of bottoms, depth upto 1.5 m including getting out the excavated soil , and then returning the soil as required , in layers not exceeding 20 cm in depth including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed , within a lead of 50 m**					
2.10.1	**All kinds of soil**					
2.10.1.2	**Pipes, cables etc. exceeding 80 mm dia. but not**	**30.000**	**Metre**	**225.50**	**6,763.50**	
	exceeding 300 mm dia					
2.25	**Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth,**	**55.409**	**Cum**	**125.80**	**6,967.60**	

	consolidating each deposited layer by ramming and watering, lead up to 50 m and lift upto 1.5 m.					
2.27	**Supplying and filling in plinth with sand under floors, including watering, ramming, consolidating and dressing complete.**	**3.077**	**Cum**	**917.80**	**2,823.90**	
2.34	**Supplying chemical emulsion in sealed containers including delivery as specified.**					
2.34.1	**Chlorpyriphos/ Lindane emulsifiable concentrate of 20%**	**9.45**	**Litre**	**186.00**	**1,756.50**	
2.35	**Diluting and injecting chemical emulsion for Pri & POST-CONSTRUCTIONAL anti- termite treatment (excluding the cost of chemical emulsion) :**					
2.35.1	**Along external wall where the apron is not provided using chemical emulsion @ 7.5 litres / sqm of the vertical surface of the**					

	substructure to a depth of 300 mm including excavation channel along the wall & rodding etc. complete:					
2.35.1.1	**With Chlorpyriphos/ Lindane E.C. 20% with 1% concentration.**	**52.000**	**Metre**	**16.80**	**873.60**	
4.0	**Concrete Work**					
4.1	**Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level :**					
4.1.8	**1:4:8 (1 Cement : 4 coarse sand (zone-III) : 8 graded stone aggregate 40 mm nominal size)**	**9.943**	**Cum**	**4,478.20**	**44,527.50**	
4.11	**Providing and laying damp-proof course 50mm thick with cement concrete 1:2:4 (1 cement : 2 coarse sand(zone-III) : 4 graded stone aggregate 20mm nominal size).**	**1.840**	**Sqm**	**320.30**	**589.30**	

4.13	**Providing & applying a coat of residual petroleum bitumen of grade of VG-10 of approved quality using 1.7kg per square metre on damp proof course after cleaning the surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil.**	**1.840**	**Sqm**	**91.90**	**169.10**	
5.0	**Form Work**					
5.9	**Centering and shuttering including strutting, propping etc. and removalof form for all heights**					
5.9.1	**Foundations, footings, bases of columns, etc. for mass concrete**	**26.114**	**Sqm**	**194.00**	**5,064.80**	
5.9.2	**Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc**	**472.1492**	**Sqm**	**378.60**	**1,78,755.70**	
5.9.6	**Columns, Pillars, Piers, Abutments, Posts and Struts**	**87.080**	**Sqm**	**467.90**	**40,740.40**	

5.9.20	**Suspended floors, roofs, landings, balconies and accessplatform. with water proof ply 12 mm thick**	**52.751**	**Sqm**	**497.50**	**26,240.90**	
5.9.21	**Lintels, beams, plinth beams, girders, bressumers andcantilevers. with water proof ply 12 mm thick**	**89.281**	**Sqm**	**419.00**	**37,404.40**	
	Steel Reinforcement Work.					
5.22	**Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto plinth level.**					
5.22.6	**Thermo-Mechanically Treated bars of grade Fe-500D or more.**	**3288**	**Kg**	**56.60**	**1,86,105.40**	
5.22A	**Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding**					

	all complete above plinth level.					
5.22A.6	**Thermo-Mechanically Treated bars of grade Fe-500 D or more.**	**13152.32**	**Kg**	**56.60**	**7,44,421.60**	
5.30	**Add for plaster drip course/ groove in plastered surface or moulding to R.C.C. projections.**	**54.340**	**Metre**	**34.20**	**1,855.70**	
	Design Mix Concrete.					
5.33	**Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS:**					

	9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge.“(Note :- Cement content considered in this item is @ 330 kg/cum.“Excess/ less cement used as per design mix is payable/recoverable separately).					
5.33.1	**All works upto plinth level**	**10.456**	**Cum**	**6,446.50**	**67,404.10**	
5.33.2	**All works above plinth level upto floor V level**	**125.780**	**Cum**	**7,250.10**	**9,11,908.70**	
	Brick Work					
6.1	**Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in foundation and plinth in:**					
6.1.1	**Cement mortar 1:4 (1 cement : 6 coarse sand)**	**5.600**	**Cum**	**4,970.30**	**27,832.70**	

6.4	**Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level in all shapes and sizes in :**					
6.4.1	**Cement mortar 1:4 (1 cement : 4 coarse sand)**	**6.19**	**Cum**	**5,801.50**	**35,901.90**	
6.13	**Half brick masonry with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level.**					
6.13.2	**Cement mortar 1:4 (1 cement :4 coarse sand)**	**1.00**	**Sqm**	**684.20**	**684.20**	
6.15	**Extra for providing and placing in position 2 Nos 6mm dia. M.S. bars at every third course of half brick masonry.**	**1.00**	**Sqm**	**56.90**	**56.90**	
	Stone Work					

8.2	**Providing and fixing 18 mm thick gang saw cut, mirror polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.**					
8.2.2	**Granite of any colour and shade**					
8.2.2.2	**Area of slab over 0.50 sqm**	**2.4108**	**Sqm**	**3,113.30**	**7,505.50**	
8.3	**Providing edge moulding to 18 mm thick marble stone counters, Vanities etc.,**					

	including machine polishing to edge to give high gloss finish etc. complete as per design approved by Engineer-in-Charge.					
8.3.2	**Granite work**	**6.42**	**Metre**	**245.70**	**1,577.40**	
8.6	**Mirror polishing on marble work/Granite work/stone work where ever required to give high gloss finish complete.**	**2.4108**	**Sqm**	**231.50**	**558.10**	
	Wood Work					
9.21	**Providing and fixing ISI marked flush door shutters conforming to IS : 2202 (Part I) non-decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters:**					

9.21.1	**35 mm thick including ISI marked Stainless Steel butt hinges with necessary screws**	**1.890**	**Sqm**	**1,559.80**	**2,947.90**	
9.23	**Extra for providing lipping with 2nd class teak wood battens 25 mm minimum depth on all edges of flush door shutters (over all area of door shutter to be measured).**	**1.890**	**Sqm**	**365.90**	**691.50**	
9.62	**Providing and fixing ISI marked oxidised M.S. sliding door bolts with nuts and screws etc. complete :**					
9.62.1	**300x16 mm**	**1**	**Each**	**154.90**	**154.90**	
9.63	**Providing and fixing ISI marked oxidised M.S. tower bolt black finish, (Barrel type) with necessary screws etc. complete :**					
9.63.2	**200x10 mm**	**1**	**Each**	**51.10**	**51.10**	
9.63.3	**150x10 mm**	**1**	**Each**	**44.10**	**44.10**	

9.66	**Providing and fixing ISI marked oxidised M.S. handles conforming to IS:4992 with necessary screws etc. complete :**					
9.66.1	**125 mm**	**2**	**Each**	**28.60**	**57.20**	
	Steel Work					
10.2	**Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.**	**3071.82**	**Kg**	**67.60**	**2,07,655.00**	
10.14	**Providing and fixing pressed steel door frames conforming to IS: 4351, manufactured from commercial mild steel sheet of 1.60 mm thickness, including hinges, jamb, lock jamb, bead and if required angle threshold of mild steel angle of section 50x25 mm, or base ties of**					

	1.60 mm, pressed mild steel welded or rigidly fixed together by mechanical means,including M.S. pressed butt hinges 2.5 mm thick with mortar guards, lock strike-plate and shock absorbers as specified and applying a coat of approved steel primer after pre-treatment of the surface as directed by Engineer-in-charge					
10.14.1	**Profile B**					
10.14.1.1	**Fixing with adjustable lugs with split end tail to each jamb**	**5.100**	**Metre**	**340.40**	**1,735.80**	
10.14.1.2	**Fixing with carbon steel galvanised dash fastener of required dia and size (to be paid for separately)**	**5.100**	**Metre**	**332.30**	**1,694.70**	
	Flooring					
11.26	**Kota stone slab flooring over 20 mm (average) thick base laid over and jointed with grey cement slurry mixed with pigment to match the**					

	shade of the slab, including rubbing and polishing complete with base of cement mortar 1 : 4 (1 cement : 4 coarse sand) :					
11.26.1	**25 mm thick**	**29.9341**	**Sqm**	**1,158.10**	**34,666.70**	
11.27	**Kota stone slabs 20 mm thick in risers of steps, skirting, dado and pillars laid on 12 mm (average) thick cement mortar 1:3 (1 cement: 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, including rubbing and polishing complete.**	**1.6575**	**Sqm**	**1,238.20**	**2,052.30**	
	FINISHING					
13.1	**12 mm cement plaster of mix :**					
13.1.2	**1:6 (1 cement: 6 fine sand)**	**32.472**	**Sqm**	**160.40**	**5,206.90**	
13.2	**15 mm cement plaster on the rough side of**					

	single or half brick wall of mix :					
13.2.2	**1:6 (1 cement: 6 fine sand)**	**26.4**	**Sqm**	**185.20**	**4,889.30**	
13.7	**12 mm cement plaster finished with a floating coat of neat cement of mix :**					
13.7.2	**1:4 (1 cement: 4 fine sand)**	**51.355**	**Sqm**	**214.20**	**11,000.20**	
13.16	**6 mm cement plaster of mix :**					
13.16.1	**1:3 (1 cement : 3 fine sand)**	**738.502**	**Sqm**	**143.80**	**1,06,196.60**	
13.40	**Distempering with dry distemper of approved brand and manufacture (two or more coats) of required shade on new work, over and including water thinnable priming coat to give an even shade.**	**53.966**	**Sqm**	**71.90**	**3,877.50**	
13.44	**Finishing walls with water proofing cement paint of required shade :**					
13.44.1	**New work (Two or more coats applied @ 3.84 kg/10 sqm)**	**106.252**	**Sqm**	**58.80**	**6,247.60**	

13.61	**Painting with synthetic enamel paint of approved brand and manufacture to give an even shade :**					
13.61.1	**Two or more coats on new work**	**99.155**	**Sqm**	**78.40**	**7,773.70**	
16.69	**Providing and laying at or near ground level factory made kerb stone of M-25 grade cement concrete in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement: 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-charge (length of finished kerb edging shall be measured for**	**0.300**	**Cum**	**5,012.70**	**1,503.80**	

	payment). (Precast C.C. kerb stone shall be approved by Engineer-in-charge).					
22.19	**Providing and laying APP (Atactic Polypropylene Polymer) modified prefabricated five layer, 3 mm thick water proofing membrane, black finished reinforced with glass fibre matt consisting of a coat of bitumen primer for bitumen membrane @ 0.40 litre/sqm by the same membrane manufactured of density at 25°C, 0.87 - 0.89 kg/litre and viscocity 70 - 160 cps. Over the primer coat the layer of membrane shall be laid using butane torch and sealing all joints etc.,**					

	and preparing the surface complete. The vital physical and chemical parameters of the membrane shall be as under : Joint strength in longitudinal and transverse direction at 23°C as 350/300 N/5 cm. Tear strength in longitudinal and transverse direction as 60/80N. Softening point of membrane not less than 150°C. Cold flexibility shall be upto -2°C when tested in accordance with ASTM, D - 5147. The laying of membrane shall be got done through the authorised applicator of the manufacturer of membrane :					
22.19.1	**3 mm thick**	**74.476**	**Sqm**	**410.70**	**30,587.30**	
	Structural Glazing and Composit Panel					

25.7	**Designing, fabricating, testing, installing and fixing in position Curtain Wall with Aluminium Composite Panel Cladding, with open grooves for linear as well as curvilinear portions of the building , for all heights and all levels etc. including:**					
	(a) Structural analysis & design and preparation of shop drawings for pressure equalisation or rain screen principle as required, proper drainage of water to make it watertight including checking of all the structural and functional design.					
	(b) Providing, fabricating and supplying and fixing panels of aluminium composite panel cladding in pan shape in metalic colour of approved shades made out of 4mm thick aluminium composite panel material					

	consisting of 3mm thick FR grade mineral core sandwiched between two Aluminium sheets (each 0.5mm thick). The aluminium composite panel cladding sheet shall be coil coated, with Kynar 500 based PVDF / Lumiflon based fluoropolymer resin coating of approved colour and shade on face # 1 and polymer (Service) coating on face # 2 as specified using stainless steel screws, nuts, bolts, washers, cleats, weather silicone sealant, backer rods etc.					

	(c) The fastening brackets of Aluminium alloy 6005 T5 / MS with Hot Dip Galvanised with serrations and serrated washers to arrest the wind load movement, fasteners, SS 316 Pins and anchor bolts of approved make in SS 316, Nylon separators to prevent bi-metallic contacts all complete required to perform as per specification and drawing The item includes cost of all material & labour component, the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working curtain wall with aluminium composite panel cladding, cleaning and protection of the curtain wall with aluminium composite panel cladding till the	**142.94**	**Sqm**	**3,405.90**	**4,86,829.10**	

	handing over of the building for occupation. Base frame work for ACP cladding is payable under the relevant aluminium item.s The Contractor shall provide curtain wall with aluminium composite panel cladding, having all the performance characteristics all complete , as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as directed by the Engineer-in-Charge. However, for the purpose of payment, only the actual area on the external face of the curtain wall with Aluminum Composite Panel Cladding (including width of groove) shall be measured in sqm. up to two decimal places."					

	Extra Items					
Ext.Itm-1	**Providing and fixing 30 to 35 mm thick waterproof GRC (Glassfibre Reinforced Concrete) in elevation.**					
1.1	**GRC JALI**	**11.65**	**Sqm**	**7,110.00**	**82,832.00**	
	EXTERNAL SEWERAGE & STORM WATER DRAINAGE					
19.3	**Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) upto haunches of rcc pipes including bed concrete as per standard design:**					
19.3.2	**150 mm dia.**	**30**	**Metre**	**479.90**	**14,395.50**	
19.6	**Providing and laying non-pressure NP2 class (light duty) R.C.C pipes jointed withh stiff mixture of cement mortar in the**					

	proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete					
19.6.2	**150 mm dia. R.C.C. pipe**	**30**	**Metre**	**356.70**	**10,701.00**	
19.27	**Constructing brick masonry road gully chamber 50x45x60 cm with bricks in cement mortar 1:4 (1 cement : 4 coarse sand) including 500x450 mm pre-cast R.C.C. horizontal grating with frame complete as per standard design :**					
19.27.1	**With common burnt clay F.P.S. (non modular) bricks of class designation 7.5**	**1**	**Each**	**4,043.10**	**4,043.10**	
Total in Figures					**35,31,925.20**	**INR Nineteen Lakh Sixty Seven Thousand Four Hundred & Seven and Paise Forty Only**
Quoted Rate in Figures			**Select**		**-**	**INR Zero Only**
Quoted Rate in Words		**INR Zero Only**				

Please Note: The Bidder is required to fill only blue cells in the BOQ as highlighted above

Note:

a. The Bidder with the lowest quoted cost for Proposed Gate for NMRC Bus Depot in the financial quote (L1 bidder) shall be selected for the award of contract.
b. The Bidder shall be required to quote the percentage in the BOQ.
c. The Bidder shall abide by the approved makes mentioned in the tender document.
d. The Financial Bid submitted is unconditional (inclusive of all taxes including GST, duties, levies, etc. as applicable) and fulfills all the requirements of the TOR Document.
e. The Bidder shall furnish his rates including Labour Cess @ 1%. The same shall be deducted from the bills of the contractor. The royalty charges levied by stats/central govt. on & other terms and conditions issued time to time by govt. shall abide by and shall be paid by contractors and its proof shall have to be submitted to Corporation.
f. We have completely read and understood the Bid Document. The Financial Tender submitted is unconditional and fulfills all the requirements of the Tender Document.

We understand you are not bound to accept any Proposal you receive.

_____

Signature and Name of the Authorized Person

_____

NAME OF THE BIDDER AND SEAL

8.17. Form 15: Bid Details

The following list is intended to help the tenderers in submitting offer which are complete. An incomplete offer is liable to be rejected. Tenderers are advised to go through the list carefully and take necessary action.

S.No.	Particulars	Attached Yes / No / Not Applicable	Page no. (Mandatory)
1	Bid Processing Fees		
2	Earnest Money Deposit		
3	Form 1: Letter of Proposal Submission		
4	Form 2: Firm Details		
5	Form 3: Capability Statement		
6	Form 4: Work Experience		
7	Form 5: Financial Capability Details		
8	Form 6: Memorandum		
9	Form 7: Undertaking - 1		
10	Form 8: Power of Attorney		
11	Form 9: Banker's Solvency Certificate		
12	Form 10: General Guidelines for Fixing Requirement of Technical Staff for Work		
13	Form 11: Proforma for Equipment available		
14	Form 12: Salable Form for Tender Document		
15	Form 13: Declaration of Refund of Earnest Money		
16	Statutory proof of existence as the legal entity		
17	A copy of the Annual Reports (Profit and Loss Account and Balance Sheet) for the last 3 (three) Financial Years of Bidder		
18	A self-attested copy of current valid ITR		
19	A self-attested copy of PAN, GST registration		
20	Character certificate issued by District Magistrate		
21	Any other document asked by the Purchaser if submitted, specify the documents Or Any other document which the Tenderer considers relevant		