GALGOTIAS UNIVERSITY
ENG. & ADMIN BLOCK

TENDER DOCUMENT
FOR
BUILDING MANAGEMENT SYSTEM (BMS)

February 2024

:CLIENT:

Smt. SHAKUNTLA EDUCATIONAL & WELFARE SOCIETY
GALGOTIAS UNIVERSITY
PLOT NO. 2, YAMUNA EXPY, SECTOR 17A,
GREATER NOIDA, UTTAR PRADESH -203201, INDIA

:PROJECT MANAGER:

CBRE South Asia Pvt. Ltd | PJM Group - India
6th & 7th Floor | DLF Square Building | Jacaranda Marg
DLF Phase II | Gurgaon 122002, India

: ARCHITECT:

ARCOP ASSOCIATES PVT. LTD.
E-106, GREATER KAILASH ENCLAVE-I
NEW DELHI, INDIA

: MEP SERVICES CONSULTANTS:

SUNIL NAYYAR CONSULTING ENGINEERS LLP
206, 206A, 2nd Floor, Time Centre,
DLF Golf Course Road, Sector-54, Gurgaon-122 002

GALGOTIAS UNIVERSITY

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NOTICE INVITING TENDER

GALGOTIAS UNIVERSITY

NOTICE INVITING TENDER

Tender is invited by The Registrar, M/s **SMT SHAKUNTLA EDUCATIONAL & WELFARE SOCIETY, Galgotias University**, **PLOT 02, YAMUNA EXPY, SECTOR 17A, GREATER NOIDA, UTTAR PRADESH** for **HVAC & CHILLER Works Works**, for New Admin & Engg. Block, Greater Noida, Uttar Pradesh.

Bidders to download the Tender Documents and submit the duly filled Tender documents in all respect to **projects.pq@galgotiasuniversity.edu.in** on OR before the date mentioned in the newspaper notification. Please send Pre-Bid queries by email only.

Following Tender Documents are to be submitted by the bidders:

Sl. No	Description	Duly Signed & Stamped
A	Notice Inviting Tender (NIT) & Form of Tender	1 Original (NIT with duly filled-in Form of Tender & Appendix)
B	GCC, SCC & Formats of No Claim Certificate, Articles of Agreement, Indemnity Bond, RBG & Performance Bank Guarantee	1 Original
C	Bill Of Quantities	1 Original
D	Power of Attorney authorizing the signatory of Tender & Contract	1 Original
E	Proposed Methodology of Work	1 Original
F	Proposed Schedule of Work	1 Original
G	List of Plant & Machinery along with Schedule of Deployment at site	1 Original
H	Proposed Site Organization Chart along with Manpower Deployment Schedule	1 Original
I	Details of works in Hand	1 Original
J	Litigation History	1 Original
K	Project Quality Plan	1 Original
L	Environment, Health, and Safety Plan	1 Original

Bidders shall put his stamp and signatures on every page of the Tender including every Tender drawing at the lower right-hand corner.

All the rates mentioned in the tender shall be inclusive of transportation, loading & unloading, government statutory requirement charges, etc., and shall remain firm till completion of work. No escalation of the prices shall be allowed for any reasons whatsoever. GST and Labour Cess shall be mentioned separately.

Bidders are advised to submit the Tenders strictly based on the conditions of contract and specifications contained in the Tender documents and are advised not to stipulate any deviations. Deviations may, however, be stipulated in case of unavoidable circumstances. Exceptions and deviations, which Bidder may desire to stipulate, shall be listed separately. The PMC, client & the Architect reserve the right to reject any such deviations or evaluate the Tender containing deviations having financial implication, by adding the cost for such deviations as may be determined by the PMC or the client or the Architect.

We intend to adhere to a very strict timeline in administering this Tender.

Proposals received beyond the mentioned time and date will not be considered.

Incomplete responses shall be liable to be disqualified at GALGOTIAS UNIVERSITY's sole discretion.

This Notice Inviting Tender shall form part of the contract.

For,

SMT SAKUNTALA EDUCATIONAL & WELFARE SOCIETY
Galgotias University

Authorized Signatory

SECTION: 2
FORM OF TENDER

FORM OF TENDER

To,
SMT SAKUNTLA EDUCATIONAL & WELFARE SOCIETY
Galgotias University
PLOT 02, YAMUNA
EXPY, SECTOR 17A,
GREATER NOIDA,
UTTAR PRADESH,
INDIA-203201

Dear Sir,

Having examined the conditions of contract, specifications, Tender drawings and Bill of quantities relating to the works specified in the Tender hereinafter set out and having examined the site of the works specified and having acquired the requisite information relating thereto as affecting the tender, I/We hereby offer to execute the works specified, within the time specified & at the rates mentioned in the attached bill of quantities and in accordance, in all respect, with the specifications, designs, drawings and instructions in writing referred to the GCC, SCC, Technical Specifications & (Tender drawings) of the said Tender.

Should this tender be accepted, I/We hereby agree to abide by and fulfil the terms and provision of the said conditions of Contract as per Tender document to so far as they may be applicable or in default thereof to forfeit and pay to **Galgotias University,** the amount as per the said conditions.

I/We have deposited Earnest Money Deposit (If applicable) in the form of Bank Guarantee in favour of **Galgotias University** as specified in Appendix to Form of Tender. Should I/We fail to execute the contract when called upon to do so, I/We do hereby agree that this sum shall be forfeited by **Galgotias University.**

All information and documents as required to be submitted as per Tender Document are enclosed.
Our banker(s) (Name & complete address):

The names of partners of our firm are:

1.

2.

Name of the partner of the firm
authorized to sign OR

Name of person having Power of Attorney to sign the Tender & Contract (Certified true copy of the Power of Attorney shall be attached)

Yours faithfully,

Signatures of Tenderer Stamp Name & Address

i. Witness 1 (Signatures, Name & Address):

ii. Witness 2 (Signatures, Name & Address):

GALGOTIAS UNIVERSITY

SECTION: 3
PRE-QUALIFICATION (attached separately)

SECTION: 4

GENERAL CONTRACT CONDITIONS

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General Conditions of Contract (GCC)

1. **DEFINITIONS & INTERPRETATIONS**

1.1. **Definitions**

The following words and expressions shall have the meanings hereby assigned to them, except where the context otherwise requires:

(a) "**Acceptance Defects Notice**" has the meaning given to it in Clause 11.3.(c).

(b) "**Affiliate**" means any entity which directly or indirectly:

(i) owns or Controls such entity;

(ii) is owned or Controlled by such entity;

(iii) is under common ownership or Control with such entity.

(c) "**Affected Party**" has the meaning given to it in Clause 31.1.

(d) "**Applicable Law"** means, with respect to any Governmental Authority, national, regional or local law, directive, statute, rule, regulation, ordinance, treat, order, decree, judgment, decision, determination, interpretation, certificate, injunction, registration, license, permits, authorization, guideline, approval, consent or requirement of/by such Governmental Authority, as construed from time to time by any Governmental Authority.

(e) "**Application for Change Proposal**" has the meaning given to it in Clause 22.4(a).

(f) "**Approved List**" has the meaning given to it in Clause 16.2.

(g) "**Architect**" means the person/entity appointed as the architect for the Project by the Client and as notified by the Client to the Contractor pursuant to Clause 13.1.

(h) "**Bid**" has the meaning given to it in the Instructions to Bidders.

(i) "**Bidding Documents**" means the Notice Inviting Bids ("**NIB**"), Tender Drawings, Instructions to Bidders ("**ITB**"), Drawings, Technical Specifications, Bid Forms, Technical Bid, Price Bid, Contract and General Conditions of Contract ("**GCC**").

(j) "**Change**" has the meaning given to it in Clause 22.1.

(k) "**Change in Law"** has the meaning given to it in Clause 32.1.

(l) "**Change Order**" has the meaning given to it in Clause 22.3(e).

(m) "**Change Proposal**" has the meaning given to it in Clause 22.3(a).

(n) "**CIBIL**" means Credit Information Bureau (India) Limited.

(o) "**Codes and Standards**" means the codes and standards as more fully detailed in the Technical Specifications, in relation to the design, specification, construction, fabrication and inspection of the New admin. & Engg. Block.

(p) "**Commencement Date"** has the meaning given to it in Clause 7.1.

(q) "**Completion**" has the meaning given to it in Clause 11.1(a).

(r) "**Completion Certificate**" has the meaning given to it in Clause 11.1(b).

(s) "**Completion Date**" has the meaning given to it in Clause 7.2(a).

(t) "**Contract**" means (i) the Contract Agreement; (ii) GCC; (iii) Technical Specifications; and (iv) any other documents listed in the Contract Agreement.

(u) "**Contractor**" means Who has been awarded the Work.

(v) "**Contract Agreement**" means the agreement to be executed on [__] between the Contractor and the Client in the form set out in **Schedule II** for undertaking and completing Works with respect to the Project including all annexures and schedules, as the same may be amended, supplemented or modified from time to time by mutual written agreement. [***input the date of execution of the Contract.***]

(w) "**Contract Price**" has the meaning given to it in Clause 23.1.

(x) "**Contract Schedule**" has the meaning given to it in Clause 5.22(b).

(y) "**Contractor's Equipment"** means all appliances, things or equipment of whatsoever nature required for the execution and completion of the Works and the remedying of any defects therein.

(z) "**Contractor's Personnel**" means the Contractor's Representative, Works Manager and each individual and collectively the Contractor's employees, labour (skilled, semi-skilled and unskilled) Sub-Contractors, and

their respective employees, contractors (of the Sub-Contractors), officers, licensees, invitees, agents and representatives, who are provided and/or utilized by Contractor for the execution of the Works and any other personnel notified to the Client by the Contractor as the Contractor's Personnel.

(aa) "**Contractor's Representative**" means the person identified in Clause 5.23.(a), or the replacement of such Person who is nominated and approved in accordance with the procedure provided in Clause 5.23.(d).

(bb) "**Control**" means (and related terms shall refer accordingly to), with respect to any person, (i) the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of such person whether through the ownership of voting securities, by agreement or otherwise or the power to elect more than one-half of the directors of such person; or (ii) the possession, directly or indirectly, of a voting interest of more than 50% (fifty percent); or (iii) the power to veto decisions of such person, whether through ownership of voting securities, by contract, or otherwise;

(cc) "**Defects Notice**" has the meaning given to it in Clause 11.1(c).

(dd) "**Defect Liability Period**" has the meaning given to it in Clause 21.2.

(ee) "**Dispute**" has the meaning given to it in Clause 35.2.

(ff) "**Documents**" means the data in the form of text, worksheets, Drawings (including as-built drawings) designs, specifications, plans or reports in print or electronic form and complying with the requirements of the Technical Specifications, to be submitted by the Contractor, in relation to the Works required for developing the New admin. & Engg. Block, including but not limited to engineering data, ELECTRICAL AND ELV and construction drawings, documents required to satisfy all regulatory approvals and other such descriptive material as specified under the Technical Specifications.

(gg) "**Drawings**" means the drawings for the New admin. & Engg. Block including for the ELECTRICAL AND ELV and structural Works required to build the New admin. & Engg. Block and as referred to in the Technical Specifications and any modification to such drawings as approved by the Client, Architect and Project Manager and such other drawings as may, from time to time be provided by the Client to the Contractor.

(hh) "**Environmental Standards**" means Applicable Law, codes, rules and regulations relating to: (a) pollution, contamination, clean-up, protection and reclamation of the environment; (b) health or safety, including, without limitation, the exposure of employees or other persons to any Hazardous Materials; (c) the release or threatened release of any Hazardous Materials; (d) the management of any Hazardous Materials, including, without limitation, the manufacture, generation, formulation, processing, labelling, distribution, introduction into commerce, registration, use, treatment, handling, storage, disposal of materials, the discharge of chemicals, gases or other substances or materials into the environment, the presence of such materials, chemicals, gases or other substances in or around the New admin. & Engg. Block, transportation, reuse, recycling or reclamation of any Hazardous Materials; and (e) any governmental approval issued by a Governmental Authority with respect to the foregoing.

(ii) "**Final Acceptance Certificate**" has the meaning given to it in Clause 11.3.(b).

(jj) "**Final Completion**" has the meaning given to it in Clause 11.3.(a).

(kk) "**Force Majeure Event**" has the meaning given to it in Clause 31.1.

(ll) "**Governmental Authority**" means any Indian national, regional, state, municipal or local government, and any division, ministry, department, agency or other emanation of any of the same, including any judicial body, commission, board, branch or similar authority of such government and anybody empowered to

grant, withdraw or determine the terms and conditions of any applicable permit and the organs of the Government of India or as the case may be, the Government of the Indian State where the Site is located.

(mm) "**Hazardous Materials**" means (i) any element, compound, substance, preparation, chemical, physio-chemical properties or biological derivative, radiation, noise, vibration, material or combination thereof which by reason of its composition or characteristics is defined in Applicable Law as a hazardous material, or (ii) any other material which any Government Instrumentality determines from time to time is harmful, toxic, or dangerous, or otherwise ineligible for handling, storage or disposal by unregulated means or is liable to cause harm to human beings, other living creatures, plant, micro-organism, property or the environment.

(nn) "**Indemnified Party**" has the meaning given to it in Clause 28.3.

(oo) "**Indemnifying Party**" has the meaning given to it in Clause 28.3.

(pp) "**Information**" has the meaning given to it in Clause 29.1.

(qq) "**Intellectual Property**" means any licenses, permissions or agreements from licensors of any materials, goods, processes, methods and systems incorporated or to be incorporated in the New admin. & Engg. Block, proprietary information, patents, trademark rights, technology, utility model, registered design, know-how, trade secrets, data bases, industrial processes, source codes, copyrights (including rights in computer software) and any other intellectual or industrial property rights (whether registered or unregistered) subsisting or recognised under the Applicable Law or laws of any other applicable jurisdiction.

(rr) "**Invoice**" has the meaning given to it in Clause 24.4(a).

(ss) "**Instructions to Bidders (ITB)**" means the instructions to bidders issued by the Client or Project manager as part of the Bidding Documents in relation to the Works to be completed by the Contractor dated 07th December 22 bearing no. RMH-ELECTRICAL AND ELV-001.

(tt) "**KMP**" means the key managerial personnel as defined under the Companies Act, 2013.

(uu) "**Latent Defect**" has the meaning given to it in Clause 21.12.(a).

(vv) "**Letter of Award (LOA)**" means the formal acceptance in writing by the Client by way of registered letter or by email notifying the Contractor that its bid has been accepted.

(ww) "**Losses**" has the meaning given to it in Clause 28.1.

(xx) "**Materials**" means and includes all the materials required for undertaking the Works including ELECTRICAL AND ELV works and activities required for developing the Project and building the New admin. & Engg. Block.

(yy) "**Miscellaneous Invoice**" has the meaning given to it in Clause 24.4.(j).

(zz) "**Notice Inviting Bids (NIB)**" means the notice inviting bids issued by the Client as part of the Bidding Documents in relation to the Works to be completed by the Contractor dated 7th December 22 bearing no. RMH-ELECTRICAL AND ELV-001.

(aaa) "**Notice of Completion**" has the meaning given to it in Clause 11.1.(a)(iv).

(bbb) "**Notice of Final Completion**" has the meaning given to it in Clause 11.3.(ix).

(ccc) "**Notice of Provisional Acceptance**" has the meaning given to it in Clause 11.2.(a).

(ddd) "**Occupancy Certificate**" means the final occupancy certificate for the New admin. & Engg. Block issued by Governmental Authority certifying the New admin. & Engg. Block can be occupied and used for its intended purpose.

(eee) "**Pending Agreement Change Order**" has the meaning given to it in Clause 22.3.(i).

(fff) "**Performance Bank Guarantee**" has the meaning given to it in Clause 3.1.

(ggg) "**Performance Parameters**" has the meaning given to it in Clause 9.

(hhh) "**Price Bid**" has the meaning given to it in the Instructions to Bidders.

(iii) "**Prohibited Payment**" has the meaning given to it in Clause 36.9(a).

(jjj) "**Project**" means the development, construction and operation of the New admin. & Engg. Block by the Contractor, located at the Site.

(kkk) "**Project Manager**" has the meaning given to it in the Instructions to Bidders.

(lll) "**Provisional Acceptance**" has the meaning given to it in Clause 11.2(a).

(mmm) "**Provisional Acceptance Certificate**" has the meaning given to it in Clause 11.2(b).

(nnn) "**Provisional Defects Notice**" has the meaning given to it in Clause 11.2.(c).

(ooo) "**Prudent Industry Practices**" means the practices, methods, techniques and standards, as they may be modified from time to time, which are generally followed in the ELECTRICAL AND ELV Works industry; including those expected from a reasonably skilled, prudent and experience person engaged in Works for completion of buildings and performing works and services and providing and supplying equipment and materials as required to be performed or supplied by the Contractor, Sub-Contractors, their employees and other third party agents of the Contractor under the Contract.

(ppp) "**Public Official**" has the meaning given to it in Clause 36.9.(b).

(qqq) "**Purpose"** has the meaning given to it in Clause 29.2.

(rrr) "**Quality Assurance Programme"** has the meaning given to it in Clause 8.2 and means the quality assurance programme as approved by the Client and as set out in the Technical Specifications.

(sss) "**Quality Engineer"** has the meaning given to it in Clause 5.35(d)(i).

(ttt) "**RBI**" means the Reserve Bank of India.

(uuu) "**Request for Change Proposal**" has the meaning given to it in Clause 22.3(a).

(vvv) "**Safety Officer**" has the meaning given to it in Clause 5.35(d)(ii).

(www) "**Serial Defect**" has the meaning given to it in Clause 21.13(a).

(xxx) "**Site**" means all parcels of land on which the New admin. & Engg. Block has to be built and developed as shown in **Schedule XVII**.

(yyy) "**New admin. & Engg. Block**" means the New admin. & Engg. Block to be built on the Site based on the designs and drawings provided by the Architect and other specifications as provided for and detailed under the Technical Specifications, which shall without limitation, include.

(zzz) "**Sub-Contractor**" means any person, including vendor of the Contractor to whom execution of any part of the Works is contracted by the Contractors and includes their successors or permitted assignees.

(aaaa) "**Successful Bidder**" has the meaning given to it in the Instructions to Bidders.

(bbbb) "**Take Over**" means the handing over of the New admin. & Engg. Block by the Contractor to the Client, pursuant to Clause 11.4, pursuant to the issuance of a Take Over Certificate.

(cccc) "**Take Over Certificate**" means the certificate issued by the Client pursuant to Clause 11.4.

(dddd) "**Taxes**" include all taxes, duties, cesses, imposts, fees, levies (including without limitation, all central, state and local government taxes, octroi, excise duties, customs duties, sales tax, countervailing duties, value added tax, works contract tax, service tax, building and construction workers cess and withholding taxes on income) imposed under any Applicable Law (whether within India or outside India) in connection with the Works, the Project, the Parties or performance by the Contractor/Sub-Contractor of its obligations and responsibilities under the Contract.

(eeee) "**Technical Bid**" has the meaning given to it in the Instructions to Bidders.

(ffff) "**Technical Specifications**" means the technical specifications attached to the Contract.

(gggg) "**Work Product**" has the meaning given to it in Clause 30.1.

(hhhh) "**Works**" means the works and services as set out in the Technical Specifications laid down into the Contract, to be executed by the Contractor in relation to the New admin. & Engg. Block and the Project, in accordance with the terms of the Contract. Works shall also include works to be executed by the Contractor under the Contract, which are contracted by the Contractor to the Sub-Contractor(s).

(iiii) "**Works Manager**" has the meaning given to it in Clause 5.23(h).

1.2. **Interpretation**

(a) Reference to the singular shall include reference to the plural and vice-versa and a reference to any gender shall include a reference to the other genders, except where the context otherwise requires.

(b) The headings and marginal notes in the Contract are included for ease of reference, and shall not affect the meaning or the interpretation of the Contract.

(c) The Schedules and Technical Specifications to and of the Contract form an integral part of the Contract and will be of full force and effect as though they were expressly set out in the body of the Contract.

(d) Unless the context otherwise requires, a reference to any Article, Clause, recital and Schedule shall be to an Article, Clause, recital and Schedule of the Contract respectively.

(e) Reference to any law or regulation having force of law includes a reference to that law or regulation, as from time to time, amended, modified, supplemented, extended or re-enacted.

(f) Reference to time shall, except where the context otherwise requires, be construed as a reference to Indian Standard Time. Any reference to calendar shall be construed as reference to the Gregorian calendar.

(g) The words "include" or "including" shall be deemed to be followed by "without limitation" or "but not limited to" whether or not they are followed by such phrases.

(h) In case of any discrepancy between words and figures, the words shall prevail over the figures.

(i) The provisions of all the documents comprising the Contract and the Documents shall be interpreted harmoniously and only if the provisions of the said agreements and documents cannot be interpreted harmoniously with each other on account of inconsistencies or ambiguities then, unless expressly stated otherwise in the Contract Agreement, the priority of the documents shall be in accordance with the following sequence; (i) the Contract; (ii) GCC (iii) Technical Specifications; and (iv) any other documents listed in the Contract.

(j) Whenever provision is made for the giving of notice, approval or consent by any Person, unless otherwise specified, such notice, approval or consent shall be in writing and the words "notify" and "approve" shall be construed accordingly.

(k) Provisions including the word "agree", "agreed", "agreement" require the agreement to be recorded in writing.

(l) The terms "written" or "in writing" means hand-written, type-written, printed or electronically made, and resulting in a permanent record.

(m) When any timeframe in terms of number of days is prescribed in the Contract, the same shall be reckoned exclusively of the first and inclusively of the last day, except for a payment obligation, in which case, in the event the last day does not fall on a business day, then the last day shall be the next succeeding business day.

(n) The rule of construction, if any, that a contract should be interpreted against the Party responsible for the drafting and preparation thereof, shall not apply.

(o) Reference to any agreement, deed, document, instrument, or the like shall mean a reference to the same as may have been duly amended, modified or replaced. For the avoidance of doubt, it is clarified that a document shall be construed as amended, modified or replaced only if such amendment, modification or replacement is executed in compliance with the provisions of such document(s).

(p) The word "cost" shall be deemed to be all-inclusive also including overhead costs and all taxes under Applicable Law whether on or off the Site.

(q) Wherever provision is made for the giving or issue of any notice, consent, approval, certificate or determination by any person, unless otherwise specified such notice, consent, approval, certificate or determination shall be in writing and the words "notify", "certify" or "determine" shall be construed accordingly.

(r) Any reference to any Applicable Law shall include such law/provision as is from time to time modified or re-enacted or consolidated.

(s) Terms defined in the Schedules, Annexure and Appendices unless contradictory shall have the same meaning throughout the Contract.

(t) Review and comment by the Client or its personnel, with respect to any of such documents or other information shall not relieve or release the Contractor from any of its duties, obligations or liabilities provided for under the terms of the Contract.

2. SCOPE OF WORK

2.1. The Contractor shall execute all the Works as set out in **(attached separately as BOQ),** including all activities required or appropriate to design, fabricate, manufacture, procure and deliver all supplies and Materials required for undertaking the Works for the New admin. & Engg. Block. The Contractor shall carry out and complete the Works in entirety which includes, the supply of all equipment, Materials, plant and machinery, tools, transportation, scaffolding, labour and everything else necessary for the proper execution and successful completion of the Works. The Works shall be undertaken and completed in such a manner that the New admin. & Engg. Block is fit for the purposes.

2.2. The Contractor shall be solely responsible for all means, methods, techniques, sequences, procedures and safety measures programmes in connection with execution of Works.

2.3. The Contractor shall be fully responsible and liable for everything and all matters in connection with or arising out of or being a result or consequence of it carrying out or omitting to carry out any part of the Works. The Contractor is bound to carry out any items of Works necessary for the completion of the New admin. & Engg. Block even though such items of work may not be expressly described in the Bidding Documents.

2.4. The Contractor shall execute the Works consistent with the requirements set forth in the Contract. The Contractor agrees to execute the Works and do all other things required/considered prudent to so do, in relation thereto, in accordance with the parameters set forth in this Clause 2. The Contractor shall be solely responsible for all means, methods, techniques, sequences, procedures and safety programmes in connection with the undertaking the Works under the provisions of the Contract. Without limiting the generality of the foregoing, the Contractor shall execute the Works:

(a) in a continuous manner;

(b) in a proper workmanlike and careful manner and in its entirety, in compliance with Applicable Law and the Codes and Standards, by using methods and Contractor's Equipment which are acceptable as per Prudent Industry Practice;

(c) with safety, dependability, efficiency and economy, in each case, using qualified, competent and where necessary, licensed Contractor's Personnel, so as to successfully achieve the Performance Parameters;

(d) by ensuring that all Works are performed in accordance with the design and instructions provided by the Client;

(e) in accordance with the Quality Assurance Programme; and

(f) with properly equipped facilities and non-Hazardous Materials, except as otherwise specified in the Contract.

2.5. The Contractor shall also execute all such Works and/or supply all such items and Materials that:

(a) can be reasonably inferred from the Contract as being required for attaining Final Completion and Take Over, and which are/is needed for the safe, trouble free and normal operation;

(b) can be reasonably inferred in accordance with Prudent Industry Practice, that the provision or causing the provision of such Works and/or supply of such items and materials, was contemplated as part of the Contract;

(c) is/are necessary to enable the Contractor to fulfill its obligations under the Contract and comply with the warranties set out in the Contract;

(d) is/are necessary to satisfy the provisions of the Technical Specifications; or

(e) although not stated in the Contract, are necessary for stability or for the completion, or safe and proper operation, of the Works;

in each case, as if such Works and/or Materials were expressly mentioned in the Contract and the same shall be considered a part of the Works and shall be executed/supplied by the Contractor, without any additional cost to the Client.

2.6. In the absence of any standard specification in relation to any part of the Works, the Parties shall discuss and mutually agree upon such technical matters pertaining to the Works. In the event the Parties cannot reach a mutual agreement within a period of [15 (fifteen)] days from the date of commencement of such discussions, then the instructions/directions of the Client or Project Manager regarding such technical matters shall be carried out by the Contractor under the Contract.

2.7. Except as otherwise expressly provided in the Contract, the Contractor agrees and acknowledges that it shall perform all its obligations and responsibilities under the Contract, at its own risk, cost and expense.

2.8. As part of the scope of obligations under the Contract, the Contractor shall procure and pay for, in its own name, as an independent contractor and not as an agent of the Client, all items, materials and services necessary in connection with the execution of the Works and all other obligations under the Contract.

2.9. The Client reserves the right to increase or decrease the scope of the Works on any or all items or to change the nature of the Works involved in any or all items or to completely delete any item(s) of the Works under the Contract. The Contractor shall not be entitled to claim for loss of anticipated profits, for mobilization of additional resources, or for any other such reason on account of such instructions. In the event that the Client elects in writing to add an item to scope of the Works or to delete an item from its scope, the Client shall be entitled to increase/reduce (as the case may be) an appropriate amount from the Contract Price.

3. CONTRACTOR'S PERFORMANCE BANK GUARANTEE

3.1. The Contractor shall, at its cost, within [15 (fifteen)] days from the issuance of the Letter of Award and on or before the execution of the Contract Agreement, submit to the Client an unconditional and irrevocable bank guarantee from a reputable bank acceptable to the Client for an amount of INR [__] amounting to 5% (five percent) of the Contract Price in the form as set out in **Schedule I** ("**Performance Bank Guarantee**"). The Performance Bank Guarantee shall be valid up to the expiry of the Defect Liability Period and shall have a claim period of 3 (three) months from the date of its expiry.

3.2. If requested by the Client, the Contractor undertakes to extend the validity period of the Performance Bank Guarantee or to issue a further Performance Bank Guarantee in the event that the duration of the Contract is for any reason extended beyond such validity date.

3.3. Notwithstanding anything contained to the contrary in the Contract and/or the Bidding Documents, no payments due to the Contractor from the Client under the Contract shall be payable by the Client to the Contractor until the Performance Bank Guarantee has been delivered to and approved by the Client.

3.4. Without prejudice to the rights to the Client under Applicable Law or otherwise, the Contractor acknowledges and agrees that the Client shall have the right to invoke the Performance Bank Guarantee in the event of:

(a) failure of the Contractor to commence and/or complete the Works to the Client's satisfaction within the time period specified in Clause 7;

(b) any breach of the Contract by the Contractor which breach has not been remedied within 30 (thirty) days of notice from the Client; or

(c) to recover any amount that may become due to the Client from the Contractor.

4. **ELECTRICAL AND ELV Works OF THE NEW ADMIN. & ENGG. BLOCK**

4.1. **Setting Out**

(a) The Contractor shall execute all Works in relation to the ELECTRICAL AND ELV works of the New admin. & Engg. Block in accordance with the requirements of the Technical Specifications and to the satisfaction of the Client and the Project Manager. The Contractor shall set-out the Works in accordance with the procedures set out under the Technical Specifications or provided to it by the Client and/or the Project Manager.

(b) The Contractor shall be responsible for undertaking the Works. If, at any time during the ELECTRICAL AND ELV works of the New admin. & Engg. Block, the Contractor becomes aware of any error, the Contractor shall promptly and in any event, no later than 15 (fifteen) days from the detection of such error, notify the Client and thereafter at its own expense, immediately rectify such error, to the reasonable satisfaction of the Client.

(c) The Contractor shall be responsible for the true and proper setting out of the Works in relation to instructions given by the Client/Project Manager/Architect in writing and for the correctness, subject as above mentioned, of ELECTRICAL AND ELV Works and for the provision of all necessary instruments, appliances and labour in connection therewith. If, at all any error shall appear or arise in the Works of any part of the Works, the Contractor, on being required to do so by the Client and/or the Project Manager, shall, at its own cost, rectify such error to the satisfaction of the Client. The checking of any defect in the Works by the Client/Project Manager/Architect shall not in any way relieve the Contractor of its responsibility for the correctness thereof and the Contractor shall carefully protect and preserve all bench marks, sight-rails, pegs and other things used in the Works.

4.2. **Contractor's Supervision**

The Contractor shall, during the ELECTRICAL AND ELV Works of the New admin. & Engg. Block, provide all necessary superintendence and ensure that the appropriate Contractor's Personnel are at all times present at the Site, to provide such full-time superintendence. In relation to the supervision during the

Works to be undertaken at the Site, the Contractor shall deploy only such Contractor's Personnel at the Site, who are skilled and experienced in their respective fields and supervisory staff who are competent to adequately supervise the said Works.

4.3. **Inspection**

(a) The Contractor shall provide to the Client and the Project Manager, access to any place on the Site where the New admin. & Engg. Block is being developed, in order to inspect the progress of the Works.

(b) The Contractor shall give the Client and the Project Manager's personnel full opportunity to carry out the activities set forth in this Clause 4.3, including providing access, facilities, permissions and safety equipment. Provided that, no such activity shall relieve the Contractor from any obligation or responsibility under the Contract.

5. CONTRACTOR'S OBLIGATIONS

5.1. **Contractor's general responsibilities**

(a) The Contractor shall execute the Works in accordance with the terms of the Contract, Applicable Law and Prudent Industry Practices. The Contractor shall be liable and responsible for provision of labour and materials for undertaking the Works required to for the New admin. & Engg. Block in accordance with the Contract.

(b) The Contractor shall take full responsibility for the adequacy, stability and safety of all the Works on the Site.

(c) The Contractor shall keep the Client informed of the progress of the Works at regular intervals as required by the Client.

(d) The Contractor shall keep the Client informed of any and all requirements and claims under any Applicable Laws and keep informed the Client of compliance thereunder.

(e) The Contractor shall be responsible for obtaining all information required for the performance of its obligations under the Contract.

(f) The Contractor has clarified and carefully examined all the documents, information and such other matters as may be necessary or desirable for performing its obligations under the Contract, to its entire satisfaction. The Contractor shall not, except as expressly provided in the Contract, be entitled to any extension of time or to any adjustment of the Contract Price, on grounds of misinterpretation or misunderstanding of any such matter.

(g) The Client shall not be responsible for any error, inaccuracy or omission of any kind in the Bidding Documents and shall not be deemed to have given any representation of accuracy or completeness of any data or information. Any data or information received by the Contractor, from the Client and/or Project Manager or otherwise, shall not relieve the Contractor from its responsibility for undertaking the Works.

(h) The Contractor has, prior to the execution of the Contract obtained all information and taken into consideration the restrictions imposed to coordinate its activities for the Works with the other contractors required for completion of the Project.

(i) The Contractor represents that it is fully informed of all general and local conditions near the Site and other factors that may have an effect on the compliance of its obligations under the Contract. The Contractor cannot claim an extension of time or an increase in the Contract Price as a result of such local conditions or factors.

(j) The Contractor represents and confirms that it has entered into the Contract Agreement on the basis of its proper examination of the Site by its checking or carrying out its own investigations as may be required, including the suitability and availability of the access routes thereto and that it is aware about the conditions of the Site and its surroundings and has satisfied itself as to all technical, commercial, social and general conditions of and all circumstances affecting the Site. The Contractor represents and confirms that by signing the Contract, the Contractor accepts total responsibility for having foreseen all difficulties and costs of successfully completing the Works and that the effect of all contingencies have been considered by the Contractor prior to entering into the Contract Agreement and that the Contractor shall not be entitled to extension of time or an increase in the Contract Price on account of the same.

(k) The Contractor acknowledges that any failure to verify and interpret any data and information in relation to the Site and/or the New admin. & Engg. Block shall not relieve it of its responsibility for properly estimating the difficulty or cost of successfully performing its obligations under the Contract.

5.2. **Water and power for carrying out the Works**

Water and electricity for carrying out the Works shall be arranged by the Contractor at its own risk and costs. The Contractor shall, so far as is reasonably practicable, having regard to local conditions provide on the Site at its own cost, water for the use of the Contractor's Personnel, staff, and work people at the Site.

5.3. **Temporary works and arrangements**

The Contractor shall furnish to the Client full particulars, Drawings, etc., of all temporary works necessary for the completion of the Works and shall allow sufficient time for the Client to consider the same. The Client reserves the right to alter/ comment on the Contractor's proposals if it considers that modifications should be made. The Contractor shall be solely responsible for the stability and safety of all temporary Works and unfinished Works.

5.4. **Demolition and clearance**

The Contractor shall be responsible for undertaking the Works, clearance from the Site of all scrub, debris, rubbish, etc. that shall be carted to an area not objected to by any Governmental Authorities. However, no trees shall be removed without the prior permission of the Client and without obtaining prior approvals as may be required under the Applicable Law.

5.5. **Storage, cleaning and de-watering**

(a) The Contractor shall at all the times during performance of the Works keep the Site clean and free from all debris and unwanted Materials as per instructions of the Client/ PM.

(b) Storage of Materials shall be in organized manner and in proper compartments. Storage on suspended floors shall not be permitted unless specifically approved in writing by the Client for specific Materials in specific locations. The Client shall be furnished with load details, if requested, before seeking approval for storage.

(c) Regular cleaning operations shall be undertaken to remove all dust, debris, waste materials, etc. and disposal of the same. A cleaning schedule shall be maintained by the Contractor to the satisfaction of the Client.

(d) The Contractor shall make its own arrangements for storage of Materials, which cannot be accommodated at the Site. The Contractor shall be fully responsible for safe custody of the same. Materials shall be considered as "Delivered at Site", only after the physical presence of Materials at the Site. Stores elsewhere shall not be eligible for being considered as "Delivered at Site".

(e) The Contractor understands that the Site is free from pollutants at the time of access to the Site and commencement of Works. The Contractor shall comply with all applicable environmental laws and regulations and shall ensure that the Works are undertaken in compliance with such Applicable Laws.

(f) The Contractor shall be responsible to keep entire Site free from water due to water coming from any source at any level and shall protect all Materials and Works from being damaged by the water from any source. The Contractor shall make proper arrangements for drainage prior to use of water.

5.6. **Vehicular movements and temporary roads**

(a) The Contractor shall not make temporary roads until approval from the Client is received in writing. Site access and circulation roads are to be on the lines agreed to with the Client.

(b) No vehicle other than those specifically allowed by the Client shall be permitted on the Site.

(c) All the vehicles and Materials coming in to the Site should be checked for explosive materials by using metal detectors and under vehicle scanner.

5.7. **Care and use of existing facilities and services**

(a) During the completion of the Works, the Contractor shall take all precautions and exercise full care, at its cost, to ensure that no damage is caused to the existing water supply, sewerage, power or telecommunication lines or any other services or works. The Contractor shall provide and erect before undertaking the Works, substantial barricades, guardrails, and warning signs. The Contractor shall furnish, place and maintain adequate warning lights, signals, etc., as required by Client. However, such substantial barricades, guardrails, and warning signs shall not relieve the Contractor of its responsibilities, obligations and liabilities for safety and timely completion of Works.

(b) If any service lines have to be shifted / diverted, it shall be done so with the explicit permission of the Client.

5.8. **Co-ordination of builders work required for services**

(a) The Contractor shall co-ordinate the requirements for holes, fixings and builders work, for internal and external services installations in accordance with the requirements of the relevant Drawings, which shall be made available to the Contractor by the Client.

(b) All holes, chases, etc., shall be left in the building work as it proceeds and cut-out subsequently, except in so far as may be necessary due to subsequent authorized instructions. The Contractor shall therefore obtain necessary builders work details in such order and in such time so as to enable them to be checked and approved by the Client and/or the Project Manager not less than 2 (two) weeks before the actual works are planned to take place.

5.9. **Contract**

The Contractor shall within [__] days of the issuance of the Letter of Award enter into and execute the Contract Agreement with the Client, in the form annexed as **Schedule II** with such modification as may be necessary. The cost of stamp duties and similar charges (if any) incurred with respect to entry into the Contract Agreement shall be borne by the Contractor.

5.10. **Inspection of Site**

(a) The Contractor shall be deemed to have inspected and examined the Site and its surroundings and information available in connection therewith and to have satisfied itself as to the form and nature of the Works. The Contractor shall not rely only on the information provided by the Client.

(b) The Contractor shall not remove/shift any existing services passing through the Site above or below ground deemed to be a hindrance towards the completion of the Works without the prior written consent of the Client.

5.11. **Works to be to the satisfaction of the Client**

Unless it is legally or physically impossible, the Contractor shall undertake the Works in strict accordance with the Contract to the satisfaction of the Client and shall comply with and adhere strictly to the instructions and directions from the Client and/or the Project Manager.

5.12. **Drawings and Documents**

(a) **General**

The Drawings and Documents prepared for the Project shall be treated as confidential documents and must not be copied or loaned or shared with any other party without the express permission of the Client. In the event of termination of the Contract, the Contractor shall forthwith return to the Client, all Drawings and Documents prepared for the Project and all copies thereof in the possession or under the control of the Contractor. The Contractor agrees that the provisions of the Contract pertaining to confidentiality shall survive termination/completion of the Works under the Contract.

(b) **Drawings**

(i) The Drawings furnished by the Architect, if any, as part of the Bidding Documents, are for bidding purposes only and are intended as a guide to the Contractor and give general layout of buildings and structures and general positions of utilities, services and equipment only and in measuring from these Drawings and preparing Bid the Contractor must make due and proper allowance for all necessary diversions from the straight line, rises or falls as may be required for the proper execution of the Works.

(ii) The set of Drawings which are part of the Bidding Documents is only representative of the type and general nature of Works and not the quantum of Works involved. Additional Drawings shall be issued at the relevant stage for actual execution of Works.

(iii) Detail Drawings in all cases shall be worked in preference to those of a more general nature and figured dimensions where indicated shall be followed in preference to scaled dimensions.

(c) **Good for Construction Drawings**

(i) The Architect/Client/or the Project Manager shall issue free of charge [3 (three) sets] of ELECTRICAL AND ELV Drawings, approved for undertaking the Works, to the Contractor. Additional copies as and when required shall be supplied by the Architect or Project Manager and costs shall be reimbursed by the Contractor.

(ii) The Client and/or Project Manager may from time to time during the course of the Contract issue the Contractor with revised Drawings and the Contractor shall ensure that all superseded Drawings are removed from Site and stored in a lockable cabinet as directed by the Client and/or Project Manager and replaced by revised Drawings.

(iii) The Contractor shall ensure that a complete up to date register of Drawings is maintained at Site. All Drawings shall be properly filed and indexed for ready reference.

(iv) The Contractor shall ensure that only the valid up to date Drawings is used for fabrication, setting-out, ELECTRICAL AND ELV etc.

5.13. **Discrepancies**

The Contractor shall bring to the notice of the Client any discrepancies within or between Drawings and/or the other Documents prior to commencement of Works and shall not proceed with Works until the Client/Architect/PM gives clarifications and instructions to proceed.

5.14. **As-built drawings**

The Contractor shall commence preparation of the 'as-built drawings' from the onset of the Contract, in order that all minor amendments and discrepancies are incorporated. To ensure that this requirement is complied with, the Client shall check the Drawings on its request as the Works proceed. [4 (four)] sets of as-built drawings and one soft copy on a CD shall be submitted by the Contractor to the Client within 2 (two) weeks from date of issue of the Final Acceptance Certificate.

5.15. **Programme**

(a) The Contractor shall include in its Bid a preliminary contract schedule. Upon issuance of the Letter of Award and before commencement of the Works, the Contractor shall prepare a detailed and comprehensive contract schedule for review and approval by Client/PM.

(b) The schedule shall show the date on which each part of the Works is to begin and date when such part of the Works is scheduled to be finished along with the relevant milestones under ("**Contract Schedule**"). The Contractor shall ensure that it complies with the Contract Schedule and shall co-ordinate performance of the Works with the Client, Project Manager and the Architect in order to maintain the Contract Schedule.

(c) The Contractor shall also submit weekly/monthly progress reports indicating progress of Works giving scheduled and actual percentage completion, causes for delays if any etc. as well as other reasonable reports and photographs as the Client and/or Project Manager may require from time to time.

(d) The submission to and approval by the Client and/or Project Manager of such schedules or the furnishing of such particulars shall not relieve the Contractor of any of its duties or responsibilities under the Contract.

(e) The Contractor acknowledges and confirms that the development of the New admin. & Engg. Block is a time bound project. The Contractor shall strictly adhere to the milestones as per the

Contract Schedule. Any delay in delivering the Project, completing the Works and meeting the milestones will result in substantial losses to the Client.

(f) Subject to Clause 10 (Liquidated Damages) for any delays by the Contractor in achieving the any milestone as per the Contract Schedule, the Client will withhold an amount from the Invoice maximum up to 5% (Five percent) of the Contract Price until the Contractor meets the subsequent milestone as per the Contract Schedule. On successfully achieving the subsequent milestone, the withheld amount will be paid to the Contractor in the next Invoice. If the Contractor fails to achieve the subsequent milestone, an additional 5% (five per cent) of Contract Price shall be withheld. The entire withheld amount shall be accounted in the Contract Price.

(g) The Contractor will submit schedule of Material delivery and shall obtain approval from the Client/PM before delivering any Material to the Site.

(h) Provision of time will be made by the Contractor for other agencies and contractors to carry out their part of the Works and such lapse of time will be considered by the Contractor in the Contract Schedule. No compensation will be paid to the Contractor for idle labour and Materials due to work of other contractors.

5.16. **Contractor's Representative and Works Manager**

Contractor's Representative

(a) The Contractor has appointed [__], s/o [__] and r/o [__], as the Contractor's representative for the purpose of the Contract ("**Contractor's Representative**"). The Contractor shall within [7 (seven) days] from the date of issuance of Letter of Award, notify the Client, of the duties and authorities of the Contractor's Representative.

(b) The Contractor's Representative shall represent and act for the Contractor, at all times during the term of the Contract and shall provide to the Client all the Contractor's notices, instructions, information and all other communications under the Contract.

(c) All notices, instructions, information and all other communications provided by the Client to the Contractor under the Contract, shall be provided to the Contractor's Representative or, in its absence, its authorized deputy, except as otherwise provided.

(d) The Contractor shall not revoke the appointment of the Contractor's Representative without the Client's prior written consent, which shall not be unreasonably withheld. If the Contractor proposes to appoint another person as its representative, then it shall provide a [14 (fourteen) days] notice to the Client requesting it to approve such appointment. In this regard, the Contractor shall submit the curriculum vitae of such representative along with its request. The Contractor shall ensure that the person proposed to act as its representative shall be fluent in the local language of India and the English language. If the Client does not object to the appointment of such representative within [14 (fourteen) days] of receipt of the request provided by the Client, the representative shall be deemed to have been approved by the Client as the Contractor's Representative. If the Client objects to the appointment of the representative within [14 (fourteen) days] of receipt of the request provided by the Contractor, giving the reason thereof, then the Contractor shall propose a replacement within 14 (fourteen) days of such objection. The provisions of this Clause 5.23(d) shall apply *mutatis mutandis* to such replacement. If the Client consents thereto, the Contractor shall appoint any other person as the Contractor's Representative, pursuant to the procedure set out in this Clause 5.23.(d).

(e) The Contractor's Representative may, subject to the approval of the Client, which shall not be unreasonably withheld, at any time, delegate to any person any of the powers, functions and authorities vested in it. Any such delegation may be revoked by the Contractor's Representative at any time, but shall be subject to a prior notice to the Client, signed by the Contractor's Representative. Such notice shall specify the powers, functions and authorities thereby revoked. No such delegation or revocation shall take effect unless a copy of written authorization of such delegation or revocation, as the case may be, has been delivered to the Client.

(f) Any act or exercise by any person of powers, functions and authorities so delegated to such person in accordance with Clause 5.23(e) shall be deemed to be an act or exercise by the Contractor's Representative and the Contractor shall be fully responsible for the same.

(g) The Contractor's Representative, persons to whom powers, functions and authorities have been delegated pursuant to Clause 5.23(e), and the Works manager shall be fluent in the English language and either proficient in the national language of India.

(h) **Works Manager**

The Contractor's Representative shall, [7 (seven) days] before Site mobilization, appoint a suitable person to manage the execution of the Works, who shall be present at the Site, during normal working hours prescribed under Applicable Law ("**Works Manager**"). Provided that, if at any point of time the Works Manager is not present at the Site, a suitable person shall be appointed by the Contractor's Representative to act as its deputy, who shall then be present at the Site in the absence of the Works Manager.

(i) **Removal of Contractor's Personnel from Site**

The Contractor's Personnel shall be reasonably qualified, skilled and experienced in their respective trades or occupations. The Client may, during the term of the Contract, by notice to the Contractor, object to the retention of any of the Contractor's Personnel and require the Contractor to remove (or cause to be removed) any person comprising the Contractor's Personnel, who,

(i) has behaved inappropriately;

(ii) carries out duties incompetently or negligently;

(iii) persists in any misconduct or lack of care;

(iv) fails to conform with any of the provisions of the Contract;

(v) has committed a serious breach of the Site regulations provided by the Client;

(vi) persists in any conduct which is prejudicial to the safety, health or the protection of the environment; or

(vii) is otherwise not suitable.

The Client shall provide evidence of the same to the Contractor, whereupon the Contractor shall remove such person from the Site and promptly appoint (or cause to be appointed) a suitable replacement in accordance with Clause 5.23(d).

5.17. **Contractor's Employees**

The Contractor shall provide and employ on the Site in connection with the execution of the Works:

(a) only such technical assistants as are skilled and experienced in their respective fields and such sub-agents, foremen and leading hands as are competent to give proper supervision to the Works they are required to supervise;

(b) such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely execution of the Works; and

(c) professionals for safety for undertaking the Works to the satisfaction of the Client.

5.18. **Watching and Lighting**

The Contractor shall in connection with the Works provide and maintain at its own cost all workplace lighting, guards, fencing and watching when and where necessary for the completion of the Works, or for the safety and convenience of the public or others. The care and the safety of the Materials and Works shall be sole responsibility of the Contractor. The constructed barricade on the Site shall be maintained by the Contractor. If such barricade is damaged, the same shall be replaced/rectified immediately without any additional cost to the Client. Adequate fire protection measures should be in place on site to attend to any mishap on the site. Adequate personnel shall be deployed by the Contractor within the Site to control the movement of Material and personnel.

5.19. **Care of Works**

From the commencement of the Works until the date stated in the Final Acceptance Certificate, the Contractor shall take full responsibility for the care of the Works and the loss or damage thereto.

5.20. **Damage to persons and property**

The Contractor shall indemnify the Client against any and all losses and claims in respect of injuries or damage to any persons or material or physical damage to any property whatsoever which may arise out of or in consequence of the execution of the Works and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto.

5.21. **Giving of notices and payment of fees**

The Contractor shall give all notices and pay all taxes, octroi, fees required to be given or paid by any national or state statute, ordinance or other Applicable Law, or any regulation, or bye law or any local or other duly constituted Governmental Authority in relation to the execution and completion of the Works and by the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Works.

5.22. **Compliance with statutes, regulations, etc.**

(a) The Contractor shall conform in all respects with the provisions of Applicable Law which may be applicable to the Works and shall keep the Client indemnified against all penalties and liability of every kind for breach of any such Applicable Law.

(b) The Contractor shall comply with all rules, regulations, and laws including but not limited to labour laws, laws relating to medical and safety of workmen for labour directly or indirectly engaged by the Contractor, its representative, and Sub-Contractor. The Contractor shall register itself

wherever and whomsoever required in this connection at local and state level. The Contractor shall indemnify the Client from every expense incurred by the Client under this Clause. The Client is authorized to call at any point of time to its registered office/offices for inspection or copy of such documents as it considers necessary for ensuring statutory compliances to the above by the Contractor.

(c) In particular, the Contractor shall ensure strict compliance with the provisions of the Employee State Insurance Act, 1948, Employee Provident Fund and Miscellaneous Provisions Act, 1952, Factories Act, 1948, Workman's Compensation Act, 1948, Payment of Wages Act, 1946, Minimum Wages Act, 1948, Employees Liability Act, 1938, Industrial Dispute Act, 1947, Maternity Benefit Act, 1961, and Contract Labour (Regulation and Abolition) Act, 1970. Copies of the records and registers maintained under the Applicable Laws shall be provided to the Client at the end of each month. The salaries to all workmen shall be paid in the presence of the Client and/or Project Manager. The Contractor shall procure and maintain the necessary licenses under the Contract Labour (Regulation and Abolition) Act, 1970 after assisting the Client in procuring the registration there under. The Contractor shall also obtain various licenses/ permits/ clearance/ approvals/ consents as appropriate from the various Governmental Authorities and other statutory authorities in respect of Works to be undertaken by it.

(d) The Contractor shall ensure that the workmen operating the Contractor's Equipment for the execution of Works are licensed under Applicable Law, to the satisfaction of the Client.

(e) The Contractor shall include in its rates all expenses necessary to meet its obligations for making contributions toward employee benefits funds (such as employees state insurance, provident fund, old age pension if any or any other benefits / compensation payable by the Contractor) etc., in compliance with all the statutory regulations and requirements. All records in this connection shall be properly maintained by the Contractor and produced for scrutiny by the concerned authorities and the Client and/or Project Manager whenever called for.

(f) The Contractor acknowledges and agrees that none of the directors of the Contractor are on the RBI's defaulter list/caution list or the CIBIL's wilful defaulter list or is a defaulter or on non-cooperative list of any of the lenders and that no director of the Contractor is disqualified under Section 164 of the Companies Act, 2013. The Contractor further agrees and acknowledges that no person:

(i) who has been named in any list of defaulters circulated by the RBI or CIBIL; or

(ii) whose name appears in any caution list of any nature published by the RBI, CIBIL or any similar Governmental Authority; or

(iii) who has been named in the caution list/defaulters list/ specific approval list; or

(iv) who has been identified as a wilful defaulter/ non-cooperative by any bank or financial institution, as per the parameters determined by RBI, from time to time; or

(v) who is director in any company which has been identified as a wilful defaulter/defaulter / non-cooperative by the RBI, CIBIL or similar Governmental Authority or any bank or financial institution,

shall become a member of the Board or a KMP of the Contractor. If any such person is already a director on the Board or KMP of the Contractor, the Contractor shall intimate the Client and the Project Manager promptly and take expeditious and effective steps to remove such person from

its Board and as KMP, and the Client shall have the right to take action as envisaged under the Applicable Law.

(g) The Contractor acknowledges and agrees that no investigation by a Governmental Authority or any regulatory authority is pending against the Contractor, its sister concern, its chief executive officer or any of its directors/ managers/ employees, including but not limited to any charge sheet by an agency of the Governmental Authority, initiation of proceedings in the court of law or a conviction by the court of law for an offence committed by the Contractor or its sister concern or any of its directors/ managers/ employees. In case any investigation is pending against the Contractor or its sister concern or against its chief executive officer or any of its directors/ manager/ employees, the following details shall be furnished to the satisfaction of the Client:

(i) full details of such investigation;

(ii) name of the investigating agency;

(iii) charge/ office for which investigation has been launched;

(iv) name and designation of persons against whom the investigation has been launched;

(v) other relevant information.

(h) The Contractor shall keep the Client informed of any and all claims under any Applicable Laws and keep informed the Client of compliance there under.

5.23. **Interference with traffic and adjoining properties**

All operations necessary for the completion of the Works shall, so far as compliance with the requirements of the Contract permits, be carried on so as not to interfere unnecessarily or improperly with the public convenience, or the access to use and occupation of public or private roads and footpaths, or to or of properties whether in the possession of the Client or of any other person. The Contractor shall save harmless and indemnify the Client in respect of all claims, proceedings, damages, cost, charges and expenses whatsoever arising out of, or in relation to, any such matters in so far as the Contractor is responsible therefore.

5.24. **Extraordinary traffic**

The Contractor shall use every reasonable means to prevent any of the highways or bridges communicating with or on the routes to the Site from being damaged or injured by any traffic of the Contractor or any of its Sub-Contractors and, in particular, shall select routes, choose and use vehicles and restrict and distribute loads so that any such extraordinary traffic as will inevitably arise from the moving of material from and to the Site shall be limited, as far as reasonably, and so that no unnecessary damage or injury may be occasioned to such highways and bridges.

5.25. **Opportunities for other contractors**

The Contractor shall, in accordance afford all reasonable opportunities for carrying out the Works to any other contractors engaged by the Client and their workmen and to the workmen of the Client and of any other duly constituted authorities who may be employed in the execution on or near the Site of any Works not included in the Contract or of any contract which the Client may enter into in connection with or ancillary to the Works.

5.26. **Contractor to keep Site clear**

During the progress of the Works, the Contractor shall keep the Site free from unnecessary obstruction and shall store or dispose of any material and clear away and remove from the Site any wreckage, rubbish or Materials no longer required, on a daily basis. Regular cleaning operations on daily basis shall be undertaken by the Contractor to remove all dust, debris, waste materials etc., and disposal of the same to the nearby waste dumping yard. If Client and/or Project Manager notices the Contractor's inability/unwillingness to do the said job, the Client shall have the right to get the same cleaned by an external agency and debit the same to the Contractor's account.

5.27. **Clearance of Site on completion**

On the completion of the Works, the Contractor shall clear away and remove from the Site all surplus Materials, rubbish and debris and Site office and stores etc. of every kind, and leave the whole of the Site and Works clean and in a workmanlike condition to the satisfaction of the Client.

5.28. **Contractor's Personnel**

(a) The Contractor shall within 7 days from the date of issuance of Letter of Award depute the Contractor's Personnel, at the Site so as to seek clarification with regard to the Works to be executed. Further, subject to details as provided in the Technical Specifications, the Contractor shall, in terms of this Clause 5.36, from the date of Letter of Award till Final Completion, engage sufficient and properly qualified Contractor's Personnel who are proficient in English language and skilled and experienced in their respective callings, to enable the Contractor to efficiently perform its obligations under the Contract. The Contractor shall ensure that the Contractor's Personnel include:

(i) professional engineers licensed in accordance with the licensing requirements prescribed under Applicable Law to perform the Works pursuant to the Contract;

(ii) a team of engineers from various disciplines, adequate number of qualified and competent supervisory staff, craftsmen or other personnel, each of whom shall have extensive experience in executing works of a magnitude similar to the Works, shall have knowledge of the Applicable Laws; and

(iii) a team of sufficiently qualified and experienced welders which are required for the execution of the Works.

(b) The Client shall have the right, but not the obligation, to approve any of the Contractor's Personnel. The Contractor shall, upon the request of the Client, provide the Client with the curriculum vitae of, and arrange interviews by the Client of, any or all of the Contractors Personnel. The Contractor shall not remove any of the Contractor's Personnel without the prior written consent of the Client, which shall not be unreasonably withheld.

(c) The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the Site. The Contractor shall be responsible for the recruitment, transportation, accommodation, catering and other welfare facilities of the Contractor's Personnel, and for all payments in connection therewith. Further, if specified in the Technical Specifications, the Contractor shall also provide all such facilities for the Client's personnel. The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with the relevant

Governmental Authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance services are available, at all times, at the Site and at the respective accommodation of the Contractor's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics. The Contractor shall indemnify and hold harmless the Client from and against any claim, liability, assessment, damage, loss, penalty or fine stemming from any breach by the Contractor or any person for whom it is responsible, of this Clause 5.36.(c).

(d) The Contractor shall, within [15 (fifteen) days] from the date of issuance of Letter of Award, appoint suitable and qualified persons, who shall be:

(i) responsible to ensure quality of the Works undertaken for construction and development of the New admin. & Engg. Block and shall co-ordinate with the Client and the Project Manager for all matters in relation to the quality of the Works (the "**Quality Engineer**");

(ii) responsible for all matters in relation to the safety and protection against accidents at the Site and shall, at all times during the term of the Contract, ensure that the safety manual provided to the Contractor by the Client and the safety regulations at the Site provided under **Schedule VII** (Safety Regulations) are strictly adhered to (the "**Safety Officer**"). The Contractor shall, no later than [15 (fifteen) days] from the date of issuance of the Letter of Award, submit to the Client, the job safety analysis of the Safety Officer. The Safety Officer shall have the authority to issue instructions and take protective measures to prevent accidents and during the term of the Contract, the Contractor shall provide whatever is required by the Safety Officer to exercise such responsibility and authority. The Safety Officer shall:

(A) ensure that copies of the safety manuals provided by the Client pursuant to **Schedule VII**, are at all times available on the Site, along with Codes and Standards of practice in relation to the same, to be referred to and followed by the Contractor's Personnel;

(B) submit to the Client, as soon as practicable after the occurrence of an accident or dangerous occurrence, the details of such accident or dangerous occurrence, as the case may be; and

(C) maintain all records and make reports concerning health, safety and welfare of persons, and damage to property, as may be reasonably required by the Client.

The Contractor shall indemnify and hold harmless the Client from and against any claim, liability, assessment, damage, loss, penalty or fine stemming from any breach by the Contractor or any person for whom it is responsible, of this Clause 5.36.(d).

(e) The Safety Officer shall be present at the Site, during normal working hours, prescribed under Applicable Law, or a suitable person shall be appointed by the Contractor's Representative to act as its respective deputy, who shall be present at the Site in the absence of the Safety Officer.

(f) The Contractor shall, at its own expense, provide, as and when required, the means of repatriation to all of the Contractor's Personnel and labour and personnel of the Sub-Contractor's to their respective home countries/states. Further, the Contractor shall also provide suitable temporary maintenance of all such persons, from the period commencing from the cessation of their employment with the Contractor, till the scheduled date of their respective departures. If the

Contractor fails to comply with its obligations under this Clause 5.36.(f), the Client may provide the same, at the cost of the Contractor.

(g) The Contractor shall ascertain the availability of labour (skilled and unskilled), personnel and Sub-contractors in the vicinity in which the Site is located and shall, to the extent possible, engage such labour (skilled and unskilled), personnel and Sub-contractors, as the Contractor's Personnel.

(h) The Contractor shall ensure that the Contractor's Personnel are entitled to the prescribed number of holidays, as per Applicable Law and unless otherwise provided in the Contract, no Works shall be executed outside normal working hours and on holidays, prescribed under Applicable Law. Provided that, provisions of this Clause 5.36.(h) shall not apply to any Works which are customarily carried out by rotating or double-shifts.

(i) The Contractor shall, and shall ensure that the Contractor's Personnel, in all dealings with the labor and personnel of its Sub-Contractors, pay due regard to all recognized festivals, official holidays, religious or other customs prevailing in the State of Uttar Pradesh, India and all Applicable Laws in this regard. Further, the Contractor shall ensure that the Contractor's Personnel act in a culturally sensitive manner at all times, giving due regard to the local community and cultures when on Site.

(j) The Contractor shall at all times, during the term of the Contract, use its reasonable endeavors to prevent any unlawful, riotous or disorderly conduct or behavior by or amongst the Contractor's Personnel, the other Contractors and/or the labour, personnel and employees of the Sub-Contractors and to preserve peace and protection of persons and property on and near the Site and under no event shall the Client be responsible for the same. The Contractor shall promptly provide the Client, a notice in relation to any actual or anticipated labour dispute which may affect the execution of the Works. The said notice shall indicate the steps being taken by the Contractor to mitigate the effects of any actual or contemplated labour disputes.

(k) The Contractor shall pay rates of wages to the Contractor's Personnel, as per rates prescribed under Applicable Law and observe conditions of labour in accordance with the Applicable Law. The Contractor shall, during the term of the Contract, withhold from wages and salaries of the Contractor's Personnel, sums required to be withheld as per the Applicable Law and pay the same promptly and directly, when due, to the respective Governmental Authority and upon request by the Client, in this regard, provide to the Client evidence of the payment of such withholding taxes as per the Applicable Law. In this regard, the Contractor shall comply with all accounting and reporting requirements under the Applicable Law and bear the cost of such compliance. In the event the Client becomes liable, under Applicable Law, due to any act or omission of the Contractor under this Clause 5.36.(k), the Client may make such payments and shall recover the same from the Contractor or deduct the amounts so paid from the Contract Price.

5.29. **Sanitation and drainage during the Works at the Site and labour camp**

(a) The Contractor shall provide sanitation and drainage facilities on the Site and labour camp as required and stated under the Contract.

(b) The Contractor shall strictly control the labour so that the Site is not polluted, made dirty or littered with debris, wastes or the likes.

(c) Any person found creating mess or litter or pollution or illegally squatting on the Site shall be removed from the Site immediately at Contractor's cost.

(d) The Contractor shall provide sanitation facilities at convenient locations on Site and labour camp to preserve the cleanliness of the Site. The effluent shall be directed as follows:

(i) waste water: Collection and pumping out and disposal off the Site in approved manner: and

(ii) septic tank provision - sludge to be collected and disposed of at intervals as directed.

(e) The Contractor shall clear and deodorize the ground after their removal and meet all statutory requirements.

5.30. **Worker's camp**

The Contractor shall make its own arrangements at its cost to provide accommodation for its staff and labour outside and away from the Site. No extra cost is payable to the Contractor on this account. The Contractor shall provide the following welfare arrangements in the labour camp area within [___] km of the Site and as further detailed in the Technical Specification:

(a) the Site activities include setting up a colony for the workers. Well laid out labour camp with all amenities (light, drinking water, cooking area with cooking facilities, wash areas, wash rooms for both male & female workers, crèche & learning area) shall be arranged at a suitable place;

(b) labour camp shall be located away from Site premises;

(c) access to the labour camp shall be provided;

(d) maintain proper hygiene all times;

(e) a warden to be appointed for labor camp and as single point responsibility;

(f) drainage of sludge water /rain water shall be provided;

(g) drinking water, bathing facilities and field washrooms should be provided at suitable places;

(h) suitable arrangements for labour to purchase weekly provisions shall be made;

(i) weekly off to the labour shall be ensured for rest;

(j) food and transport (to & fro from Site to labour camp) facilities should be provided;

(k) sufficient number of fire extinguishers should be provided;

(l) an emergency assembly point should be provided;

(m) security should be provided;

(n) crèches/learning/play centre should be provided;

(o) provision of pumps to drain out flood water from site/ labour camp;

(p) electricity (with power back up) should be provided;

(q) first aid facility, ambulance & along with doctor shall be provided;

(r) labour camp monsoon precautions;

(s) prevent contamination of drinking water;

(t) collection and disposal of food waste & garbage regularly;

(u) secure all loose [G. I. Sheets] to prevent from flying off in case of stormy and gusty wind;

(v) standard earthing to partition with effective functioning of [ELCB's]

(w) all temporary electric connections must be rooted through 30 mA cut off rating [ELCB];

(x) all wires / cables are not laid on sharp edges or through a hole within the G. I. Sheet as to prevent damage to insulation. If, possible route through conduit pipes and support wire / cables by suitable hook;

(y) no wooden material to be used for labor camp construction; and

(z) all wire / cable joints are water and shock proof to prevent from shock.

5.31. **Alcoholic liquor or drugs**

Use of any alcoholic liquor, drugs, chewing of pan, gutka or smoking etc., is fully prohibited on the site. The Contractor shall not import, sell, give, barter or dispose any alcoholic liquor or drugs or cigarettes / beedies /etc. by its Sub-Contractors, agents or employees.

5.32. **Arms and ammunition**

The Contractor shall not give, barter or otherwise dispose of to any person or persons, any arms or ammunition of any kind or permit or suffer the same as aforesaid.

5.33. **Festivals and religious customs**

The Contractor shall in all dealings with labour in its employment have due regard to all recognized festivals, days of rest and religious or other customs. The Contractor shall intimate [7 (seven) days] in advance to the Client of any festival for any resource/ labour shortfall presumed with proper mitigation plan in place.

5.34. **Epidemics**

In the event of any outbreak of illness of an epidemic nature at Site and/or labour camp for the workmen engaged for the Works (directly or indirectly) the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Governmental Authority, or the local medical or sanitary authorities for the purpose of dealing with and overcoming the same under Applicable Law.

5.35. **Disorderly conduct, etc.**

The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by any of its Sub-Contractors, employees or agents and for the preservation of peace and protection of persons and property in the neighborhood of the Works against the same.

5.36. **Safety Standards and Requirements**

The Contractor shall follow the rules and guidelines laid down in safety requirements as listed in **Schedule VII**. The cost so incurred by the Contractor in providing for safety standards and requirements as above shall be deemed to be included in the Contract Price and no extra amounts shall be payable to the Contractor on this account.

5.37. **Reports by the Contractor**

(a) The Contractor shall file daily category-wise labour returns. The report shall indicate scheduled requirement against actual strength.

(b) The Contractor shall prepare weekly reports of planned and actual progress of Works and subsequent week's scheduled Works. These will also include Material procurement status. These reports shall be submitted to Client and shall be reviewed in weekly co-ordination meeting.

(c) The Contractor shall submit monthly report along with monthly bills. The reports shall include photographs taken from pre-determined locations which illustrate progress of the Works.

(d) Further progress charts and schedules shall be prepared by the Contractor as directed by the Client and/or Project Manager.

(e) The submission to and approval by the Client of such programmes/ reports or the furnishing of such particulars shall not relieve the Contractor of any of its responsibilities and liabilities under the Contract.

5.38. **Night or Sunday work**

Subject to Applicable Law and the terms of the Contract, the Contractor shall not perform any activity at the Site at night on any day or on Sundays except with the prior written consent of the Client and the Project Manager.

5.39. **Taxation**

The Contractor shall be responsible to pay personal and company taxes of its staff and its organization wherever applicable. The Contractor shall be responsible for deduction of tax at source while releasing payment to their staff, Sub-Contractors, workers, etc.

5.40. **NGT Guidelines**

The Contractor shall comply with all the provisions of National Green Tribunal (NGT) laws, rules, orders, notifications, and amendments made from time to time at his own cost, nothing extra shall be paid on this account. Any penalty, imposed by the NGT for construction of aforesaid building due to non-compliances shall be borne by the contractor itself. The item rates of BOQ are inclusive of all such cost to manage the activities as suggested by NGT If site shutdown/ work held due to NGT/ Govt. orders then, the Contractor shall only be entitled to Extension of time and no claim shall be entertained on account of this by the owner on account of idle labour, staffs tools & plants, machineries etc.

6. CLIENT'S OBLIGATIONS

6.1. **Rights of Way and Facilities**

(a) The Client shall provide and bear all costs and charges for special and/or temporary rights of way, which the Contractor may require, including those for access to the Site.

(b) The Client shall provide clear, unhindered, freely accessible Site to the Contractor for execution of the Works.

(c) The Client shall, in respect of the Works, provide adequate space for the storing of Contractor's Equipment (including equipment which is being procured by the Client under a separate contract) until the Completion Date.

6.2. **Access to the Site**

The Contractor and Contractor's Personnel shall be permitted access to the Site for the purposes of carrying out the Works. The Client, may at any time, remove or cause to be removed any of the Contractor's Materials, articles, things, personnel or labour without notice to the Contractor. This shall not, in any manner, prejudice or affect the Contractor's liabilities and obligations in respect of the Works and in particular the liability arising due to any damage to any person or Material at the Site.

7. **TIME FOR COMMENCEMENT AND COMPLETION**

7.1. **Commencement of works**

The Contractor shall commence the Works at the Site from the date of issuance of the Letter of Award ("**Commencement Date**"). The Contractor acknowledges that time is the essence of the Contract for commencement and completion of Works by the Completion Date.

7.2. **Time for completion and extension of time**

(a) The Contractor agrees and undertakes to complete the Works in accordance with the terms of the Contract and the Bidding Documents within 6 months from the Commencement Date ("**Completion Date**") subject to Clause 7.2.(b) below.

(b) In the event that the Contractor is delayed in performing the Works under the Contract solely as a result of:

(i) an event of Force Majeure; or

(ii) on account of Change in Law; or

(iii) breach by the Client of its material obligations herein,

then the Contractor shall issue a written notice to the Client and the Project Manager promptly upon occurrence of any of the events specified above indicating the reasons for the delay, the additional time required by the Contractor to complete the Works and the corrective action already undertaken or to be undertaken. The Client upon receipt of notice from the Contractor shall determine the time period for extension and whether such extension shall take place retrospectively or prospectively. Provided that, the Contractor shall be solely responsible for all costs and risks on account of such extension of time.

(c) The Parties agree that any extension of time shall only be considered when work on the critical path of the program for the Works is affected. It shall be the duty of the Contractor at all times to use all reasonable endeavors to prevent any delay being caused by any of the events or

circumstances mentioned in this Clause 7.2, to minimize any such delay as may be caused thereby, and to do all that may be reasonably required, to the satisfaction of the Client, to proceed with the Works.

7.3. **Notice of Claim**

(a) Except where otherwise specifically provided in the Contract, the Contractor shall submit to the Client and the Project Manager a notice of a claim for an extension of the Completion Date, together with particulars of the event or circumstance justifying such extension, as soon as reasonably practicable, after the commencement of such event or circumstance. Such notice provided by the Contractor to the Client and Project Manager shall include:

(i) the material circumstances of the event including the cause or causes;

(ii) the nature and extent of any delay;

(iii) the corrective action already undertaken or to be undertaken;

(iv) the period of any extension of time required for each component of the Works, so effected (as applicable); and

(v) a statement that it is a notice pursuant to this Clause 7.3.

(b) The Contractor shall ensure that the particulars provided to the Client and Project Manager under this Clause 7.3 are kept up to date and shall continuously submit such further particulars as may be necessary or which may be requested by the Client, from time to time.

7.4. **Minimize Delay**

The Contractor shall, at all times, use its reasonable endeavor's to minimize any delay in the performance of its obligations under the Contract.

7.5. **Concurrent Delays**

If there are concurrent causes of delay and both delays would entitle the Contractor to an extension of time under this Clause 7.5., then, to the extent of that concurrency, the Contractor shall only be entitled to claim an extension of time for that cause of delay which would entitle it to the longer period of extension.

7.6. **Rate of progress**

If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the Works is at any time, in the opinion of the Client and/or the Project Manager, too slow to ensure completion of the Works within the time period specified in Clause 7.2., the Client shall notify the Contractor in writing and the Contractor shall promptly take all steps as are necessary and the Client may approve to expedite progress so as to complete the Works or such section by the prescribed time or extended time. The Contractor shall not be entitled to any additional payment for taking such steps.

8. MATERIALS AND WORKMANSHIP

8.1. **Quality of Materials and workmanship and tests**

All Materials and workmanship shall be as described in the Contract and in accordance with the Client's instructions and shall be subject from time to time to such tests as the Client may direct.

8.2. **Quality Assurance Programme**

The Contractor before the start of Works shall submit for approval a quality assurance programme to the Client indicating measures that it proposes to implement to ensure that the quality of Works shall be in accordance with requirements laid down in the Contract ("**Quality Assurance Programme**"). The Client and/or Project Manager may add such additional quality assurance measures as it considers appropriate for ensuring quality compliance of the Works. The Contractor shall strictly adhere to this programme and any failure attributable to the Contractor shall attract the penal provisions laid down in the Contract.

8.3. **Cost of samples/ Mock-ups / Tests**

(a) All samples/mock-ups shall be supplied by the Contractor at its own cost if the supply thereof is clearly intended by or provided for in the Contract.

(b) The Contractor shall provide samples for the approval of Client and shall provide alternative samples until the approval of the Client has been obtained. Samples approved by the Client shall be kept at Site under custody of the Contractor until completion of the Project.

(c) The cost of conducting any test shall be borne by the Contractor if such test is clearly intended by or provided for in the Contract and in the cases only of a test under load or of a test to ascertain whether the design of any finished or partially finished work is appropriate for the purposes which it was intended to fulfill, is particularized in the Contract in sufficient detail to enable the Contractor to price or allow for the same in its tender.

(d) The Contractor shall provide normal testing facilities at Site at its cost as directed by the Client and/or the Project Manager.

8.4. **Inspection of Works**

The Client and the Project Manager or any person authorized by them shall at all times have access to the Works and to all workshops and places where Works are being prepared or from where Materials, manufactured articles or machinery are being obtained for the Works and the Contractor shall afford every facility for and every assistance in or in obtaining the right to such access.

8.5. **List of approved brand and makes**

A list of approved brands and makes for Materials to be incorporated in the Works should be furnished by the bidder along with its tender. The Contractor shall submit samples of processed raw materials and Materials procured in conformity with Prudent Industry Practices for the approval of the Client and/or the Project Manager. Procurement of the Materials for the Works shall be after the approval of the Client and/or the Project Manager in writing.

8.6. **Basic Prices**

Basic price shall mean the cost of the Material per unit inclusive of all Taxes and duties, cost of transportation, loading, unloading, breakage, incidental charges, etc. All costs and expenses shall be deemed to be included in item rate quoted by the Contractor for that relevant item and shall not be entitled to claim any extra amounts on this basis. Goods and service tax, if applicable, in performance of the Works shall be calculated and shown separately in the Bidding Documents. The Contractor must provide break-up of all the tax components as applicable separately from the basic price.

8.7. **Removal of improper Materials**

The Client shall during the progress of the Works has power to order in writing from time to time:

(a) the removal from the Site, within such time or times as may be specified in the order, of any Materials, which, in the opinion of the Client, are not in accordance with the Contract or otherwise not fit for use in respect of the Works;

(b) the substitution of proper and suitable Materials and;

(c) the proper re-execution of any Works which in respect of Materials or workmanship is not in accordance with the Contract.

8.8. **Default of Contractor in compliance**

In case of default on the part of the Contractor in carrying out such order, the Client shall be entitled to engage and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be recoverable from the Contractor by the Client or may be deducted by the Client from any monies due to or which may become due to the Contractor.

8.9. **Quality Control Tests**

The Contractor shall perform the relevant tests as required under the scope of Works. The cost of all such tests so performed shall be borne by the Contractor and no extra amounts shall be borne by the Client on this account. The details of the quality tests to be carried out shall be as set out in Technical Specifications or notified by the Client and/or Project Manager.

9. PERFORMANCE PARAMETERS

9.1. **Tests**

The tests shall be conducted by the Contractor in the presence of the Client and/or the Project Manager in accordance with the testing procedures set out in **Schedule VIII** to the Contract, so as to ensure the operation of the New admin. & Engg. Block as an integrated whole to establish the Performance Parameters.

9.2. **Performance Tests**

The performance tests shall be conducted by the Contractor in the presence of the Client and/or the Project Manager in accordance with the performance testing procedures to the Contract, so as to ensure the operation of the New admin. & Engg. Block as an integrated whole to establish the Performance Parameters.

9.3. **Attainment of Performance Parameters**

The Contractor guarantees that during the performance tests, the New admin. & Engg. Block and all parts thereof, shall attain the Performance Parameters, subject to and upon the conditions specified herein.

9.4. **Consequences of Performance Parameters Not Being Met**

Subject to Clauses 9.1 and 9.2, if pursuant to conducting the tests and performance tests, the Performance Parameters are not met, either in whole or in part, the Contractor shall, at its cost and expense, make such changes, modifications and/or additions to the New admin. & Engg. Block, or any part thereof, as may be necessary to meet the Performance Parameters to the satisfaction of the Client. The Contractor shall notify the Client upon completion of the necessary changes, modifications and/or additions, carried out in accordance with this Clause 9.4, and shall request the Client to facilitate the repetition of the performance tests until the Performance Parameters have been met. If the Performance Parameters are not met, either in the whole or in part, even after 2 (two) such re-tests (after carrying out necessary changes, modifications, and/or additions), and the cap for the liquidated damages as provided in Clause 10.2. has been reached, then the Client may, at its sole discretion, exercise any one of the following options:

(a) reject the New admin. & Engg. Block, and recover all the payments already made to the Contractor in terms of the Contract;

(b) terminate the Contract and find a replacement contractor for undertaking the Works at the cost and risk of the Contract; or

(c) accept the deficient Works and proportionately reduce the Contract Price to reflect the diminished value to the Client, and such reduction shall be determined by the Client. The Client shall deduct from the Contract Price, the amounts payable for the defects in New admin. & Engg. Block and the Contractor shall proceed in accordance with all other obligations under the Contract.

9.5. **Liquidated Damages and Termination**

If the total amount of liquidated damages for shortfall in performance exceeds the amount of liquidated damages specified in Clause 10, the Client shall have the right to either:

(a) reject the Works and recover all the payment already made to the Contractor in terms of the Contract; or

(b) terminate the Contract pursuant to Clause 34 of the Contract.

10. LIQUIDATED DAMAGES

10.1. **Liquidated Damages for Shortfall in Performance of the Works**

The Contractor shall pay the liquidated damages as set forth in this Clause 10.1, if the New admin. & Engg. Block, or any part thereof, fails to meet:

10.2. **Liquidated Damages for Delay**

(a) If the Contractor fails to achieve completion of the Works on or before the expiry of the Completion Date, then the Contractor shall pay to the Client [1% (one percent)] of the Contract Price per week subject to maximum of [5% (five per cent)] of the total Contract Price as liquidated damages for every week or part thereof which shall elapse between the Final Completion and the date of issuance of the Final Acceptance Certificate. The Client may, without prejudice to any other method of recovery, deduct the amount of such damages from any monies in its hands, due or which may become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from its obligation to complete the Works or from any other of its obligations and liabilities under the Contract.

(b) The Contractor recognizes and acknowledges that the Client would suffer substantial losses and damage if there is a delay in the completion of the Works.

(c) The payment of liquidated damages for delay under this Clause is in addition to, and without prejudice to, any other remedies that may be available to the Client under the Contract or Applicable Law.

(d) Without prejudice to any other rights the Client may have, the Client shall have the right to reject the Works if the quality of the Works does not meet the Technical Specifications set out in **Schedule X** and the Contractor is unable to correct the deficiencies in Works within [5 (five) days] of being asked to by the Client.

10.3. **Genuine Pre-estimate**

The Parties acknowledge that the damages, losses and costs incurred by the Client for delay in achieving completion of the Works by the Completion Date and for shortfall in performance are uncertain and difficult to determine with precision at the date of signing the Contract. The sums for liquidated damages for delay and liquidated damages for shortfall in performance as set out in this Clause 10.3 represent a reasonable, genuine and appropriate pre-estimate of the damages, losses and costs likely to be suffered by the Client if the delay or the shortfall in performance described in this Clause 10 occurs and are calculated as a best efforts attempt to quantify the Client's actual losses, costs and damages associated with such delay and shortfall in performance. The amounts due under this Clause 10.3, as liquidated damages, shall be payable by the Contractor, without any requirement of proof of the actual loss or damage caused by such delay and/or breach. The sums set out in this Clause 10 seek to limit the potential liability of the Contractor and constitute liquidated damages and not a penalty.

10.4. **Contractor's Obligations**

The payment of liquidated damages by the Contractor in terms of Clause 10.3, does not in any way relieve the Contractor from any of its duties, obligations and responsibilities under the Contract and shall be without prejudice to any other rights available to the Client under the Contract.

10.5. **Rights at Law**

If this Clause 10 (or any part hereof) is found for any reason to be void, invalid or otherwise in-operative so as to disentitle the Client from claiming liquidated damages, the Client is entitled to claim, damages in accordance with Applicable Law for the Contractor's delays or shortfall in performance of the Works for the New admin. & Engg. Block.

11. COMPLETION AND ACCEPTANCE OF WORKS

11.1. **Completion** The Works shall achieve completion, when each of the following has been completed to the Client's satisfaction ("**Completion**"):

(i) the New admin. & Engg. Block is functional in accordance with the requirements of the Contract, and the tests have been successfully completed in accordance with Clause 9.1.;

(ii) the Contractor has complied with all provisions of the Contract relating to the Works;

(iii) the Contractor has performed all its obligations and provided to the Client all Documents, that are due on or prior to the Completion Date, in accordance with the terms of the Contract; and

(iv) the Contractor has delivered to Client, the notice of completion: (a) certifying that all the conditions stated in this Clause 11.1 have been fully satisfied; and (b) accompanied by a

report of results of the tests and the Works completed with sufficient detail to enable the Client to determine whether Completion has been achieved ("**Notice of Completion**"). Provided, however, that if Client subsequently raises an objection to such Notice of Completion in accordance with Clause 11.1.(c), such notice will not be deemed to be delivered until any such objection is satisfied.

(a) Upon the Client and Project Manager being satisfied of completion with the Contractor set out in Clause 11.1.(a) above, they shall issue the completion certificate in a form and manner set out in **Schedule XI** ("**Completion Certificate**").

(b) Within 30 (thirty) days of receipt of the Notice of Completion, the Client shall notify the Contractor, of deficiencies and defects, if any, in relation to satisfying the provisions of Clause 11.1.(a) ("**Defects Notice**"). The Contractor shall, promptly upon receipt of the Defects Notice, perform at the Contractor's sole cost and expense, corrective measures to remove such deficiencies and shall deliver to the Client, a new Notice of Completion when completion of the applicable Works has been completed.

(c) Within 30 (thirty) days of receipt of the subsequent Notice of Completion, the Client shall notify the Contractor of additional or remaining deficiencies, if any, that must be corrected by Contractor as a condition to the Completion. Any Disputes regarding the existence or correction of any such alleged deficiencies shall be resolved pursuant to Clause 35 (Dispute Resolution).

(d) For the avoidance of any doubt, it is clarified that the issuance of the Completion Certificate by the Client shall in no way relieve the Contractor of its other obligations under the terms and conditions of the Contract or give rise to any liabilities for the Client.

11.2. **Provisional Acceptance**

(a) The New admin. & Engg. Block shall achieve provisional acceptance, when each of the following has been completed to Client's satisfaction ("**Provisional Acceptance**"):

(i) the Contractor has achieved Completion (Clause 11.1);

(ii) the Contractor has performed all its obligations under the Contract required to be performed;

(iii) the Contractor has successfully completed the tests required to ensure that the Works are reliable;

(iv) the Contractor has obtained the Occupancy Certificate for the New admin. & Engg. Block;

(v) the Contractor has removed from the Site, all scaffolding, rubbish, etc., and has cleaned the Site off all debris;

(vi) Client has received copies of all permits obtained by the Contractor required for the Works;

(vii) the Contractor has submitted all Documents (including the as-built plans pursuant to Clause 5.19 and Clause 14, and all other items and deliverables required to be submitted by the Contractor under the Contract;

(viii) the New admin. & Engg. Block is capable of being operated in accordance with Prudent Industry Practices;

(ix) the New admin. & Engg. Block is capable of being operated in accordance with Applicable Laws;

(x) the Client has received copies of all permits obtained by the Contractor pursuant to Clause 5.29.(c);

(xi) all Works have been completed to the satisfaction of the Client; and

(xii) no default pursuant to Clause 11.1.(c) exists.

The Contractor shall deliver to the Client, a notice of provisional acceptance, certifying that all the conditions set forth in this Clause 11.2.(a) have been fully satisfied, accompanied by a report of the Works completed with sufficient detail to enable the Client to determine whether Provisional Acceptance Certificate should be issued ("**Notice of Provisional Acceptance**").

(b) Upon the Client and Project Manager being satisfied of completion with the Contractor set out in Clause 11.2.(a) above, they shall issue the provisional acceptance certificate in a form and manner set out in **Schedule XII** ("**Provisional Acceptance Certificate**").

(c) Within [30 (thirty) days] of receipt of the Notice of Provisional Acceptance, the Client and/or the Project Manager shall notify the Contractor, of deficiencies, if any, in relation to satisfying the provisions of Clause 11.2.(a) ("**Provisional Defects Notice**"). The Contractor shall promptly upon receipt of the Provisional Defects Notice, perform at Contractor's sole cost and expense, corrective measures to remove such deficiency and shall deliver to Client a new Notice of Provisional Acceptance when completion of the applicable Works has been completed. Within [30 (thirty) days] of receipt of the subsequent Notice of Provisional Acceptance, Client and/or Project Manager shall notify Contractor of additional or remaining deficiencies, if any, that must be corrected by Contractor as a condition to the issuance of the Provisional Acceptance Certificate. Any Disputes regarding the existence or correction of any such alleged deficiencies shall be resolved pursuant to Clause 35 (Dispute Resolution).

(d) In the event the items stated under Clause 11.2(a)(v) have not been removed within [30 (thirty) days] of the issuance of the Provisional Acceptance Certificate, the Client may sell or otherwise dispose of the same. The Client shall be entitled to be paid the costs incurred in connection with, or attributable to, such sale or disposal and restoring the Site. Any balance of monies from the sale shall be paid to the Contractor.

(e) The issuance of the Provisional Acceptance Certificate by the Client and/or Project Manager shall in no way relieve the Contractor of its other obligations under the terms and conditions of the Contract or give rise to any liabilities for the Client.

11.3. **Final Acceptance Certificate and Final Completion**

(a) The New admin. & Engg. Block shall achieve final completion, when each of the following has been completed to Client's satisfaction and the Contractor has performed all other obligations under the Contract, which are required to be performed prior to the issuance of the Final Acceptance Certificate ("**Final Completion**"):

(i) the Contractor has achieved Provisional Acceptance;

(ii) the Contractor has executed Works to the sole satisfaction of the Client;

(iii) the Contractor has paid all liquidated damages, indemnity sums and other payments due from the Contractor under the Contract;

(iv) the Contractor has assigned to the Client or provided Client with all warranties or guarantees that Contractor has received from Sub-Contractors to the extent Contractor is obligated to do so pursuant to the Contract;

(v) all Contractor's Materials and other supplies, equipment, surplus, waste, huts, wreckage, debris, rubbish, and temporary facilities to which Client does not, and is not entitled to hold title, have been removed from the Site, and the Site have been restored in accordance with the terms of the Contract provided that, all activities in relation to clearing and disposal shall be conducted in accordance with all Applicable Laws;

(vi) all the Contractor's Personnel and the personnel of the Sub-Contractors and their personnel, have been removed from the Site;

(vii) all Sub-Contractors have been paid their dues by the Contractor and Contractor has delivered the final release and waiver of Liens and claims pursuant to the Contract and has delivered such other documents and certificates as Client has reasonably requested to ensure compliance with all Applicable Laws;

(viii) all activities required as per Applicable Law on account of the completion of the Works have been completed by the Contractor;

(ix) the Contractor has delivered to Client a notice of final completion: (a) certifying that all the conditions set forth in this Clause 11.3.(a) have been fully satisfied; and (b) accompanied by a report of the Works completed with sufficient detail to enable the Client to determine whether Final Completion has been achieved ("**Notice of Final Completion**"). Provided, however, that if the Client subsequently raises an objection to such notice in accordance with Clause 11.3(c), such Notice of Final Completion will not be deemed to be delivered until any such objection is satisfied.

(b) Upon the Client and Project Manager being satisfied of completion with the Contractor set out in Clause 11.3.(a) above, they shall issue the final acceptance certificate in a form and manner set out in **Schedule XIII** ("**Final Acceptance Certificate**").

(c) Within [30 (thirty) days] after receipt of the Notice of Final Completion, the Client and/or the Project Manager shall notify the Contractor, of deficiencies, if any, in relation to satisfying the provisions of Clause 11.3.(a) ("**Acceptance Defects Notice**"). The Contractor shall promptly upon receipt of the Acceptance Defects Notice perform at Contractor's sole cost and expense, corrective measures to remove such deficiency and shall deliver to Client, a new Notice of Final Completion when completion of the applicable Works has been completed. Within [30 (thirty) days] of receipt of the subsequent Notice of Final Completion, Client and/or the Project Manager shall notify Contractor of additional or remaining deficiencies, if any, that must be corrected by Contractor as a condition to the Final Completion. Any Disputes regarding the existence or correction of any such alleged deficiencies shall be resolved pursuant to Clause 35 (Dispute Resolution).

(d) Without prejudice to Clause 11.3.(a), additional conditions may be agreed to between the Client and the Contractor, as conditions for issuance of the Final Acceptance Certificate.

(e) For the avoidance of any doubt, it is clarified that the issuance of the Final Acceptance Certificate by the Client shall in no way relieve the Contractor of its other obligations under the terms and conditions of the Contract or give rise to any liabilities for the Client.

11.4. **Take Over**

(a) Upon the issuance of the Final Acceptance Certificate, the Contractor shall handover to the Client and the Client shall take possession and control of the New admin. & Engg. Block ("**Take Over**") and shall issue to the Contractor, a take over certificate in a form and manner set out in "**Take Over Certificate**". Upon such Take Over, the Client shall, except as otherwise provided, be responsible for the risk of loss or damage to the New admin. & Engg. Block.

(b) Prior to the possession and control of the New admin. & Engg. Block being handed to the Client in terms of this Clause 11.4, the Contractor shall be responsible and take care of the New admin. & Engg. Block/ Project in a manner consistent with Applicable Laws, Prudent Industry Practice and the other requirements set forth in the Contract. The transition of such possession and control of the New admin. & Engg. Block from Contractor to Client as set forth in this Clause 11.4 shall be accomplished in accordance with the procedures to be set forth in a transition plan to be submitted by Contractor (in a form acceptable to the Client) to the Client, for its approval, no later than [15 (fifteen) days prior] to the anticipated date of Final Completion.

12. PROJECT MANAGER

12.1. The Contractor acknowledges and agrees that the Client has appointed the Project Manager for the supervision and management of the Works to be undertaken by the Contractor and ensure completion of Works in the time period specified under Clause 7. The Contractor shall coordinate with the Project Manager while carrying out the Works. The Contractor acknowledges and agrees that any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test, or similar act by the Project Manager shall have the same effect as though the act had been an act of the Client. However:

(a) it shall not relieve the Contractor from any responsibility it has under the Contract, including responsibility for errors, omissions, discrepancies and non-compliances;

(b) any failure to disapprove any Works, Contractor's Equipment or Materials shall not constitute approval, and shall therefore not prejudice the right of the Client to reject the Works, Contractor's Equipment or Materials; and

(c) if the Contractor questions any determination or instruction of the Project Manager, the Contractor may refer the matter to the Client, who shall promptly confirm, reverse or vary the determination or instruction.

12.2. The Project Manager may issue to the Contractor instructions which may be necessary for the Contractor to perform its obligations under the Contract. Each instruction shall be given in writing and shall state the obligations to which it relates and the sub-clause (or other term of the Contract) in which the obligations are specified.

12.3. The Contractor shall comply with instructions from the Project Manager, or from the Client, including but not limited to:

(a) inspect and examine the Works before covering up and generate quality report;

(b) certification of bills in the manner satisfactory to the Client; and

(c) inspect and approve the mock-ups, quality of Materials and workmanship.

Notwithstanding any of the above, the Project Manager and the Architect shall, without prejudice, perform actions and deeds as also listed elsewhere in the Contract or in the agreement for appointment of the Project Manager by the Client.

12.4. The Project Manager shall be at liberty to object to and require the Contractor to remove forthwith from the Site engaged in the undertaking of Works any person provided by the Contractor who, in the opinion of the Project Manager, misconducts himself, or is incompetent or negligent in the proper performance of its duties, or whose presence on Site is otherwise considered by the Project Manager to be undesirable, and such person shall not be again allowed upon the Works without the consent of the Project Manager. Any person so removed from the Site for the performance of the Works shall be replaced as soon as possible.

13. ARCHITECT

13.1. The Client has appointed an architect for the purposes of designing the New admin. & Engg. Block ("**Architect**"). The Contractor shall co-operate and coordinate with the Architect and the Client to ensure that the Works are completed in accordance with the provisions of the design of the Architect as supplied to the Contractor as part of the Technical Specifications.

13.2. The Architect may shall depute a representative at the Site for performing the duties and obligations of the Architect specified herein and as set out in the agreement entered into between the Architect and the Client.

13.3. The Contractor acknowledges and confirms that the Architect or any representative of the Architect shall be entitled to inter alia the following items:

(a) give instructions to the Contractor in matters pertaining to the design, Drawings and specifications and completion of the Works; and

(b) give notice to the Contractor of non-approval of any Works or Materials, and such Works shall be suspended or the use of such materials shall be discontinued until the decision of the Client, but such examination shall not in any way exonerate the Contractor from the obligation to remedy any defects which may be found to exist at any stage of the Works or after the same is completed.

13.4. The Contractor shall provide the Architect access to the Site to inspect the Works and provide every facility and assistance for inspecting the Works.

14. DOCUMENTS

14.1. Documents Schedule

The Contractor shall, in accordance with the timelines specified in the Technical Specifications, provide to the Client a complete list of all Documents, which shall be utilized by the Contractor for the purpose of

completion of the Works. The said list of Documents shall clearly indicate the Document number in accordance with the codes, title, revision number, and issue number in accordance with Prudent Industry Practice together with the date on which such Document has been issued. Further, Drawings in relation to the layout of the New admin. & Engg. Block shall clearly provide for the north direction and shall depict grid lines at the scale of [__] meters which lines shall be submitted after a detailed survey carried out by the Contractor. The Contractor shall, if required by the Client, submit a revised schedule of the said Documents, till such time that all Works in relation to the fabrication of the New admin. & Engg. Block are completed by the Contractor. The Contractor shall, at its own cost, supply reduced size prints of all Documents, as and when required by the Client.

14.2. **Specification and Data Sheets**

The Contractor shall, within the time specified in the Technical Specifications, submit to the Client, an updated list of all specifications and data sheets required for undertaking the Works. The said data sheets shall indicate the account number, title, revision number and date of issuance of such sheets, so that an updated summary of the latest specifications, is at all times available with the Client, for reference. The procedure for the submission of revisions, if any to the said data sheets shall be as per the procedure set out for the revision of Documents pursuant to this Clause 14.2.

14.3. **As-Built Plans**

(a) The Contractor shall prepare and maintain an updated and complete set of as-built records of the New admin. & Engg. Block, identifying the precise as built locations, sizes and details of the Works executed. The Contractor shall ensure that all such records are maintained at the Site and shall be exclusively used for the purpose of the Contract.

(b) The Contractor shall, in accordance with this Clause 14, submit to the Client, for its review and comments, (along with the other Documents), plans of the Works for the New admin. & Engg. Block, depicting all executed Works. If any errors are found in the as-built plans, such errors shall be corrected at the Contractor's cost and expense. Unless otherwise provided, as-built plans of the New admin. & Engg. Block and related documents submitted by the Contractor for review under this Clause 14.3.(b) shall be reviewed within 15 (fifteen) days from the date of submission to the Client. If the Client does not provide any comments on the Documents submitted by the Contractor within such 15 (fifteen) days review period then it would be deemed that the Client has no comments on the said as-built plans.

(c) The Contractor shall submit 2 (two) copies of the as-built records to the Client. Further, upon completion of the ELECTRICAL AND ELV phase of the New admin. & Engg. Block, the Contractor shall complete the related plans in relation to the as-built stage (excluding all vendor drawings) and submit to the Client the following:

(i) [3 (three)] complete sets of all Documents on compact disc or other acceptable electromagnetic or electronic media, as may be required by the Client;

(ii) [5 (five)] complete sets of full size prints of the Documents;

(iii) [5 (five)] complete sets of data books specifying all details of the New admin. & Engg. Block in hard binders including certified prints and data for specialty materials to be provided under the Contract. All data books provided by the Contractor under this Clause shall be complete with index for tag numbers associated with the manufacture’s data. Data books shall be bound in volumes, limited to a maximum of 3 (three) inches in thickness;

(iv) [3 (three)] sets of as-built data filled in computer data entry forms; and

(v) [3 (three)] copies of all the Documents information in the form of compact disc or other acceptable electromagnetic or electronic media, as may be required by the Client.

(d) Provided that, in the event the Contractor designs the soft copies, it shall also provide a copy of that version along with its complete documentation. The Contractor shall, [15 (fifteen)] days prior to the issuance of the Final Acceptance Certificate, submit [5 (five)] sets of hard copy outputs of all the Documents to the Client.

14.4. **Data**

(a) The Contractor shall, in accordance with the timelines specified in the Technical Specifications provide such other structural drawings, instruction systems descriptions, Documents and Drawing indexes, computer control keys, computer programs, passwords and all other related data for the New admin. & Engg. Block containing the information necessary to enable the Client to use the New admin. & Engg. Block in accordance with Applicable Law.

(b) The Contractor shall, in accordance with the timelines specified in the Technical Specifications provide the Client with data books, vendor prints, complete Drawing lists, descriptions of the New admin. & Engg. Block and other specific information on the New admin. & Engg. Block.

14.5. **Review of Documents by the Client and/or the Project Manager**

(a) The Contractor shall provide to the Client, free of cost, all Documents in accordance with the Technical Specifications and Applicable Law. All Documents submitted by the Contractor shall be written in English language. The Contractor shall prepare all the Documents, and shall also prepare any other documents that are necessary so as to instruct the Contractor's personnel with regard to the completion of the Works.

(b) The review of Documents by the Client shall cover only general conformity of the Documents to the Technical Specifications, interfaces with the specification of the New admin. & Engg. Block provided under the Technical Specifications, external connections and of the dimensions which may affect the layout of the New admin. & Engg. Block.

(c) This review by the Client may not indicate a thorough review of all dimensions, quantities and details of the New admin. & Engg. Block, any devices or items indicated or the accuracy of the information submitted. This review by the Client shall not be construed by the Contractor, as limiting any of its responsibilities and liabilities for mistakes and deviations from the requirements, specified under the Technical Specifications and the Contract. Any activity forming part of the Documents not particularly described in the Contract shall also be included in the obligations of the Contractor and the omission from the Documents of such activity necessary and obviously intended shall not relieve the Contractor from performing such activity. For the avoidance of doubt, it is clarified that Contractor shall await the expiry of the period specified in Clause 14.2 during which the Client is required to review the Documents, prior to commencing the related Works, and if the Contractor executes the related Works prior to the expiry of such period of the Documents, the same shall be at the sole risk and cost of the Contractor.

14.6. **Mode of Submission**

(a) Unless otherwise provided or agreed to by the Client, the Contractor shall, in accordance with the timelines specified in the Contract, submit to the Client, all Documents specified in the Contract, as being required to be submitted for the review by the Client, along with a notice as specified below.

(b) The Documents to be submitted by the Contractor in accordance with this Clause 14.6 shall be submitted:

(i) in 2 (two) sets of soft copy using an internationally recognized web-based document viewing system, acceptable to the Client, linking the Client, the Contractor and the Sub-Contractors and [4 (four)] sets of hard copy;

(ii) along with a notice which shall state that the said Document is considered ready for both, (i) review by the Client in accordance with this Clause 14.2, and (ii) for use. The notice to be submitted by the Contractor shall also state that the said Document complies with the provisions of the Contract, or, if applicable, the extent to which it does not comply.

(c) Without prejudice to the above, any Document, when issued to the Client, shall clearly evidence on such Document itself, the prior approval of the Contractor with respect to such Document. The Client may reject, without further review, any Document submitted by the Contractor, which in the opinion of the Client (i) has not been subjected to the Contractor's quality assurance system submitted pursuant to Clause 9.2; or (ii) contains an unusual amount of errors or (iii) is otherwise sub-standard.

(d) Notwithstanding review by the Client of the Documents to be submitted by the Contractor pursuant to this Clause 14.2, the Contractor shall continue to be responsible for any errors, omissions or discrepancies therein. The Contractor shall bear any costs as a result of delay in providing such Documents or as a result of errors, omissions or discrepancies therein. The Contractor shall bear the cost of any alterations or remedial work necessary due to such errors, omissions or discrepancies for which the Contractor is responsible and shall modify the Documents accordingly. The performance of its obligations under this Clause 14.2 shall not relieve the Contractor of liability for delay in the completion of the Works under the Contract.

(e) Unless otherwise provided in the Technical Specifications or the Contract, Documents submitted by the Contractor for review, shall be reviewed within 14 (fourteen) days from the date of submission of the respective Document along with the notice specified in Clause 10.2(b), to the Client. If the Client fails to intimate the Contractor with regard to its decision on a Document, within the 14 (fourteen) day period specified in this Clause 14.2, then, such Document shall be deemed to have been reviewed by the Client. The Contractor shall, within 5 (five) days of intimation from the Client with regard to the review of the Documents, or a deemed review of such Document in accordance with this Clause 14.6., as the case may be, submit 6 (six) hard copies and 6 (six) soft copies in electronic form (in compact discs). Any Documents submitted by the Contractor, if in electronic form, shall be in a format acceptable to the Client.

14.7. **Correction of Documents**

(a) Without prejudice to Clause 14.3.(b), the Client may, at any time during the 15 (fifteen) day period specified in Clause 14.3, provide a notice to the Contractor that a Document has failed (to the extent stated) to comply with the provisions of the Contract. Upon receipt of a notice from the Client in terms of this Clause 14.7, the Contractor shall, at its own cost, promptly and in any case no later than 15 (fifteen) days from the receipt such notice, rectify the said Document and resubmit the same for the approval of the Client.

(b) Unless otherwise provided, if any of the information submitted to the Client, in the Documents is substantially in variance with the Technical Specifications, which in the opinion of the Client is unacceptable, such Documents shall be returned to the Contractor marked "**Rejected**" and the Contractor shall re-submit the said Documents. For the avoidance of doubt, it is clarified that no

extension of time shall be granted under this Clause 14.7 due to the Documents not being acceptable to the Client, in the first instance. In addition, the Client shall have the right to request the Contractor to make any change in the Documents that may be necessary to make the New admin. & Engg. Block conform to the Technical Specifications and the Contract, at the cost and expense of the Contractor.

14.8. **Responsibility of Documents**

(a) The Contractor hereby acknowledges that certain identified Documents forming part of the Technical Specifications have, as at the date hereof, been reviewed by the Client and the Contractor shall not, while executing the Works, depart from such Documents, unless consented to in advance by the Client. The Contractor shall be responsible for the accuracy of the Documents and any discrepancies, errors or omissions in the Documents and other particulars supplied by it, regardless of whether such Documents and particulars have been reviewed by the Client. If a Party becomes aware of an error or defect of a technical nature in a Document which was prepared for use, for the purpose of executing the Works, the Party shall promptly give notice to the other Party of such error or defect. If errors, omissions, ambiguities, inconsistencies, inadequacies or other defects are found in any Document provided by the Contractor, such Document, along with the Works corresponding to such Document, shall be corrected at the Contractor's cost and expense, notwithstanding the review by the Client of such Document. If the Documents have been previously reviewed by the Client, the Contractor shall not, during the completion of the Works, depart from the reviewed Documents, unless consented to in advance by Client. Review by the Client shall in no way relieve the Contractor of its obligations under the terms and conditions of the Contract or give rise to any liabilities for the Client.

(b) The Contractor's obligation to complete the Works shall not be reduced or affected by review of any Documents or specifications by the Client.

(c) Unless handed over by the Contractor to the Client, in accordance with the provisions of this Clause 14, the Documents shall, at all times, be in the care and custody of the Contractor.

14.9. **Documents and Specifications for Works**

(a) The Contractor shall, in accordance with the timelines specified in the Technical Specifications, submit to Client, for its review, in accordance with the procedure set out in Clause 14, details of the process package, layout Documents, detailed Documents, design specifications, detailed calculations and purchase specifications, etc., and any other information required by Client prior to issuing the same for the purpose of construction and development of the New admin. & Engg. Block. Within 7 (seven) days of the review by the Client of the Documents to be submitted in terms of this Clause 14.9.(a), the Contractor shall submit to the Client, Document lists, indicating the date of availability of the latest copy of such Document with date of review by the Client of each such Document released for ELECTRICAL AND ELV purposes.

(b) The Contractor shall ensure that all Documents submitted in terms of this Clause 14.9.(b) are made to a reasonable scale and are made in sufficient detail, as mutually agreed between the Parties, and in the event of any non-compliance with the same, necessary changes shall be made by the Contractor, at its own cost.

(c) Unless the Contractor requests the Client for a specific deviation from the specifications in relation to the Documents submitted pursuant to this Clause 14.9. and the Client issues a written authority to deviate from the said specifications, the submission and correction, if any, of the Documents

submitted pursuant to this Clause 14.9.(c), shall not relieve the Contractor of its responsibility to comply with the specifications specified in the Contract.

(d) The Contractor shall ensure that all Documents to be submitted by it pursuant to this Clause 14 are submitted in accordance with the time lines specified in the Technical Specifications. For the avoidance of doubt, it is clarified that at no given point of time, will the Contractor rely on preliminary drawings for the purpose of construction and development of the New admin. & Engg. Block.

(e) The Parties shall follow the following procedure in relation to the submission and subsequent review of the Documents submitted under this Clause 14:

(i) The Contractor shall submit to the Client, no later than the time specified in the Technical Specifications, copies of all preliminary Drawings and specifications in accordance with the requirements of the Technical Specifications;

(ii) The Client shall review the preliminary Drawings submitted in terms of Clause 14 and notify the Contractor, of any comments or suggestions by returning a marked-up print or copy of the said Drawings to the Contractor.

(iii) If the Client returns to the Contractor, marked-up Drawings or if the comments on Drawings and specifications are returned pursuant to Clause 14, the Contractor shall, promptly and in any event no later than 7 (seven) days from the receipt of the same, carry out the requisite corrections and obtain the Client's approval in relation to the said corrections, before issuing the same for the purpose of construction and development of the New admin. & Engg. Block.

(iv) The Contractor shall not modify any Documents submitted pursuant to this Clause 14 after the same have been reviewed by the Client. Provided that, if the Contractor is desirous of modifying any item issued for the purpose of construction and development of the New admin. & Engg. Block, as depicted on the Documents which have been submitted and reviewed in terms of this Clause 14, it shall submit to the Client the revised Documents and modified prints in relation to the same and follow the procedure set forth in this Clause.

(f) The procedure stated in this Clause 14 shall apply *mutatis mutandis* to all applicable Documents submitted by the Contractor, during the construction and development of the New admin. & Engg. Block.

15. CONTRACTOR TO INFORM ITSELF FULLY

15.1. Information

(a) The Contractor shall be responsible for obtaining all information required for the performance of its obligations under the Contract.

(b) The Contractor has clarified and carefully examined all the Documents, design criteria, calculations, (if any) data, Technical Specifications and such other matters as may be necessary or desirable for performing its obligations under the Contract, to its entire satisfaction. The Contractor shall not, except as expressly provided in the Contract, be entitled to any extension of time or to any adjustment of the Contract Price, on grounds of misinterpretation or misunderstanding of any such matter.

(c) The Client shall not be responsible for any error, inaccuracy or omission of any kind in the Technical Specifications as originally included in the Contract and shall not be deemed to have given any representation of accuracy or completeness of any data or information. Any data or information received by the Contractor, from the Client or otherwise, shall not relieve the Contractor from its responsibility of completion of the Works.

(d) The Contractor has, prior to the execution of the Contract Agreement obtained all information and taken into consideration the restrictions imposed by the necessity to coordinate its activities for the New admin. & Engg. Block to be constructed and developed with the mutually agreed times.

15.2. **Local Conditions**

The Contractor represents that it is fully informed of all general and local conditions near the Site and other factors that may have an effect on the compliance of its obligations under the Contract. The Contractor cannot claim a Change under Clause 22 (Change in Contract Elements), an extension of time or an increase in the Contract Price as a result of such local conditions or factors.

15.3. **Site and the New admin. & Engg. Block**

(a) The Contractor represents and confirms that it has entered into the Contract Agreement on the basis of its proper examination of the Site by its checking or carrying out its own investigations as may be required, including the suitability and availability of the access routes thereto and that it is aware about the conditions of the Site and its surroundings and has satisfied itself as to all technical, commercial, social and general conditions of and all circumstances affecting the Site, including the nature of the ground and sub-soil, Site surroundings, environmental aspects, the form and nature of the Site and the exact location and condition, as may be required. In this regard, the Contractor has obtained for itself all information, as may be necessary or desirable for the compliance of its obligations under the Contract, including all necessary information as to the risks, contingencies, climatic, hydrological, natural conditions and all other circumstances which may influence or affect the Contract Price and/or its obligations under the Contract. Further, the Contractor agrees that if during the term of the Contract, any portion of the Site is rendered unsafe, on account of any reason whatsoever (including unfavourable weather), the Contractor shall restrict the completion of the Works, to such portion of the Site which is safe and not affected by the said contingency. The Contractor represents and confirms that by signing the Contract Agreement, the Contractor accepts total responsibility for having foreseen all difficulties and costs of successfully completing the Works and that the effect of all contingencies have been considered by the Contractor prior to entering into the Contract Agreement and that the Contractor shall not be entitled to extension of time or an increase in the Contract Price on account of the same.

(b) The Contractor represents and confirms that it has entered into the Contract on the basis of a proper examination of the data relating to the New admin. & Engg. Block on the basis of information that the Contractor could have obtained from a visual inspection of the Site and of other data readily available to it relating to the New admin. & Engg. Block. The Contractor acknowledges that any failure to verify and interpret any data and information in relation to the Site and/or the New admin. & Engg. Block shall not relieve it of its responsibility for properly estimating the difficulty or cost of successfully performing its obligations under the Contract.

16. SUB-CONTRACTORS

16.1. **Experience**

The Contractor represents that each Sub-Contractor has the requisite skill, expertise, experience, capacity, capability and has successfully executed works similar to the Works, in the immediately preceding [3 (three) years] from the Commencement Date.

16.2. **List of Sub-Contractors**

A list of all major items and the approved Sub-Contractors for each of such major items has been provided by the Contractor and incorporated in the Technical Specifications. The Client and the Contractor have agreed on a list of approved Sub-Contractors, from the list provided in the Technical Specifications, and the same is set out in **Schedule XV** (Approved List of Sub-Contractors) ("**Approved List**"). The Client, after due consultation and agreement with the Contractor, shall have the right to add or delete from the Approved List, from time to time, and approve any successor or replacement of any person listed on the Approved List.

16.3. **Sub-Contracting**

With regard to major items, as specified in the Technical Specifications, the Contractor shall, subject to Clause 16.2, only contract with the Sub-Contractors provided in the Approved List. Further, any sub-contracting in terms of this Clause 16.3, shall not relieve or discharge the Contractor from any of its liabilities or obligations under the Contract and the Contractor shall be responsible for the acts, defaults and neglects of all Sub-Contractors and its agents, servants or workmen, or any of them, as fully, as if they were the acts, defaults or neglects of the Contractor under the terms of the Contract and the Client shall not be liable on account of the same. No acts or omissions on the part of any of the Sub-Contractors will allow the Contractor to claim an extension of time, an increase in the Contract Price, or any other dispensation pursuant to the Contract.

16.4. **Other Sub-Contractors**

If the Contractor intends on contracting with Sub-Contractors, other than those specified in the Approved List, the Contractor shall provide the Client with details in relation to the same. The Client shall, no later than 10 (ten) days from such additional details being provided by the Contractor, approve or disapprove the same. In the event the Client approves the additional Sub-Contractors in terms of this Clause 16.4, such additional Sub-Contractors shall be deemed to be included in the Approved List. The Client shall also have the right to propose a Sub-Contractor other than those specified in the Approved List and upon mutual agreement with the Contractor in this regard, require the Contractor to contract with such Sub-Contractor. In the event of such mutual agreement, the sub-contractor proposed by the Client shall be deemed to be included in the Approved List. Provided that, any agreement between the Parties in terms of this Clause 13.4 shall not relieve or discharge the Contractor from any of its liabilities or obligations under the Contract and the Contractor shall be responsible for the acts, defaults and neglects of all such Sub-Contractors and its agents, servants or workmen, or any of them, as fully, as if they were the acts, defaults or neglects of the Contractor under the terms of the Contract.

16.5. **Client's Consent**

The Contractor shall not sub-contract the whole of its obligations under the Contract. Notwithstanding the Client's consent to any Sub-Contractor, the Contractor shall at all times remain fully responsible to the Client for the proper performance of its obligations under the Contract. The Client shall, at no given point of time, be considered to have any duties or obligations towards any Sub-Contractor as a result of the Contract or by virtue of providing its consent to the Contractor with respect to a Sub-Contractor. The

Contractor shall not be relieved of any obligation or responsibility under the Contract by subcontracting of any portion of the Works to a Sub-Contractor.

16.6. **Copies of Sub-Contracts**

The Contractor shall, upon request, provide to the Client copies of technical ordering specifications and principal commercial terms (un-priced) of the sub-contracts with regard to the major items as identified in the Technical Specifications, to be executed with the Sub-Contractors.

16.7. **Form of Sub-Contracts**

(a) The Contractor shall ensure that all contracts with its Sub-Contractors are made in writing. The Contractor shall also ensure that each Sub-Contractor includes provisions which will entitle the Contractor to discharge its obligations and liabilities to the Client in terms of the Contract. The Contractor shall further ensure that all contracts with the sub-contractors shall require each Sub-Contractor, to the extent of the Works to be performed by the Sub-Contractor, to be bound by the terms of the Contract and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by the Contract, assumes toward the Client. Each contract with a Sub-Contractor shall preserve and protect the rights of the Client under the Contract with respect to the Works being performed by the Sub-Contractor so that such sub-contracting does not prejudice the rights of the Client.

(b) Each instrument evidencing any contract with its Sub-Contractors shall provide that, pursuant to its terms, in form and substance satisfactory to the Client, the rights of the Contractor under such contract with its Sub-Contractors (including all warranties provided by the sub-contractor) are assignable to the Client. The Contractor shall assign to the Client, its successors and assigns, any such contract with its Sub-Contractors as may be required by the Client in its sole discretion, prior to the issuance of the Final Acceptance Certificate or following termination of the Contract, as the case may be.

16.8. **Client's Rights**

The Contractor warrants that no arrangement, agreement or understanding with any sub-contractor shall directly or indirectly interfere with, restrict or impede the Client in the exercise of any right or remedy under the Contract.

16.9. **Evidence of Payment**

(a) The Contractor shall promptly pay all amounts due to any Sub-Contractor. The Contractor shall, by an appropriate agreement with each Sub-Contractor, require each Sub-Contractor to make payments to its sub-contractors, if any, in a timely manner. The Client shall have no obligation to pay or to verify the payment of any monies to any sub-contractor. However, the Client may, at its discretion, verify the payments made by the Contractor to the Sub-Contractors.

(b) The Contractor shall provide to the Client documentary evidence that the Contractor has made or caused to be made all payments due to its Sub-Contractors and when final payment has been made to the Contractor under the Contract, that the Contractor has made final payment to its Sub-Contractors.

17. TRANSFER OF OWNERSHIP

17.1. **Ownership**

The ownership of the New admin. & Engg. Block shall, at all times vest with the Client. Without prejudice to this Clause 17.1, the Contractor shall, until the issuance of the Take Over Certificate, be responsible for the care of the New admin. & Engg. Block, together with the risk of damage thereto. After the issuance of the Take Over Certificate, the Client shall be responsible for the care of the New admin. & Engg. Block, provided that any damage to the New admin. & Engg. Block on account of reasons attributable to the Contractor, shall at all times during the term of the Contract and the expiry of the Defect Liability Period, be to the Contractor's account.

17.2. **Warranty as to Title**

The Contractor warrants that the Contractor's equipment and material shall remain free from defects in title including liens of any kind. The Contractor shall defend the title to the same against any third party and shall indemnify, defend and hold the Client harmless from and against any and all losses arising out of or otherwise resulting from any failure to comply with this Clause 17.2.

17.3. **Ownership of the Contractor's equipment & materials**

The ownership of the Contractor's Equipment, used by the Contractor or its Sub-Contractors, shall at all times remain with the Contractor**.**

17.4. **Excess Material**

The ownership of any Materials, in excess of the requirements for the New admin. & Engg. Block, as may be determined by the Client and Contractor, shall vest with the Contractor.

18. REPRESENTATIONS AND WARRANTIES

18.1. **Contractor's Representations and Warranties**

The Contractor makes the following representations and warranties to the Client, each of which is true and correct as on the date of issuance of Letter of Award which representations and warranties shall continue to be true and correct throughout the term of the Contract:

(a) it has been incorporated as a company under the Companies Act, [1956/2013], is validly existing and has the power and authority to carry on its business in India;

(b) it has the power to enter into the Contract and comply with its obligations under it;

(c) it has in full force and effect the authorizations necessary for it to enter into the Contract and the transactions contemplated under it;

(d) it has satisfied itself as to the correctness and sufficiency of the Contract Price, which shall, except as otherwise provided for in the Contract, cover all its obligations under the Contract; and

(e) it and its Sub-Contractors have the requisite knowledge, skill, experience, expertise, capacity and capability to execute the Works in a timely manner and to satisfy and fulfill all their respective obligations and responsibilities under the Contract.

18.2. **Client's Representations and Warranties**

The Client makes the following representations and warranties to the Contractor, each of which is true and correct as on the date of issuance of Letter of Award which representations and warranties shall continue to be true and correct throughout the term of the Contract:

(a) it has been incorporated as a company under the Companies Act, 2013, is validly existing and has the power and authority to carry on its business in India;

(b) it has the power to enter into the Contract and comply with its obligations under it;

(c) it has in full force and effect the authorizations necessary for it to enter into the Contract and the transactions contemplated under it; and

(d) it shall, with the necessary assistance of the Contractor, as and when required, acquire permits, approvals and/or licenses specified in the Technical Specifications.

19. WARRANTIES

19.1. Contractor's Warranties

The Contractor hereby warrants to the Client that the New admin. & Engg. Block has been and shall have been engineered, designed, tested and the Works shall be executed in a manner consistent with the terms of the Contract, in accordance with Prudent Industry Practices and Applicable Law,

(a) using the skill, care and diligence to be expected of appropriately qualified and experienced professionals with experience in ELECTRICAL AND ELV works of a type, nature and complexity similar to the ELECTRICAL AND ELV in the industry;

(b) in accordance with good modern engineering principles and of appropriate grade compatible with the intended purpose;

(c) using only Materials and goods for incorporation into the New admin. & Engg. Block which are new, and do not contain any refurbished components, are free of lien and encumbrances, are unused and the standards of all workmanship, manufacture and fabrication have conformed in all respects to the Technical Specifications, and shall be of such quality as is intended for the purpose for which it is intended;

(d) using the standards of all workmanship and fabrication which conform in all respects to the Codes and Standards and being of such quality as is intended for the purpose for which it is intended;

(e) conforming to the Technical Specifications and being free of defects and deficiencies. The engineering and design shall be such that the Works shall meet all safety and applicable criteria as specified in the Contract;

(f) being suitable for the use in accordance with the requirements necessary to meet the Performance Parameters;

(g) using means, methods and techniques required for the completion of the Works which are appropriate for the conditions and materials involved and in accordance with the current state of the art; and

(h) ensuring that the Works when completed will conform in all respects with the requirements of, and will be suitable for, the purpose of the Contract.

19.2. Other Warranties

The New admin. & Engg. Block shall:

(a) upon Final Completion, be in accordance with all requirements of the Contract unless otherwise agreed by the Client, or altered in accordance with a Change in accordance with Clause 22 (Change in Contract Elements) instructed by the Client;

(b) be capable of being operated in accordance with the requirements of the Contract and Prudent Industry Practices; and

(c) comply with Applicable Law in effect on the Final Completion Date.

20. INSURANCE

20.1. Insurance Policies

(a) All insurance policies, whether required to be obtained under this Clause 20 or otherwise, wherever possible shall be taken out in the joint names of the Client, the Contractor and Sub-Contractor, wherever applicable.

(b) All the insurance shall be arranged by Contractor from a reputable insurance company which can deal with all matters pertaining to the subject and is acceptable to the Client. The Client has reserved its right to nominate the insurance company or take the insurance policies under which the claims will be lodged by the Contractor.

(c) The Contractor must ensure that the policy amounts cover the Contract Price and adequately cover the maximum possible liability that may arise on the occurrence of the risks covered.

(d) The Contractor shall deposit the original insurance policy and the premium paid receipts with the Client on the date of issuance of the Letter of Award. If the Contractor fails to procure such policy or deposit the same and the premium receipts in original with the Client, the Client shall be entitled, but not obligated to procure such policy and recover the payments thereon from the Contractor either by withholding the amounts payable to the Contractor or otherwise. Any deviation from the same shall be subject to the prior written approval of the Client. The Client shall be entitled to prosecute and/ or compromise or settle the claims under such policies in such manner as may be deemed fit without reference to the Contractor. The Contractor shall provide necessary assistance to the Client in this regard.

(e) The Client, however reserves the right to take all or some of the insurance policies on its own and thereafter the Contractor shall be required to process the claims if any for settlement under the policies so taken by the Client. The Client further reserves its right to nominate an insurance company with whom the Contractor will be required to obtain the policies, insurance of Works, etc.

(f) Without limiting its obligations and responsibilities, the Contractor shall insure in the joint names of the Client and the Contractor against all loss or damage from whatever cause arising, for which it is responsible under the terms of the Contract and in such manner that the Client and Contractor are covered for the period stipulated in hereof, and are also covered during the Defects Liability Period.

(g) Such insurance shall be effected with an insurer and in terms approved by the Client which approval shall not be unreasonably withheld, and the Contractor shall, whenever required produce to the Client or its representative the policy or policies of insurance and the receipts for payment of the current premiums.

(h) The Contractor shall take out a Contractor's all risk insurance policy for the full amount of the Contract Price valid till the expiry of the Defects Liability Period, within 10 (ten) days of the date of issuance of the Letter of Award jointly in the name of the Client and the Contractor and the original policy shall be deposited with the Client.

(i) The Contractor shall similarly indemnify the Client against all claims, which may be made upon the Client, whether under the Workman's Compensation Act, 1923 or any Applicable Law in force during the currency of the Contract or at common land in respect of any employee of the Contractor or any Sub-Contractor and shall at its own expense effect and maintain up to the Defect Liability Period, with an approved office, a policy of insurance in the joint names of the Client and the Contractor against such risks and deposit such policy or policies with the Client from time to time during the currency of the Contract.

20.2. **Third Party Insurance**

(a) Before commencing the Works, the Contractor shall insure against loss for any material or physical damage, loss or injury which may occur to any property, including that of the Client, or to any person, including any employee of the Client, the Project Manager, other contractors/ Sub-Contractor(s) or their respective employees, agents, representatives and visitors, by or arising out of the completion of the Works or in the carrying out of the Contract.

(b) The Contractor shall, whenever required, produce to the Client or its representative the policy or policies of insurance and the receipts for payment of the current premiums.

(c) The term of such insurance shall be up to the end/ expiry of the Defect Liability Period and shall include for any damage to the properties and/ or injury including death to the persons of the general/ public/ architects and anyone else deemed to be third party.

20.3. **Provisions to indemnify Client**

The terms of such insurance shall include a provision whereby, in the event of any claim in respect of which the Contractor would be entitled to receive and indemnify under the policy being bought or made against the Client, the insurer will indemnify the Client against such claims and any cost, charges and expenses in respect thereof and the Contractor to indemnify the Client for any shortfall in the realization of the claims. The Client shall be entitled to set off any such amounts from the amounts due and payable by it to the Contractor under the terms of the Contract.

20.4. **Accident or Injury to workmen**

The Contractor shall be responsible and liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or any Sub-Contractor. The Client shall not be liable for or in respect of any damages or compensation payable by law in respect or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or any person working under/with the Contractor. The Contractor shall fully indemnify and keep indemnified the Client against all such damages and compensation, against all claims, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

20.5. **Insurance against accident, etc., to workmen**

(a) The Contractor shall insure against such liability with an insurer approved by the Client, which approval shall not be unreasonably withheld, and shall continue such insurance during the whole of the time that any persons are employed by it on the Works and shall, when required, produce to the Client or its representative such policy of insurance and the receipt for payment of the current premium. Provided always that, in respect of any persons employed by any Sub-Contractor, the Contractor's obligation to insure as aforesaid under this sub-Clause shall be satisfied if the Sub-Contractor shall have issued against the liability in respect of such persons in such manner that the Client is indemnified under the policy, but the Contractor shall require such Sub-Contractor to produce to the Client or its representative, when required, such policy of insurance and the receipt for the payment of the current premium.

(b) Notwithstanding the requirements mentioned in the above, the Contractor shall at the minimum provide for Contractor's all risk insurance policy to cover the following:

(i) entire Contract Price for the period of completion including Defect Liability Period;

(ii) third party insurance to cover for any damages to third party. This shall be up to the end of the Defect Liability Period and shall include for any damage to the properties and/ or injury including death to the persons of the general/ public/ architects and anyone else deemed to be third party;

(iii) policy to cover Contractor's liability under Employee's Compensation Act 1923, Minimum Wages Act 1948, Contract Labour (Regulation and Abolition) Act 1970 and other Applicable Laws. This shall be for the period up to issue of the Final Acceptance Certificate, including the Defect Liability Period;

(iv) insurance cover against damage, theft or any other loss of all Materials and Contractor's Equipment brought to the Site; and

(v) the Contractor shall insure against all such liabilities and shall continue such insurance during the term of the Contract including Defect Liability Period. Premium for all insurance policies shall be paid and borne by the Contractor and shall not be reimbursable.

(c) These insurance certificates shall be executed and shall state that the policies cannot be surrendered for 10 (ten) days after written notice of the Client having consented to such surrender.

(d) The Contractor shall obtain written confirmation of similar certificates from all Sub-Contractors and thereby assume responsibility for any claims or losses to the Client resulting from failure of any of the Sub-Contractors to obtain adequate insurance protection in connection with the Works.

(e) If the Contractor fails to effect and keep in force the insurances referred to in Clause 20, or any other insurance which it may be required to effect under the terms of the Contract, then and in any such case the Client may effect and keep in force any such insurance and pay such premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the Client as aforesaid from any monies due or which may become due to the Contractor, or recover the same as a debt due from the Contractor.

20.6. **Insurance for Contractor's Equipment**

(a) The Contractor shall insure the Contractor's Equipment against all loss or damage. This insurance shall cover loss or damage from any cause in so far as such insurance is readily obtainable. Such insurance shall be for a limit of not less than the full replacement value (including delivery to the Site). Such insurance shall be in such a manner that each item of Contractor's Equipment is insured while it is being transported to and from the Site or the right of way and throughout the period it is on or near the Site or the right of way.

(b) The Client shall have no liability for the loss/ damage to the Contractor's Equipment unless such loss or damage are due to reasons attributable to the Client.

(c) Client shall deduct from any amount due to the Contractor under the Contract entire insurance premium and other costs that the Client shall have paid to the insurer or incurred or may otherwise recover such amount as a debt due from the Contractor.

20.7. **Insurance for Contractor's Personnel**

The Contractor shall effect and maintain insurance against liability for claims, Contractor's Personnel damages, losses and expenses (including legal fees and expenses) arising from the death, injury, sickness or disease to any person employed by the Contractor or any Sub-Contractor of all types. The Client and the Client's representatives shall also be indemnified under the policy of insurance, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Client or of the Client's representative's personnel. For a Sub-Contractor's employees, such insurance may be effected by the Sub-Contractor, but the Contractor shall be responsible for compliance with this Clause.

20.8. **General Requirements for Insurance**

(a) The Contractor shall comply with the conditions stipulated in each of the insurance policies. The Contractor shall not make any adverse material alteration to the terms of any insurance without the prior approval of the Client.

(b) If the Contractor fails to effect and keep in force any of the insurance required wherever applicable under the Contract, or fails to provide satisfactory evidence policies and receipts in accordance with this sub-Clause, the Client may, without prejudice to any other right or remedy, effect insurance for the coverage relevant to such default, and pay the premiums due. Such payments shall be recoverable from the Party whose obligation it was to effect the insurance.

(c) Nothing in this Clause limits the obligations, liabilities or responsibilities of the Contractor, under the other terms of the Contract or otherwise. Any amounts not insured or not recovered from the insurers shall be borne by the Contractor in accordance with the Contract.

21. DEFECT LIABILITY PERIOD

21.1. **General** During the Defect Liability Period, the Contractor shall remain liable for any technical or other defects in the Works.

(a) The Defect Liability Period shall be [12 (twelve months)] from the issuance of the Take Over Certificate ("**Defect Liability Period**"). If the Contractor re-performs any of the Works or otherwise makes good

the Works (as the Client shall, at its discretion, determine) a defect in terms of this Clause 21.2, then the Defect Liability Period with respect to any such re-performed Works, or Works which have been otherwise made good, shall be a period of [12 (twelve) months] from the date of re-performance of such Works, or the date when such Works, have otherwise been made good, as the case may be. Provided that, the Defect Liability Period pursuant to this Clause 21.2 shall be subject to a maximum period of [30 (thirty) months] from the issuance of the Take Over Certificate. Provided further that, if the Contract is terminated prior to the issuance of the Take Over Certificate, then, the provisions of this Clause 21.2 with respect to the Defect Liability Period for repair, replacement, or otherwise making good shall apply *mutatis mutandis*, and in such an event the Defect Liability Period shall be [12 (twelve) months] from the date of termination.

(b) If during the Defect Liability Period, any defect is found in the design, construction, or engineering being part of the Works, of the New admin. & Engg. Block, the Contractor shall promptly and in any event no later than [3 (three) days] from the receipt of the notice from the Client in terms of Clause 21.2, commence the correction of any errors, omissions, defects or deficiencies in the Works, re-perform any part of the Works, or repair, replace or otherwise make good (as the Client shall, at its discretion, determine) such defect, in addition to any damage to the New admin. & Engg. Block caused by such deficiency in Works, at the sole risk and expense of the Contractor. Provided that, the Contractor shall not be responsible for the repair, replacement or making good of any defect or of any damage to the New admin. & Engg. Block arising out of or resulting from normal wear and tear.

(c) The Contractor shall perform all remedial action and re-perform any part of the Works required in such a manner and at such time, and shall co-ordinate its activities in connection therewith as notified by the Client in this regard.

(d) The Contractor shall in re-performing the Works or undertaking any repair/ replacement under this Clause 21, which could affect the safe and effective use of the New admin. & Engg. Block or any part thereof, observe all requirement of the Client and the Project Manager with regard to safe and effective use or operation thereof.

(e) During the Defect Liability Period¸ any re-design, repair or replacement of any part of the New admin. & Engg. Block requiring the New admin. & Engg. Block to be shut-down, shall be undertaken in co-ordination with Client so as to minimize disruption of the ongoing operations of the New admin. & Engg. Block. Such re-design, repair or replacement may, at Client's option, require Works to be carried out at the Site by the Contractor's personnel, beyond the normal working hours, including weekends and public holidays. All costs required for the performance of such re-design, repair or replacement shall be to the account of the Contractor.

(f) During the performance of the re-design, repair or replacement of any part of the New admin. & Engg. Block as provided in Clause 21.6, the Contractor shall procure that the Contractor's personnel act in compliance with Applicable Law, the Site regulations, work rules, workmen's compensation requirements as well as safety procedures.

21.2. **Notice of Defect**

The Client shall provide the Contractor a notice stating the nature of any defect in the New admin. & Engg. Block and/or Works, together with all available evidence, promptly following the discovery of such defect. The Client shall afford all reasonable opportunity to the Contractor to inspect any such defect. The Contractor shall, within 3 (three) days of the notice from the Client in this regard, submit to the Client details of the proposed re-performance of the Works and/or the repairs or replacements, which it proposes to make, the estimated duration of the repairs or the duration required to effect the replacement Works, details or parts of the New admin. & Engg. Block considered necessary to shut down and the

proposed dates for such re-performance, repairs or replacements. All Works and repairs and replacements shall be carried out at a time and for periods agreed with the Client pursuant to Clause 21.

21.3. **Access**

With regard to repairs or re-performance of Works needed, the Client shall afford the Contractor, subject to its reasonable security restrictions, the necessary access to the New admin. & Engg. Block and the Site to enable the Contractor to perform its obligations under this Clause 21.

21.4. **Tests**

(a) The Contractor shall carry out the tests, in relation to the repaired part of the New admin. & Engg. Block and shall endeavor not to disrupt the New admin. & Engg. Block as a whole, to demonstrate that such defect has been removed and that the repaired part of the New admin. & Engg. Block is functioning in the manner in which it is required to function under the Contract. Such tests shall be conducted, solely at its cost and expenses and the Contractor shall provide all materials, manpower, tools and tackles etc., which are required for carrying out the said tests.

(b) In addition to the tests conducted under Clause 21.10(a), if the repair or making good is of such a nature that it may affect the efficiency of the New admin. & Engg. Block or any part thereof, the Client shall provide the Contractor a notice of [28 (twenty eight) days] requiring additional tests to be conducted on the defective part of the New admin. & Engg. Block and the Contractor shall promptly, at its own risk and cost, carry out any such additional tests.

(c) If any part of the New admin. & Engg. Block fails the tests as set forth in Clause 21.10.(a), the Contractor shall carry out further repair, replacement or making good, as the case may be, until that part of the New admin. & Engg. Block passes such tests. The tests, in character, in no event shall be inferior to what has been agreed upon by the Client and the Contractor.

21.5. **Failure to Remedy Defects**

(a) If the Contractor fails to commence repair of the defect or any damage to the New admin. & Engg. Block caused by such defect, within the time frame stipulated in Clause 21.3, following the notice from the Client in this regard, the Client may, by notice to the Contractor, proceed to repair such defect.

(b) In addition to the Client's rights pursuant to Clause 21, if, in the reasonable opinion of the Client, a defect in the New admin. & Engg. Block or part thereof, is expected to cause serious loss or damage which can be prevented by immediate action, such defect may be corrected by the Client or a third party designated by the Client. Upon intimation by the Client in this regard, the Contractor shall assist wherever possible in undertaking any necessary corrections. Notwithstanding anything to the contrary stated in the Contract, any action undertaken by the Client pursuant to this Clause 21.11.(b), shall not in any way relieve the Contractor of its responsibilities under the Contract and the warranties set forth in Clause 18 and Clause 19 (Warranties) shall not be reduced or affected on account of the Client undertaking such action.

(c) All costs incurred by the Client in terms of this Clause 21.11.(a), shall be paid to the Client by the Contractor and/or may be deducted by the Client from any monies due to the Contractor and/or claimed by invoking the Performance Bank Guarantee. For the avoidance of doubt, it is clarified that any action undertaken by the Client in terms of this Clause 21.11 shall not extinguish the Contractor's liabilities arising pursuant to the terms and conditions of the Contract.

(d) If the Contractor fails to remedy the defect or damage under Clause 21.11, the Client shall have the right to:

(i) terminate the Contract pursuant to Clause 34 as a whole or in respect to such major part which cannot be put to the intended use and without prejudice to any other rights, under the Contract or otherwise, the Client shall then be entitled to recover all sums paid for the Works or for such part (as the case may be), the cost of dismantling the same and clearing the Site; or

(ii) accept the deficient New admin. & Engg. Block and proportionately reduce the Contract Price to reflect the diminished value to the Client and such reduction shall be determined by the Client at its discretion.

21.6. **Latent Defect**

(a) If, any defect appearing in any part of the Works, is of a kind that would not have been apparent to the eye prior to the expiry of the Defect Liability Period (a "**Latent Defect**") and arises within a period of [5 (five) years] from the Completion Date, the same shall be made good by the Contractor by repair or replacement. The Client shall, upon discovery of Latent Defect, notify the Contractor. The Contractor shall commence repair on such Latent Defect no later than [3 (three) days], or such other mutually agreed time period, from the receipt of a notice from the Client in this regard.

(b) The Contractor shall have the right to investigate the cause of any problem or abnormality in the New admin. & Engg. Block, which the Client reasonably believes is due to a Latent Defect.

(c) If the Contractor fails to commence repair of any Latent Defect within the time specified in Clause 21.12(a), following receipt of a notice from the Client, the Client may cause such repairs to be affected at the Contractor's expense.

21.7. **Serial Defect**

(a) If, during the Defect Liability Period, more than [15% (fifteen percent)] of the Works contains the same defect ("**Serial Defect**"), then a Serial Defect shall be deemed to exist in all such parts of the Works.

(b) If a Serial Defect exists, then it shall be deemed to be a defect for the purposes of this Clause 21.13 and all provisions with regard to the rectification of defects as set out in this Clause 21.13 shall apply *mutatis mutandis* to the rectification of the Serial Defect.

(c) Without prejudice and in addition to Clause 21.13(b), if a Serial Defect exists, the Contractor shall:

(i) promptly perform a thorough investigation to ascertain the cause of the Serial Defect and provide a report to the Client detailing the cause and effect of the Serial Defect;

(ii) subject to Clause 21.6, remedy all Works which are deemed to be effected by the Serial Defect including carrying out any necessary alterations, additions, modifications, design modifications, repairs or replacements regardless of whether a defect has made itself apparent in such parts of the Works at the time that the threshold stated under Clause 21.13(a) is exceeded.

21.8. **Costs, Taxes and Duties**

The Contractor shall be responsible for payment of all costs, taxes (including all indirect taxes except excise duty, entry tax and octroi and duties incurred in the course of performance of its obligations under this Clause 21.

22. VARIATIONS AND CHANGE IN CONTRACT ELEMENTS

22.1. **Introducing a Change**

The Client shall have the right to propose and subsequently require the Contractor, from time to time, till the issuance of the Take Over Certificate, to make a Change in accordance with the procedure set out in Clause 22.3 ("**Change**"). The Contractor shall execute and be bound by a Change proposed by the Client, unless the Contractor promptly provides a notice to the Client (along with supporting documents) that, the Change:

(a) will have an adverse impact on the achievement of the Performance Parameters; or

(b) comprises the omission of any Works which are to be carried out by a third party.

22.2. **No Change for Default**

No variation made on account of any default of the Contractor in the performance of its obligations under the Contract shall be deemed to be a Change, and such variation shall not result in any adjustment of the Contract Price or the postponement of the Completion Date.

22.3. **Changes Originating from Client**

(a) If the Client proposes a Change pursuant to Clause 22.1, it shall send to the Contractor, a notice ("**Request for Change Proposal**") requiring the Contractor to prepare and provide to the Project Manager within [15 (fifteen) days] of the Request for Change Proposal, a proposal ("**Change Proposal**") which shall include the following:

(i) brief description of the Change, including a description of the proposed corrective activities and/or Works to be executed or modified, and a programme for its execution, together with supporting calculations containing a break down for the actual cost of supplies for any items required/Works to be executed to give effect to the Change;

(ii) effect on the Completion Date and the necessary modifications;

(iii) the effects of implementation of the Change, taking into account the omission of execution of a portion of the Works, if any;

(iv) the cumulative impact of effects resulting from the stated Change on all prior Works and any changes in the Works to be executed as scheduled; and

(v) estimated cost of the Change;

(vi) effect of the Change on the safety of the New admin. & Engg. Block, if any; and

(vii) effect on any other provisions of the Contract.

(b) In addition to the information specified in this Clause 22.3(b), the Change Proposal shall include such other information as the Client may reasonably request in connection with each Change, and shall include copies of all price quotations and other documents as may enable the Client to verify the Contractor's proposed costs or savings in respect of the Change. For the avoidance of doubt, it is clarified that Contractor shall bear all costs and expenses in relation to the Change Proposal, whether or not such proposal is ultimately implemented.

(c) The pricing of a Change shall, as far as practicable, be calculated in accordance with the rates and prices included in the Contract as set out in Bidding Documents. If the rates and prices of any Change are not available in the Contract, the Parties shall agree on specific rates for the valuation of the Change. If the Contractor is instructed to proceed with a Change, prior to the determination of its value, the Contractor shall keep contemporary records of all labour hours, cost of Materials and Contractor's Equipment and any other cost related to undertaking the Change. Such records shall be provided to the Client upon request.

(d) If before or during the preparation of the Change Proposal, it becomes apparent that the aggregate effect of compliance with the Change and with previously issued Change Orders, would have the effect of increasing or decreasing the Contract Price as originally set forth by more than [15% (fifteen percent)], the Contractor shall provide a notice of objection prior to providing the Change Proposal. If the Client accepts the Contractor's objection, the Client and the Contractor shall agree on specific rates for the valuation of the Change and the Contractor shall submit the Change Proposal accordingly. If the Client does not accept the Contractor's objection, then the Client may cancel or vary the Request for Change Proposal, in which case, the Contractor shall submit the Change Proposal in accordance with the Client's revised Request for Change Proposal. However, in case of any Dispute in this regard, the matter may be resolved in terms of Clause 35 (Dispute Resolution).

(e) Upon receipt of the Change Proposal, the Client and the Contractor shall mutually agree upon all matters in the Change Proposal, including agreement on rates if such rates are not available in the Contract or if the limit of [15% (fifteen percent)] has been exceeded. Within 15 (fifteen) days of such agreement, the Client shall, if it intends to proceed with the Change, issue to the Contractor an order ("**Change Order**") whereby:

(i) the Client shall grant an extension of time, if necessary;

(ii) the agreed adjustments, if any, shall be made to the Contract Price and the Completion Date; and

(iii) such other changes may be ordered as may be required to give effect to the Change.

(f) The Client shall only instruct a Change under this Clause 22.3(f), upon mutual agreement with the Contractor on the quotation and the terms and conditions of the implementation of the Change.

(g) If the Client is unable to reach a decision within 15 (fifteen) days of the receipt of the Change Proposal, it shall notify the Contractor with details of the expected time by when the Contractor can expect a decision. For the avoidance of doubt, it is clarified that the Contractor shall continue to perform its obligations under the Contract, whilst awaiting a response from the Client in relation to the Change Proposal.

(h) If the Client decides not to proceed with the Change, for any reason whatsoever, it shall, within 30 (thirty) days from the receipt of the Change Proposal, or such later date indicated to the Contractor, notify the Contractor accordingly.

(i) If the Client and the Contractor cannot reach an agreement on:

(i) the price for the Change;

(ii) an equitable adjustment to the Completion Date; or

(iii) any other matters identified in the Change Proposal,

then, the Client has the right to instruct the Contractor to proceed with the Change by issuing an instruction in this regard ("**Pending Agreement Change Order**").

(j) Upon receipt of a Pending Agreement Change Order, the Contractor shall immediately proceed with effecting the Change under the Pending Agreement Change Order. The Parties shall thereafter attempt to reach an agreement on the outstanding issues under the Change Proposal. If the Parties cannot reach an agreement within 60 (sixty) days from the date of issuance of the Pending Agreement Change Order, then the matter may be resolved in terms of Clause 35 (Dispute Resolution).

22.4. **Changes Originating from Contractor**

(a) The Contractor shall have a right to propose a Change only, when in the Contractor's opinion, if adopted, such change would:

(i) accelerate Completion;

(ii) reduce the cost to the Client of constructing and developing the New admin. & Engg. Block;

(iii) improve the efficiency or value to the Client of the completed Works;

(iv) improve the quality, efficiency or safety of the New admin. & Engg. Block or any part thereof; or

(v) otherwise be of benefit to the Client,

in each instance, by submitting to the Client a written application in this regard, at its own cost and expense, giving reasons for the proposed Change and including the information stated in Clause 22.4 ("**Application for Change Proposal**").

(b) Without prejudice to the above, the Contractor shall, during the term of the Contract, have a continuing obligation to suggest to the Client for its consideration, Changes known to the Contractor, as may be necessary to incorporate significant new developments in technology which are applicable or appropriate for the New admin. & Engg. Block or any part thereof. If the Contractor proposes such a Change, it shall submit to the Client an Application for Change Proposal, *inter-alia*, identifying the benefits of such Change.

(c) Upon receipt of the Application for Change Proposal under this Clause 22.4., the provisions of Clauses 22.3(c) to 22.3(j) shall apply *mutatis mutandis*.

22.5. **Improvements**

The Client or the Contractor may propose changes in the Technical Specifications in respect of the New admin. & Engg. Block or quality thereof, which enhances the performance of the New admin. & Engg.

Block. If the Parties agree upon any such changes, the same shall be given effect to in accordance with the procedure specified in this Clause 22.

22.6. **Exclusions**

(a) Notwithstanding anything to the contrary, no Change Order shall be granted if:

(i) the Contractor seeks any Change or variation in its obligations which is due to any fault in the Documents supplied by it or due to any misrepresentation relating to any warranties provided by the Contractor;

(ii) the Change is necessary in order for the Contractor to satisfy its responsibility to complete the Works and ensure that the New admin. & Engg. Block is capable of performing as contemplated under the Contract and as specified in the Technical Specifications; or

(iii) the Change relates to the re-performance of any of the Works due to the Contractor's failure to comply with the Technical Specifications.

(b) Notwithstanding any other provision of the Contract, none of the following shall:

(i) be considered under any circumstances as a Change;

(ii) be taken into account when calculating the effect upon the Contract Price; or

(iii) by itself, be considered the basis for any adjustment of the Contract Price:

(A) any escalation in the cost of materials or labour; or

(B) any normal design improvements effected by the Contractor.

23. CONTRACT PRICE AND INVOICING

23.1. **Payment of Contract Price**

(a) The Contract Price is exclusive of service tax and works contract tax and the applicable taxes and duties shall be payable in accordance with the provisions of Clause 21.14 (Taxes and Duties).

23.2. **Mobilization Advance**

(a) 10% of Contract Value against an irrevocable bank guarantee as prescribed in the tender form for equivalent value and recoverable 12.5% basis from 2nd RA bills however 100% mobilization will be recovered once the value of work done reached of 80% of contract value.

23.3. **Escalation/Contract Price Variation**

Subject to the provisions of Clause 22 (Variation and Change in Contract Elements) and Contract Price, the Contract Price shall be firm till the completion of the obligations of the Contractor under the Contract and there shall be no escalation whatsoever of the Contract Price.

23.4. **Full and Complete Payment**

a) The Contract Price shall be the full and complete payment for satisfactory discharge of the Contractor's performance of its obligations under the Contract and all things necessary for the proper execution and completion of the Works and the remedying of any defects and except as otherwise provided, includes all costs necessary for the completion of the Works and compliance with the terms and provisions of the Contract.

b) For the avoidance of doubt, it is clarified that the Contract Price includes all Direct Taxes, direct, indirect and ancillary charges, cess, costs and expenses of whatsoever nature, including for the Contractor's Equipment & Materials, license, royalty and fees, accessories, Intellectual Property licenses and Documents to be provided under the Contract. The applicable indirect taxes shall be paid in accordance with Taxation.

24. TERMS OF PAYMENT

24.1. **General**

The Contract Price shall be paid in accordance with this Clause 24.

24.2. **Effect of Payment**

No payment of the Contract Price made by the Client, shall be deemed to constitute acceptance by the Client of the Works or any part(s) thereof and shall not relieve the Contractor of any of its obligations under the Contract.

24.3. **Currency of Contract Price**

All payments of the Contract Price shall be made by the Client to the Contractor in INR (Indian Rupees).

24.4. **Terms and Procedure of Payments of the Contract Price**

(a) The Contractor shall submit an invoice to the Client [in triplicate] by the 1st week of each month providing details of the achievement, in the immediately preceding month. The Invoices shall be accompanied with relevant supporting documents (including work completion reports to be submitted by the Contractor) and any relevant documents required by the Client in this regard. The Contractor shall submit to the Client, for its approval, a copy of each Invoice to be submitted by the Contractor pursuant to this Clause 24. The approval of the Client shall be made within 30 (Thirty) Days, (10 days to the PMC + 20 days to the Client) from the submission of such Invoice in a manner satisfactory to the Client. The proforma of the Invoice and the documents and details to accompany it shall be mutually discussed and agreed to by the Parties, provided that, the Contractor shall at all times ensure that Invoices are raised in accordance with the relevant provisions of Applicable Law, so as to enable the Client to avail credit of the taxes indicated in the said Invoice.

For the avoidance of doubt, it is clarified that if an Invoice is not accompanied by the supporting documents, then such amounts of the Invoice shall not be due and payable by the Client, until the supporting documents have been provided by the Contractor. Further, the withholding of any amounts by the Client pursuant to this Clause 24, shall not constitute an event of default for non-payment, on the part of the Client.

(b) If an amount under an Invoice is disputed for any reason by the Client in terms of Clause 24, or if the Invoice is not raised in accordance with the relevant provisions of Applicable Law, then such amounts of the Invoice shall not be due and payable by the Client and the Client shall be entitled to withhold payment of the amounts under such Invoice, which shall only be released upon the resolution of the Dispute in terms of Clause 35, or upon receipt of a revised Invoice raised in accordance with the relevant provisions of Applicable Law, from the Contractor, as the case may be. Further, the withholding of any amounts by the Client pursuant to this Clause 24 shall not constitute an event of default for non-payment, on the part of the Client. The Contractor shall provide details concerning the description of the Works executed and any further substantiation as Client may reasonably require, including any other information or documentation relating to the performance of the obligations of the Contractor under the Contract, that the Client might reasonably need to present, from time to time, to a Government Instrumentality.

(c) The Client shall, subject to Clause 24.4.(b), make payments of undisputed amounts under an Invoice, within 30 (Thirty Days) days following the approval by the Client of the Invoice pursuant to Clause 24. The Client shall pay amounts under each Invoice directly to such bank account(s) of the Contractor, as may be instructed by the Contractor to the Client.

(d) 5% (five percent) retention of the value of Works certified by the Project Manager, shall be made in every Invoice by the Client.

(e) It is expressly clarified that the value of the Retention Money shall not exceed 5% (five percent) of the Contract Price in aggregate and shall be retained by the Client till the expiry of the Defect Liability Period.

(f) The Retention Money shall be released by the Client, subject to the following conditions being satisfied:

(i) the Contractor has achieved Final Completion;

(ii) the New admin. & Engg. Block has been handed over to the Client in terms of Clause 11.4;

(iii) the Contractor has executed all the Works to the sole satisfaction of the Client;

(iv) the Defect Liability Period has expired, and the Contractor has rectified all defects in terms of Clause 21;

(v) the Contractor has paid all liquidated damages, indemnity sums and other payments due from the Contractor under this Agreement.

(vi) the Contractor has assigned to the Client or provided Client with all warranties or guarantees that Contractor has received from Sub-Contractors to the extent Contractor is obligated to do so pursuant to this Agreement.

(vii) all Contractor's Materials and other supplies, equipment, surplus, waste, huts, wreckage, debris, rubbish, and temporary facilities to which Client does not, and is not entitled to hold title, have been removed from the Site, and the Site have been restored in accordance with the terms of this Agreement provided that, all activities in relation to clearing and disposal shall be conducted in accordance with all Applicable Laws;

(viii) all the Contractor's Personnel and the personnel of the Sub-Contractors and their personnel, have been removed from the Site;

(ix) all Sub-Contractors have been paid their dues by the Contractor and Contractor has delivered the final release and waiver of Liens and claims pursuant to this Agreement and has delivered such other documents and certificates as Client has reasonably requested to ensure compliance with all Applicable Laws; and

(x) all activities required as per Applicable Law on account of the completion of the Works have been completed by the Contractor.

Provided that the Retention Money may be released upon submission an unconditional and irrevocable bank guarantee from a reputable bank acceptable to the Client for an amount equivalent to the Retention Money. The Retention Money Bank Guarantee shall be valid up to the expiry of the Defect Liability Period and shall have a claim period of 3 (three) months from the date of its expiry. If requested by the Client, the Contractor undertakes to extend the validity period of the Retention Money Bank Guarantee.

(g) The Client shall withhold from payments to be made to the Contractor and pay to the Governmental Authority, any and all taxes required to be withheld pursuant to Applicable Law. The Client shall provide to the Contractor the tax deduction certificates, for such withheld amounts.

(h) All Invoices shall be endorsed with the contract number and title.

(i) Payments made by the Client against any Invoice shall not preclude the right of the Client to thereafter dispute any items invoiced and paid for.

(j) Except as provided in Clause 24, if any other amounts are due and payable from one Party to the other, including payments pursuant to Clause 10 (Liquidated Damages) and Clause 28 (Indemnity), then the Party to whom such amounts are owed shall provide to the other Party an invoice accompanied by/along with the calculations and with the relevant documentary proof showing the basis for the calculations substantiating the claimed payments. The Party liable to make payment under a Miscellaneous Invoice shall make payment against the same within 30 (thirty) days from the date of receipt of such Miscellaneous Invoice.

(k) Notwithstanding the provisions of this Clause 24, the Parties shall have the right to dispute, in good faith, any invoiced item. Where any amount, under an Invoice or a Miscellaneous Invoice, as the case may be, is disputed by a Party, then such Party shall, within 21 (twenty one) days of receipt of the Invoice or Miscellaneous Invoice, as the case may be, notify the other Party of such Dispute and the Parties shall seek to resolve the Dispute by mutual consultation. If the Parties fail to resolve the Dispute by mutual consultation within 15 (fifteen) days of the date of such notice then the disputing Party shall withhold payment of such disputed amount till the resolution of such Dispute pursuant to Clause 35 (Dispute Resolution). Provided that, the disputing Party shall duly make payment of the undisputed amount in accordance with this Clause 24 (Terms of Payment).

(l) The Client shall withhold sums equivalent to taxes at applicable rates on the amount payable to the Contractor by way of consideration under the Contract in accordance with the provisions of the Income Tax Act, 1961, as amended or modified and applicable. The Client shall not make such withholdings in the event that the Contractor produces a certificate from the appropriate authority constituted under the Indian Income Tax laws to the effect that no withholding taxes would be required on the payments received by the Contractor from the Client.

(m) The Contractor shall adhere to the directions of the Client, Project Manager and/or the Architect, as the case may be in terms of the provisions laid down in the Contract.

24.5. **Client's Claims**

(a) If the Client considers itself to be entitled to any payment under any Clause of the Contract or otherwise in connection with the Contract, and/or to any extension of the Defect Liability Period in accordance with Clause 21, it shall, as soon as practicable after becoming aware of its claim or circumstances giving rise to such claim, provide the Contractor with notice and particulars of such claim. A notice relating to any extension of the Defect Liability Period shall be given before the expiry of such period.

(b) The notice for claim shall specify the provisions of the Contract which the Client relies upon or other basis of the claim, and shall include substantiation of the amount and/or extension to which the Client considers itself to be entitled in connection with the Contract. The Client shall then proceed to agree or determine (i) the amount (if any) which the Client is entitled to be paid by the Contractor, and/or (ii) the extension (if any) of the Defect Liability Period in accordance with Clause 21.

(c) The Client may deduct the amount due to it pursuant to such a claim from the Contractor, from any monies due, or that become due, to the Contractor or may issue a Miscellaneous Invoice with regard to such amounts.

25. SITE OFFICES, SECURITY AND FACILITIES

25.1. The Contractor shall supply and erect a well-lit, temporary Site office for use by it at its own cost, if required. The layout of the Site office, Drawing shall be as approved by the Client in consultation with the Project Manager. The Site office shall contain wash rooms, seating arrangement with furniture and good ventilation.

25.2. A fully furnished Site office to be provided to the Client and the Project Manager for total 10 (TEN) members crew for a period of 90 days beyond actual project completion date. The Site office to contain workstations, meeting/conference room, manager cabin, air conditioning, grid ceiling, chairs, flooring, washrooms, maintenance of wash rooms/office, tea and drinking water facility, projector, projector screen, walky talky, fridge, dining area, safety PPE (safety helmet, google, shoes (with steel toes), reflective vest, public address system, for the Client and Project Manager and their visitors.

25.3. No photos/CCTV shall be installed by the Contractor without prior written permission from the Client.

25.4. The Contractor shall deploy Site security team for material storage as well as for manpower movement at Site till the Take Over Certificate is issued by the Client. The Contractor security team should work closely with the Client and the Project Manager for maintaining the Site logistics.

26. SAFETY REQUIREMENTS

26.1. The Contractor shall comply with the safety precautions, protective measures, housekeeping requirements, etc. as set out in **Section 10**. The Client shall have the right to stop the work at Site, if in its opinion, proceeding with the Works will lead to an unsafe and dangerous condition. The Contractor shall get the unsafe condition removed or provide protective equipment. The Contractor shall ensure that all workmen are aware about the nature of risk involved in their work and have adequate knowledge for carrying out their work safely.

26.2. The instructions issued by the Client and/or the Project Manager pursuant to the Contract are indicative and not exhaustive. Therefore, the Contractor shall be responsible to ensure that adequate safety measures are adopted in the course of execution of the Works in accordance with the Contract in accordance with safety standards / statutory regulations, as applicable.

26.3. In case of any non-compliance by the Contractor of any of the provisions of this Clause 26 above would, without prejudice to any other remedy that the Client may be entitled to under Applicable Law or in the Contract or otherwise, the Client shall be entitled to impose an amount as compensation in its sole discretion.

27. LIMITATION OF LIABILITY

27.1. The total liability of the Contractor to the Client under or in connection with the Contract, shall not exceed the Contract Price, provided that, this limitation shall not apply to any obligation of the Contractor to:

(a) pay liquidated damages to the Client in accordance with Clause 10;

(b) indemnify the Client in accordance with the provisions of the Contract;

(c) pay the indemnity amount that may be payable under Clause 28.2; or

(d) pay for losses caused due to the Contractor's gross negligence, fraud or willful misconduct.

27.2. **No Consequential Loss**

Notwithstanding anything to the contrary, except in cases of payment to be made pursuant to Clause 27.1., neither the Contractor nor the Client shall be liable to the other, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that, this exclusion shall not apply to any obligation of the Contractor to pay liquidated damages to the Client.

28. INDEMNITY

28.1. **General:** The Contractor shall protect, defend, indemnify and hold the Client, and their directors, key managerial personnel, employees, agents and representatives harmless from and against:

(a) any and all losses, damages, costs, expenses (collectively "**Losses**") incurred by reason of the acts or omissions of the Contractor, its officers, directors, employees, in the performance of the Contract or execution of Works, including without limitation any and all Losses, arising directly or indirectly from or incurred by reason of any failure of the Contractor or any Sub-Contractor (i) to pay any taxes, duties, cesses etc. required to be paid by such person, (ii) to make any payments in respect of taxes, duties, cesses which are to be paid by such person in connection with the performance of its obligations relating to the Contract, (iii) any such Losses arising from injury to or death of third parties or damage to or loss of property of third parties;

(b) any and all Losses, incurred by reason of or arising from claims or sanctions or penalties imposed by any Governmental Authorities or others for any actual or asserted failure by the Contractor, Sub-Contractor(s) or any of their respective officers, directors, employees to comply with any Applicable Laws;

(c) any and all Losses, arising directly or indirectly from or incurred by reason of the Works being undertaken at the Site post Completion Date;

(d) any damage caused by the Contractor to the Site;

(e) all Contractor and/or Sub-Contractor employee claims, failure of Contractor or its Sub Contractors to comply with Applicable Law and Prudent Industry Practices and liability for any hazardous substances claims; and

(f) any and all Losses, arising directly or indirectly as a result of any violation of any patents, design rights, trademark or copyright, confidentiality and other protected rights arising in connection with the Contractor's Equipment or in the course of the completion of the Works; and

(g) any and all Losses, damages, costs, expenses, claims, demands, proceedings, or liability however arising against or incurred by the Client relating to the Project due to or arising from or contributed to by any act, omission or default on the part of the Contractor.

28.2. **Zero Fatality Rate at Site**

(a) The Contractor acknowledges that having a zero fatality rate at the Site is important for the Client and a material requirement of the Safety Requirement. If the Contractor does not take all safety precautions and/or fails to comply with the Safety requirement or the Applicable Laws for the safety at the Site while performing its obligations under the Contract, then without prejudice to the provisions of Clause 28.1 or any other obligation of the Contractor under the Contract, the Contractor shall pay to the Client:

(i) a sum of [INR 10,00,000 (Rupees ten lakh only)] in case of death of any workman/employee at the Site; and

(ii) a sum of [INR 2,50,000 (Rupees two lakh fifty thousand only)] in case of permanent disability of any workman/employee at the Site,

in each case occurring during the course of the Contract.

(b) The Contractor shall pay such amounts to the Client, immediately upon a demand being made for the same, but in no event later than the time period prescribed in Clause 24.4.(g) for payment of a Miscellaneous Invoice. The Parties agree that such amounts received by the Client from the Contractor shall be paid by the Client to the family of such deceased workman/employee or such disabled workman/employee. The compensation mentioned in this Clause 28.2. is in addition to the compensation payable to the workman under the relevant provisions of the Employee's Compensation Act, 1923 and rules framed there under or any other Applicable Law.

28.3. **Proceedings**

On receipt of any notice of any claim from any third Party, which would entitle any Party ("**Indemnified Party**") to claim indemnification from the other Party ("**Indemnifying Party**"), the Indemnified Party shall within a reasonable time provide a written notice of the same to the Indemnifying Party along with all the documents available with it in respect of the said claim specifying in detail the claim, the amount claimed by the third Party, the date on which the claim arose and the nature of the default to which such item is related (including a reference to the applicable provision of the Contract). The Indemnifying Party shall be entitled to but not obliged to participate in and control the defense of any such suit, action or proceeding at its own expense or direct the Indemnified Party to defend such claim, at the cost of the Indemnifying Party. If the Indemnifying Party elects to control the defense of any such suit, action or proceeding, the Indemnified Party shall render all necessary assistance including grant of access to premises and personnel and to relevant documents and records that it possesses or controls to the extent required by the relevant

adjudicatory authorities or is necessary for the purposes of investigating the matter and enabling the Indemnifying Party to take the action referred to in this clause. The Indemnifying Party may also request the Indemnified Party, at the cost of the Indemnifying Party to dispute, resist, appeal, compromise, defend, remedy or mitigate the matter or enforce against the Third Party the Indemnifying Party's rights in relation to the matter and in connection with proceedings related to the matter or use reputable advisers and lawyers chosen by the Indemnifying Party. The Indemnified Party shall not settle any such suit, action or proceeding without the prior written consent of the Indemnifying Party.

28.4. **Payment of Indemnities**

Where a Party is entitled to payment from the other Party pursuant to this Clause 28, such Party shall promptly notify the other Party of the same and issue a Miscellaneous Invoice. The other Party shall make payment of such Miscellaneous Invoice in accordance with Clause 24.4.(g).

29. CONFIDENTIAL INFORMATION

29.1. Each Party shall treat as confidential, the other Party's information consisting of specifications, designs, plans, drawings, software, data, prototypes, or other business and/or technical information, methodologies, know-how, processes, quotations, which such party discloses to the other party ("**Information**").

29.2. Each Party agrees that for a confidentiality period beginning on the date of execution of the Contract and ending 2 (two) years from the termination of the Contract, the receiving Party shall use information only for the purpose of the Contract ("**Purpose**"), shall hold information in confidence using the same degree of care as it normally exercises to protect its own proprietary information, but not less than reasonable care, taking into account the nature of the information, and shall grant access to Information only to its employees who have a need to know, shall reproduce Information only to the extent essential to fulfilling the purpose, and shall prevent disclosure of information to third parties. The receiving Party may, however, disclose the Information to its consultants and contractors with a need to know; provided that by doing so, the receiving Party agrees to bind those consultants and contractors to terms at least as restrictive as those stated herein, advise them of their obligations, and indemnify the disclosing party for any breach of those obligations.

29.3. Upon the disclosing Party's request, the receiving Party shall either return to the disclosing Party all Information or shall certify to the disclosing Party that all media containing Information have been destroyed.

29.4. The foregoing restrictions on each Party's use or disclosure of Information shall not apply to information that the receiving Party can demonstrate:

(a) was independently developed by or for the receiving Party without reference to the information, or was received without restrictions; or

(b) has become generally available to the public without breach of confidentiality obligations of the receiving Party; or

(c) was in the receiving Party's possession without restriction or was known by the receiving party without restriction at the time of disclosure; or

(d) is required to be disclosed pursuant to legal or administrative requirement for disclosure; provided that the receiving Party has given the disclosing Party prompt notice of such demand for disclosure and the receiving Party reasonably cooperates with the disclosing Party's efforts to secure an appropriate protective order.

30. INTELLECTUAL PROPERTY RIGHTS

30.1. All designs, Drawings, specifications, data, Documents, reports, studies, manuals, programs, analyses and all other items produced by the Contractor or the Sub-Contractors or the suppliers in the performance of the Works (herein collectively referred to as the "**Work Product**"), shall become and remain the property of the Client, and the Contractor shall deliver the same (properly sorted and indexed) to the Client in accordance with the provisions of the Contract and in any event upon termination of the Contract. For the avoidance of doubt, the Parties acknowledge and agree that the Drawings and plans, and all ELECTRICAL AND ELV and construction plans and Drawings relating to the Project, are the Client's property.

30.2. The Contractor hereby irrevocably assigns to the Client any rights it may have or acquire in (and waives and will require each supplier, vendor and Sub-Contractor to waive all "moral rights" it may have with respect to) any and all such Work Product.

30.3. The Contractor shall save harmless and indemnify the Client from and against all claims and proceedings for or on account of infringement of any intellectual property rights including patent rights, designed trademark or name or other protected rights in respect of any constructional plant, technology, design, machine work, or Material used for or in connection with the Works or any of them and from and against all claims, proceedings, damages, cost, charges and expenses whatsoever in respect thereof or in relation thereto. Except where otherwise specified, the Contractor shall pay all tonnage and other royalties, rent and other payments or compensation, if any, for any document/materials required for the Works.

30.4. **Ownership of Documents**

All Documents and other documents prepared by the Contractor and used in the performance of the Works shall be the property (including all intellectual property rights vested in the documents prepared by the Contractor for the purposes of the development of the New admin. & Engg. Block) of the Client. The Contractor shall supply to the Client all such Documents and other documents, as well as any drawings, specifications, calculations, memoranda, data, notes and other materials at the earlier of Final Acceptance or termination of the Contract. The Client shall have the right to copy, use, transfer and communicate the documents for the purposes of completing, operating, maintaining, altering, adjusting, or repairing the New admin. & Engg. Block.

30.5. **Use of Drawings by Contractor**

The Contractor shall be entitled to retain a reproducible set of all Drawings and Documents and other documents delivered to the Client by the Contractor in accordance with the Contract. Provided that the Contractor shall not at any given point of time use the information provided in such documents or such documents for any purpose other than the completion of the Works.

30.6. **Royalties and License Fees**

The Contractor shall pay all required royalties and license fees with respect to proprietary rights, intellectual property licenses and agreements and shall procure (at its cost), as required, the appropriate proprietary rights, intellectual property licenses and agreements for materials, methods, processes and systems in accordance with the provisions of the Contract. The Contractor shall not incorporate any materials, methods, processes or systems that involve the use of any Confidential Information, intellectual property or proprietary rights that the Client does not have the right to use or that may result in claims or suits against the Client or the Contractor arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other proprietary rights, or applications for any such rights, or use of Confidential Information.

31. FORCE MAJEURE

31.1. Except as otherwise specifically provided in the Contract, neither Party shall be liable to the other Party or be deemed to be in breach of the Contract by reason of any delay in performing or observing, or any failure to perform or observe, any of its obligations under the Contract, if the delay or failure was due to any event or circumstance which is not within the reasonable control, of the Party, and with the exercise of due diligence, was not reasonably foreseeable and could not reasonably be prevented, avoided or removed by such party ("**Affected Party**") through the exercise of reasonable skill or care, and does not result from the Affected Party's negligence or the negligence of its agents, employees or Sub-Contractors, which causes the Affected Party to be delayed, in whole or in part, or unable to partially or wholly perform its obligations under the Contract ("**Force Majeure Event**"). Force Majeure Event shall include:

(a) acts of God, fire, flood, lightning, storm, typhoon, hurricane, tornado, earthquake, epidemics, or other natural disaster;

(b) act of Government Authority which makes the performance of obligations under the Contract to be impossible for either Party;

(c) event of war (whether declared or not), invasion, act of foreign enemy, hostilities, revolution, rebellion, terrorism, insurrection, military, usurped power, mutiny or civil war.

For the avoidance of doubt, it is clarified that insufficiency of finances or funds or any obligation for the payment of money or the Contract becoming onerous to perform shall not be a Force Majeure Event.

31.2. The Affected Party shall give notice to the other Parties of any Force Majeure Event as soon as practicable, but not later than 7 (seven) days after the date on which such Party becomes aware of the occurrence of the Force Majeure Event or should reasonably have known of the commencement of the Force Majeure Event. If an event of Force Majeure results in a breakdown of communications rendering it unreasonable to give notice within the applicable time limit specified herein, then the Affected Party shall give such notice as soon as reasonably practicable after reinstatement of communications, but not later than 1 (one) day after such reinstatement.

31.3. The notice of occurrence of a Force Majeure Event shall be a pre-condition to the Affected Party's entitlement to claim relief under the Contract. Such notice shall include full particulars of the event of Force Majeure, its effects on the Party claiming relief and the remedial measures proposed. The Affected Party shall give the other Party regular reports on the progress of those remedial measures and such other information as the other Party may reasonably request about the Force Majeure Event.

31.4. The Affected Party shall give notice to the other Parties of:

(a) the cessation of the relevant Force Majeure Event; or

(b) the cessation of the effects of such Force Majeure Event, on the performance of its obligations under the Contract.

31.5. To the extent not prevented by a Force Majeure Event pursuant to Clause 31, the Affected Party shall continue to perform its obligations under the Contract. The Affected Party shall use its reasonable efforts to mitigate the effect of any Force Majeure Event as soon as practicable.

31.6. Subject to Clause 31.3, the Affected Party shall not be responsible or liable for failure to perform its obligations under the Contract, if such failure is due to a continuing Force Majeure Event, provided that a Force Majeure Event shall not release the Affected Party of its obligations to perform the other obligations, which are unaffected by such Force Majeure Event.

31.7. For avoidance of doubt, no Party's obligation to make payments of money due or payable prior to occurrence of the Force Majeure Events under the Contract shall be suspended or excused due to the occurrence of a Force Majeure Event in respect of such Party.

32. CHANGE IN LAW

32.1. For the purpose of the Contract, the term "**Change in Law**" shall mean the occurrence of any of the following events after the Execution Date, resulting into any increase or decrease in the Contract Price:

(a) the enactment, coming into effect, adoption, promulgation, amendment, modification or repeal (without re-enactment or consolidation) in India, of any Applicable Law, including rules and regulations framed pursuant to such Applicable Law;

(b) a change in the interpretation of any Applicable Law by any Government Authority having the legal power to interpret or apply such Applicable Law;

(c) the imposition of a requirement, for obtaining any applicable approvals/licenses/ permits which were not required earlier;

(d) a change in the terms and conditions prescribed for obtaining any approvals/licenses/ permits required by a Party for the performance of its obligations under the Contract or the inclusion of any new terms or conditions for obtaining such approvals/licenses/ permits;

(e) any change in tax or introduction of any tax made applicable for performance of the Works as per the terms of the Contract.

For the avoidance of doubt, it is clarified that any revision to the Contract Price or the Completion Date would be restricted to direct transactions between the Parties.

32.2. If the Contractor is affected by an incident of Change in Law and considers itself eligible for relief for such Change in Law, then, it shall give notice to the Client and the Project Manager of such Change in Law, along with the documentary evidence, if any, establishing the impact of such Change in Law. The notice served pursuant to this Clause 32 shall provide, amongst other things, precise details of:

(a) the Change in Law;

(b) effect on the Contractor;

(c) adjustment required in the Contract Price.

32.3. If after the date of issuance of the Letter of Award, there is a Change in Law, due to which the Completion Date needs to be changed, the same shall be revised reasonably in accordance with Clause 7.2, to the extent that Contractor has thereby been affected in the performance of any of its obligations under the Contract.

32.4. If the Parties fail to agree upon a revision to the Contract Price, the matter shall be referred to an internationally recognized firm of auditors, mutually acceptable to the Parties. If the Parties cannot agree on a firm of auditors, then the Client shall appoint an internationally recognized firm of auditors. The said firm of auditors, shall within 10 (ten) days of such appointment, make a determination as to such proposed revision, which determination shall be binding on the Parties.

33. SUSPENSION

33.1. **Suspension of works:**

The Contractor confirms and acknowledges that the Client shall have the right to, by giving a 1 (one) day prior written notice to the Contractor, with the previous approval of the Client, direct the Contractor to suspend the progress of the Works or any part thereof for such time and in such manner as the Client may consider necessary and shall during such suspension require the Contractor to properly protect and secure the Works, so far as is necessary in the opinion of the Client. The extra cost incurred by the Contractor in giving effect to the instructions of the Client under this Clause shall be borne by the Client unless such suspension is:

(a) otherwise provided for in the Contract, or

(b) necessary by reason of some default on the part of the Contractor, or

(c) necessary by reason of climatic conditions on Site, or

(d) necessary for the proper completion of the Works or for the safety of the Works or any part thereof in so far as such necessity does not arise from any act or default by the Project Manager or the Client.

Provided that the Contractor shall not be entitled to recover any such extra cost unless it gives written notice of its intention to claim such costs to the Client and the Project Manager within 15 (fifteen) days of the order of the Client. The Client shall settle and determine any extra payment and/or extension of time under to be made to the Contractor in respect of such claim in accordance with the provisions of the Contract.

33.2. **Suspension of Work**

The Contractor shall, on the instructions of the Client and/or the Project Manager, suspend the progress of the Works or any part thereof for such time and in such manner as the Client and/or the Project Manager may consider necessary and shall, during such suspension, properly protect and secure the Works or such part thereof so far as is necessary in the opinion of the Client and/or the Project Manager.

33.3. The Project Manager shall after due consultation with the Client and the Contractor, determine any extension of time to which the Contractor is entitled on account of such suspension.

34. TERMINATION

34.1. The Contract may be terminated by the Client by issuing a written notice of 7 (seven) days to the other Parties upon occurrence of the any of the following events:

(a) any breach of the terms of the Contract and/or Applicable Law which breach has not been rectified by the Contractor within 7 (seven) days of issuance of notice by the Client; or

(b) if the Contractor fails to complete the Works by the Completion Date.

34.2. The Client shall have the right to terminate the Contract forthwith if the Contractor becomes insolvent or an order is made or a resolution passed for the liquidation, administration, winding-up, bankruptcy or dissolution of the other Party (otherwise than for the purposes of a solvent amalgamation or reconstruction) or an administrative or other receiver, manager, trustee, liquidator, administrator, insolvency resolution professional or similar officer is appointed over all or any substantial part of the

assets of the Contractor or the Contractor enters into or proposes any composition or arrangement with its creditors generally or anything analogous to the foregoing occurs in any applicable jurisdiction.

34.3. Expiry or termination of the Contract shall not relieve the Parties of their obligations due up to the time of such expiry or termination, nor shall such expiry or termination prejudice any claim of either Party that has already accrued prior to such expiry or termination.

34.4. If the Client elects to terminate the Contract pursuant to Clause 34, the Client shall be entitled (but not obliged) to complete the remaining Works either by itself or by any other contractor on account of and at the risk and cost of the Contractor. If the Client decides to complete the remaining Works, it shall be entitled to recover the cost and other charges associated with such completion from the Contractor. In all cases, and irrespective of whether the Client decides to complete the remaining Works, the Client shall be entitled to recover all costs, expenses or losses flowing from the termination from the Contractor.

34.5. The Contractor shall, at Client's request and at Contractor's cost and expense, perform the following services in relation to the Works so affected:

(a) cease all further Works which is the subject of the termination, except such Works as Client may specify in the termination notice for the sole purpose of protecting that part of the Works already executed;

(b) assist the Client in preparing an inventory of all equipment in use or in storage at the Site;

(c) assign to the Client or to any replacement contractor designated by Client, without any right to compensation, title to all Works not already owned by Client, together will all subcontracts and other contractual arrangements (including warranties) as may be designated by Client, all of which subcontracts and contractual arrangement shall be so assignable and assign to Client;

(d) remove from the Site all such Contractor's equipment and materials and waste material as the Client may request; and

(e) deliver to Client all design and other information in the possession of the Contractor as may be requested by Client for the completion of the Works.

34.6. The Parties agree that in the event of termination of the Contract, the Client shall pay to the Contractor the Contract Price proportionate to the Works completed by the Contractor to the Client's satisfaction by the date of termination.

35. GOVERNING LAW AND DISPUTE RESOLUTION

35.1. The Contract including all questions concerning the construction, validity and interpretation of the Contract will be governed by the laws of India. Subject to Clause 35.2 below, the courts at Gautam Buddh Nagar, Uttar Pradesh, India shall have exclusive jurisdiction on any matter arising under the Contract.

35.2. The Parties shall amicably resolve by mutual discussions any and all controversy, claim, differences or disputes arising out of or in connection with the Contract including any question regarding its existence, validity, invalidity, breach or termination ("**Dispute**"), failing which the Disputes shall be settled by arbitration in accordance with provisions of the Indian Arbitration and Conciliation Act, 1996. The arbitral tribunal shall consist of 1 (one) arbitrator. The seat for arbitration shall be Gautam Buddh Nagar, Uttar Pradesh, India and the language for arbitration shall be English. Any arbitral award shall be final and binding on the Parties.

35.3. The Contract and the rights and obligations of the Parties contained in the Contract shall remain in full force and effect pending issuance of the award in such arbitration proceedings, which award, if appropriate, shall determine whether and when any termination shall become effective.

36. **MISCELLANEOUS**

36.1. **Notices**

Any notice and other communications provided for in the Contract shall be in writing and shall be transmitted by e-mail or registered post or courier service in the manner as elected by the Party giving such notice to the following addresses:

In the case of notices to the Client:
Attn: [__]
Add: [__]
Email: [__]

In the case of notices to the Project Manager:
Attn: [__]
Add: [__]
Email: [__]

In the case of notices to the Contractor:
Attn: [__]
Add: [__]
Email: [__]

Any Party may, from time to time, change its address or representative for receipt of notices provided for in the Contract by giving to the other prior written notice.

36.2. **Waiver**

Waiver by a Party of any default by the other Party(ies) in the observance and performance of any provision of or obligations under the Contract:

(a) shall not operate or be construed as a waiver of any other or subsequent default hereof or of other provisions or obligations under the Contract;

(b) shall not be effective unless it is in writing and executed by a duly authorised representative of such Party;

(c) shall not affect the validity or enforceability of the Contract in any manner.

Neither the failure by a Party to insist on any occasion upon the performance of the terms, conditions and provisions of the Contractor any obligation hereunder nor time or other indulgence granted by a Party to the other Party shall be treated or deemed as waiver/breach of any terms, conditions or provisions of the Contract.

36.3. **Survival**

Termination of the Contract (a) shall not relieve the Parties of any obligations already incurred hereunder which expressly or by implication survives termination hereof, and (b) shall not relieve a Party of any

obligations or liabilities for loss or damage to the other Party(ies) arising out of or caused by acts or omissions of such Party prior to the effectiveness of such termination or arising out of such termination.

36.4. **Partial Invalidity**

If any provision of the Contract is held to be invalid or unenforceable to any extent, the remainder of the Contract shall not be affected thereby, and each provision of the Contract shall be valid and enforceable to the fullest extent permitted by applicable law. Any invalid or unenforceable provision of the Contract shall be replaced with a provision which is valid and enforceable and most nearly reflects the original intent of the unenforceable provision.

36.5. **Amendments**

Subject to the terms of the Contract, no modification or amendment to the Contract shall be valid or binding unless made in writing and duly executed by all the Parties.

36.6. **Cost**

Except as otherwise provided in the Contract, each Party will bear its own costs and expenses incurred in connection with the preparation and execution of the Contract and for performance of transactions contemplated hereunder including any accounting, tax, legal and other advisors' expenses and expenses.

36.7. **Further Assurances**

Each Party will, at its own respective cost and expense, execute and do (or procure to be executed and done by any other necessary party) all such deeds, documents, acts and things as may be required from time to time or as may be necessary to give full effect to the Contract or for performance of its obligations under the Contract or for compliance with the provisions of Applicable Law.

36.8. **No Partnerships**

Nothing contained or implied in the Contract shall constitute or be deemed to constitute a partnership or agency between the Parties and none of the Parties hereto will have any authority to bind, commit or make any representations on behalf of the other Party(ies).

36.9. **Anti-Corruption**

(a) The Parties shall not, and shall ensure that their respective Affiliates, officers, agents, directors and representatives shall not, in the course of conduct of performance of their obligations under the Contract: (i) the (Indian) Prevention of Corruption Act, 1988, or any other applicable anti-bribery or anti-corruption laws under any Applicable Law; or (ii) offer, pay, promise to pay, or authorize the payment of any money, or offer, give, promise to give, or authorize the giving of anything of value, to anyone, including Public Officials, either directly or indirectly, to improperly influence official action or obtain an improper advantage. This includes acting through a third party under circumstances where the Parties (or their respective Affiliates, officers, agents, directors and representatives) know, or are aware of circumstance that may cause a significant risk, that all or a portion of such money or thing of value would be offered, given or promised to anyone, including a Public Official, for the purpose of:

(i) improperly influencing any act or decision of such Public Official in his official capacity;

(ii) inducing such Public Official to do or omit to do any act in relation to his lawful duty;

(iii) securing any improper advantage; or

(iv) inducing such Public Official to influence or affect any act or decision of any Government Authority;

(v) (any such payment, a "**Prohibited Payment**"), provided that Clause 36.9 shall not apply to any payment that is permitted by Applicable Law.

(b) For the purposes of this Clause 36, the term "**Public Official**" means any officer or employee of a government, public entity or public international organization (including any department, or agency thereof or any government-owned or controlled entity including state-owned enterprises), or any person acting in an official capacity for or on behalf of a government or public international organization.

Each of the Parties shall, and shall procure that each of their respective Affiliates, officers, agents, directors and representatives shall, promptly report to the other Party any Prohibited Payment of which they obtain knowledge, become aware of, or which they have reasonable grounds to believe has occurred during the term of the Contract.

37. Priority of Documents

The documents forming the contract are to be taken as mutually explanatory of one another, for the purpose of interpretation, the priority of the documents shall be in accordance with the following sequence:

a. The contract Agreement
b. The Letter of Intent
c. The Letter of Tender
d. GCC
e. Schedule of quantities and rates
f. The specifications
g. The Drawings
h. The schedules and any other documents forming part of the Contract.

SECTION: 5

FISCAL ASPECTS

SCHEDULE OF FISCAL ASPECTS

Description	**Schedule of Fiscal Aspects.**
Location Of work	Engineering & Admin Block Project at Galgotias University, Yamuna Expressway, Greater Noida, Uttar Pradesh
Scope of Work	Main Scope: The detailed Scope for execution shall conform to the BOQ, Technical specification and drawings for the HVAC + CHILLER & BMS works. This Contract is re measurable Item rate contract and all the scope as per the drawings/tender/attached annexure shall be included. The quoted rates hold firm for the entire work plus the period up to the settlement of final bill. No escalation will be entertained towards labor, materials, petrol, diesel and or any such account.
Type of Contract	Item rate & Re-measurable type of contract.
Escalation	This is a fixed price contract with all rates being firm till completion of project and no escalation is admissible on any item, for any reason.
Date of Commencement	Immediate from the date of issuance of LOI/Work Order.
Contract Construction Period	Commencement of work: Immediate from the date of issuance of LOI. Total time for the completion of all works under the scope of this contract and handover shall be 10 (Ten) Calendar months form the date of issuance of LOI including final handing over and de-snagging. Contractor shall submit a detailed Construction programme in the form of bar-chart for major milestones along with resource loading.
Mobilization Advance	10% of Contract Value against an irrevocable bank guarantee as prescribed in the tender form for equivalent value and recoverable 12.5% basis from 2nd RA bills however 100% mobilization will be recovered once the value of work done reached of 80% of contract value.
Payment cycle	The owner, after submission of bill from Contractor and recommendation from the Project Manager, shall pay 100% of the bill amount to the Contractor. This payment shall be released within 30 (Thirty) working days (10 days for PMC + 20 Days for client) from the date of application for payment from Contractor; if the Project Manager disputes any items shown on the application for payment or the Owner disputes on the certificate for payment, the Project

	Manager shall bring the disputed items to the attention of the Contractor, and within said time period, the Owner shall pay the amount of such application for payment that is not in dispute.
Payment terms	The Terms of payment shall be as follows: - 10% against submission of shop drawings on Pro-rata basis 50% against supply on Pro-rata basis 15% against installation on pro-rata basis 15% against testing and commissioning at site on pro-rata basis 10% after handing over the work.
Amount of Liquidated Damage	Time is the essence of the contract. If the works are not completed within 10 months' time, liquidated damages of 1% of the Contract Value per week will be deducted, subject to a maximum of 5% of the contract value, after which the contract can be terminated at the option of M/s. Galgotias University, Plot No 2, Sector 17A, Yamuna Expressway, Opp Budha International Circuit, Greater Noida, Uttar Pradesh – 203201.
Defects Liability Period	12 months from the date of issuance of Final Completion Certificate.
Performance Guarantee	5% of the Accepted Contract Amount, within 7 days of issue of Agreement, and shall be released upon successful completion of Defect Liability Period.
Performance Bonus	If works completed within 10 (Ten) calendar months form the date of issuance of LOI, bonus of 1% of the contract value will give to the contractor
Percentage of retention	5% from each certified or an unconditional, irrevocable and divisible bank guarantee from any nationalized bank of the equal amount. 50% retention money shall be released upon the issuance of final completion certificate against unconditional, irrevocable and divisible bank guarantee from any nationalized bank of the same amount and balance 50% shall be released at the end of Defect Liability Period.
Bank Guarantees	The bank guarantees required to be submitted by the successful contractor shall be as per the forms and formats provided by Client. Only bank guarantees drawn from nationalized banks shall be accepted
Insurance	The contractor will take Contractors All Risk Insurance (CAR) Policy in our joint name for the full contract value together with the value of material supplied by M/s. Galgotias University, Plot No 2, Sector 17A, Yamuna Expressway, Opp. Budha International Circuit, Greater Noida, Uttar Pradesh – 203201 In addition to the above you should also take • Workmen Compensation Insurance for your direct workmen and your subcontractor's Labour. • Group Personnel Accident Insurance to your staff. • Third party liability insurance.

	Personal Injury: You will take insurance policy for a value as may be required subject to an individual limit of Rs.1.00 lakh per person per incident
Price for Extra Items	The accepted rates in the schedule of quantities will apply for the entire project. Any item of work which is not covered in the schedule of quantities shall be paid as per the actual cost of materials, Labour, 2% (will be towards tools, cartage, power, and water) and 15% (towards all overheads and profits), provided the same cannot be derived from quoted rates from similar comparable items. It is to be clearly understood that claims for extras of any nature will not be entertained unless such extras are duly authorized by project manager in advance
Taxes & Duties	The rate shall include all customs duties and Excise Duties, taxes, like sales tax any other direct or indirect taxes (if applicable) works contract tax, GST, entry tax etc. There shall be no extras on any account whatsoever, excluding the statutory variations after award of contract.
ESI and PF	The accepted rates are inclusive of ESI and PF as applicable
Statutory Compliance of State & Central Government and Local Municipal Authorities	Following Statutory compliance obligations shall be performed during the entire Contract period without any failure. I. Labour License II. Provident Fund & ESI III.GST VI. Other compliances changes from time to time as per State and Central Government.
Construction Related Statutory Compliances	Shall be arranged by the Contractor at no additional cost to the Client.
Construction Water	Construction Water will be provided by the client free of cost at one point, the contractor must make his own arrangements for distribution at the site at his own cost.
Construction Electricity	There will be a charge for electricity provided by the client, and the contractor will install a sub-meter to measure the amount of electricity consumed. The contractor is responsible for making his own arrangements for the supply and distribution of electricity as part of the work that he is undertaking. The Contractor shall be responsible for ensuring that uninterrupted power supply is provided for their works by installing silent DG sets at their own expense as required.
Safety, Health, and Environment	Contractor shall adhere to all Health and Safety standards as issued by the Bureau of Indian Standards, National Building Code, 1983 as required by Project Management Consultant / Owner regulations of local Authorities.
Labour	Adequate number of persons to the satisfaction of the Project Manger shall be provided. Statutory requirements of EPF, ESIC and all other applicable Labour legislations to be complied with; and monthly certification to that effect to be submitted.

	Duty allocation and Roaster control shall be contractor's responsibility
Sanitary	The Contractor shall make all arrangements till completion of Project for sanitary and storm sewer arrangements as required and shall make all necessary payments directly to appropriate departments. The Contractor shall arrange to provide the Contractor's subcontractor, these facilities at no additional cost to the owner.
Contractors Conditions	Apart from those stated in the above provisions, no other conditions of the Contractors shall be acceptable
Storage, Safe Custody & Protection of Finished items	Rent free space will be provided at the site. The cost of construction of store, security etc. will have to be arranged by the contractor
RA Bills	The RA bill in triplicate shall be submitted by 1st week of every month to the Project Manager along with all supporting documents. Only one bill per 30 days shall be admitted. Bill/Invoice submitted by the contractor shall be strictly as per the format prescribed by the Project Manager. Bills will not be accepted/ received by the Project Managers if bills are not in the correct format as prescribed by the Project Managers or are not presented along with material invoices/ delivery challans, measurement sheets, rate analysis etc. The final bill shall be accompanied with all necessary and relevant handover/closure documents.
Final Bill	Within 45 days of Final completion of works and submission of handing over documents duly signed by the Architect/Project Manager/Client.
Correctness of Measurement.	In case measurements submitted with bills are found to contain incorrect information, the bill would be returned and would be admissible only with the next bill after correction of all measurements. The correct information shall be as per defined norms of measurement or generally accepted practices; any queries shall be discussed and clarified during project pre-Commencement meeting.
Weekly meetings/Monthly Meeting	The Project Manager will hold and preside over weekly progress meetings at the site. The scheduling of such meetings will be arranged by the Project Manager in advance or set up on a regular basis at a set time. Senior Management of Contractor shall be part of Monthly meeting arranged by Project Manager.
Billing Address/Shipping Address	M/s. Galgotias University, Plot No 2, Sector 17A, Yamuna Expressway, Opp Budha International Circuit, Greater Noida, Uttar Pradesh – 203201

SECTION: 6
SPECIAL CONDITIONS OF CONTRACTS

SPECIAL CONDITIONS OF CONTRACT

1.1 GENERAL INFORMATION

The Special / Particular Instruction and Conditions of Contract as described in this document are intended to amplify the General conditions of Contract and shall be read in conjunction with specifications of work, drawings and all other documents forming part of this Contract wherever the context so requires. The following clauses shall be considered as an extension and not in limitation of obligation of the Contractor.

All expenses incurred by the CONTRACTOR in connection with obtaining information for submitting this tender including his visits to the site or efforts in compiling the tender shall be borne by the CONTRACTOR and no claims for reimbursement shall be entertained.

Not withstanding the sub-division of the documents into separate sections and volumes every part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into the CONTRACT.

Wherever it is mentioned in the specification, that the CONTRACTOR shall perform certain work or provide certain facilities, it is understood that the CONTRACTOR shall do so at his own cost.

1.2 OBLIGATION OF CONTRACTOR

The obligation of Contractor in fulfilment of HVAC works are stated below:

- Checking the design data, HVAC heat loads & system proposed in the tender & drawings by Consultants and confirming adequacy of the system or highlighting the deficiency / shortfall & possible ammendments / solutions. This process should be carried out first during the tender / bidding stage and finally during preparation of shop drawings / Good For Construction drawings / during submission of technical submittals, but before finalization of equipment order on sub-contractors / sub-vendors / suppliers and before supply & installation of equipment / system so that any changes required in the equipment / system can be done timely. Contractor/ Vendor to work out its own Basement ventilation, smoke venting & Staircase / Lift well / Lift Lobby pressurization calculation to check its suitability / adequacy as per latest 'NBC' of India & Fire safety norms / codes / fire NOC. Contractor to comment on any inadequacies & propose alternative solution. This should also be done first during tendering process and finally after obtaining order but before execution.
- Procurement, fabrication and supply
- Inspection and testing
- Expediting and co-ordinating with other agencies
- Scheduling and Monitoring
- Training the Client's representative in the Operation & Maintenance of the Plant

- Erection, checking and testing
- Commissioning of the equipment & complete system.
- Carrying out performance tests to meet the specification requirement and to the full satisfaction of EMPLOYER
- Providing Guarantee - Performance as well as product / equipment guarantee.
- Maintenance during Guarantee/Defects Liability period
- Final documentation

Checking up the equipment and other materials to ensure that the same are as per the specifications laid down in description of work and drawings and also to make sure that they are in proper condition to be taken up for erection.

Drawing up a detailed time schedule and organise the erection work in conformity with the time schedule.

Arranging for the procurement and ensuring availability at the site at the required time of all the erection tools, necessary tackle, required for the erection work such as cranes, air compressor, welding sets, oxy-acetylene cutters, electric and pneumatic drills, steel wedges for levelling and grouting, scaffolding gay wire testing and cleaning equipment and all other construction equipment necessary for proper erection.

Arranging for procurement and ensuring availability at site at the time of all consumable construct materials for erection work such as welding electrodes, oxygen, acetylene and other welding gases, greases, petrol, cotton waste and all temporary fastening such as tack bolts clips, cleats and other materials, chemicals for cleaning and such other materials as may be needed to execute the handling and erection works.

Engaging and allotting an adequate number of engineers, erectors of all the required categories (Supervisory, skilled and unskilled labour) for carrying out different items at different stages of the erection work.

Assembling and installing of all items of machinery / equipment at their proper places at the plant site. The erection work will cover necessary operations such as, handling, sorting, stacking, unpacking, cleaning, assembling, bottling welding riveting, erecting, site fabrication, instrument cable laying and jointing, earthing, erecting, site fabrication, instrument cable laying and jointing, earthing, treatment for underground pipe protection, painting, thermal insulation and manual / mechanical / chemical cleaning, testing and other operations, provision of inserts, embedded plates in walls / roof / floor for erection of ducting, piping etc. Installation of all instruments – measuring and controlling of the plant. All control wiring also forms part of erection work.

Checking up of each individual items of plant equipment and also each pipeline, to ensure that the erection of these items has been properly carried out in conformity with the technical specification.

After all the installation and assembly work is completed the entire plant assembly including the pipe lines shall be checked up, by proper tests applicable to ensure that individual items of equipment, including pipe line have been properly installed.

Machines like compressors, pumps shall be checked up by actual working to satisfy that their alignment has been properly made and there are no mechanical faults.

Pipe lines shall be checked up by hydraulic tests to make sure that all valves, flanges etc., have been properly fitted up to that there are no leakages or wrong connection of interconnecting valves, pipes etc. Similarly all ductwork shall be tested to ensure that air leakages rates are within the limits prescribed in the specification.

Instruments shall be checked up individually to make sure that they are in proper working order. The testing shall be in accordance with INDIAN STANDARDS or accepted International Standards. All instruments used for testing and measurements shall be calibrated instruments acceptable to National level standards.

The performance of the aforesaid services should confirm strictly to the ENGINEER'S technical specification, which forms an integral part of 'THIS CONTRACT'.

It is only after the entire plant assembly has been thoroughly checked up on the lines indicated above and found satisfactory that erection work shall deemed to be completed and the plant considered READY FOR COMMISSIONING.

Plant and equipment details shall also be prominently displayed in engraved plastic nameplates.

The Contractor shall if called upon, also furnish necessary electrical wiring diagram to meet the requirements of the Electricity authorities.

1.3 QUALITY ASSURANCE REQUIREMENTS

GENERAL

Quality Assurance (QA) requirements form an integral part of the contract and all contractors are required to comply.

SCOPE

The scope of QA requirements is as follows:

a) Preparation of a Quality Assurance Plan by the Contractor, which is referred to as "CONTRACTOR'S QUALITY PLAN" or CQP.

b) Performance of:

- Quality Assurance (QA) and

- Quality Control (QC) activities at site

c) Documentation of the above

1.4 **TENDER DRAWINGS**

The Drawings issued with this Specification are for guidance of the CONTRACTOR and show the approximate positions of all items of equipment, etc. The actual and final position of all items of equipment shall be determined at site and approved by the Consulting ENGINEER. CONTRACTOR is to ensure that their proposal will meet with all the current rules and regulations of the relevant authorities in India.

1.5 **SHOP DRAWINGS**

a) All Shop Drawings shall be on Standard A0/A1 size paper depending upon the content and details of the drawing.

b) Before any work is put in hand, the Contractor shall submit two (2) sets of dimensioned Drawings showing all details of the equipment, piping, wiring and materials etc. to be used, to the Consulting ENGINEER for review. The Contractor shall not commence final connection works until the Drawings are reviewed by the Consulting ENGINEER.

c) Review of Drawings by the Consulting ENGINEER does not exonerate the Contractor from any responsibility under the Contract terms and conditions.

d) The detailed Shop Drawings, prepared at a minimum scale of 1:100, plus necessary detail plans and cross sections at a scale of 1:50, showing complete detail of each item of specially fabricated equipment shall be submitted to the Consulting ENGINEER for his review before proceeding with fabrication. These Drawings shall be based upon the floor plans and the following specifications. These Drawings shall include accurately dimensioned details and locations of any special wall openings that are required where items of equipment extend through walls.

e) If early review is required, the Contractor shall advise the Consulting ENGINEER to this effect when submitting the drawings.

f) The Contractor shall forward eight (4) sets of the reviewed shop drawings to the Consulting engineer for distribution to interested parties.

1.6 **WORKING DRAWINGS**

The Contractor shall at all times maintain on site, in good order and condition, a complete set of all Drawings and Documents necessary for the proper execution and checking of the Works. These Drawings and Documents shall be made available on request to the Consulting ENGINEER or other authorized persons on site. Any amendment shall be indicated on the Drawing, dated and signed by the Authorised person in charge, with reasons stated if possible.

1.7 **AS-INSTALLED DRAWINGS**

a) The Contractor shall prepare two (2) sets of paper prints of the As-Installed Drawings, diagrams and schedules as in the opinion of the Consulting engineers, shows an accurate record of the work as installed by the Contractor and submit to the Consulting ENGINEER for approval. When approved, the Contractor shall submit three (3) sets of paper prints, one (1) set of sepia and one (1) CD ROM of the approved As-Installed Drawings for reference and record by the Consulting ENGINEER.

b) Such records shall include the preparation of properly dimensioned drawings showing the following:

i) General arrangement of all services
ii) Cable routes, types of fixings, layout, support and other particulars;
iii) The detailed layout of all equipment, plant chambers, etc;
iv) Conduit runs, pipe runs, duct work, etc.
v) A system diagram giving means of identification, circuit labelling and mounting level of equipment, etc., provided under the Sub-Contract;
vi) Schedules of all equipment installed.

c) All Drawings submitted by the Contractor shall have in the bottom right hand corner in addition to the Contractor's name, title, scale, date and drawing number, the title of the project and subject of the drawings.

d) The retention sum or final payment will not be released until all such drawings and records have been received and approved by the Consulting ENGINEER.

e) One copy of the schematic drawing, isometric or layout drawing showing all equipment, controls, connections, etc. shall be framed and hung in the relevant Plant Room or location as directed by the Consulting ENGINEER.

1.8 **TESTING AND COMMISSIONING**

a) **GENERAL**

Testing shall mean providing that all of the systems efficiently meet the performance specified while in operation. The systems shall be tested in the presence of the Consulting ENGINEER who requires at least two full working days prior notice to enable him to attend.

The Contractor shall arrange for representatives of any of his own sub-Contractor to be in attendance.

It shall be the responsibility of the Contractor to supply all necessary testing equipment including pitot tube and manometer, anemometer, newly calibrated pressure gauge, etc. Provision of all testing equipment and the appropriately skilled labour shall have been included in the Tender Price.

Should anyone of the tests reveal a fault, the Consulting ENGINEER will order that the fault be corrected and re-tested prior to acceptance. All fees connected with testing of equipment payable by Contractor to any of the relevant Government Authority shall be borne by the Contractor.

b) **COMMISSIONING TEST**

i) The complete installation or any part thereof shall be tested, both before and after being commissioned to check the performance in operation. All fees connected with testing of equipment payable by the Contractor to any of the relevant Government Authority or expert from the Supplier shall have been included in the Tender Sum.

ii) The contractor shall be represented by a competent person approved by the Consulting ENGINEER during the whole of the period required for the tests.

iii) All materials and equipment supplied or erected under this Contract which fail the tests shall be replaced or rectified at once by the Contractor without cost to the EMPLOYER.

iv) The Contractor shall supply all necessary instruments, apparatus, connections, skilled and unskilled labour required for the tests to be conducted in the presence of the Consulting ENGINEERS, make accurate records of all tests carried out and furnish the Consulting ENGINEERS with four (4) COPIES OF THE Test Certificates and Schedule of Test Results in approved form.

v) The Contractor shall prepare a detailed and comprehensive checklist for use during commissioning and testing. The Contractor shall submit to the Consulting ENGINEER his proposed check list for approval as follow:

1) Ensure that all items that should be checked are included.
2) Produce a permanent record of the commissioning checks carried out.
3) Accordingly, the checklist must be built from information contained in the Specification, from Suppliers, SUB-Contractor's and Contractor's installation and commissioning similar equipment and systems.
4) The detail of the checklist must be such that it can be completed with a reading or a tick, which means that every device listed, has been checked.

1.9 **OPERATING MANUALS**

The Contractor shall prepare three (3) copies of an operating manual, in a stiff-covered ring binder two (2) for the EMPLOYER and one (1) for the Consulting ENGINEER, describing the operation and maintenance of the whole system and including: -

a) Operating instruction for all equipment
b) Catalogues for all equipment.
c) List of spares recommended;
d) Schedule of Recommended Maintenance.

Practical completion will be certified after the receipt of the above operating manual by the Consulting ENGINEER.

1.10 **IDENTIFICATION AND LABELLING**

Parts of the Works shall be properly labelled and identified. The contractor shall carry out the following work: -

i) Machine engraved traffolyte nameplates shall be provided to identify majority of equipment. Similar labels will indicate the function of ancillary equipment such as gauges, control valves, switches, indicating lights, push buttons, relays and other indicating devices.

ii) Lettering shall be black on white background. Nameplates for major items of equipment shall be engraved in lettering of at least 6 mm. Labels identifying ancillary equipment shall be engraved in lettering of at least 3 mm.

iii) Identification lettering shall be applied to all pipe work and to all conduit at the following spacing: -

1) For all concealed runs in walls or ceiling spaces, every 5 metres but at least once.

2) For exposed runs, every 10 metres but at least once for each exposed section.

The identification shall consist of stencilled painted black lettering 25 mm high naming the services.

1.11 PLANT OPERATION

The EMPLOYER shall have free and unrestricted use of the Contract Works or any part thereof which the Consulting ENGINEER may deem suitable without any interference whatsoever from the Contractor and such use by the EMPLOYER shall not relieve the Contractor of any liabilities or obligations in regard to the Contract.

1.12 TESTING

Routine and type for various items of equipment shall be performed at the SUB-Contractor's works and test certificates shall be furnished. The EMPLOYER or his authorised representative reserves the right to be present during the tests.

After notification to the EMPLOYER that the installation has been completed, the Contractor shall make under the direction of EMPLOYER such tests and inspections as have been specified or as the EMPLOYER shall consider necessary to determine whether or not the full intent of the specifications have been fulfilled and whether further tests shall be considered necessary. The Contractor shall bear all the expenses thereof.

The Contractor shall operate, test and adjust all air-conditioning, ventilation and exhaust system units, fan motors, all air handling appliances provided in connection with the installation and shall make all necessary adjustments and corrections thereof including the adjustments of all regulating dampers. A carefully detailed record of the results of these adjustments shall be furnished to and be subject to the approval of the EMPLOYER.

1.13 PERFORMANCE TEST

A performance test by keeping the plant running for a period of 72 hrs. shall be carried out in peak summer, peak monsoon and peak winter periods. During the tests all necessary readings shall be taken hourly. From the readings so taken, the Contractor shall also establish the plant capacity. The computed results shall tally with the specified capacities furnished with Tender.

The contractor shall install in the system temperature probes, flow meters, pressure gauges etc., to verify the capacity of the various equipment.

All the test equipment instruments, labour, operating personnel, oil and refrigerant required for these tests shall be furnished by the Contractor at his own cost.

If the test do not show satisfactory result, the Contractor shall at his own cost, rectify / replace and defective installation or part thereof as directed by the EMPLOYER within two months. The decision of the EMPLOYER shall be final and binding in this respect. Only after all these tests are satisfactorily completed and the defects found during these are rectified, the plant will be finally accepted.

1.14 **TESTING GUARANTEE**

All equipment and space conditions shall be tested after carrying out necessary adjustments and balancing to establish the equipment ratings and indoor space conditions. At least four sets of readings shall be taken daily for each item tested and submitted in the form shown separately. Instruments required for testing shall be furnished by the Contractor.

All equipment shall be guaranteed for the specified ratings with a tolerance of 0% on the minus (negative) side.

All equipments and the entire installation shall be guaranteed against defective materials and workmanship for a period of 12(twelve) months from the date the equipment and installation are handed over.

1.15 **REPORTS**

Provide 3 copies of the complete balancing and testing reports to the EMPLOYER / Consulting engineer. Report shall be neatly typed and bound suitable for a permanent record. Report forms shall contain complete test data and equipment data as specified.

1.16 **TRAINING**

Upon commissioning and final handover of the installation, the Contractor shall submit 3 copies of operating instructions, maintenance and service manuals, part lists and all final drawings and diagrams, indexed and bound together in hard cover ring binder.

The Contractor shall conduct a training programme for designated Employer's personnel. These courses shall be carried out during normal office hours. The date of commencement of training shall be mutually agreed upon and in any case shall be within two weeks of handover of installation.

The training programme shall cover all operating and maintenance aspects of the system, inclusive of detailed explanation and demonstration of each and every piece of equipment and an overview of the system network.

The training programme shall consist of both handouts and classroom training at the job site or at location agreed upon by the EMPLOYER.

All instruction manuals, tools, transportation, etc. association with the training programme shall be provided by the Contractor. Such cost shall be deemed to have been included in the CONTRACTOR programme.

1.17 GUARANTEE

The Contractor shall guarantee the inside conditions as stipulated elsewhere. In addition, the Contractor shall also guarantee that all equipment shall be free from any defect due to the defective materials and bad workmanship and that the equipment shall operate satisfactorily and the performance and efficiencies of the equipment shall be not less than the guarantee values.

The guarantee shall be valid for a period of 12 months after taking over and any parts found defective shall be replaced free of all costs by Contractor. The services of successful Contractor's personnel if requisitioned by the EMPLOYER during this defects liability period for such work shall be made available free of any cost.

The Contractor shall without any extra cost carry out for a period of 12 (twelve) months after the installation is taken over, all routine and special maintenance of the plant and attend to the defects that may arise in the operations of the plant.

Maintenance will consist of monthly maintenance and necessary adjustment and lubrication of the equipment by the Contractor's employee under competent direction and supervision. In addition to the monthly maintenance, special examination between regular intervals and emergency minor adjustment, call back services should be provided during the guarantee period.

Parts that become necessary due to normal wear and tear during the guarantee period will have to be replaced free of cost.

In case of any defect or malfunctions of the equipment during the period of maintenance, immediate attention must be ensured without claim to any extra amount, charges or compensation.

All the maintenance work will be performed during regular hours of regular working days. However the works in condenser coil and cleaning of cooling coils etc., should be carried out only during the holidays with prior permission from the EMPLOYER.

One month before the end of the defects liability period, the Contractor shall notify the EMPLOYER of the required inspections for all equipment and facilities including specific energy consumption.

1.18 MAINTENANCE IN WARRANTY PERIOD

The CONTRACTOR shall furnish warranty for the entire system for a defect liability period (DLP) of twelve (12) months after the final official hand over date of the installation duly approved by the consultants and project managers. This period shall include maintenance replacement of parts, regular periodic visit by qualified personnel of the CONTRACTOR and attending to emergency call at short notice.

1.19 **CONCLUSION OF 12-MONTH WARRANTY PERIOD**

Just before the expiry of the warranty period of the Contract, the Contractor shall carry out a complete system operability test on all the systems or sub-systems as called for in the Contract.

The purpose of the test is to verify that the performance of all the systems of sub-systems in the Contract is in accordance to the specifications.

All tests shall be carried out in the presence of the EMPLOYER or his representative.

The warranty period is deemed to be over if the EMPLOYER or his representative is completely satisfied with the system performance during the test.

1.20 **ANNUAL MAINTENANCE CONTRACT**

The CONTRACTOR shall quote separately for comprehensive and all-inclusive (labour and material and everything) Annual Maintenance Contract for full five years period after the Defect Liability Period (DLP). The CONTRACTOR shall bear the full responsibility for all kinds of maintenance which includes periodic maintenance as well as attending to all breakdown and emergency calls at short notice whenever called. During this five-year period the scope of annual maintenance contract includes repair and replacement of any or all parts as required. Besides, the replenishment of all consumables shall also to be included in the scope of annual maintenance contract.

The CONTRACTOR shall furnish the list of recommended spares along with quantity and unit price schedule to the EMPLOYER along with the bid. The EMPLOYER reserves the right the required spares during the tenure or on completion of annual maintenance contract at the quoted price which should be valid for the entire maintenance period i.e. five (5) years after DLP.

1.21 **COMPENSATION FOR SHORTFALL IN CONTRACT RATINGS.**

RATINGS / CAPACITIES OF THE PLANT

There shall be no credit to the CONTRACTOR if the output of the plant is higher than the rated capacity. There will be zero percent (0%) tolerance for the rated capacity on the negative sides.

During performance tests in case of any shortfall in the contracted system / equipment capacity, the Contractor will be given a chance to make adjustments after which the Performance test will be conducted again at the Contractors expense. In case the equipment does not meet the contract rating the equipment will have to be replaced at the cost of the Contractor within a reasonable period of time as will be indicated by the EMPLOYER and as per Performance as Guaranteed in the Tender.

1.22 **TAKING OVER CERTIFICATE**

As soon as the Works have been completed in accordance with the Contract and have passed the tests on completion, the Consulting ENGINEER will issue a provisional certificate (hereinafter called the

provisional Taking over Certificate) in which he shall certify the date on which the Works have been successfully commissioned.

1.23 **BRAND NAME / MAKE OF EQUIPMENT**

For the main air-conditioning plant, Contractors are required to offer only the 'Brand' Make / as indicated elsewhere in the specification of to ensure fair evaluation of proposal. It is to be noted by the contractor that materials / equipment, for which brand / make has not been specified, the contractor shall use only reputed makes. The contractor shall submit a list of such brands / makes to the consulting engineer along with his offer for approval.

1.24 **SITE MANAGER & SITE ENGINEER**

The site engineer posted at site shall have adequate experience for handling a job of this magnitude. The resume of the site engineer shall be submitted to the Consulting engineer for approval along with the offer.

1.25 Consumable materials during construction, commissioning testing and subsequent warranty period

The Contractor shall supply at his own cost the following consumable materials as and when required.

(a) Complete water requirements including system requirements as well as water required for testing and commissioning.

(b) All oils and greases required for lubrication of compressors, fan bearings, motors bearings, pivots and other moving parts.

(c) All refrigerant required to replace refrigerant losses in the refrigerant systems.

(d) All consumable, filter elements / rolls.

(e) All Chemicals for the correct chemical treatment of the chilled water system.

(f) All carbon brushes required to replace worn brushers in electric motors.

(g) All electric contact points required to replace worn electric contact points in switchgears, motor starter gears, electronic control gears and electric relays.

(h) All electric fuses required to replace blown fuses.

(i) All cotton waste, soap detergent and other cleaning materials required for cleaning purpose.

The cost of these consumable materials shall be included in the contract Price.

After every inspection and service, the Contractor shall submit a written report to the EMPLOYER with a carbon copy extended to the Architect.

1.26 PAINTING & LABELLING

GENERAL

Unless otherwise specified, all exposed surfaces including trucking and cable tray, ductwork, equipment, etc., shall be thoroughly cleaned and painted.

All ferrous metal surfaces without protective finishes shall be painted, except surfaces of moving parts, which shall be thoroughly oiled and greased as required.

Non-ferrous surfaces may be left unpainted unless called for in this specification or required by the Architect for the purposes of colour coding and identification. Aluminium grilles and diffusers shall be powder coated with colour approved by the architects.

All bare surfaces requiring painting shall first be given a priming coat followed by an undercoat and two finishing coats.

SIGN WRITING

All major items of equipment shall be identified with approved names and / or numbers of suitable size in proportion to the size of the respective items.

Pipelines shall be painted in contrasting colour directional arrows adjacent connections, valves and branches and at intervals of not more than 2.5 mm. These arrows shall be 75 mm long on pipes up to 50 mm diameter and 150 mm long on pipes over 50 mm diameter.

All stop valves and control valves the function of which are not obvious shall be provided with a non-corroding metal or laminated plastic identification tag. The tag shall indicate the service, and the area or items, which the valve serves.

1.27 CONTROL OF NOISE & VIBRATION

This section of the specification covers the supply, delivery, installation and testing of Noise and Vibration Control equipment to be used in the isolation of the various Mechanical equipment as called for in this specification.

It is the intent of this specification that noise levels due to mechanical equipment and related services will be controlled to the design objectives stated herein, in all occupied areas. The requirements specified are considered to be the minimum precautions necessary to achieve these objectives. The entire installation shall operate without objectionable noise and vibration as determined by the Architect.

The contractor shall examine all drawings and specifications including architectural and structural sets of working documents, before commencing any work on the project and shall immediately bring to the Architect’s attention any characteristics or properties of the building or any other factors which, in his opinion, would jeopardize or nullify the attainment of the design objectives.

The contractor shall guarantee that the complete plant and installation when operated within the design criteria shall acoustically perform to the noise criteria ratings specified.

The screw Chiller package shall be mounted on steel springs in series with neoprene. Limit stops are required to limit travel when machine is drained. A steel base frame suitable for point loading of the Chillers shall be provided as approved by the Architect.

MISCELLANEOUS EQUIPMENT

All equipment located above or under occupied areas and capable of producing noise or vibration shall be isolated from the structure.

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GALGOTIAS UNIVERSITY

SECTION: 7

TECHNICAL SPECIFICATION – BMS WORKS

GALGOTIAS UNIVERSITY

TECHNICAL SPECIFICATION

1. BUILDING MANAGEMENT SYSTEM (BMS)

1.1 GENERAL - SCOPE OF WORK

- The general character and the Scope of work to be carried out under this contract is illustrated in Drawings, Specifications, IO Summary and Schedule of Quantities.
- The Contractor shall carry out and complete the said work under this contract in every respect in conformity with the contract documents and with the direction of and to the satisfaction of the Engineer. The Contractor shall furnish all labor, materials and devices and specified otherwise, transportation and incidental necessary for Supply, Installation, Testing, Commissioning, final testing, putting into operation and Handing over of the complete Building management system (BMS) system as described in the Specifications and as shown in the drawings. This also includes any material, devices, appliances and incidental work not specifically mentioned herein or noted on the Drawings / Documents as being furnished or installed, but which are necessary and customary to be performed under this contract.
- The BMS Sub-Contractor carrying out the SITC shall make the system operational for its intended use, by addition of components specific to its make/model even if not specifically mentioned in the tender at no additional Cost.

Building Management System (BMS) shall be based on Cloud, open, interoperable and integrated architecture.

The IBMS system proposed to be installed shall be a peer-to-peer networked, stand-alone, distributed control system with the capability to integrate various technologies and communication protocols such as BACnet/ MSTP, BACnet/IP, RS485, HTTP, MQTT as per well accepted international standards such as the ANSI/ASHRAE Standards in one open, interoperable system for automation of diverse utilities and services such as HVAC, Fire Fighting, Plumbing and electrical systems & ELV system etc.

The integrated BMS platform shall employ state of the art design with facilities such as – Single Log-on URL, Building Portfolio Landing Page, Nine-dot Menu for Module Navigation and indication of operation area, Data Card drag and drop features, Portfolio Menu for Navigation to the Additional Features & Modules, unified workflow for all disciplines, English-language support, intuitive operation, secure, relatively fast in operations and efficient operation and a seamless integration of 3rd party systems.

Besides, adherence is required to industry standards and certifications such as CE and compliance.

The IBMS system offered shall be completely modular in structure and freely expandable at any stage with 3 level architecture.

- Management Level (Software)
- Automation Level (Controller)
- Field Level (Expansion/Slave)

Management level and operation shall include cloud server, processing, encryptions, security and cloud software with visualization, data analysis/reporting, Alarm pop-ups, Notification, animations and exchange of data. At the management level, it shall be possible for communication to flow in all directions, across networks and via direct connections.

Automation level is the level at which the redundant (secondary) processing takes place based on the built-in logic written on the Direct Digital Controller (DDC). All DDC controllers shall have Wi-Fi d IP based dual mode of communication, where in taking the benefit of LAN communication protocol & communication backbone. The processes are carried out at the DDC controllers for stand-alone control of all operations. Automation Level data exchange needs to happen through peer to Peer Communication for master slave communication only and data exchange shall happen to server through Wi-Fi or LAN Enabled internet(HTTP) via MQTT brokers.

Field Level shall comprise of Individual expansion/slave controllers for addition of control & monitoring, based on application specific logic written on the master controllers.

The Contractor shall supply the complete Cloud software package consisting of all types modules with cloud server systems, any normal PCs/workstation for operating the systems, cloud based database server suites, and cloud-based anti-virus for cloud servers, IBMS application software modules, Energy Management Software Module and GUIs. The entire software package consisting of the above shall be from established OEMs and shall be original licensed products. Where no user or point capacity licenses shall be required at all.

A hierarchical topology is required to assure reasonable system response times and to be able to manage the flow and sharing of data without unduly burdening the internal Intranet/data communication network.

Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 2-5 seconds for network connected user interfaces.

1.2 IBMS CLIENT

The IBMS shall support cloud based clients, web browser URL for PC and tablet devices. The IBMS shall support N number of concurrent operator workstation connections on a single server with provided IDs & Passwords. Client URL can be loaded on unlimited number of PC's allowing a limitless number of users to access these connections on simultaneous basis. The IBMS shall have Web-based user interface providing operators or facility engineers easy access and puts the user in control of every situation at any point in time and from anywhere in the world without any SNMP enablement but as Native cloud system.

The IBMS client shall support at a minimum, the following functions:

- User log-on identification and password shall be required. If an unauthorized user attempts access, a ID or Password error pop-up shall be displayed.
- Graphical screens developed for the GUI shall be the same screens used for the Web browser client. Any animated graphical objects supported by the GUI shall be supported by the Web browser interface.
- HTML programming shall not be required to display system graphics or text data on a Web page.

- Cloud Storage of the graphical screens shall be in the IBMS cloud server, without requiring any graphics to be stored on the client workstation PC machine. Systems that require graphics storage on local server or client are not acceptable.
- Real-time values displayed on a Web page shall update automatically without requiring a manual “refresh” of the Web page with recent update time stamp.
- Users shall have administrator-defined access privileges. Depending on the access privileges assigned, the user shall be able to perform the following:
- Modify common application objects, such as schedules, calendars, and set points in a graphical manner.
- Schedule times will be adjusted using a graphical interface.
- Using a graphical calendar shall set holidays.
- Commands to start and stop binary objects shall be done by pop-up of override button on data card by the selected object and selecting the appropriate command from the pop-up menu. No entry of text shall be required.
- View logs and charts.
- View and acknowledge alarms.
- The system shall provide the capability to specify a user’s (as determined by the log-on user identification) home page. Provide the ability to limit a specific user to adjust their defined home page. From the home page, links to other views, or pages in the system shall be possible, if allowed by the system administrator. Graphic screens on the Web Browser client shall support hypertext links to other locations on the Internet or on Intranet sites, by specifying the Uniform Resource Locator (URL) for the desired link.

1.3 CODES AND STANDARDS:

All the following codes & standards shall follow and conform to the latest editions, amended to date.

- CE Certified

1.4 SYSTEM DESCRIPTION

The IBMS shall comprise of a Wi-Fi & BLE Enabled, interoperable, stand-alone IP digital controllers
communicating on MQTT communication protocol.

The IBMS shall, in addition to HVAC system, communicate with third party systems such as energy metering systems, electrical systems, energy management systems, plumbing system, access control systems, fire-life safety systems etc.

Microcontroller based Direct Digital Controller (DDC) shall interface with MEP systems as given in but not limited to IO summary and carry out followings functions:

a. Individual input/output point scanning, processing and control.
b. Centralized operation of the services (remote control).
c. Dynamic graphic details of building services.
d. Energy Management through optimization of all connected electrical and mechanical
e. plants.
f. Alarm Detection and early recognition of faults.
g. Time, event and holiday scheduling as well as temporary scheduling.
h. Prevention of unauthorized or unwanted access.

i. Communication interface and control.
j. Suggestive preventive maintenance for all equipment as well as own error Diagnosis.
k. Building maintenance & report generation.
l. Optimum support of personnel.
m. Data Visualization Tool

These Wi-Fi and BLE controllers shall be capable of functioning on a stand-alone mode i.e. in case of loss of communication with the Cloud Server, these shall function independently. These shall have microcontroller built-in as standard. The local access to these shall be either through configuration app on any portable operator terminal (Normal PC/Laptop). The controller shall be capable of executing advanced control algorithms like Proportional + Integral + Derivative control, Conditioned Based On/Off Command, Schedules, etc. These shall also execute logic function based on time and/or event.

Each stand-alone intelligent Wi-Fi & BLE Enabled IP DDC controller shall have a microcontroller, on board Ethernet connectivity supporting BACnet/ IP or Modbus/IP protocol and Modbus/RTU over RS485.
The operator station should use a simple web browser in conjunction with the IBMS without any need of server/client architecture and no special software should be needed to be loaded on the computer nor any specific server class PCs are required. The computer shall be sized without any esitation to cover the graphic display memory and planning information. The display shall be in the form of dynamic color graphics and text format with menu driven pop-up windows and help facility.

Since having Cloud based Software & Sever Packed, the following software packages shall not be required to be loaded into the system as minimum standard: -
a. Databases and database management systems
b. Anti-Virus package
c. Complete IBMS software suite
d. Energy management software

All DDC controllers shall have µC and with minimum 12-bit A/D resolution on the analogue inputs and shall be connected via IEEE standards-based Wi-Fi or LAN on MQTT protocol. Communication between controllers shall be such that, controllers can communicate between themselves without having to first communicate with the Supervisory Controllers. The communication between the different subnets shall be through the router (integration) units rather than through the supervisory or server at control stations. No proprietary LAN or WAN shall be allowed.

1.5 MONITORING STATION SOFTWARE AND HARDWARE

1.5.1 Integrated Building Management Software

A. Cloud based central IBMS server, located at Native Cloud server without the need of physical server, shall be provided. The server shall support all routers and BACnet broadcast management devices connected to the customer's network whether local or remote.
B. Local connections shall be via an Ethernet LAN. Remote connections can be via broadband
C. connection.
D. It shall be possible to provide access the MQTT Broker of all controller via a single connection to the IBMS cloud server through building Internet (HTTP). In this configuration, each MQTT

Controller can be accessed from the Cloud based Graphical User Interface (GUI) or from a standard Web browser data point by connecting to the cloud based URL of IBMS server.

E. It shall have SVGZ Graphics, 3D Style, AutoCAD Import, Multi-Layer Native Editor and Symbol Libraries.
F. It shall have a user interface with English-language facility and online customization for switching from customization mode to operational mode.
G. It shall have a powerful report engine for Report Scheduling, Customizable Reports including Bar, Scattered, Line Charts type trend plots, export to other formats such as PDF and Excel.
H. It shall support flexible client options such as a web based (URL) client interface without any windows based installed application.
I. It should support automatic discovery of devices on the MQTT network via Internet router (HTTP).
J. Cloud based Software should support all open protocols such as BACnet, Modbus & Lontalk and any addition or deletion of soft integration should not affect on the software configuration or require any additional software drivers or licenses.
K. It should provide facility to import symbols and graphics, forward alarms to a predefined email address or SMS account and an automatic alarm escalation in case of no feedback in a defined time frame without the need of Auto-Dialer physical Modem connectivity and shall be enabled to do so via cloud based software instead.
L. The IBMS server shall provide the following functions, at a minimum:
    1. Native Global Data Access: The server shall provide complete access to distributed data defined anywhere in the world without using any SNMP or additional license enablement.
    2. Distributed Control: The IBMS cloud server shall provide the ability to execute global control strategies based on control and data objects in any MQTT device in the network, local or remote.
    3. The IBMS system shall include a IST clock service for its all systems and provide time synchronization for all devices with Cloud software & sever.
    4. The Cloud based IBMS server shall provide scheduling for all MQTT devices and their underlying field control devices. It should have the Management Scheduling functionality for 3rd party devices' scheduling.
    5. The Cloud based IBMS server shall provide demand limiting that operate across all BBMD/B-AAC devices. The Cloud based IBMS server must be capable of multiple demand programs for sites with multiple meters and or multiple sources of energy. Each demand program shall be capable of supporting separate demand shed lists for effective demand control if extensively and exclusively required.
    6. Each devices supported by the cloud server shall have the ability to archive its log data for 2-5 days in times of internet failure and shall be retrieved by Cloud server automatically by first in first out basis. Archiving options shall be user-friendly and automatic without any configuration needs.
    7. The Cloud Based IBMS server shall provide central alarm management for all devices supported by the cloud server. Alarm management shall include:
        - Routing of alarms to display, printer, email and mobile SMS
        - View and acknowledge of alarms
        - Query alarm logs based on user-defined parameters

8. The Cloud Based IBMS server shall provide central management of log data for all devices supported by the Cloud server. Log data shall include process logs, runtime and event counter logs, audit logs and error logs. Log data management shall include:
   - Viewing and printing log data
   - Exporting log data to other software applications via API Integration
   - Query log data based on user-defined parameters

1.5.2 Cloud based Server Shall be Requirements:

The IBMS Cloud server shall meet the following requirements:

A. Supply, Installation and Testing & Commissioning of Cloud Deployed Server with on demand auto scaling capabilities using orchestration tool, 99.95 % uptime-downtime by using distributed architecture and highest level of inbuilt SSL securities and 256 bit encryptions which shall be certified by Digicert, compatible with all type of OS. Shall have machine learning & AI capabilities for Optimization & Energy Savings. Single sign-on for multi-site database access through Cloud Based server working independently without any intervention of Local PC based server. Shall have cloud based computing, processing and upgrades shall be on the go without any license upgrade or software changes and without any downtime on server, shall be having cloud data optimization, state of art logic engine, easy to upgrade & change without additional license purchase, highly secured end to end encrypted data trans receiver process with cloud with highest SSL certification. Advanced & future IOT enabled device interface capable. Having all type of anti-virus and also shall be able to share API integration for the high level integration.

1.5.3 System Programming

A. The Graphical User Interface software (GUI) shall provide the ability to perform system customization and graphic display engineering as part of a complete software package. Access to the GUI shall be through password access as assigned by the system administrator.

B. The Cloud based library of control, application, and graphic objects shall be with OEM to enable the creation of all applications and user interface screens. Applications shall be created by selecting the desired control objects from the library, arranging them back-end platforms and linking them together using a cloud based built in data point connection tool. Completed applications may be stored in the cloud library for future use. Graphical User Interface screens shall be created in the same fashion on cloud via Back-end. Data for the user displays is obtained by graphically linking the user display objects to the application objects to provide “real-time” data updates. Any real-time data value or object property may be connected to display its current value on a user display. Systems required any separate PC based software tools or processes to create applications and user interface display and to upload & download data base or create offline database shall not be acceptable.

C. Programming Methods

1. Provide the capability to use objects from the cloud libraries by back-end developers. Objects shall be linked by a graphical linking scheme by assigning a link from one object to another. Object links will support one-to-one, many-to-one, or one-to-many relationships. Linked objects shall maintain their connections to other objects regardless of where they are positioned on the page and shall show link identification for links to objects on other pages for easy identification. Configuration of each object will be done through the object’s property sheet using fill-in the

blank fields, list boxes, and selection buttons. Use of custom programming, scripting language, or an Open procedural language for configuration will not be accepted.

2. It shall be programmable through Cloud based back-end programming and shall allow creating control strategies, schedules and helps user to commission and monitor the controller parameters
3. The system shall support object mirror within a customer's cloud database. An application, once configured, can be reuse for easy re-use and duplication. All links, other than to the hardware, shall be maintained during duplication.

1.5.4 Network Management

A. URL Based Native Cloud Graphical User Interface software (GUI) shall provide a complete set of integrated network management tools for working with MQTT protocol based network.
B. Cloud Network management shall include the following services: device identification, device installation, device configuration, device diagnostics, device maintenance and network variable binding.
C. Cloud based back-end configuration shall also provide diagnostics to identify devices on the network, to reset devices, and to view health and status counters within devices on separate checksum backend dashboard.
D. The network management database shall be resident in the Cloud based software/server and local data of each controller for 2-5 days in case of Wi-Fi failure, ensuring that anyone with proper authorization has access to the cloud managed database at all times. Systems employing network management databases that are not cloud native, at all times, and within the control system shall not be accepted.

1.5.5 System Features:

1.5.6 Help Facility

The help facility shall be made available to the operator by use of a dedicated key or a single key click on the mouse. A minimum help shall be available for every menu item and dialogue box.

The facility shall contain both text and graphics to provide information about the selected function directly.

The information provided shall be in simple clear language and shall be capable of being added to or modified by an authorized operator.

1.5.7 Alarms

Multiple priority levels of alarm shall be made available. Priority levels shall be deemed Critical Alarms and Non critical (general) Alarms. Normally, critical alarms shall take precedence over non-critical alarm and high priority over low priority.

Each analog point shall have the following limits defined; wherever required

High threshold alarm limit

Low threshold alarm limit

When an analog point goes outside the low threshold alarm limit, a user defined warning message shall be directed to the appropriate log for future printers at the control station.

The warning limits shall be used to monitor controllability, not comfort conditions. The alarm limits shall be used to monitor comfort conditions. Alarm message shall require operator acknowledgement.

When a digital point goes into alarm, a user defined alarm message shall be output to the appropriate log for future printing and to respective control station. Alarm messages shall require operator acknowledgement.

When a point returns to normal, the event shall be recorded in control stations as 'Return to Normal'.

The Operator workstations shall be capable of displaying a list of all points in alarm for the building in a separate summary. Systems which require the operator to make a single summary for alarm shall not be acceptable.

1. Annunciation: Alarm shall be annunciated at a terminal icon. Critical alarm shall be defined by a different color than non-critical alarms.
2. It shall be possible to produce a user definable full text message to accompany the annunciation of any alarm. This shall provide further information about the alarm and any action required to be taken by the operator or indicate that action is automatically programmed in the system.
3. Acknowledgement: It shall be necessary for all alarms to be acknowledged by an authorized operator.

Alarm silencing shall be by the authorized operators by pressing the silence key.

4. Alarm Clear: When alarms are cleared, then a message shall be produced to indicate the description of the alarm point, its current state, and the time and date.
5. Point lockout: It shall be possible for the operator to lockout the control for any point, to force it to remain in its current state.

A summary showing locked out points shall be available. Systems which require the operator to make a separate lockout summary shall not be acceptable.

6. Alarm Review: Points in alarm shall be displayed on the operator's panel using the alarm review function.

1.5.8 Data Logging

A. It shall be possible to log the status or value of system points at regular intervals or on change of state and store this on Cloud Server Repository at any of the designated server. Facilities such as historical and dynamic trends, times-shift comparison, workstation trends, sub-system trend, design for each trend curve type, i.e., color, font etc. shall be supported.

B. It shall be possible to archive this information for future reference on cloud server.

C. In the case of timed interval logs, it shall be possible to specify a time interval (in minutes) and the points which are required to be logged.

D. Storage of logged information shall be able to be carried out in the following way:

- Logging shall be carried out only during a pre-defined period for which the start and finish time and date shall be configurable.

E. Logging files shall be terminal based not system based, to provide true multi-terminal capability.

F. Data produced by the logging facility must be able to be used by standard spread-sheet package for the analysis of information and the preparation of management report.

G. In addition to the above, it shall be possible to present the data in a simplified customized format, allowing the following minimum features:

- Charting of logged data on cloud GUI in line graph, bar graph or pie format.
- Presentation of logged data on Cloud Server in tabular format.
- Line graphs of dynamic data (up to 8 points) in real time.
- Presentation of dynamic data in tabular format in real time.
- Selection of Auto/ manual scaling of X(time) axis and Y(variable) axis.
- Tailoring of charts by selection of line width and background colors.
- Optional grid overlays (full and dotted lines).
- Selection of horizontal/ vertical arrangement of windows or a `cascade' presentation.
- Multiple Windows.
- Printing of completed presentations.
- User configurable data selections.
- Optional display of point titles.
- Selection of primary or secondary values for display.
- Presentation of both analog and digital values (ON/OFF etc.).

1.5.9 Report Generation

Standard reports shall be provided, which shall be operator selectable to appear on the Dashboard, any selected printer or both.

Standard pre-formatted reports to be provided shall include:

A. Point summary reports that may be generated for any penetration level. Point summary reports shall include the current value/status and condition, point descriptors and all relevant information. Point summary reports shall be selectable for all points.

All reports shall be capable of being scheduled to run at a specific time and/or interval via an operator function supported by necessary data entry templates and interactive prompts.

B. As a minimum, the system shall provide the following summaries:

- Point summary
- Alarm summary
- Limits summary
- Point status (alarm, locked out, off-line, override)
- Point name
- Point status/value (automatically updating)
- Engineering units.

The alarm summary shall list all points in alarm in the selected system. It shall be possible to print on a single summary, all points in alarm in the building. As a minimum, the alarm summary shall include:

- Point name
- Point status/value (when alarm occurred)
- Alarm message
- Date and time of alarm occurrence

The limits summary shall list all the alarm limits, and warning limits.

C. Trend reports shall allow the operator to randomly select logical group of points to be recorded at
selectable time intervals. It shall be possible to assign up to ten variables to each trend report. The format, headers, footers, and calculations shall be selectable by the operator. It shall be possible to store the trend report to disk for being displayed, and/or printed by the operator later.

D. Dynamic trends shall provide up to eight points and show real time activity of the associated points. It shall be possible for the operator to print and/or display in numeric, line chart etc., this information as per selection. Graphic plots shall allow a unique color for each point. Sample interval of points selected for dynamic trend shall be user selectable. 3-Dimensional dynamic trending must be provided in the system.

E. Alarm and run time reports shall be automatically issued to assigned printers immediately upon occurrence, and shall consist of the point with engineering unit, the time, and the date, and the alarm message.

1.5.10 Data Storage

A history file capability shall be provided to allow automatic storage of certain records plus allow the operator to selectively direct critical real time system data and activity to a mass storage device for later recall and analysis.

A. All alarm activity shall automatically be routed to history files. Alarms shall include warning and alarm threshold violations with no-response, trouble, run time exceeded.
B. Operator shall be able to select those analog and digital inputs and outputs to be stored and the interval at which samples are taken.
C. It shall be possible to access software packages and office productivity suites such as MS-Office /
D. MS-Excel or similar, so that the operator may format display or printouts in the form of spread sheets, bar charts or curve plots with the help of Back-end programmer or through configuration app.
E. History files shall be the source data for stored trend reports to be used for records and system analysis. Operator shall be able to select specific points to be trended, the time period of the trend, the sample interval, and time at which the report is printed. Trend output format shall be as specified for trend logs (shaded, un-shaded etc.).

1.5.11 Utilities

The operator Dashboard shall be provided with variety of widely used URL based system utilities. System should be capable of supporting third party software packages like spreadsheet, word processing, Adobe Acrobat reader etc.

1.5.12 Time Scheduling

A. There shall be real time clock facility to help in time scheduling. The scheduling feature shall not be dependent on a central database cloud server or a controller.

B. The following commands shall be able to be time scheduled to be issued at a later day and time from the operator workstation or portable workstation:

- Start and stop a point
- Adjust analog value
- Change set-point

C. The following typical commands shall be able to be time scheduled to be executed at a later day and time from the operator workstation:

- Change alarm limits or warning
- Demand limit target setting
- Reset tracking period for energy statistics
- Trend point enable/ disable for a point
- Totalization enable/ disable for a point
- Reset totalization value

D. The following typical summaries shall be able to time scheduled to be printed or stored in a cloud server file at a later day and time from the operator workstation :

- Standard point summary
- Alarm summary
- Off-line summary
- Override summary
- Disabled summary
- Utility summary
- Alarm limits summary

E. Commands shall be able to be issued repeatedly on specified days of the week at specified times.

F. A system wide calendar shall be set up to define each day as:

- Regular day
- Special day
- Holiday

The system wide calendar shall be stored in multiple locations so that the failure of any one device does not cause the system to fail.

The calendar shall automatically accommodate the leap year and the turn of the century.

The calendar shall allow the days to be scheduled one year in advance from the current system date.

G. Separate schedules shall be stored for:

- Regular days

- Special days
- Holidays

H. The system shall accept one-time schedules to accommodate overtime usage. One-time schedules shall be automatically deleted from the system after execution. The system shall allow one-time schedules to be programmed up to one year in advance.

I. After recovery from a power failure, the system shall determine any time scheduled commands which should have been issued during the period that the power was off. These commands shall automatically be issued.

1.5.13 Point History

A. For every analog point in the system, a 24 hour record of the value sampled on regular interval shall be maintained. The operator shall choose whether samples older than 24 hours shall be discarded or archived. The most recent 2-4 hours of analog point history shall be able to be displayed at the Cloud Dashboard.

B. Point history samples with time/date shall also be taken under the following conditions:

- Point in alarm
- Point overridden/released by operator
- Point on-line/off-line

A report shall be available showing all points for which point history is being archived.
The system shall provide point history graphs for analog/digital points.

1.5.14 Point Trend

A. The trend feature shall be able to record any of the following parameters for any point :

- Point value
- Point alarm status
- Operator override flag
- On-line/Off-line flag

B. The operator shall be able to select points and define any interval on which samples may be taken.

C. For long term storage of samples, trend data shall automatically be updated.

D. A report shall be available listing all points being trended. The report shall display:

- Trend status
- Point name
- Parameter being trended
- Display units
- Sample interval
- Number of samples taken.

E. A trend for a point shall be able to be started either by operator command or according to a time scheduled command. A trend for a point will end as a result of an operator command, time scheduled command or when the required number of samples have been collected.

F. Trend samples shall be displayed in either tabular or graphical format. A minimum of eight trended points shall be able to be displayed concurrently on a graph or report.
G. The trend graph display shall automatically scale the value and time axis to display all samples. From the trend graph, the operator shall be able to select and read the instantaneous value of any previous sample.
H. The trend point graphing capability shall be a built-in feature of the system and shall not require operator set- up. Systems, which require trend point data to be exported to third party software, shall not be acceptable.

1.5.15 Totalization

A. For every digital point, the system shall be able to calculate:
- Cumulative on-time
- Cumulative off-time

B. For every point, analog and digital, the system shall be able to calculate:
- Cumulative time in alarmA. For every digital point, the system shall be able to calculate:
- Cumulative on-time
- Cumulative off-time

C. For every point, analog and digital, the system shall be able to calculate:
- Cumulative time in alarm
- Cumulative time overridden by operator
- Cumulative time off-line

D. Time totalization shall have a resolution of one minute or less.
E. Time totalization shall be displayed in hours.

1.5.16 Database Manager

Cloud based software & Server shall include a data base manager to allow the data to be managed on an integral and non-redundant basis. It shall be able to make additions and deletions to database, without affecting the existing data.

1.6 PROGRAMMABLE CONTROLLER

1.6.1 Wi-Fi & BLE Enabled Direct Digital Controller (DDC) - Hardware

a) Wi-Fi and BLE Enable DDC controller shall be IP based type and shall have on board RJ 45 Ethernet Port to directly connect with network switch.
b) Controllers shall be capable of fully “stand- alone” operation, i.e., in the event of loss of Wi-Fi and hence the internet connection and so the MQTT broker with other DDCs (Slaves) over Modbus/RTU protocol, they shall be able to function on their own.
c) The DDC shall communicate with peers over Modbus RTU and cloud server over MQTT protocol on Ethernet with Internet or Wi-Fi with Internet
d) The controllers shall consist of microcontroller and it shall have minimum 16MB internal RAM for data storage and additional SD card provision for higher data storage enablement.
e) The memory available to the controller board as working space for storage of the firmware only and no operating systems on board shall be accepted and data files shall be decided based on number of points being connected by them.

f) It shall have built in MQTT router eliminating the need for additional MQTT routers for the system.
g) The controllers shall be UCE certified.
h) It shall have adequate non volatile / Flash Memory with capacity to store all I/O data of that particular DDC for minimum 2-7 Days.
i) Controllers shall have Proportional control, Proportional plus Integral (PI) Control, Proportional plus Integral plus Derivative (PID) Control, Two Position Control and Time Proportioning Control and algorithms etc., all in its memory and all available for use by the user, i.e. all the control modes shall be firmware selectable at any time and in any combination of master slave. The analog output of Proportional Control, PI Control, and PID Control shall continuously be updated and output by the program shall be provided. Between cycles the analog output shall retain its last value or default value as decided for the project. Enhanced integral action in lieu of Derivative function shall not be acceptable.
j) The controllers shall have a resident real time clock for providing time of day, day of week, date, month and year. These shall be capable of being synchronized with cloud server & software.
k) Back-up power shall support the clock. Upon power restoration all clocks shall be automatically
l) synchronized.
m) The controller shall have A/D converters, memory and capacity to accommodate input/output (I/O) hardware points (with expansion board or module) as per I/O requirement. However, DDCs with a lower capacity of I/Os may be adequate for locations with relatively less input/output points. ELV Sub-Contractor shall submit DDC I/O points' configuration, i.e., no. of I/Os in each DDC for approval. DDCs with adequate number of I/O points shall be supplied after considering a spare capacity of 10% for each I/O type in every controller.
n) If the controllers provided by the contractor have the configurable plug in expansion module with RS485 port, then the following minimum specifications shall have to be met :

- In addition to the basic outstation a minimum of one slots shall be provided for the insertion of plug-in expansion module.
- The module shall provide for analog or digital, input or output, hardwired connections to the installed plant.
- The quantity and combination of these cards shall be determined by the requirements of the plant in that location with the concurrence of the Engineer. Controller shall be sized to have 10% spare capacity left out (digital/ analog input/output) to give flexibility for future expansion.

o) Controllers shall have 12 bit A/D resolution and be capable of handling DC voltage (using 500 ohm
resistor for I to V conversion) resistance or open and closed contacts inputs in any mix, if required.

Analog (Universal) inputs/outputs of the following minimum types shall be supported:

- 0-1 volts.
- 0-10 volts.
- 0-5 volts,
- 2-10 volts.
- 4-20mA
- RTD (Ohms)

Digital input / output types to be supported shall be, but not limited to the following:

- Normally open contacts.
- Normally closed contacts.

Modulating outputs shall be true proportional outputs and not floating control type.

p) Controller packaging shall be such that complete installation and check out of field wiring can be done prior to the installation of electronic boards.
q) All board terminations shall be made via plug-in connectors to facilitate trouble-shooting, repair and replacement. Soldering of connections shall not be permitted.
r) Controllers shall be equipped with diagnostic LED indicators with indication for Power On, Bus Error and Wi-Fi or Internet Error. All LED's shall be visible without opening the casing.
s) It shall be possible for the controllers to accept regulated uninterrupted power supply to maintain full operation of the controller functions (control, logging, monitoring and communications) in the event of a localized mains failure.
t) Controllers requiring fan cooling are not acceptable.
u) The controllers shall be housed in vandal proof ABS enclosures to protect them from tampering by any unauthorized personnel. All controllers used in plant room spaces and external application shall be housed in minimum IP55 rating enclosures.
v) It shall be possible to add new controllers to the system without taking any part of the system off-line.

1.6.2 Direct Digital Controller - Capabilities

a. Controller shall have a self-analysis feature and shall transmit heat beat messages to the IBMS cloud server to facilitate trouble-shooting and ensure the shortest possible down time of any failed controller.
b. Controllers shall have resident in its memory and available to the programs, a relevant library of algorithms, intrinsic control operators, arithmetic, logic and relational operators for implementation of control sequences.
c. In the event of failure of communication between the controllers and/or IBMS cloud server terminal, data shall be stored at the controllers and transmitted to the cloud server terminal on restoration of communication (Wi-Fi/LAN-Internet).
d. During new release of firmware the necessary data-base shall be downloaded automatically over the air update and without operator instruction. Controllers requiring a manual intervention for the re-boot of software are not desired.
e. Where information is required to be transmitted between controllers for the sharing of data such as outside air temperature, it shall be possible for global points to be allocated such that information may be transmitted either on change of incremental value or at specific time intervals.
f. Controllers must be able to perform the following energy management functions as a minimum.
   - Time & Event programs
   - Holiday Scheduling
   - Start and stop program
   - Load reset
   - Duty cycle
   - Run Time Totalization
   - Sequencing and Optimization
   - Exception scheduling

g. Controllers shall have Adaptive Control capability whereby the control software measures response time and adjusts control parameters accordingly to provide optimum control. The software shall allow self-tuning of the variable control loops (all or any of P, P+I, P+I+D) of the AHU's and chiller system so as to provide the most efficient and optimized controls at different load conditions. The energy management programs shall update their parameters based on past experience and current operating conditions.

h. Run time shall be accumulated based on the status of a digital input point. It shall be possible to total either ON time or OFF time. Run time counts shall be resident in non-volatile memory.

i. It shall be possible to accommodate Holiday and other planned exceptions to the normal time programs. Exception schedules shall be operator programmable up to one year in advance.

j. Mode of Measurement - "Each".

k. The ELV Sub-Contractor shall quote as per I/O Summary provided for each DDCs such as for analog and digital I/Os as per the I/O Summary for various equipments such as HVAC system (AHUs, Chillers, Ventilation), Electrical and Plumbing System that are be integrated with IBMS. Each DDC shall be supplied with required no. of IOs and communication protocols ports as applicable for the DDC at that location. Cabling distances for serial interface protocol shall not exceed 900 mtrs from DDC up to the last device being connected; in which case an additional DDC(s) shall be provided to connect remaining devices. ELV Sub-Contractor shall submit shop drawings/layouts and schematics indicating DDC locations, connectivity etc. for approval.

1.7 PORTABLE OPERATOR TERMINAL (POT) (Normal Laptop/PC)

a. POT shall be provided to allow operator readout of system variables, override control and adjustment of control parameters. The POT shall be portable and plug directly into individual controller for power and data.

b. The minimum functionality of POT shall include :

- Set points to a fixed value or state.
- Display diagnostic results.
- Display sequentially all point summary and sequentially alarm summary.
- Display digital point state, analog point value.
- Display/change time and date.
- Display/change analog limits.
- Display/change time schedule.
- Display/change run time counts and run time limits.
- Display/change time and/or event initiation.
- Display/change minimum ON/OFF and maximum OFF times.

c. The POT shall be complete with command keys, data entry keys, cursor control keys and a 24 character liquid crystal alphanumeric display. Access shall be via self-prompting menu selection with arrow key control of next menu/previous menu and step forward/backward within a given menu.

d. Connection of a POT to a controller shall not interrupt or interfere with normal network operation in any way, prevent alarms from being transmitted, or interfere with operator work station commands and system modifications.

e. Connection of POT at any controller shall provide display access to all controllers on that bus. In case the controller has a fixed LCD display and entry keyboard, then the display access shall be available on each screen.

f. It shall be possible for the POT to be connected to any controller on the bus to view and control any point on any other controller on the bus under password protected menus. POTs in which only a predefined number & set of points are available shall not be accepted.

g. A failure of any DDC on the bus, Interface unit or Central PC station or any other device of the system shall not affect the operation of the POT.

Systems in which the POT is connected to only a single interface master port and hard wired to other controllers are not acceptable.

h. Use of a POT at DDC shall allow the user to display software information and via password control, modify DDC software.

i. All displays on the POT shall be in English language text and data points shall have customized descriptions as per application requirement.

j. It should be possible to override the commands given through POT by the Operator Control Station.

1.8 DATA COMMUNICATION

The communication shall be via a dedicated Wi-Fi/LAN Ethernet enabled Internet communication on MQTT over Ethernet standards. No other MQTT networking standard shall be acceptable. Controller microcontroller failures shall not cause loss of communication of the remainder of any other device in network.

Each controller shall have equal rights for data transfer and shall report in its predetermined time slot. There shall be no separate device designated as the communications master.

The communication network shall be such that:

- Every controller must be capable of communicating with all other controllers via MQTT through Cloud server which are not connected via Master Slave Communication.
- Each controller is to be provided with a communication watchdog to assure that an individual controller does not permanently occupy the bus.
- Error recovery and communication initialization routines are to be resident in each network connected device.
- The communication protocol shall incorporate CRC (Cyclic Redundancy Check) to detect transmission errors. Parity bit error checking shall not be acceptable.

Single or multiple stand-alone controller failures shall not cause loss of communication between active control panels connected on the communication network (Wi-Fi or LAN).

The communication network shall include provision for automatically reconfiguring itself to allow all operational equipment to perform as efficiently as possible in the event of single or multiple failures.

1.9 **DDC Sensors and Point Hardware**

A. **Temperature Sensors**

- **Acceptable Manufacturers: Veris Industries**
- **All temperature devices shall use precision thermistors accurate to +/- 1 degree F over a range of –30 to 230 degrees F. Space temperature sensors shall be accurate to +/- .5 degrees F over a range of 40 to 100 degrees F.**
- **Room Sensor: Standard space sensors shall be available in an [off white] [black] enclosure made of high impact ABS plastic for mounting on a standard electrical box. Basis of Design: Veris TW Series**

1) **Where manual overrides are required, the sensor housing shall feature both an optional sliding mechanism for adjusting the space temperature setpoint, as well as a push button for selecting after hours operation.**
2) **Where a local display is specified, the sensor shall incorporate an LCD display for viewing the space temperature, setpoint and other operator selectable parameters. Using built in buttons, operators shall be able to adjust setpoints directly from the sensor.**

- **Duct Probe Sensor: Sensing element shall be fully encapsulated in potting material within a stainless steel probe. Useable in air handling applications where the coil or duct area is less than 14 square feet. Basis of Design: Veris TD Series**
- **Duct Averaging Sensor: Averaging sensors shall be employed in ducts which are larger than 14 square feet. The averaging sensor tube shall contain at least one thermistor for every 3 feet, with a minimum tube length of 6 feet. The averaging sensor shall be constructed of rigid or flexible copper tubing. Basis of Design: Veris TA Series**
- **Pipe Immersion Sensor: Immersion sensors shall be employed for measurement of temperature in all chilled and hot water applications as well as refrigerant applications. Provide sensor probe length suitable for application. Provide each sensor with a corresponding pipe-mounted sensor well, unless indicated otherwise. Sensor wells shall be stainless steel for non-corrosive fluids below 250 degrees F and 300 series stainless steel for all other applications. Basis of Design: Veris TI Series**
- **Outside Air Sensor: Provide the sensing element on the building's north side. Sensing element shall be fully encapsulated in potting material within a stainless steel probe. Probe shall be encased in PVC solar radiation shield and mounted in a weatherproof enclosure. Operating range -40 to 122 F, Basis of Design: Veris TO Series**
- **A pneumatic signal shall not be allowed for sensing temperature.**

B. Humidity Wall Transmitter

- Acceptable Manufacturer: Veris Industries
- Transmitters shall be accurate to +/- [1] [2] % at full scale.
- Transmitter shall have replaceable sensing element.
- Sensor type shall be thin-film capacitive.
- Sensor element shall contain multipoint calibration on-board in nonvolatile memory
- Operating range shall be 0 - 100% RH noncondensing, 50 to 95 F
- Output shall be field selectable 4-20 mA or 0-5/0-10 VDC.
- Transmitter shall accept 12-30 VDC or 24 VAC supply power.
- Transmitter shall be available in an [off white] [black] enclosure made of high impact ABS plastic for mounting on a standard electrical box.
- Transmitter shall have LCD display
- Transmitter shall be available with a certification of NIST calibration

- [Transmitter shall have integrated temperature sensor]
- Basis of Design: Veris HWL Series

C. Humidity Duct Transmitter

- Acceptable Manufacturer: Veris Industries
- Transmitters shall be accurate to +/- [1] [2] % at full scale.
- Transmitter shall be fully encapsulated in potting material within a stainless steel probe.
- Transmitter shall have replaceable sensing element.
- Sensor type shall be thin-film capacitive.
- Sensor element shall contain multipoint calibration on-board in nonvolatile memory
- Operating range shall be 0 - 100% RH noncondensing, -40 to 122 F
- Output shall be 4-20 mA or 0-5/0-10 VDC.
- Transmitter shall accept 12-30 VDC or 24 VAC supply power.
- Transmitter shall be available with a certification of NIST calibration
- [Transmitter shall have integrated temperature sensor]
- Basis of Design: Veris HD Series

D. Humidity Outdoor Transmitter

- Acceptable Manufacturer: Veris Industries
- Transmitters shall be accurate to +/- 2% at full scale.
- Transmitter shall be fully encapsulated in potting material within a stainless steel probe. Probe shall be encased in PVC solar radiation shield and mounted in a weatherproof enclosure.
- Transmitter shall have replaceable sensing element.
- Sensor type shall be thin-film capacitive.
- Sensor element shall contain multipoint calibration on-board in nonvolatile memory
- Operating range shall be 0 - 100% RH noncondensing, -40 to 122 F
- Output shall be 4-20 mA or 0-5/0-10 VDC.
- Transmitter shall accept 12-30 VDC or 24 VAC supply power.
- Transmitter shall be available with a certification of NIST calibration
- [Transmitter shall have integrated temperature sensor]
- Basis of Design: Veris HO Series

E. Carbon Dioxide Wall Transmitter:

- Acceptable Manufacturer: Veris Industries
- Sensor type shall be Non-dispersive infrared (NDIR).
- Accuracy shall be ±30 ppm ±2% of measured value with annual drift of ±10 ppm. Minimum five year recommended calibration interval.
- Repeatability shall be ±20 ppm ±1% of measured value
- Response Time shall be <60 seconds for 90% step change
- Outputs shall be field selectable [Analog: 4-20mA or 0-5/0-10VDC] [Protocol: Modbus or BACnet] with [SPDT Relay 1A@30VDC] [temperature setpoint slider]
- Transmitter shall accept 12-30 VDC or 24 VAC supply power.
- Temperature Range: [32° to 122°F (CO2 only)] [50° to 95°F (with humidity option)]
- Output range shall be programmable 0-2000 or 0-5000 ppm
- Transmitter shall be available in an [off white] [black] enclosure for mounting on a standard electrical box.
- Transmitter shall have LCD display for commissioning and provide additional faceplate to conceal LCD display where occupants may misinterpret CO2 readings.
- [Transmitter shall have integrated [humidity sensor] [temperature sensor]]
- Basis of Design: Veris CWL

F. Carbon Dioxide Duct Transmitter:

- Acceptable Manufacturer: Veris Industries
- Sensor type shall be Non-dispersive infrared (NDIR).
- Accuracy shall be ±30 ppm ±2% of measured value with annual drift of ±10 ppm. Minimum five year recommended calibration interval.
- Repeatability shall be ±20 ppm ±1% of measured value
- Response Time shall be <60 seconds for 90% step change
- Outputs shall be field selectable Analog: 4-20mA or 0-5/0-10VDC with SPDT Relay 1A@30VDC
- Transmitter shall accept 12-30 VDC or 24 VAC supply power.
- Temperature Range: 32° to 122°F
- Output range shall be programmable 0-2000 or 0-5000 ppm
- Enclosure shall not require remote pickup tubes and make use of integrated H-beam probe to channel air flow to sensor.
- Enclosure lid shall require no screws and make use of snap on features for attachment
- Enclosure shall be made of high impact ABS plastic
- Transmitter shall have LCD display
- [Transmitter shall have integrated [humidity sensor] [temperature sensor]]
- Basis of Design: Veris CDL

G. Air Pressure Transmitters.

- Acceptable Manufacturers: Veris Industries
- Sensor shall be microprocessor profiled ceramic capacitive sensing element
- Transmitter shall have 14 selectable ranges from 0.1 – 10" WC
- Transmitter shall be +/- 1% accurate in each selected range including linearity, repeatability, hysteresis, stability, and temperature compensation.
- Transmitter shall be field configurable to mount on wall or duct with static probe
- Transmitter shall be field selectable for Unidirectional or Bidirectional
- Maximum operating pressure shall be 200% of design pressure.
- Output shall be field selectable 4-20 mA or 0-5/0-10 VDC linear.
- Transmitter shall accept 12-30 VDC or 24 VAC supply power
- Response time shall be field selectable T95 in 20 sec or T95 in 2 sec
- Transmitter shall have an LCD display
- Units shall be field selectable for WC or PA
- Transmitter shall have provision for zeroing by pushbutton or digital input.
- Transmitter shall be available with a certification of NIST calibration
- Basis of Design: Veris model PXU.

H. Liquid Differential Pressure Transmitters:

- Acceptable Manufacturer: Veris Industries
- Transmitter shall be microprocessor based
- Transmitter shall use two independent gauge pressure sensors to measure and calculate differential pressure
- Transmitter shall have 4 switch selectable ranges
- Transmitter shall have test mode to produce full-scale output automatically.
- Transmitter shall have provision for zeroing by pushbutton or digital input.
- Transmitter shall have field selectable outputs of 0-5V, 0-10V, and 4-20mA.
- Transmitter shall have field selectable electronic surge damping
- Transmitter shall have an electronic port swap feature
- Transmitter shall accept 12-30 VDC or 24 VAC supply power
- Sensor shall be 17-4 PH stainless steel where it contacts the working fluid.
- Performance:

a. Accuracy shall be ±1% F.S. and ±2% F.S. for lowest selectable range

b. Long term stability shall be ±0.25%
c. Sensor temperature operating range shall be -4° to 185°F
d. Operating environment shall be 14° to 131°F; 10-90% RH noncondensing
e. Proof pressure shall be 2x max. F.S. range
f. Burst pressure shall be 5x max. F.S. range

- **Transmitter shall be encased in a NEMA 4 enclosure**
- **Enclosure shall be white powder-coated aluminum**
- **Transmitter shall be available with a certification of NIST calibration**
- **[Transmitter shall be preinstalled on a bypass valve manifold]**
- **Basis of Design: Veris PW**

I. Current Sensors

- Current status switches shall be used to monitor fans, pumps, motors and electrical loads. Current switches shall be available in split core models, and offer either a digital or an analog signal to the automation system. Acceptable manufacturer is Veris Industries

J. Current Status Switches for Constant Load Devices

- Acceptable Manufacturer: Veris Industries
- General: Factory programmed current sensor to detect motor undercurrent situations such as belt or coupling loss on constant loads. Sensor shall store motor current as operating parameter in non-volatile memory. Push-button to clear memory.
- Visual LED indicator for status.
- Split core sensor, induced powered from monitored load and isolated to 600 VAC rms. Sensor shall indicate status from 0.5 A to 175 A.
- Normally open current sensor output. 0.1A at 30 VAC/DC.
- Basis of Design: Veris Model H608.

K. Current Status Switches for Constant Load Devices (Auto Calibration)

- Acceptable Manufacturer: Veris Industries.
- General: Microprocessor based, self-learning, self-calibrating current switch. Calibration-free status for both under and overcurrent, LCD display, and slide-switch selectable trip point limits. At initial power-up automatically learns average current on the line with no action required by the installer
- Split core sensor, induced powered from monitored load and isolated to 600 VAC rms. Sensor shall indicate status from 2.5 A to 200 A.
- Display: Backlit LCD; illuminates when monitored current exceeds 4.5A
- Nominal Trip Point: ±40%, ±60%, or on/off (user selectable)
- Normally open current sensor output. 0.1A at 30 VAC/DC.
- Basis of Design: Veris Model H11D.

L. Current Status Switches for Variable Frequency Drive Application

- Acceptable Manufacturer: Veris Industries.
- General: Microprocessor controlled, self-learning, self-calibrating current sensor to detect motor undercurrent and overcurrent situations such as belt loss, coupling shear, and mechanical failure on variable loads. Sensor shall store motor current as operating parameter in non-volatile memory. Push-button to clear memory and relearn.
- Visual LED indicator for status.
- Alarm Limits: ±20% of learned current in every 5 Hz freq. band
- Split core sensor, induced powered from monitored load and isolated to 600 VAC rms. Sensor shall indicate status from 1.5 A to 150 A and from 12 to 115 Hz.
- Normally open current sensor output. 0.1A at 30 VAC/DC.
- Basis of Design: Veris Model H614.

M. Liquid Flow, Insertion Type Turbine Flowmeter:

- **Acceptable Manufacturer:**
- **General: Turbine-type insertion flow meter designed for use in pipe sizes 1 1/2" and greater. Available in hot tap configuration with isolation valves and mounting hardware to install or remove the sensor from pipeline that is difficult to shut down or drain**
- **Performance:**

1) **Accuracy ±1% of rate over optimum flow range; ≥10 upstream and ≥5 downstream straight pipe diameters, uninterrupted flow**
2) **Repeatability ±0.5%**
3) **Velocity Range: 0.3 to 20 FPS**
4) **Pressure Drop 0.5 psi or less @ 10 ft/sec for all pipe sizes 1.5" dia and up**
5) **Pressure Rating: 1000 psi @ 70°F**

- **Maximum Temperature Rating: 300°F**
- **Materials: Stainless Steel or Brass body; Stainless steel impeller**
- **Transmitter:**

1) **Power Supply: 12 - 30VAC or 8 - 35VDC.**

a) **Output: [Frequency] [4-20 mA] [Scaled Pulse]**

2) **Temperature Range: 14° to 150°F**
3) **Display: 8 character 3/8" LCD (Optional)**
4) **Enclosure: NEMA 4, Polypropylene with Viton® sealed acrylic cover**

- **Basis of Design: Veris SDI series**

N. Liquid Flow/Energy Transmitter, Non-invasive Ultrasonic (Clamp-on):

- Acceptable Manufacturer:
- General: Clamp-on digital correlation transit-time ultrasonic flow meter designed for clean liquids or liquids containing small amounts of suspended solids or aeration. Optional temperature sensors for BTU calculations.
- Liquid: water, brine, raw sewage, ethylene, glycol, glycerin, others. Contact manufacturer for other fluid compatibility
- Pipe Surface Temperature: Pipe dia 1/2" to 2":-40-185°F; Pipe dia > 2": -40-250°F
- Performance:

1) **Flow Accuracy:**

a) **Pipe dia 1/2" to 3/4" 1% of full scale**
b) **Pipe dia 1" to 2" 1% of reading from 4-40 FPS**
c) **Pipe dia 2" to 100" 1% of reading from 1-40 FPS**

2) **Flow Repeatability ±0.01% of reading**
3) **Velocity Range: (Bidirectional flow)**

a) **Pipe dia 1/2" to 2" 2 to 40 FPS**
b) **Pipe dia 2" to 100" 1 to 40 FPS**

4) **Flow Sensitivity 0.001 FPS**
5) **Temperature Accuracy (energy): 32-212°F; Absolute 0.45°F; Difference 0.18°F**
6) **Temperature Sensitivity: 0.05°F**
7) **Temperature Repeatability: ±0.05% of reading**

- Transmitter**:**

1) **Power Supply: 95 to 264 VAC, 47 to 63 Hz or 10 to 28 VDC.**
2) **Output: [RJ45] [Modbus TCP/IP] [Ethernet/IP] [BACnet/IP] [Pulse] [4-20 mA] [RS-485 Modbus RTU}**

3) **Temperature Range: -40 to +185°F**
4) **Display: 2 line backlit LCD with keypad**
5) **Enclosure: NEMA 4, (IP65), Powder-coated aluminum, polycarbonate**

- Agency Rating: UL 1604, EN 60079-0/15, CSA C22.2, CSA Class 1 (Pipe > 2")
- Basis of Design: Veris FST & FSR series

O. Analog Electric/Pneumatic Transducer:

- Acceptable Manufacturer:
- General: Micro-controlled poppet valve for high accuracy and with no air loss in the system. Field configurable for pressure sensing in multiple applications.
- Power Supply: 22-30VDC, 20-30VAC
- Control Input: 4-20mA, 0-10V, 0-5V; jumper selectable
- Performance:

1) **Accuracy: 1% full scale; combined linearity, hysteresis, repeatability**
2) **Compensated Temperature Range: 25° to 140°F**
3) **Temp Coefficient: ±0.05%°C**
4) **Operating Environment: 10-90% RH, non-condensing; 25° to 140°F**

- Supply Pressure: 45 psig max.
- Manual Override: Jumper selectable mode, digital pushbutton adjust
- Alarm Contact: 100mA@30VAC/DC (Optional)
- Control Range 0-20 psig or 3-15 psig; jumper selectable
- Pressure Differential 0.1 psig (supply to branch)
- Pressure Indication Electronic, 3-1/2 digit LCD
- Housing: Mounted on standard SnapTrack; Optional clear dust cover
- Basis of Design: Veris EP Series

P. Control Valves

- Provide automatic control valves suitable for the specified controlled media (steam, water or glycol). Provide valves which mate and match the material of the connected piping. Equip control valves with the actuators of required input power type and control signal type to accurately position the flow control element and provide sufficient force to achieve required leakage specification.
- Control valves shall meet the heating and cooling loads specified, and close off against the differential pressure conditions within the application. Valves should be sized to operate accurately and with stability from 10 to 100% of the maximum design flow.
- Trim material shall be stainless steel for steam and high differential pressure applications.
- Electric actuation should be provided on all terminal unit reheat applications unless electric heat is provided.

Q. Dampers

- **A**utomatic dampers, furnished by the Building Automation Contractor shall be single or multiple blade as required. Dampers are to be installed by the HVAC Contractor under the supervision of the BAS Contractor. All blank-off plates and conversions necessary to install smaller than duct size dampers are the responsibility of the Sheet Metal Contractor.
- Damper frames are to be constructed of 13 gauge galvanized sheet steel mechanically joined with linkage concealed in the side channel to eliminate noise as friction. Compressible spring stainless steel side seals and acetyl or bronze bearings shall also be provided.
- Damper blade width shall not exceed eight inches. Seals and 3/8 inch square steel zinc plated pins are required. Blade rotation is to be parallel or opposed as shown on the schedules.
- For high performance applications, control dampers will meet or exceed the UL Class I leakage rating.
- Control and smoke dampers shall be Ruskin, or approved equal.
- Provide opposed blade dampers for modulating applications and parallel blade for two position control.

R. Damper Actuators

- Damper actuators shall be electronic, and shall be direct coupled over the shaft, without the need for connecting linkage. The actuator shall have electronic overload circuitry to prevent damage. For power-failure/safety applications, an internal mechanical, spring return mechanism shall be built into the actuator housing. Non-spring return actuators shall have an external manual gear release to allow positioning of the damper when the actuator is not powered.

S. Smoke Detectors

- Air duct smoke detectors shall be by Air Products & Controls or approved equal. The detectors shall operate at air velocities from 300 feet per minute to 4000 feet per minute.
- The smoke detector shall utilize a photoelectric detector head.
- The housing shall permit mechanical installation without removal of the detector cover.
- The detectors shall be listed by Underwriters Laboratories and meet the requirements of UL 268A.

T. Airflow Measuring Stations

- Provide a thermal anemometer using instrument grade self heated thermistor sensors with thermistor temperature sensors.
- The flow station shall operate over a range of 0 to 5,000 feet/min with an accuracy of +/- 2% over 500 feet/min and +/- 10 ft/min for reading less than 500 feet/min.

2.8 Electrical Power Measurement

U. **Electrical Power Monitors, Single Point (Easy Install):**

- Acceptable Manufacturer: Veris Industries.
- General: Consist of three split-core CTs, factory calibrated as a system, hinged at both axes with the electronics embedded inside the master CT. The transducer shall measure true (rms.RMS) power demand real power (kW) consumption (kWh). Conform to ANSI C12.1 metering accuracy standards.
- Voltage Input: Load capacity as shown on drawings. 208-480 VAC, 60 Hz
- Maximum Current Input: Up to 2400A
- Performance**:**

1) **Accuracy: +/- 1% system from 10% to 100% of the rated current of the CT's**
2) **Operating Temperature Range: 32-140°F, 122°F for 2400A.**

- **Output: 4 to 20 mA, Pulse. or Modbus RTU**
- **Ratings:**

1) **Agency: UL508 or equivalent**
2) **Transducer internally isolated to 2000 VAC.**
3) **Case isolation shall be 600 VAC.**

- **Basis of Design: Similar to Hawkeye Veris H80xx40 series**
- **Accessories: [BACnet] [LON] communications gateway**

V. Electrical Power Monitors, Single Point (High Accuracy):

- Acceptable Manufacturer: Veris Industries.
- General: Revenue grade meter. Measures voltage, amperage, real power (kW), consumption (kWh), and reactive power (kVARar), and power factor (PF) per phase and total load for a single load. Factory calibrated as a system using split core CT's. Neutral voltage connection is required.
- Voltage Input: 208-480 VAC, 60 Hz
- Current Input: Up to 2400A
- Performance**:**

1) **Accuracy: +/- 1% system from 2% to 100% of the rated current of the CT's**
2) **Operating Temperature Range: 32-122°F**

- Output: Pulse, BACnet, Modbus RTU

- Display: Backlit LCD
- Enclosure: NEMA 1
- Agency Rating: UL508 or equivalent
- Basis of Design: Veris Industries H81xx00 series.

W. Electrical Power Monitors, Single Point (High Accuracy/Versatility):

- Acceptable Manufacturer: Veris Industries.
- General: Revenue grade meter. Measures voltage, amperage, real power (kW), consumption (kWh), reactive power (kVAR), apparent power (kVA) and power factor (PF) per phase and total load for a single load. Available with data logging , Bi-directional (4-quadrant) metering, and pulse contact accumulator inputs.
- Voltage Input: 90-600 VAC, 50/60 Hz, 125-300 VDC
- Current Input: 5A – 32,000A, selectable 1/3V or 1V CT inputs
- Performance:

1) **Accuracy shall be +/- [0.2%] [0.5%] revenue grade**
2) **Operating Temperature Range: -22-158°F**

- **Output shall be [Pulse] [BACnet] [Modbus RTU] [LON]**
- **Display: Backlit LCD**
- **Enclosure: NEMA 4x optional**
- **Agency Rating: UL508, ANSI C12.20**
- **Basis of Design: Veris E5xxx series.**

X. Electrical Power Monitors, Multiple Point (92 loads, High Accuracy):

- Acceptable Manufacturer: Veris Industries.
- General: Revenue grade meter. Measures volts, amps, power and energy for each circuit. 1/4 amp to 200 amp monitoring. 4 configurable alarm threshold registers
- Voltage Input: 90-277 VAC, 60 Hz
- Current Input: 5A – 32,000A, 1/3V CT inputs
- Performance:

1) **Accuracy: +/- 0.5% meter (split core), +/- 1% system from 1/4-100A (solid core)**
2) **Operating Temperature Range: 32-140°F**

- **Output: Modbus RTU**
- **Agency Rating: UL508, ANSI C12.10, IEC Class 1**
- **Basis of Design: Veris E3xxx series.**

PART – 3 EXECUTIONS

3.1 Contractor Responsibilities

Y. **General**

- **Installation of the building automation system shall be performed by the Contractor or a subcontractor. However, all installation shall be under the personal supervision of the Contractor. The Contractor shall certify all work as proper and complete. Under no circumstances shall the design, scheduling, coordination, programming, training, and warranty requirements for the project be delegated to a subcontractor.**

Z. Demolition

- Remove controls which do not remain as part of the building automation system, all associated abandoned wiring and conduit, and all associated pneumatic tubing. The Owner will inform the Contractor of any equipment which is to be removed that will remain the property of the Owner. All other equipment which is removed will be disposed of by the Contractor.

AA. Access to Site

- Unless notified otherwise, entrance to building is restricted. No one will be permitted to enter the building unless their names have been cleared with the Owner or the Owner's Representative.

BB. Code Compliance

- All wiring shall be installed in accordance with all applicable electrical codes and will comply with equipment manufacturer's recommendations. Should any discrepancy be found between wiring specifications in Division 17 and Division 16, wiring requirements of Division 17 will prevail for work specified in Division 17.

CC. Cleanup

- At the completion of the work, all equipment pertinent to this contract shall be checked and thoroughly cleaned, and all other areas shall be cleaned around equipment provided under this contract.

3.2 Wiring, Conduit, and Cable

DD. **All wire will be copper and meet the minimum wire size and insulation class listed below:**

Wire Class	Wire Size	Isolation Class
Power	12 Gauge	600 Volt
Class One	14 Gauge Std.	600 Volt
Class Two	18 Gauge Std.	300 Volt
Class Three	18 Gauge Std.	300 Volt
Communications	Per Mfr.	Per Mfr.

EE. Power and Class One wiring may be run in the same conduit. Class Two and Three wiring and communications wiring may be run in the same conduit.

FF. Where different wiring classes terminate within the same enclosure, maintain clearances and install barriers per the National Electric Code.

GG. Where wiring is required to be installed in conduit, EMT shall be used. Conduit shall be minimum 1/2 inch galvanized EMT. Set screw fittings are acceptable for dry interior locations. Watertight compression fittings shall be used for exterior locations and interior locations subject to moisture. Provide conduit seal-off fitting where exterior conduits enter the building or between areas of high temperature/moisture differential.

HH. Flexible metallic conduit (max. 3 feet) shall be used for connections to motors, actuators, controllers, and sensors mounted on vibration producing equipment. Liquid-tight flexible conduit shall be use in exterior locations and interior locations subject to moisture.

II. Junction boxes shall be provided at all cable splices, equipment termination, and transitions from EMT to flexible conduit. Interior dry location J-boxes shall be galvanized pressed steel, nominal four-inch square with blank cover. Exterior and damp location JH-boxes shall be cast alloy FS boxes with threaded hubs and gasketed covers.

JJ. Where the space above the ceiling is a supply or return air plenum, the wiring shall be plenum rated. Teflon wiring can be run without conduit above suspended ceilings. EXCEPTION: Any wire run in suspended ceilings that is used to control outside air dampers or to connect the system to the fire management system shall be in conduit.

KK. Fiber optic cable shall include the following sizes; 50/125, 62.5/125 or 100/140.

LL. Only glass fiber is acceptable, no plastic.

MM. Fiber optic cable shall only be installed and terminated by an experienced contractor. The BAS contractor shall submit to the Engineer the name of the intended contractor of the fiber optic cable with his submittal documents.

3.3 Hardware Installation

NN. **Installation Practices for Wiring**

OO. **All controllers are to be mounted vertically and per the manufacturer's installation documentation.**

PP. **The 120VAC power wiring to each Ethernet or Remote Site controller shall be a dedicated run, with a separate breaker. Each run will include a separate hot, neutral and ground wire. The ground wire will terminate at the breaker panel ground. This circuit will not feed any other circuit or device.**

QQ. **A true earth ground must be available in the building. Do not use a corroded or galvanized pipe, or structural steel.**

RR. **Wires are to be attached to the building proper at regular intervals such that wiring does not droop. Wires are not to be affixed to or supported by pipes, conduit, etc.**

SS. **Conduit in finished areas will be concealed in ceiling cavity spaces, plenums, furred spaces and wall construction. Exception; metallic surface raceway may be used in finished areas on masonry walls. All surface raceway in finished areas must be color matched to the existing finish within the limitations of standard manufactured colors.**

TT. **Conduit, in non-finished areas where possible, will be concealed in ceiling cavity spaces, plenums, furred spaces, and wall construction. Exposed conduit will run parallel to or at right angles to the building structure.**

UU. **Wires are to be kept a minimum of three (3) inches from hot water, steam, or condensate piping.**

VV. **Where sensor wires leave the conduit system, they are to be protected by a plastic insert.**

WW. **Wire will not be allowed to run across telephone equipment areas.**

3.4 Installation Practices for Field Devices

XX. **Well-mounted sensors will include thermal conducting compound within the well to insure good heat transfer to the sensor.**

YY. **Actuators will be firmly mounted to give positive movement and linkage will be adjusted to give smooth continuous movement throughout 100 percent of the stroke.**

ZZ. **Relay outputs will include transient suppression across all coils. Suppression devices shall limit transients to 150% of the rated coil voltage.**

AAA. **Water line mounted sensors shall be removable without shutting down the system in which they are installed.**

BBB. **For duct static pressure sensors, the high pressure port shall be connected to a metal static pressure probe inserted into the duct pointing upstream. The low pressure port shall be left open to the plenum area at the point that the high pressure port is tapped into the ductwork.**

CCC. **For building static pressure sensors, the high pressure port shall be inserted into the space via a metal tube. Pipe the low pressure port to the outside of the building.**

3.5 Enclosures

DDD. **For all I/O requiring field interface devices, these devices where practical will be mounted in a field interface panel (FIP). The Contractor shall provide an enclosure which protects the device(s) from dust, moisture, conceals integral wiring and moving parts.**

EEE. **FIPs shall contain power supplies for sensors, interface relays and contactors, and safety circuits.**

FFF. **The FIP enclosure shall be of steel construction with baked enamel finish; NEMA 1 rated with a hinged door and keyed lock. The enclosure will be sized for twenty percent spare mounting space. All locks will be keyed identically.**

GGG. **All wiring to and from the FIP will be to screw type terminals. Analog or communications wiring may use the FIP as a raceway without terminating. The use of wire nuts within the FIP is prohibited.**

HHH. **All outside mounted enclosures shall meet the NEMA-4 rating.**

III. **The wiring within all enclosures shall be run in plastic track. Wiring within controllers shall be wrapped and secured.**

3.6 Identification

JJJ. **Identify all control wires with labeling tape or sleeves using words, letters, or numbers that can be exactly cross-referenced with as-built drawings.**

KKK. **All field enclosures, other than controllers, shall be identified with a Bakelite nameplate. The lettering shall be in white against a black or blue background.**

LLL. **Junction box covers will be marked to indicate that they are a part of the BAS system.**

MMM. **All I/O field devices (except space sensors) that are not mounted within FIP's shall be identified with name plates.**

NNN. **All I/O field devices inside FIP's shall be labeled.**

3.7 Existing Controls.

OOO. **Existing controls which are to be reused must each be tested and calibrated for proper operation. Existing controls which are to be reused and are found to be defective requiring replacement, will be noted to the Owner. The Owner will be responsible for all material and labor costs associated with their repair.**

3.8 Control System Switch-over

PPP. **Demolition of the existing control system will occur after the new temperature control system is in place including new sensors and new field interface devices.**

QQQ. **Switch-over from the existing control system to the new system will be fully coordinated with the Owner. A representative of the Owner will be on site during switch-over.**

RRR. **The Contractor shall minimize control system downtime during switch-over. Sufficient installation mechanics will be on site so that the entire switch-over can be accomplished in a reasonable time frame.**

3.9 Location

SSS. **The location of sensors is per mechanical and architectural drawings.**

TTT. **Space humidity or temperature sensors will be mounted away from machinery generating heat, direct light and diffuser air streams.**

UUU. **Outdoor air sensors will be mounted on the north building face directly in the outside air. Install these sensors such that the effects of heat radiated from the building or sunlight is minimized.**

VVV. **Field enclosures shall be located immediately adjacent to the controller panel(s) to which it is being interfaced.**

3.10 Software Installation

WWW. **General.**

- **The Contractor shall provide all labor necessary to install, initialize, start-up and debug all system software as described in this section. This includes any operating system software or other third party software necessary for successful operation of the system.**

3.11 Database Configuration.

XXX. **The Contractor will provide all labor to configure those portions of the database that are required by the points list and sequence of operation.**

3.12 Colour Graphic Displays.

YYY. **Unless otherwise directed by the owner, the Contractor will provide color graphic displays as depicted in the mechanical drawings for each system and floor plan. For each system or floor plan, the display shall contain the associated points identified in the point list and allow for setpoint changes as required by the owner.**

3.13 Reports.

ZZZ. **The Contractor will configure a minimum of 4 reports for the owner. These reports shall, at a minimum, be able to provide:**

- Trend comparison data
- Alarm status and prevalence information
- Energy Consumption data
- System user data

3.14 Documentation

AAAA. **As built software documentation will include the following:**

- Descriptive point lists
- Application program listing
- Application programs with comments.
- Printouts of all reports.
- Alarm list.
- Printouts of all graphics
- Commissioning and System Startup

3.15 Point to Point Checkout.

BBBB. **Each I/O device (both field mounted as well as those located in FIPs) shall be inspected and verified for proper installation and functionality. A checkout sheet itemizing each device shall**

be filled out, dated and approved by the Project Manager for submission to the owner or owner's representative.

3.16 Controller and Workstation Checkout.

CCCC. **A field checkout of all controllers and front end equipment (computers, printers, modems, etc.) shall be conducted to verify proper operation of both hardware and software. A checkout sheet itemizing each device and a description of the associated tests shall be prepared and submitted to the owner or owner's representative by the completion of the project.**

3.17 System Acceptance Testing

DDDD. **All application software will be verified and compared against the sequences of operation.**

- Chiller control
- Boiler Control
- Single Zone Air Handlers
- Multi Zone Air Handlers
- Packaged Roof Top Control
- Cooling Only VAV
- Fan Powered VAV
- Fan Coil Control
- Heat Pump Control
- Unit Ventilator Control

EEEE. **Control loops will be exercised by inducing a setpoint shift of at least 10% and observing whether the system successfully returns the process variable to setpoint. Record all test results and attach to the Test Results Sheet.**

FFFF. **Test each alarm in the system and validate that the system generates the appropriate alarm message, that the message appears at all prescribed destinations (workstations or printers), and that any other related actions occur as defined (i.e. graphic panels are invoked, reports are generated, etc.). Submit a Test Results Sheet to the owner.**

GGGG. **Perform an operational test of each unique graphic display and report to verify that the item exists, that the appearance and content are correct, and that any special features work as intended. Submit a Test Results Sheet to the owner.**

HHHH. **Perform an operational test of each third party interface that has been included as part of the automation system. Verify that all points are properly polled, that alarms have been configured, and that any associated graphics and reports have been completed. If the interface involves a file transfer over Ethernet, test any logic that controls the transmission of the file, and verify the content of the specified information.**

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GALGOTIAS UNIVERSITY

SECTION: 8

LIST OF APPROVED MAKES

GALGOTIAS UNIVERSITY

APPROVED MAKES FOR BMS

Sr. No.	Details of Materials / Equipment	Manufacturer's Name
1.	Standalone 32 bit DDCs	NETIX.AI/ Enlite / Siemens
2	Web Based BMS Software with unlimited user license	NETIX.AI/ Enlite / Siemens
3	Web Based Router / Network Area Controller	NETIX.AI/ Enlite / Siemens
4.	Immersion Temperature Sensor (manufactured in north America or Europe only)	Siemens / Dwyer / NETIX.AI
5.	Duct Temperature Sensor (manufactured in north America or Europe only)	Siemens / Dwyer / NETIX.AI
6.	Outside Air Temperature Sensor (manufactured in north America or Europe only)	Siemens / Dwyer / NETIX.AI
7.	Room Temperature Sensor (manufactured in north America or Europe only)	Siemens / Dwyer / NETIX.AI
8.	Duct Humidity Sensor (manufactured in north America or Europe only)	Siemens / Dwyer / NETIX.AI
9.	Room Humidity Sensor (manufactured in north America or Europe only)	Siemens / Dwyer / NETIX.AI
10.	Flow Meter (manufactured in north America or Europe only)	Axioma / Landis Gyr. / NETIX.AI / Krohne Marshall
11.	Duct Static Pressure Sensor (manufactured in north America or Europe only)	Siemens / Dwyer / NETIX.AI
12.	Water Level Switch	Filpro / Sontay / NETIX.AI
13.	DP Switch – Water (manufactured in north America or Europe only)	Siemens / Dwyer / NETIX.AI
14.	DP Switch – Air (manufactured in north America or Europe only)	Siemens / Dwyer / NETIX.AI
15.	CO2 Sensor (manufactured in north America or Europe only)	Siemens / Dwyer / NETIX.AI
16.	Water Flow Switch (manufactured in north America or Europe only)	Siemens / Dwyer / NETIX.AI
17.	Pressure Transmitter – Water (manufactured in north America or Europe only)	Siemens / Dwyer / NETIX.AI

Sr. No.	Details of Materials / Equipment	Manufacturer's Name
18.	Current Relay	Veris / Seto / Mamac/Omron / ABB
19.	Voltage / Current / Power Factor Transducer	SETO / ABB / L&T / Enercon / SETCO
20.	Flame Proof Level Switch / Level Transmitter	Filpro / Sontay / NETIX.AI
21.	PH Sensor / TDS Sensor (manufactured in north America or Europe only)	Hach / Greisinger / Omicron
22.	Personal Computer	HP / DELL
23.	Color Monitor	DELL (ULTRA SHARP) / HP (PAVILION) / SAMSUNG (SYNC MASTER) / LG (FLATRON)
24.	Printer	HP / EPSON / CANON
25.	Copper Conductor Control Cable	Finolex / Bonton / Polycab / KEI / RR Kabel / Rallison / Ravin
26.	Communication Cables / Signal Cable	Finolex / Bonton / Polycab / KEI / RR Kabel / Rallison / Ravin
27.	LAN cables for BMS Network	Commscope / Systimax / Panduit / Molex / Belden
28.	PVC Conduits	BEC / AKG / Precision
29.	UPS	Fuji Consul / Schneider
30.	GI Cable trays	Profab / BEC / Indiana Gratings / Asawa
31.	Battery (sealed maintenance free)	Exide / Amara Raja

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SECTION: 9

COMPLIANCE UNDER EIA

COMPLIANCE UNDER EIA

Contractor to comply with the provisions under EIA, but not limited to following provisions:

1. Contractor would not be permitted to store/dump construction material or debris on metalled road.
2. Beyond the metalled road the area where such the construction material or debris can be stored shall be physically demarcated by 'the Contractor ensuring that it would not cause any obstruction to the free flow of traffic/inconvenience to the pedestrians. It should be ensured that no accidents occur on account of such permissible storage.
3. Contractor shall ensure that the construction material is covered by tarpaulin and all other precaution should be taken to ensure that no dust particles are permitted to pollute air quality as a result of such storage.
   It shall also be ensured that appropriate protection measures are taken by raising wind breakers of appropriate height on all sides of the plot/area using plastic and for other similar material to ensure that no construction material dust fly outside the plot area and it will be the builder/contractor responsibility to ensure that their activity does not cause any air pollution during course of construction and/or storage of material or construction activity. This condition shall be strictly adhered to by every builder, contractor, person or authority. In the event of default they shall be liable to be prosecuted under the law in force, as well as for causing environmental pollution and will be liable to pay compensation which would be determined by Tribunal in accordance with law.
4. All the trucks or vehicles of any kind which are used for construction purposes/or are carrying construction material like cement, sand and other allied material should be fully covered. The vehicles should be properly cleaned, should be dust free and every necessary precautions is to be taken to ensure that enroute their destination, the dust, sand or any other particles are not permitted to be released in air/contaminate air. Any truck not complying with the above directions would not be permitted to enter the area.
   And whereas Hon'ble National Green Tribunal in order dated 10.04.2015 interalia directed as follows:
   a. Contractor shall put tarpaulin on scaffolding around the area of construction and the building. No person including builder, owner can be permitted to store any construction material, particularly sand on any part ofthe street, roads in any colony.
   b. The construction material of any kind that is stored in the site will be fully covered in all respects so that it does not disperse in the Air in any form.
   c. 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.
   d. The dust emissions from the construction site should be completely controlled and all precautions taken inthat behalf.
   e. The vehicles carrying construction material and construction debris of any kind should be cleaned before it is permitted to ply on the road after unloading of such material.
   f. 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.
   g. Every owner and or builder 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.
   h. It shall be the responsibility of every builder to transport construction material and debris waste to construction site, dumping site or any other place in accordance with rules and in terms of this order.
   i. All to take appropriate measures and to ensure that the terms and conditions of the earlier order and these orders should strictly comply with by fixing sprinklers, creations of green air barriers.
   j. Compulsory use of wet jet in grinding and stone cutting.

k. Wind breaking walls around construction site.
l. All the builders who are building commercial, residential complexes which are covered under the EIA Notification of 2006 shall provide green belt around the building that they construct. All Authorities shall ensure that such green belts are in existence prior to issuance of occupancy certificate.
m. All builders shall ensure that C&D waste is transported in terms of this order to the C & D Waste site only and due record in that behalf shall be maintained by the builders, transporters and NCR of Delhi.
n. Even if constructions have been started after seeking Environmental Clearance under the EIA notification 2006 and after taking other travel but is being carried out without taking the preventive and protective environmental steps as stated in this order and MoEF guidelines, 2010, the State Government, SPCB and any officer of any department as afore stated shall be entitled to direct stoppage of work.

And whereas, Environmental Impact Assessment Guidance Manual for Building, Construction, Township and area Development Projects of February, 2010 is available on the website of MoEF &CC envisaging the following guidelines for mitigation measures in respect of dust control from Building, Construction projects:

"*Adopting techniques like, air extraction equipment, and covering scaffolding, hosing down road surfaces and cleaning of vehicles can reduce dust and vapour emissions. Measures include appropriate containment around bulk storage tanks and materials stores to prevent spillages entering watercourses.*

The other measures to reduce the air pollution on site are:

- *Sprinkling of water and fine spray from nozzles to suppress the dust.*
- *On-Road- Inspection should be done for black smoke generating machinery.*
- *Promotion of use of cleaner fuel should be done.*
- *All DG sets should comply emission norms notified by MoEF.*
- *Vehicles having pollution under control certificate may be allowed to ply.*
- *Use of covering sheet to prevent dust dispersion at buildings and infrastructure sites, which are being constructed.*
- *Use of covering sheets should be done for trucks to prevent dust dispersion from the trucks, implemented by district offices.*
- *Paving is a more permanent solution to dust control, suitable for longer duration projects. High cost is the major drawback to paving.*
- *Reducing the speed of a vehicle to 20 kmph can reduce emissions by a large extent.*

Speed bumps are commonly used to ensure speed reduction. In cases where speed reduction can't effectively reduce fugitive duct, it may be necessary to divert traffic to nearby paved area.

Material storages – care should be taken to keep all material storages adequately covered contained so that they are not exposed to situation where winds on site could lead to dust / particulate emissions. Fabric and plastics for covering piles of soil and debris is an effective means to reduce fugitive dust.

SECTION: 10

HSE GUIDELINES

SAFETY

This document sets out **GU** expectations from contractors on Environment, Health and Safety aspect of the construction workers deployed at the project site. It provides general EHS procedures for most, but not all, construction activities to prevent accidents and to monitor/correct violations of procedures through regular Safety meetings. However, a key requirement for EHS success is serious commitment from senior management and strong safety leadership at the project site with well-defined roles and responsibilities of the assigned individuals. Towards that, it is imperative that the selected Managing Contractor employs a well-qualified (relevant qualifications) and experienced Safety Officer responsible for implementing and continuously communicating and driving the procedures throughout the labour force. Being one of the key critical to quality (CTQ's) parameters, the contractors shall be required to submit with their tenders their organization safety policy, risk assessment along with brief summary of the safety performance on projects that they have managed in the last three years (i.e. number of man-hours, number of fatalities, accidents, near misses, type and cause of accidents, etc).

Scope of procedures and relationship with GU:

The Contractor's Safety & Health Procedures applies to all contractor and its subcontractor employees and to all construction and maintenance activities on the job site. A close relationship and continuous interaction must be maintained with **GU** Project team by the construction manager of the contractor. **GU** does have specific safety and health requirements as perthe **GU**'s EHS policy to be observed and cooperation with its representative, Architects, consultant various audit teams and other contractors at site, throughout the contract period is essential.

Selection of sub-contractor:

The main contractor shall select sub or works contractors, using the same criteria of practical safety policy. Again, it must be ensured that the terms of contract include adequate provision for safe working practices & for specified safety and health items.

Standards

The prime contractor and all subcontractors are to comply with the Client specific rules and procedures, the national legislation and codes and in particular the following standards;

IS: 3696 (Part I) -1966 Safety code for scaffolds and ladders: Part I Scaffolds IS:
3696 (Part II)-1966 Safety code for scaffolds and ladders: Part II Ladders IS: 3764-
1966 Safety code for excavation work

IS: 4082-1977 Recommendations on stacking and storage of construction materials at site (first revision)IS:
4130-1976 Safety code for demolition of building (first revision)

IS: 4912-1978 Safety requirements for floor and wall openings, railings and toe boards (first revision)IS:
5121-1969 Safety code for piling and other deep foundations

IS: 5916-1970 Safety code constructions involving use of hot bituminous materialsIS:
7205-1974 Safety code for erection of structural steel work

IS: 7969-1975 Safety code for handling and storage of building materialsIS:
8989-1978 Safety code for erection of concrete framed structures

IS: 7293-1974 Safety code for working with construction machineryIS:
10291-1982 Code of dress in Civil Engineering works, safety

IS: 875-1964 Code of practice for structural safety of buildings and loading standardsIS:
1905-1980 Code of practice for structural safety of buildings, masonry walls

IS: 10386-1983 General aspects Part 1 – 1983, Part 2 – 1982, Part 6 – 1983, Part 10 – 1983 Amenities, protective clothing and equipment, construction, storage, handling, detection and safety measures for gases, chemicals and flammable liquids IS: 2925-1984 Safety helmet tests

IS: 5983-1980 Testing for Eye protectorsIS:
7524 (Part I)-1979 Safety goggles

IS: 1179-1967 Welding helmetsIS:
5914-1970 Safety shoes

IS: 4770-1991 Safety gloves

IS: 12254-1993 Rubber/ PVC knee boots/ gum boots

Client specific requirements for compliance with OSHA standards

SECTION 2: ELEMENTS OF CONSTRUCTION SAFETY

Planning:

Detailed planning should take the following matters in to account;

- Obtaining work specific permits like;
- Permit for work at Height
- Hot work permit
- Disposal permit
- Excavation permit
- Night work permit
- Permit for working in restricted areas
- Confined space Entry permit
- Shaft work permit

- Know the hazardous operations eg. Use of cranes and site transport, structural erection, excavation and false work, scaffolding, roof work, demolition etc.
- Requirement for plant and equipment to ensure safe working or ease of handling
- Sequence of work and its phasing between contractors to minimize the possibility of one contractor placing another contractor's men at risk, where appropriate the segregation of contractors should be considered
- Need to provide information, instruction and appropriate training, both on general site safety and hazardous specific in the site. The latter could range from restricted zones, Permit-to-work systems, lifting operation to the wearing of Personal protective equipment
- Need for fire precautions and emergency procedures
- Need for environmental monitoring and health surveillance
- Site security and foreseeable risks to the public, including the need for directional and warning signs
- Safe access across the site for persons, vehicles and equipment. Thought should be given to arrangements for keepingthe site tidy, accommodation for site staff, safety welfare, first aid and other facilities
- Provision of safe places of work at different stages of the job including the provision of scaffolding, ladders for a numberof sub-contractors.

Control:

Sub and works contractors shall be briefed about the safety policy and site including site specific safety procedures of the prime contractor at the pre-bid meeting itself and further reiterated during the kick-off meeting. Responsibilities of all parties shall be clearly defined before contractors start work at site. Such matters should include:

- Appropriate precautions and methods for identified hazards or hazardous work
- Necessary plant, equipment and arrangements for its provision, maintenance use and inspection
- Question of trade union or other workforce safety representation and the need for a joint safety committee
- A formal joint safety committee must be appointed to review results and to initiate further actions (should be done eitherduring kick-off meeting or subsequently)
- Arrangement for initiation of introduction training for new states on site
- Arrangements for any specialized training
- Arrangements for promulgating safety and health information e.g. On-site notice boards

It is important that such safety and health arrangements are reviewed at the Kick-off meeting as well as first project and first Safety meeting, where the site management can set the tone for the conduct of work by resolving at an early stage the difficulties which may arise at a later date. It is expected that each subcontractor will provide employees adequately licensed(if required for specific works), trained and capable of doing the specialty work.

Coordination:

The Site In-charge appointed by the prime contractor shall be totally responsible for compliance with this health and safety code. The contractor must appoint a Chief Safety Officer and form a "contractor safety committee" along with safety representatives from its sub-contractors. This committee will be chaired by the Site In-charge and meet at least once a weekto review status on EHS issues. It is expected that each contractor and sub-contractor will participate in Daily "Tool BoxTalks" and other safety meeting to co-ordinate project work for the day across trades. The site in-charge must make suitable arrangements to ensure the effective coordination of the work of all its sub-contractors on site. Clear lines of communication should be set up between each sub-contractor's Safety Officer and Safety officer of the prime Contractor. Effective co-ordination will be enhanced by ensuring that 'Safety and Health' figures prominently on the agenda of regular project meetings, as well as Safety meetings. For better coordination on project related EHS issues, the safety meeting participants shall include Project Manager, Project Manager's Safety representative, all contractor's safety representatives along with 's safety rep. Project Manager's Safety officer shall convene this meeting and participants from all contractors safety representatives will be mandatory. Minutes of this meeting shall be circulated to all concerned.

Monitoring:

Arrangements must be made for safety and health monitoring of the site on a regular basis. This will include, not only ensuring the safety issues associated with working at heights, excavations, working with energy sources, etc. but also environmental matters such as hazardous dust, fumes, noise etc. In all cases, the contractor's Site- In-charge shall ensure that daily site inspections are carried out by the contractor's Safety Officer, more in depth inspection being done periodically

by visiting safety advisor. It may be necessary for arrangements to be made for specialist occupational health and hygiene advice. The checklist for daily inspection is provided which must be included in the Behaviour Observation Process (BOP).

Records:

The prime contractor should ensure that all statutory notification, examinations and inspections are carried out. Except for equipment used exclusively by individual contractors, all records should be kept & updated by the contractor's Site In-charge. This individual shall also keep track of all Safety statistics and send report to **GU** Project team on periodic basis, as determined by **GU** Project Manager.

Non-Compliance with Safety and Health Provisions:

The compliance with Environmental Health and Safety provisions is of utmost importance to the. The contractors must note that the will take a serious view of any Safety non-compliance notices. The has a right to order stoppage of work till rectification is carried out to the satisfaction of the safety committee or safe arrangements are made for the execution of work and all stoppages on this account will be at the entire risk, costs and consequences of the contractor.

Disciplinary action:

Noncompliance of the Safety and Health Provisions will result in disciplinary action as per the procedure below:1st time violation: Written warning

2nd time violation: Imposition of penalty as deemed fit by **GU** Project Manager3rd time violation: Removal from site

In the event of the offender bringing itself or others in direct life-threatening situation or where he/she creates a large material damage, will result in immediate removal from site. Repeated violations by a contracting company shall lead to termination of contract and removal of contracting firm from the job site. Any losses incurred by the contracting company, whatsoever, shall be the responsibility of contracting company.

Imposition of penalties for non-compliance with EHS guidelines:

The contractor will be required to comply with all the requirements laid down in these EHS guidelines, Special safety conditions, General conditions of contract and any other safety requirements as a matter of general prudence. Upon failure to comply with any of these, Project Manager is authorized to impose penalty on the contractor as per the details below:

Schedule of Charges to Contractors who are in breach of the employer's Site Safety, Site Safety Cycle and Environmental Rules and Regulations:		
S No.	**Nature of Offence**	**Amount of Safety or Environmental Charge to be levied against the Sub Contractor for each breach of the employer's Rules & Regulations (Indian Rs)**
1	Smoking in an unauthorized area and/or consumption ofalcohol and/or use of illegal substances.	Rs 1000.00
2	Burning of waste or smoldering of combustible materials on site other than for heat treatment processes required for the execution of the Sub Contract works.	Rs 3000.00
3	Failure to wear personal protective equipment (P.P.E.) e.g. Safety helmets, safety boots, goggles etc. respirator, ear plugs, safety belts which shall include failure to anchor belt to a secure structure.	1) Rs.1000.00 per worker when lack of enforcement of the usage of P.P.E. by the Contractor/ Sub-contractor is observed by the employer.
	Where any site operation requires the use of PPE then all workmen must use the required PPE eg. grinding, welding, burning, unloading hazardous materials etc.	2) Rs. 2,000.00 where issuance of the required P.P.E. by the Sub Contractor equipment is not carried out.
4	Failure to attend general safety induction courseconducted by the employer / the employer.	1) Rs.5000.00 per worker for not attending the course; and
		2) Workers to attend course within 2 working days orbe dismissed.

5	Failure to attend a notified site safety meeting.	Rs 5,000.00
6	Failure to submit, within the specified time to the employer, safety supervisor reports which shall include other relevant statutory reports made under the F&IUO Cap. 59, tool box briefing records, weekly Labour return, issuance of personal protective equipment records, safety data sheets of toxic and harmful materials and others related certificates.	Rs 5,000.00
7	Failure to submit a written report for an accident and/or other dangerous occurrence, to the employer within 24 hours of its occurrence.	Rs 5,000.00
8	Failure to carry out within the specified time thenecessary improvement action against any notified safety violation.	Rs 8,000.00
9	Damaged to or misuse of the employer's property.	1) Rs. 5,000.00; and 2) in addition the Sub Contractor to pay for the cost of items damaged.
10	Failure to maintain work area, facility storage and preparation yard, office premises and workers changing and rest area in a clean and orderly state and free from health and fire hazards.	1) Rs 3,000.00; And 2)in addition the Sub Contractor shall clean up thedisorderly and untidy areas within 3 days.
11	Obstruction of passageways, entrance, door, way's, stairs, access to firefighting equipment etc. and /or theerection unsafe access and crossing's	Rs 5,000.00 In addition sub-contractor shall clean up the disorderly and untidy areas within 1 day.
12	Use of equipment that has not been examined by an approved person as required under the factories and industries undertaking ordinance and its related regulations.	Rs 7,000.00
13	Use of defective or uncertified sling's for liftingoperations	Rs. 8,000.00;
14	Executing unsafe hoisting of materials and include unsafe use of lifting appliance.	Rs 10,000.00
15	Erecting and / or using unsafe or unstable scaffolding,working platforms and temporary structures.	Rs 7,000.00
16	Failure to provide and use proper working platforms and safe means of access to the work place, where work is required to be carried out beyond person's normal reach.	Rs 10,000.00
17	Allowing workers to occupy or work on unguarded elevated platforms, floor edges and without adopting adequate safety measures against the risk of person falling from height.	Rs.7,000.00; .

18	Not providing safety barricades / barriers to hazardous floor edge, openings, gaps and shafts.	Rs.7,000.00;
19	Rendering scaffold or working platform unsafe bytampering / alternation.	Rs.10,000.00;
20	Placing of heavy items unsafely on scaffold orworking platforms.	Rs 5,000.00
21	Throwing or allowing objects to drop from heights.	Rs.10,000.00
22	Stacking or leaving materials include work in progress articles and tools in unstable condition and or along flooredges such they are likely to endanger workers.	Rs 8,000.00;
23	Failure to effectively cordon off guard and warn other workers from entering into the danger areas when they are likely to be affected by falling materials from the sub-contractor work.	Rs 8,000.00
24	Violating the permit to work system	Rs 10,000.00
25	Dismantling and rendering any safety guards or protective features of any part of a machine or any partof building structure to extend that such guards and protective features are not operational or are incapable of providing the necessary protection for its design and purpose.	Rs. 10,000.00 .
26	Adopting unsafe tapping, connections and termination of electrical lines and including the use of defective electrical fittings, power cables and electrical tools. Allowing cables / equipment to be merged into water.	Rs 5000.00;
27	Using any defective or unsafe equipment.	Rs 5,000.00
28	Unauthorized use of fire equipment provided foremergency purposes.	Rs.5,000.00
29	Failure to comply with an order issued by the employer's construction manager, safety officer in regard tosafety/environment matters.	Rs.8,000.00
30	Threatening safety personal, misbehaver, fighting orintentional causing hurt to others.	Rs.10,000.00 Person to be banned from the site and report will be made to the police.
31	Failure to wear safety harness and anchor to a secure structure, while working at height.	Rs 5,000.00 if there is 2nd time violation by the sameperson or group attract penalty Rs. 10,000 or more
32	Failure to provide valid certificates for lifting appliances and accessories including any lifting appliance / accessories on vehicles delivering goods to the site.	Rs.8,000.00
33	Failure to provide voltage reducing device onwelding machine.	Rs 4,000.00;
34	Failure to attend site safety walk	Rs 5,000.00

35	Deploying under age or over age worker worker or staff	Rs. 10, 000.00
36	Pregnant women to be not engaged at the constructionsite	Rs. 10, 000.00
37	Failure to provide site safety officer as per the requirement of latest ordinance.	Rs 10,000.00

Note:-

Procedure of Debit:-

- A debit Note will be issued to vendors with the backup records of Non-Conformity and the Penalty amount will bedebited from the Running Bill.

- Prior to the above a 'non conformity notice' shall be issued to give last opportunity to the vendor to comply therequirements.

- Please ensure that all OHSE NON –Conformities with debits are in the notice of client with acceptance beforetaking forward to the contactors.

SECTION 3: SAFETY AUDITS

1) It is essential to conduct formal periodic safety audits to prevent deviations from safety standards.
2) The audit should take the form of a full survey covering all aspects of safety throughout the project site. Reports should be submitted to the Safety Committee. Copies of the results of a survey should be sent to the persons in charge of the respective areas so that corrective measures can be taken. A copy of the Audit report should also be sent to the ProjectHead.
3) Audit team should cover the following aspects:

- Organization
- Accident control
- Hygiene facilities
- Electrical systems
- Fire prevention
- Demarcated areas
- Mechanical equipment
- Safe work practices
- Storage areas
- Material stacking
- Housekeeping
- Safety statistics
- Display of emergency numbers
- MSDS sheets
- Personal Protective Equipment
- Safety training
- Safety meetings
- First aid facilities
- Traffic control, Signage, etc.

4) Findings of the safety audits shall be sent to Safety committee and also be discussed in the Safety committee meetings.
5) Work place audits should also be carried out at job site frequently (at least every week) conducted by representatives of respective contractors to make sure that all Safety provisions are getting complied with. These should primarily focus on Safe working systems, Housekeeping, Machine guarding and use of PPE. Results of these audits shall be reported to the Safety committee.

SECTION 4: ACCIDENT PREVENTION, REPORTING AND INVESTIGATION

Definition:

An accident is commonly defined as: "An unplanned event which may or may not result in injury or damage". As is clear from the definition, an accident need not necessarily involve either injury or damage to person or property. A "near miss" is by definition an accident and should be regarded as a warning that a problem exists and that some action is required to avoid a possible accident/ incident in future.

Causes of Accidents:

88% of all accidents are caused by human error, 10% are caused by mechanical failures and the other 2% are considered outside human control eg. Earthquake etc. The likely causes of accidents should be identified in advance and the appropriate action taken to ensure that the accident never actually takes place. The most important and effective accident prevention technique is training the actions and attitudes of all personnel.

Accident Recording and Investigation

It is essential to have an effective management system for recording accidents. All accidents should be thoroughly investigated. A near miss or incident should be investigated as though an accident had occurred. The prime objective of all investigations of this type is to identify the causes in order to eliminate the risk. Such aspects as systems training and guarding should all be considered in addition to what actually happened and why. The accidents record should include accidents to employees and non employees on company premises i.e. Contractors, construction workers, maintenance workers, visitors etc. and to those using company vehicles. Supervisory staff and, when possible, department personnel should be involved in any investigation relating to their area of control and should be delegated in writing to conduct a detailed analysis of the causes. They should determine how best to prevent a recurrence and this should be taken into account in the report. The depth of the investigation and the effectiveness of the follow up action should be monitored. Records of all accidents must be kept to enable statistics to be analyzed and root causes determined.

Incident Control System

Unsafe acts & conditions and "near misses", if they are not dealt with appropriately, can turn into accidents. It is essential that companies operate an incident control system to ensure that these potential hazards are reported and eliminated. The system should;

- Ensure that whenever possible safety representatives and other employees are involved
- Encourage any person to register an unsafe action or conditions
- Ensure that reports are recorded and acted upon
- Identify the responsibility for investigation and for carrying out corrective action
- Specify the time within which the corrective action should be completed or progress reported
- Ensure that a report is made to management and to the originator when
- corrective action has been completed

Levels of Accident Investigation:

The type or level of accident investigation depends on the nature and seriousness of the incident. In most cases, an "Accident and Incident investigation panel will be formed which will determine the appropriate level of investigation.

Types of Investigation:

• A full investigation which requires a panel including a Project Manager, Safety Officer and Contractor's Safetyrepresentative and GU Corporation Pvt Ltd project team representative or a panel as determined by Project Manager.

• A departmental investigation involving the departmental manager(s) the safety officers and the appropriate supervisor

• An investigation by the supervisor involving, where appropriate, the employees concerned

Lost Time Accidents (LTA):

This refers to the total number of accidents of all types which result in lost man hours. Lost man hours occur if the person involved is unable to return to normal duties immediately after any treatment.

Reportable Accidents:

When an employee, as a result of a lost time accident, is absent from work for more than two days (48 hour), then this will be recorded not only as a lost time accident but also a reportable accident. Brief details of each reportable accident and the steps taken to avoid repetition should be given in the Project Mangers monthly Report.

Serious Accident:

This is an accident which causes death or serious injury e.g. a broken limb, amputation serious burns etc., or hospitalization for one or more nights. In addition any escape of gases/toxics substances, which affect the environment and the surrounding area / community even if it does not cause injury to people, is considered a serious accident. This definition applies to employees and non employees, the yardstick that defines whether it is a serious accident in site terms is whether the victim was on company premises on company business, or using company equipment or transport. Thus if an operating companyis in any way involved in a serious accident then it must be fully investigated and reported to company management.

Incident / Near Miss:

This can be described as an undesired event which, under slightly different circumstances, could have resulted in an accident.

Reporting Accidents/ Incidents/ Near Misses:

All Accidents/ Near misses must be reported to Project managers of the company immediately, with brief details. A preliminary report will then be submitted by the Project Manager to the Zonal Associate Director and Executive Director, as per the procedure outlined in Project Management firm's Standard Operating Procedures. A full and final report will subsequently need to be prepared and submitted. The contractor shall submit the report in the standardized format attached with these EHS guidelines.

Reporting Accident Statistics:

Accident statistics reported to company should be based on employees at job site. Accidents to non-employees (vendors or sub-vendors) should be reported as separate statistics.

Statistical formulae:

Lost time Accidents: This is the total number of accidents including all reportable and serious accidents

Reportable Accident: This is the number of accidents where an employee is absent from work for more than 48 hours consecutively (excluding the day of accident).

Percentage man hours lost: This is the total number of hours lost expressed as a percentage of total man hours worked.Total man hours lost X 100%

Total man hours worked

The lost time accidents, reportable accidents and percentage man hours lost should be reported on a monthly basis as part of the Project Manager's review. The figures given in each category should be for the month under review, the year to date and the previous year to date.

Accident Frequency rate:

This is the total number of lost time accidents per 1 million man hours worked by permanent and temporary employeesTotal number of lost time accidents X 1,000,000

Total number of man hours worked

Accident incident rate:

This is the total number of any accidents per 1000 employees.Total number of lost time accident X 1000

Average number of persons employed

For this calculation the total number of employees should be averaged out over the year. Part time employees should be included in proportion to the time worked. The accident frequency rate and accident incidence rate should be calculated annually and reported in the year end results. In addition to the statistics referred to above, all data pertaining to incidents must also be kept at site.

SECTION 5: MANAGEMENT RESPONSIBILITY FOR SAFETY

Management has the responsibility to ensure that a well developed Safety program is in place. The contractors are obligated to provide;

- Safe place of work, which includes safe means of access and exit during normal daily work routine as well as in emergencies
- Safe plant and equipment including the maintenance of it
- Safe systems of work. This includes safe working practices and work instructions for all jobs taking particular account of hazardous situations
- Safe working environment and proper arrangements for employee welfare. This responsibility includes proper lighting, ventilation, fume and dust extraction, noise control, housekeeping, seating, drinking water, sanitary facilities and a wide range of other factors
- Safe methods for storing, handling and transporting goods and substances
- Such information instruction, training and supervision as are necessary to ensure efficient and safe workingpractices, which comply with national legislation and company rules.
- Basic and job related safety training for all its and as well its Sub contractor's
- Temporary and permanent employees.
- Consultation with employee with a view to making and maintaining adequate and effective arrangements for health safety and welfare
- A written statement with respect to the health, safety and welfare of the employees containing details of procedures which will put the policy into effect and define individual responsibilities for safety
- Where accommodation provided in the GU CORPORATION PVT LTD premises, this must conform to the same safety and hygiene standards as other company premises, in respect of the premises itself and the working of any staff.
- Safe and correct work procedures must be followed for carrying out any construction activity.

SECTION 6: SAFETY ORGANISATION

The contractor/ contracting company shall appoint in writing a person to direct and co-ordinate job site safety program. This person should be a full time, technically qualified safety officer and must have received formal training in Health and Safety.In addition, the contracting company shall also appoint required number of safety stewards, as per prevailing Laws and regulations, but in any event, a Safety steward shall be on the job site at all times when work is ongoing. The duties and responsibilities of contractor's safety manager should be clearly defined at the outset, which will include managing the company health and safety program in order to achieve an accident free environment.

Duties of contractor's Safety Manager

The precise duties of the manager responsible for health and safety will be determined by the contractor/ contracting company concerned and the following should only be taken as a minimum guideline. In general the duties shall include:

- To manage the company Health and Safety program

- To make recommendations on matters concerning health and safety to the Director responsible for the company health and safety program in order to achieve the company's health and safety objectives To inspect all or part of the premises daily to ensure the program is being complied with To carry out full inspection at least once everyweek for potential hazards To prepare Pre task plans and make necessary modifications till they are accepted by Project Manager's Safety representative
- To recommend any necessary health and safety rules including changes where appropriate
- To arrange adequate materials and publicity for the Health and Safety Program
- To arrange, attend and supply relevant material for Safety Committee Meetings and weekly safety meetings
- To conduct appropriate job related health and safety training for all new and existing staff whether temporary orpermanent. Any job change should be accompanied by relevant retraining.
- To carry out specific health and safety training for managers, supervisors and safety representatives.
- To properly investigate all accidents, damage to property and near miss incidents and make sure that anycorrective action is implemented
- To maintain accident records and make a weekly inspection of first aid records and implement any necessarysubsequent action
- To prepare weekly summaries of injury/damage and inspection reports for senior management
- To ensure that all fire equipment is regularly inspected and serviced.
- To ensure the provision of safe tools, equipments and protective clothing where appropriate, and their safe use.

SECTION 7: SAFETY COMMITTEE

Formation of a site specific safety committee is one of the best methods of obtaining employee involvement in safety. The committee should have formal status and its members shall include;

- Project Manager's Safety representative
- GU's Safety representative
- Contractor's safety representative
- Subcontractor's safety representatives
- Head – Site security
- Fire officer
- Any other members the management may decide to include

Objectives of Safety Committees:

The prime objective of a safety committee is to promote co-operation between employers and employees in order to investigate, develop and carry out measures designed to ensure the health and safety at work of the company's employees, non employees and other project participants on job site.

Functions of Safety Committees:

The key functions of Safety Committee shall include;

- To study the accident statistics and trends within their area
- To report on unsafe or unhealthy conditions together with recommendations which can then be made tomanagement and the safety group
- Examining safety audits relating to their area
- Considering reports comments and suggestions of safety representatives
- Giving assistance in the development of safety rules/ systems of work
- Commenting on the effectiveness of the safety content of staff training program
- Commenting on the adequacy of health and safety
- Communications in the workplace including on-the-job safety meetings
- Co-operating with management in carrying out regular safety inspection of departmental areas and reporting theresults of these inspections to the main safety committee.
- Organize safety training and demonstrations etc to make to make everyone aware about the safety procedures.
- Organize safety competitions for motivating people at site

The safety committees can only assist Management in taking decisions; they cannot substitute for Management. Management must still take overall responsibility for executive action with a view to ensuring that health and safety arrangements are checked regularly and that the health and safety policy as a whole is being implemented properly.

SECTION 8: CONTACTOR'S SAFETY INSPECTION CHECK LIST

Contractor Contract No. /Purchase order no ----------

Project----------

Location----------

Type of Work----------

Date Checked By----------

S	ITEM	STATUS	REMARKS
	Accident prevention Organization Trained First Aid person First Aid Kit Safety Material Posted Emergency Phone # Posted		
	Housekeeping & Sanitation General neatness of working areas Daily disposal of waste and trash Passageways and walkways clear Adequate lighting Projecting nails removed Oil and grease removed Waste containers provided & used Sanitary facilities adequate and clean Drinking water tested and approved Adequate supply of water Drinking cups, Clean Dispensers Exit sign posted		
	Fire Prevention Fire extinguishers identified, checked, charged Hydrants clear access to public thoroughfare Open Good Housekeeping		
	NO SMOKING posted and enforced where needed		
	Personal Protection Hard-hats Noise Level Exposure / Ear protection Eye Protection Safety Lines & harnesses Life Jackets (If necessary) Safety shoes / Gum Boots Gloves		
	Electrical Installation Adequate well insulated wiring Fuses & GFI provided Fire hazards checked Electrical dangers posted Open wires without adaptors not used Lock out / Tag out procedures used for maintenance of Electrical system, Temporary wiring not used as permanent installation. Personal protective equipment and clothing provided.		
	Gas Cutting Flash back arrester in all the gas cutting nozzles. Use of DA or industrial LPG only no domestic cylinders. Availability of fire extinguishers / water close by		
	Hand & Power Tools Tools and cords in good condition Proper grounding All mechanical safeguards in use Tools neatly stored when not in use Right tool being used for the job at hand Wiring properly installed Enough men used to handle material Use of GFCI for tools usedoutdoors		
	Ladders Stock ladders in good condition Stock ladders not spliced Properly secured, top and bottom Side rails on fixed ladders extend above top landing Built-up ladders constructed of sound materials Rungs not over 12 inches on center Stepladders fully open when in use Metal ladders not used around electrical hazards Proper maintenance and storage		

	Hoists, Cranes & Derricks Inspect cables and sheaves Check slings and chains, hooks and eyes Equipment firmly supported Outriggers used if needed Power lines inactivated, removed, or at safe distance Proper Loading for capacity at lifting radius All equipment properly lubricated and maintained Signalmen where needed Hoisting plan. Test certificate of all the lifting equipments. All equipments should display the last inspection date and the next due date		
	Motor Vehicles Brakes, lights, warning devices or barricaded Weight limits and load sizes controlled Personnel carried in safe manner. Seat belts provided and used. Reverse horn in working condition, PUC certificate available		
	Barricades Floor opening planked over or barricaded Roadways and sidewalks effectively protected Adequate lighting provided Traffic controlled		
	Handling & Storage of Materials Neat storage area, clear passageway Stacks on firm footings, not too high Men picking up		
S	**ITEM**	**STATUS**	**REMARKS**
	loads, correctly Materials protected from heat and moisture Protection against falling intohoppers and bins Dust protection observed		
	Excavation & Shoring Shoring of adjacent structures Shoring and sheathing as needed for soil and Depth Public roads and sidewalks supported and protected Materials not too close to the edge of excavation Lighting at night Water controlled Equipment at safe distance from edge		
	Concrete Construction Forms properly installed and braced Adequate shoring, plumbed and cross braced Shoring remains in place until strength is attained Proper curing period and procedures Check heating devices Adequate runways Protection from cement dust Hard-hats, safety shoes, shirts covering skin Nails and stripped form material removed from area		
	Masonry Proper scaffolding Masonry saws properly equipped, dust protection provided Safe hoistingequipment		
	Hoists, Cranes & Derricks Inspect cables and sheaves Check slings and chains, hooks and eyes Equipment firmly supported Outriggers used if needed Power lines inactivated, removed, or at safe distance Proper Loading for capacity at lifting radius All equipment properly lubricated and maintained Signalmen where needed Hoisting plan. Test certificate of all the lifting equipments. All equipments should display the last inspection date and the next due date		
	Motor Vehicles Brakes, lights, warning devices or barricaded Weight limits and load sizes controlled Personnel carried in safe manner. Seat belts provided and used. Reverse horn in working condition, PUC certificate available		
	Barricades Floor opening planked over or barricaded Roadways and sidewalks effectively protected Adequate lighting provided Traffic controlled		
	Handling & Storage of Materials Neat storage area, clear passageway Stacks on firm footings, not too high Men picking up loads, correctly Materials protected from heat and moisture Protection against falling intohoppers and bins Dust protection observed		

	Excavation & Shoring Shoring of adjacent structures Shoring and sheathing as needed for soil and Depth Public roads and sidewalks supported and protected Materials not too close to the edge of excavation Lighting at night Water controlled Equipment at safe distance from edge		
	Concrete Construction Forms properly installed and braced Adequate shoring, plumbed and cross braced Shoring remains in place until strength is attained Proper curing period and procedures Check heating devices Adequate runways Protection from cement dust Hard-hats, safety shoes, shirts covering skin Nails and stripped form material removed from area		
	Masonry Proper scaffolding Masonry saws properly equipped, dust protection provided Safe hoistingequipment		

SECTION 9: FIRST AID AND EMERGENCIES

Trained First Aid Person

A contractor shall provide, or ensure that required number of suitable persons as adequate and appropriate are provided inthe circumstances for rendering first aid to people deployed at site if they are injured or become ill at work. The trained first aid person should have undergone:

a) Such training and has qualifications as the Health and Safety Executive may approve for the time being in respect of that case or the class of case, and

b) Such additional training, if any, as may be appropriate in the circumstances of that case. In practice, (a) refers to a trained first aider and (b) to an occupational first aider. In addition, a person who holds a current first aid certificate issued by registered medical association or Indian Red Cross Society will be classed as a "Suitable Person" for the purposes of regulation. The contractors shall ensure that sufficient first aides are appointed to provide adequate coverage for each shift. Provisions for medical care must be made available by the contractor for every employee covered by the regulations. In the absence of dispensaries, clinics, or hospitals in proximity to the work site, properly trained and certified first aid personnel

must be available, and first aid supplies must be provided by the contractor. Appropriate equipment for transportation of injured personnel to a physician or hospital must be provided for. An emergency plan, medical care, firefighting and evacuation plan must be developed by the main contractor.

First Aid Kit:

Regardless of the number of people there must be at least one first-aid box on site. Every first aide and occupational first aider should have easy access to first-aid equipment, and provision should be made for every person to have reasonably rapid access to first aid. Each box should be placed in a clearly identified and readily accessible location, and contain a sufficient quantity of suitable first-aid materials and nothing else. Boxes and kits should be checked frequently to ensure they are fully stocked and all items are in a usable condition. Sufficient quantities of each item should always be available in every first aid box or cabinet.

S.No	Item	Numbers of People working at Site				
		1-5	6-10	11-50	100	150
1	Guidance card individually wrapped	1	1	1	1	1
2	Sterile adhesive dressings	10	20	40	40	40
3	Sterile eye pads with attachment	1	2	4	6	8
4	Triangular bandages	1	2	4	5	8
5	Sterile coverings for serious wounds	1	2	4	5	8
6	Safety pins	6	6	12	12	12
7	Medium sized sterile un-medicated	3	6	8	10	12
8	large sterile un-medicated dressings	1	2	4	6	8
9	X-large sterile un-medicated dressing	1	2	4	6	8
10	Sterile water in 300 ml disposable containers, where tap water unavailable	1	1	3	6	6

The first-aid box or cupboard should protect the content from dampness and dust and be clearly marked with a white cross on green background

First Aid Rooms:

Where there are 250 or more persons at work on site, a suitably staffed and equipped first-aid room should be provided. In addition, where there is a large (over 150) number of employees divided into several dispersed working groups, or the location of the site makes access to places of treatment outside difficult, the contractor should consider whether a centralized first-aid room may be needed. A First aid room should:

- Be under the charge of an occupational first aider in most circumstances: names and locations of all first aiders should be displayed
- Be readily available and used only for the rendering of first aid
- Be clearly identified and of sufficient size to allow access for a stretcher, wheelchair, etc. And hold a couch withspace for people to work around it
- Contain in addition to the previously mentioned first aid materials: a sink with hot and cold running water, drinking water, paper towels, impermeable work surfaces, clean garments for use by first aiders and occupational first aider's clinical thermometer a couch with pillow and blankets frequently cleaned
- Be heated, lighted, ventilated and cleaned regularly
- Be designed so that immediate contact can be made with the person on call, e.g radio, siren, and a telephone linkif feasible. It should be stressed that a sufficient number of first-aid boxes must be provided for any work area,which is not within easy reach of the first aid room.

Emergency Phone # Posted

Project name---------- **Project No. ----------**

-

The following are the business telephone numbers where project key personnel can be reached at all times. In addition, the emergency telephone numbers of other vital agencies are listed:

BUSINESS RESIDENCE

Project Manager

GU Project Manager
Contractor Safety Officer
Fire/ Security officer

OTHER EMERGENCY TELEPHONE NUMBERS

Fire :

Ambulance :

Doctor :

Hospital :

Police :

Gas Company :

Electric Company :

Water Company :

Telephone Company :

Insurance Carrier :

SECTION 10: HOUSEKEEPING AND SANITATION

At the work site, an adequate supply of potable water must be provided, as well as clean drinking water dispensers. Potable water for clean up must be provided. Where non potable water is used for industrial or fire fighting purpose it must be identified by appropriate signs.

Apart from the above, the contractor has to adhere to general neatness of working areas, daily disposal of waste and trash, maintenance of clear passageways and walkways, providing adequate temporary lighting and ventilation (both natural as well as artificial) to perform the project related works, removal of projecting nails, removal of oil and grease, removal of loose unused construction material, provision for waste containers, and maintaining adequate sanitary facilities for the work force. The contractor and in turn its sub-contractors shall be responsible for cleaning behind them on daily basis. The accumulation of construction materials/ debris shall not be permitted at any location.

SECTION 11: FIRE PREVENTION

An emerging plan for firefighting and evacuation must be made. A training plan must be developed. Electrical wiring equipment for heating, light or power purposes must be installed in compliance with the statutory requirements. Internal combustion engine-powered equipment must be located with exhausts well away from combustible materials. Smoking is tobe prohibited in the vicinity of fire hazards, and such areas must be conspicuously posted. Care shall be taken properly to ground nozzles, hoses or steam lines used in hazardous tanks or vessels. In location of temporary buildings and yard storage, appropriate care shall be taken for proper separation to allow an accumulation of fire potential. The contractor is responsible for maintaining the entire construction area, but particularly storage areas, free from accumulation of unnecessary combustible materials. Sufficient fire extinguishers must be installed in all temporary buildings and storerooms. The contractor must identify and maintain proper escape routes at the project site in the event of a fire emergency. The escape routes should be sufficient in number and free from any encumbrances. All the workers as well as others working at job site should be made aware of them through training, mock drills and posting of exit signs. The contractor, consultation with the Project Manager must identify a “Mustering point” where all the workers would be required to gather in the event offire. The contractor must generate an “Evacuation Procedure” in the event of fire and post it at multiple locations on theproject site. The assembly area should be clearly defined and marked out. The procedure should include what should bedone to the ongoing activity when such a situation arises, which escape routes to follow, safe location to gather, who to call(with telephone numbers), how to inform the site security, etc.

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Site Fire Check List

- Are safe ashtrays provided where smoking is permitted? And are fire extinguishers installed?
- Are heaters properly guarded?
- Are wet clothes kept clear of heaters?
- Are portable heaters secure from being knocked over?
- Is all temporary wiring well supported and protected?
- Are any circuits overloaded?
- Are all flammable liquids, gas cylinders and flammable materials separately and properly stored?
- Are all gas appliances fitted with control taps?
- No burning of rubbish is permitted outside
- Is all flame cutting and welding taking place with proper precautions?
- Are all blow lamps and blow torches being used correctly and all the hoses protected?
- Do all night watchmen and security patrols know the fire routines?

Preventing the spread of fire:

- Is waste accumulating in hoist shafts, under belts, in odd corners?

- Are separate metal waste containers supplied for each of the following : oily rags, paint rags, paint scrapings,waste flammable liquids, wood shavings and offcuts?
- Is all waste regularly cleared?
- Are all huts safely located?

Means of escape:

- Are all gangways, stair and platforms free from obstruction?
- Does everyone know what to do in an emergency?
- Is fire drill practiced, and is there a system to ensure that all persons have
- evacuated the area?

Fire Fighting:

- Have all extinguishers been checked and / or recharged?
- Are they clearly identified and easily accessible?
- Are operatives trained in their use?

SECTION 12: PERSONNEL PROTECTION

The required personnel protective equipment (PPE) should be worn at all times. The contractor is encouraged to supply comfortable personnel protective equipment to the site workers. All necessary personnel safety equipment as considered adequate by the Engineer-in-charge shall be available for use of persons employed on the site and maintained in a condition suitable for immediate use, and the contractor shall take adequate steps to ensure proper use of equipment by those concerned. Irrespective of the type of work being performed, contractor will have 100% compliance with Safety hard hats, safety glasses and safety shoes. In addition for specific works described below though not limited to these only, additional safety precautions as stated will be taken by the contractor. Workers employed on mixing asphalt materials, cement and lime mortars/ concrete shall be provided with protective footwear and protective gloves. Those engaged in handling any material which is injurious to eyes shall be provided with protective goggles. Special protective goggles must be used by graining,sawing and drilling. Those engaged in welding works shall be provided with welder's protective eye-shields. Stone workers are employed in sewer and manholes, which are in use, the contractor shall ensure that manholes are ventilated at least foran hour before workers are allowed to get into them. Manholes so opened shall be cordoned off with suitable railing andprovided with warning signals or boards to prevent accident to public

During these activities in sewers and manholes, regular monitoring of oxygen levels and the presence of explosive mixtures and toxic gases are to be controlled. Suitable face masks shall be supplied for use by workers during painting work. Overalls shall be supplied by the contractor to workmen and adequate facilities shall be provided to enable working painters to wash during and on cessation of work. Special care should be taken with regards to the hygiene of the temporary facilities.

SECTION 13: ELECTRICAL INSTALLATION

The National Indian electric codes and regulations shall apply to all permanent and temporary electrical installations. A temporary power distribution system shall be installed in accordance with the national codes All other temporary connections and sub distribution systems shall be connected to this main system. All temporary power systems shall be properly grounded. Circuit breakers (incl. fuses) shall be used in all temporary power connections for system and cable protection. All wires shall be colour coded in accordance with the national codes. All electrical cables shall consist of solid copper conductors (stranded wires shall not be used). Only certified electricians will be allowed to enter high tension station, transformer and low voltage areas. All electrical installation work and all connections to the main power distribution system shall be done by qualified electricians from certified contractors. Usage of 30Ma ELCB as per IE guidelines (or as stated inits subsequent revisions)

SECTION 14: LADDERS

Work activities situated above 2.5m from ground floor level Precautions shall be made to avoid workers from falling down. For work above 2.5m from ground level, proper scaffolds need to be erected. No metal ladders to be used around electrical hazards. Special attention shall be paid to the material of the ladder for the type of work to be performed i.e. whether the ladder shall be metal or wooden.

Use of ladders and folding step ladders

This regulation applies to all ladders and pairs of steps but not roof ladders and crawling boards. Ladders must:

- Be fixed near the top if practicable, or near the bottom if not: if suspended they must be secure.
- Be placed (except when suspended) on a firm level base; they must not stand on loose packing (eg. Bricks)
- Be intermediately secured, where necessary, to prevent swaying and sagging
- Be supported, or suspended, equally on each stile.
- When working on a ladder above 2.5m, fall protection must be used.
- Extend at least 1.05m above any landing place beyond the highest rung from which a person may be working or have a nearby handhold of equivalent height.
- Be placed so that there is space behind each rung for proper foothold (eg. No rung should coincide with a scaffoldtube)

SECTION 15: SCAFFOLDING

Work activities above 2.5m from the ground level:

Precautions shall be made to avoid workers from falling down. For work above 2.5m above a floor level proper scaffolds need to be erected. Ladders properly secured can be used, but only for light work which can be done with one hand.

Supervision of work and inspection of material:

Scaffolds must be erected, altered or dismantled only under competent supervision and as far as possible, by experienced persons. All scaffolding materials must be inspected before use to check that they are up to standard. All inspected scaffolds must bear a sign “ready for use”.

Construction and material:

Sufficient sound material must be provided for a scaffold to be strong and stable enough for the job. Wherever timber is used for any kind of scaffolding purpose, it must be of the right type for the job and must not be painted so that any defects are hidden. Scaffold tubes and fittings must not be bent, distorted or unduly rusty.

Defective material:

Scaffold tubes, couples or fittings that are bent unduly rusty or distorted should be rejected. Timber with dangerous splits and knots should always be rejected. Ropes and lashings showing signs of chafing through wear, or of being corroded, should be rejected. All scaffold components must be properly stored when not in use and kept separately from all other building materials

Maintenance of scaffolds:

Scaffolding must be kept in good order and every effort made to prevent the accidental displacement of any part.

Partly erected or dismantled scaffolds:

If any scaffold is either partly erected (or partly dismantled), but nevertheless is still capable of being used to some extent, it must have a bold warning notice fixed, or all access blocked off or barred, at the point beyond which it cannot be safely used.

Standards or Uprights, Ledgers and Putlogs:

Scaffold standards should be vertical and spaced closely enough for the intended use of the scaffold. Base plates must be used. Timber sole plates should also be used to distribute the

load from the standard over a wide area, as well as to offset possible local subsidence. Ledgers must be level and fixed to standards with right-angle couplers. Putlogs and transoms must be firmly fixed to ledgers or standards. The flattened end of the putlog must be pushed right into the wall to provide maximum support. Putlogs and transoms should be spaced according to the expected load and the thickness of the boards to be used in the platform. In normal use, putlogs and transoms should be spaced so that the spans of scaffold boards should not be greater than :

32mm boards: 1m 38mm
boards: 1.50 m50mm
boards: 4.60 m

Ladders used in Scaffolds:

Ladders used as uprights must be:

- Strong enough to carry the load of both the work and the workers.
- Equally supported on each side.
- Secured to prevent slipping.

Ladders to be placed under an angle of 70 ° with the vertical and shall extend 1m above the railing. Ladders are only to be used to support a scaffold platform when the work is light, e.g., painting.

Stability of Scaffolds:

All scaffolds must be:

- On a solid, even base ; or suspended from a sound structure
- Braced to prevent failure, and
- Tied to the building or structure unless specially designed to be completely independent.
- Any building or structure which supports a scaffold must be strong enough to carry the scaffold and its load A scaffold only used as a working platform for workers when a scaffold also used to store material etc, a calculationis needed to check if that scaffold is safe to carry the total load. Mobile scaffolds must:
- Be stable, weighted at the base if necessary
- Be used only on a flat, level surface.
- Have the wheels locked to prevent movement whilst being used for work,
- Be pushed, or pulled only at the base when being moved. Scaffolds must not be built on loose bricks, drain pipes, chimney pots, etc. Bricks or blocks can be used to support a platform no higher than 600mm from the ground orfloor.

Slung Scaffolds

- Be strong enough
- Be properly secured to be overhead anchor-ages and to be platform frame,
- Be spaced so as to keep the platform stable,
- Be vertical, and
- Be kept straight
- No rope other than wire rope may be used for suspension
- Packing must be used to prevent damage to suspension ropes or chains at any point where sharp or rough-edgedprotrusions could cause chafing.
- The platform must be secured to prevent swaying whilst in use.

Cantilever, Jib figure and Bracket scaffolds:

Cantilever or jib scaffolds must be anchored to a structure which is strong enough to carry the total load Outriggers must be long enough and strong enough and the scaffold must be braced to ensure stability. Figure or bracket scaffolds supported by dogs or spikes must not be used if there is any danger of these pulling out of the brickwork or stone-work.

Support for Scaffolds:

No part of the building may be used to support scaffolding unless it is strong enough to do so. Unless gutters have been designed as walkways and are strong enough to bear the weight, they must not be used to support scaffolding or ladders.

Suspended Scaffolds (Not Power Operated)

The ropes, winches, block and tackle must be strong enough and correctly rigged. A safe anchorage for the suspension must be provided.

Winches or similar lifting devices must:

a. have brakes which apply when the operating lever is released, and
b. be protected from the weather, falling dirt, etc.

Outriggers must:

a. be long enough and strong enough,
b. be horizontal (light cradles are excepted)
c. have stops at their outer ends (light cradles excepted)
d. be tied down or properly counter-weighted at the tail, and
e. be close enough together to support the rails and scaffolds properly .

Counterweight Must

a. be bolted or securely attached to the outriggers, and

Runways must:

be strong enough and in good condition, have stops at each, and be bolted or tied securely to their supports

Platforms of suspended scaffolds must: be closely boarded be at least 430mm wide on light weight cradles and be atleast 600mm wide on all other types, if used only for workmen, or be at least 800mm wide, if used for workmen and materials Never be used to carry higher platform

Platforms should be as close as possible to the face of the building but where persons sit on the edge of the platform to carry out their work then the distance between platform and building can be upto 300mm

Winches must:

Have at least two full turns of rope on the drum when the platform is in its lowest position and

Be marked with the length of rope on the drum Suspended scaffolds and associated equipment must be maintained in good conditions. Platforms must be prevented from tipping or swaying whilst in use. Steel wire rope must be used for the suspension for all platforms other than light weight cradles Light cradles may be suspended by fibre ropes and pulley blocks which should not be more than 3.20m apart. (Only ropes recommended by manufacturers for this purpose should be used)

Boatswain's Chair's Cages, Skips etc. (Not Power Operated)

Hand-operated boatswain's chairs, skip etc. must:

- Be well constructed, strong enough, and properly maintained
- Have outriggers strong enough and firmly anchored,
- Have chains, ropes and lifting gear firmly secured to the outriggers above and to the chair, skip etc. Theconstruction (lifting operations) regulations apply to the lifting gear,
- Be designed so that the occupant cannot fall out
- Carry no loose materials which could interfere with the safety of occupant
- Have means of preventing spinning and tipping (a swivel connection at the suspension points is strongly advised)
- In the case of skips, be at least 910 mm deep
- Be under the supervision of a competent person during installation and use, and
- A boatswain's chair may only be used as a workplace when the work would not take long enough to make the useof a suspended (or standard) scaffold reasonably practicable.
- Persons working in these must wear fall protection harnesses connected to a rope or chain separate from the chairor skip suspension rope or chain.

SECTION 16: HOISTS, CRANES AND DERRICKS

Safety of Hoist ways, Platform and Cage:

Hoist ways must be enclosed wherever access is provided or wherever persons could be struck by the platform or other moving parts. Gates must be fitted in the enclosure at all landing places and must normally be at least 2m high, but gates 910 mm high are acceptable where persons are not at the risk of falling down the hoist ways or coming into contact with moving parts. Gates must be kept closed except for the movement of men and materials; it is the duty of all persons to ensure it is done. Hoists platforms and cages must be fitted with a device capable of supporting them, fully loaded, should hoists, ropes or driving gear fail. Hoists must be fitted with verrun stops at the top.

Operation of Hoists

a) Hoists must only be capable of being operated from one position at a time, whether by rope, lever or switch. Hoists mustnot be operated from the cage.

b) Where the hoist driver cannot see the platform or cage during it s movement, a signaling system, which covers all landingplaces, must be used.

c) All hoists, prior to their use, have to be inspected by a competent person

Safe Working Load and Marking of Hoists

a) The platform of materials or goods hoists must carry a notice stating

(i) the safe working load and

(ii) that the passenger must not ride on platform

The safe working load must not be exceeded except for test purposes.

b) Cages for passengers hoists must carry a notice stating

(i) the safe working load and

(ii) the number of passengers permitted.

No greater number of passengers may be carried and safe working load must not be exceeded except for the test purposes.

SECTION 17: MOTOR VEHICLES

A site traffic plan must be developed at the beginning of the project to control all traffic on site and movement of materials, parking etc. Motor equipment left unattended at night near areas where work is in progress must have appropriate lights, reflectors or barricades to identify the locations of the equipment. A safety tie rack, cage, or equivalent protection must be used

when a worker is inflating, mounting, tires installed on split rims or rims equipped with locking rings. Heavy machinery that is suspended or held aloft by the use of slings, hoists, or jacks must be blocked or cribbed to prevent falling or shifting before employees are permitted to work under them. Bulldozer and scraper blades and similar equipment shall be either fully lowered or blocked when being repaired or when not in use. All controls must be in the neutral position and the motor stopped and brakes set, unless work being performed requires otherwise. Parked equipment must be checked and parking brakes set. All cab glass shall be safety glass. All vehicles must have a service brake system, an emergency brake system, and a parking brake system. Vehicles that require additional light shall have at least two headlights, as well as brake lights. The vehicles must also be equipped with back horn which automatically sets off as and when the vehicle is in reverse gear. Other standard vehicles equipment such as seat belts, rear-view mirrors and safety latches on operating levers shall be in accordance with standard vehicle codes, and state-inspected where appropriate. The authorized individuals with valid driving license only shall be allowed to drive.

SECTION 18: BARRICADES

(i) Contractor shall erect and maintain barricades required in connection with its operation to guard or protect,

a) Hoisting areas.

b) Areas adjudged hazardous by contractor's safety management and/ or Project Manager's Inspectors

c) 's existing property subject to damage by the contractor's operations

(ii) Contractor's employees and those of his subcontractors shall become acquainted with Project Managers barricadingpractice and shall respect the provisions thereof.

Guarding of floor opening and floor holes:

Every temporary floor opening shall have railings, or shall be constantly attended by Supervisors appointed by Contractor's safety officer / Manager. Every floor hole into which persons can accidentally fall shall be guarded by either:

a) A railing with toe board on all exposed sides, or

b) A floor hole cover of adequate strength and it should be hinged in place. When the cover is not in place, the place the floor hole shall be constantly attended by some one or shall be protected by a removable railing. Barricades must be strong enough to carry the weight of people. Every stairway floor opening shall be guarded by a railing on all exposed sides, except at entrance to stairway. Every ladder way floor opening or platform shall be guarded by a guard railing with toe board on all exposed sides (except at entrance to opening) with the passage through the railing either provided with a swinginggate or so offset that a person can not directly into the opening.

Guarding if open-side floors and platform

Every open-sided floor or platform 120cm or more above adjacent floor or ground level shall be guarded by a railing (or the equivalent) or all open sides except where there is entrance to ramp, stairway or fixed ladder. The railing shall be provided with a toe board beneath the open sides wherever,

(a) Persons may pass,

(b) there is moving machinery and

(c) there is equipment with which failing materials could create a hazard

SECTION 19: HANDLING AND STORAGE OF MATERIALS

Cement:

Storage and stacking: Cement shall be stored at the work site in a building or a shed which is dry, leak proof and moisture proof. The building or shed for storage should have minimum number of windows and close fitting doors and these should be kept closed. Cement received in bags shall be kept in such a way that the bags are kept free from the possibility of any dampness or moisture coming in contact with them. Cement bags shall be stacked off the floor on wooden planks in such a way as to keep

them 150 to 200mm clear from the floor and space of 450mm minimum shall be left all round between the exterior walls and in the stacks. In the stacks the cement shall be kept close together to reduce circulation of air as much as possible. Owing to pressure on bottom layer of bags sometimes 'warehouse pack' is developed in these bags. This can be removed easily by rolling the bags when cement is taken out for use. The height of stack shall not be more than 15 bags to prevent the possibility of lumping up under pressure. The width of the stack shall be not more than four bags length or 3m. In stacks more than eight bags high, the cement bags shall be

arranged alternately lengthwise and crosswise so as to tie the stacks together and

minimize the danger of toppling over. For extra safety during monsoon or when it is expected to store for an unusually long period, the stack shall be completely enclosed by a water proofing membrane such as polyethylene, which shall close on the top of the stack. Care shall be taken to see that the waterproofing membrane is not damaged any time during the use. Drums or other heavy containers of cement shall not be stacked more than two

layers high. The manner of storage shall facilitate the requirement that lots of cement received are removed and used more or less in the order in which they are received.

Handling – Hooks shall not be used for handling cement bags unless specifically permitted by the engineer-in-charge.

Polyethylene pipes

(a) Storage & stacking:

Black polyethylene pipes may, be stored either under cover or in the open. Natural polyethylene pipes however, should be stored under cover and protected from direct sunlight. Coils may be stored either on edge or stacked flat one on top of the other, but in either case they should not be allowed to come into contact with hot water or steam pipes and should be kept away from hot surface. Straight lengths should be stored on horizontal racks giving continuous support to prevent the pipe taking on a permanent set. Storage of pipes in heated areas exceeding 270 C should be avoided.

(b) Handling: Removal of pipe from a pile shall be accomplished by working from the ends of the pipe.

Pipes of conducting materials:

(a) Storage and stacking: Pipes shall be stacked on solid level sills and contained in a manner to prevent spreading or rolling of the pipe. Where quantity storage is necessary suitable packing shall be placed between succeeding layers to reduce the pressure and resulting spreading of the pile. In stacking and handing of pipes and other conducting materials the following minimum safety distances shall be ensured from the overhead power line:

11KV and below 40m

Above 11and below 33KV 60m Above
33 and below 132KV 70m Above 132
and below 275KV 70mAbove 275and
below 400KV 50m

(b) Handling: Removal of pipes from a pile shall be accomplished by working from the ends of the pipe. Duringtransportation, the pipes shall be so secured as to ensure against displacement.

Paints, Varnishes and Thinners:

(a) Storage and stacking: Paints, varnishes lacquers, thinners and other flammable materials shall be kept in properly sealed or closed containers. The containers shall be kept in a well ventilated location, free from excessive heat, smoke, sparks or flame. The floor of the paint stores shall be made up of 10cm thick loose sand and stored in a collection drip pan to prevent leakage's to the ground and/or the soil.

Paint materials in quantities other than required for daily use shall be kept stocked under regular storage place. Where the paint is likely to deteriorate with age the manner of storage shall facilitate removal and use if lots in the same order in which they are

received. Temporary electrical wiring / fittings shall not be installed in the paint store. When electric lights, switchesor electrical equipment are necessary, they shall be of explosion proof design.

(b) Handling: Ventilation shall be adequate to prevent the accumulation of flammable vapors to hazardous levels of concentration shall be provided in all areas where painting is done.

When painting is done in confined spaces where flammable or explosive vapors may develop any necessary heat shall be provided through duct work remote from the source of flame. Sources of ignition such as open flame and exposed heating elements shall not be permitted in area or rooms where spray painting is done nor shall smoking be allowed there. Careshould be taken not to use any naked flame inside the paint store. Buckets containing sand shall be kept ready for use incase of fire. Fire extinguisher when required shall be of foam type confirming to accepted standards.

Bitumen, Road Tar, Asphalt etc.:

(a) Storage and stacking: Drums or containers containing all types of bitumen, road tar, asphalt etc. shall be stacked vertically on their bottoms in upto 3 tiers. Leaky drums shall be segregated and either their contents shall be emptied intointact drums or contained in larger containers. All spillages or leakages onto natural soil shall be immediately cleaned up and placed in a contained area. Empty drums shall be stored in pyramidal stacks neatly in rows.

(b) Handling: Bitumen / Tar – Bitumen / tar shall not be heated beyond the temperature recommended by the manufacturer of the product. While discharging heated binder from the boiler, workers shall not stand opposite to the jet so as to avoid the possibility of hot binder falling on them. The container shall be handled only after closing the control valve. While handlinghot bitumen / tar, workers shall exercise scrupulous care to prevent accidental spillage thereof. The buckets and cans inwhich the hot material is carried from boiler shall be checked before use to ensure that they are intact and safe. Mops and other applicators contaminated with bituminous materials shall not be stored inside buildings

Bituminous roofing felts:

(a) Storage and stacking: Bituminous roofing felts shall be stored away from other combustible, flammable materials. Forlong storage it shall be kept under shade.

(b) Handling: Bituminous roofing felts should be handled in a manner to prevent cracking and other damages

Flammable materials:

(a) Storage and stacking: In addition the following provisions shall also apply: Outdoor storage of drums required some care to avoid contamination because moisture and dirt in hydraulic brake and transmission fluid, gasoline or lubricants may cause malfunction of failure or equipment with possible danger to personnel. The storage area should be free of accumulations of spilled products, debris and other hazards and Compressed gases and petroleum products shall not be stored in the same building or close to each other.

(b) Handling: Petroleum products delivered to the job site and stored there in drums shall be protected during handling to prevent loss of identification through damage to drum markings, tag, etc. Unidentifiable petroleum products may result in improper use with possible fire hazard damage to equipment or operating failure. Workmen shall be required to guard carefully against any part their clothing becoming contaminated with flammable fluids. They shall not be allowed to continue work when their clothing becomes so contaminated. All flammable and toxic liquids shall be stored in suitable collecting drip pans to avoid spill contamination into the ground/soil. All workers shall be provided training as part of the induction as to how to correctly handle and lift materials and the maximum load they can lift or handle at any point.

SECTION 20: EXCAVATION AND SHORING

Excavation and Trenching: All trenches, 1.5m or more in depth, shall at all times be supplied with at least one ladder for each 30m in length or fraction thereof. Ladder shall be extended from bottom of trench to at least 1meter above surface of the ground. Sides of a trench which is 1.5m or more in depth shall be stepped back to give suitable slope or securely held by timber bracing so as to avoid the danger of sides collapsing. Excavated material shall not be placed within 1.5m of edge of trench of half of depth of trench, whichever is more cutting undermining or undercutting be done. Safety procedures for the operation of the excavation and grading equipment (such as the safe distance from excavations) should be developed.

SECTION 21: CONCRETE CONSTRUCTION

Handling of plant

Mixers: All gears, chains and rollers of mixers shall be properly guarded. If the mixer has a charging skip the operator shall ensure that the workmen are out of danger before the skip is lowered. Railings shall be provided on the ground to prevent anyone walking under the skip while it is being lowered. All cables, clamps, hooks, wire ropes, gears and clutches etc. of the mixer, shall be checked and cleaned, oiled and greased and service once a week. A trial run of the mixer shall be made and defects shall be removed before operating a mixer. When workmen are cleaning the inside of the drums and operating power of the mixer shall be locked in the off position and all fuses shall be removed and a suitable notice hung at the place.

Trucks:

When trucks are being used on the site, traffic problems shall be taken care of. A reasonably smooth traffic surface shall be provided. If practicable, a loop road shall be provided to permit continuous operation of vehicles and to eliminate their backing. If a continuous loop is not possible a turnout shall be provided. Backing operations shall be controlled by a signalman positioned so as to have a clear view of the area behind the truck and to be clearly visible to the truck driver. Movement of workmen and plant shall be routed to avoid crossing as much as possible the truck lanes.

Formwork:

Formwork shall be designed after taking into considering spans, setting temperature of concrete, dead load and working load to be supported and safety factor for the material used for formwork. All timber formwork shall be carefully inspected before use and members having cracks and excessive knots shall be discarded The vertical supports shall be adequately braced or otherwise secured in position that these do not fall when the load gets released or the supports are accidentally hit. Tubular steel centering shall be used in accordance with the manufacturer's instructions. When tubular steel and timber centering isto be used in combination necessary precautions shall be taken to avoid any unequal settlement under load.

All centering shall be finally inspected to ensure that:

a) Footings or sills under every post of the centering are sound
b) All tower adjustment screws or wedges are snug against the legs of the panels.
c) All upper adjustment screws or heads of jacks are in full contact with the formwork.
d) Panels are plumb in both directions.
e) All cross braces are in place and locking devices are in closed and secure position.
f) In case of chajjas and balconies the props shall be adequate to transfer the load to the supporting point.

Ramps and gangways:

Ramps and gangways shall be of adequate strength and evenly supported. They shall either have a sufficiently flat slope or shall have cleats fixed to the surface to prevent slipping of workmen. Ramps and gangways shall be kept free from grease, mud, snow or other slipping hazards or other obstructions leading to tripping and accidental fall of workman. Ramps andgangways meant for transporting materials shall have even surface and be of sufficient width and provided with skirt boardson open sides.

Pre-stressed concrete:

In pre-stressing operations, operating, maintenance and replacement instructions of the supplier of the equipment shall be strictly adhered to. Necessary shields should be put up immediately behind the pre-stressing jacks during stressing operations. Wedges and other temporary anchoring devices shall be inspected before use. The pre-stressing jacks shall be periodically examined for wear and tear. A spreader beam shall be used wherever possible so that the cable can be as perpendicular to the members being lifted as practical. The angle between the cable and the members to be lifted shall not be less than 600. Methods of assembly and erection specified by the designer, shall be strictly adhered to at site. Immediately on erecting any unit in position, temporary connections or supports as specified shall be provided before releasing the lifting equipment. The permanent structural connections shall be established at the earliest opportunity.

Heated concrete:

When heaters are being used to heat aggregates and other materials and to maintain proper curing temperatures, the heaters shall be frequently checked for functioning and precautions shall be taken to avoid hazards in using coal, liquid, gasor any fuel.

SECTION 22: MASONARY WORK

Walls

General: Depending on the type of wall to be constructed the height of construction per day shall be restricted to ensure that the newly constructed wall does not come down due to lack of strength in the lower layers. Similarly, in long walls adequate expansion / crumple joints shall be provided to ensure safety.

Opening in walls: Whenever making of an opening in the existing walls is contemplated, adequate supports against the collapse or cracking of the wall portion above or roof or adjoining walls shall be provided. Guarding of wall openings and Holes: Wall opening barriers and screens shall be of such construction and mounting that they are capable of withstanding the intended loads safely. For detailed information reference may be made to good practice. Every wall opening from which there is a drop of more than 120mm shall be one of the following: Rail, roller, picket fence, half door or equivalent barrier:The guard may be removable but should be preferable be hinged or otherwise mounted so as to be conveniently replaceable. Where there is danger to persons working or passing below on account of the falling materials, a removable toe board or the equivalent shall also be provided. When the opening is not in use for handling materials the guards shall be kept in position regardless of a door in the opening. In addition a grab handle shall be provided on each side of the opening. The opening should have a sill that projects above the floor level at least 2.5cm. Extension platform into which materials may be hoisted for handling, shall be of full length of the opening shall be of full length of the opening and shall have side rails orequivalent guards. Every chute wall opening from which there is a drop of more than 120mm shall be guarded by one ormore of the barriers specified in 16.2.1 or as required by the

conditions.

SECTION 23: HEALTH & HYGIENE STANDARDS

Drinking water:

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

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

c) Every water supply or storage shall be at a distance of not less than 50 feet from any latrine drain or any other source ofpollution.

Washing facilities:

a) In every work place adequate and suitable facilities for washing shall be provided and maintained for the use of contractlabour employee therein

b) Separate and adequate cleaning facilities shall be provided for the use of male and female workers

c) Such facilities shall be conveniently accessible and shall be kept in clean and hygienic condition.

Latrines and Urinals

a. (a). Latrines shall be provided in every work place on the following scale namely:

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

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

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

c. Every latrine shall be under cover and so partitioned off as to secure privacy and shall have proper door and fastenings.

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

(i) Where workers of both sexes are employed, there shall be displayed out side each block of latrine and urinal a notice inthe language understood by the majority of the workers “for men only” or for” women only” as the case may be.

(ii) The notice shall also bear the figure of man or woman as the case may be.

e. There shall be at least one urinal for male workers upto 50 and for female workers upto 50 employed at a time, provided that where the number of male or female workers as the case may exceed 500 it shall be sufficient if there is one urinal for every 50 males or females upto the first 500 and one for every 100 or part thereafter.

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

(ii) Latrines and urinals other than those connected with flush sewage system shall comply with the requirements of Public Health Authorities.

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

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

(i) The contractor shall at his own expense, carry out all instructions issued to him by the Engineer-in-charge to effect proper disposal of night soil and other conservancy work in respect of the contractor’s workmen or employees of the site. The contractor shall be responsible for payment of any charges which may be levied by the municipal or cantonment authority for execution of such on behalf.

Provision of shelter during rest:

At every place there shall be provided free of cost, for suitable sheds two for meals and other two for rest separately for the use of men and women labour. The height of each shelter shall not be less than 3m from the floor level to the lowest part of the of the shed roof. These shall be kept clean and the space provided shall be on the basis of 0.6sqm per head. Providedthat the engineer-in-charge may permit subject to its satisfaction, a portion of building under construction or other alternative accommodation to be used for the purpose.

Café/Eating place:

a. In every work place where the work regarding the employment of contract labour is likely to continue for six months and where in contract labour numbering 100 or more are ordinarily employed an adequate place shall be provided by the contractor for the use of such labour.

b. The café shall be maintained by the contractor in an efficient manner.

c. The café shall consist of at least a dining hall, cafe, storeroom, pantry and washing places separately for workers andutensils.

d. The floor shall be made of smooth and impervious materials and inside walls shall be lime washed or colour washed at least once a year. Provided that the inside walls of the cafe shall be lime washed every four months.

e. The premises of the cafe shall be maintained in a clean and sanitary condition

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

g. Waste water shall be carried away in suitable covered drains and shall not be allowed to accumulate so as to cause nuisance.

h. The dining hall shall accommodate at a time 30% of the contract labour working at a time.

i. The floor area of the dining hall, excluding the area occupied by the service counter and any furniture except tables andchairs shall not to be less than 1sqm per diner to be accommodated as prescribed in sub-rule (i)

j. There shall be provided and maintained sufficient utensils crockery, furniture and any other equipment necessary for efficient running of cafe

k. The furniture, utensils and other equipment shall be maintained in clean and hygienic condition.

l. Suitable clean clothes for the employees serving in the café shall be provided and maintained.

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

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

o. A portion of the dining hall and service counter shall be partitioned off and reserved for women workers in proportion totheir number.

p. Sufficient tables stools or benches shall be available for the number of diners to be accommodated as prescribed in subrule (i)

q. The food stuff and other items to be served in the cafe shall be in conformity with the normal habits of the contract labour.

r. The charges of food stuffs, beverages and other items served in the cafe shall be based on 'No profit no loss' and shall beconspicuously displayed in the cafe.

s. In arriving at the price of the foodstuffs and other article served in the cafe, the following items shall not be taken in toconsideration as expenditure namely:

t. The rent of land and building

u. The depreciation and maintenance charges for the building and equipment provided for the cafe.

v. The purchase, repairs and replacement of equipment including furniture, crockery, cutlery and utensils.

w. The water charges and other charges incurred for lighting and ventilation

x. The interest and amount spend on the provision and maintenance of equipment provided for the cafe.

y. The accounts pertaining to the cafe shall be audited once every 12months

z. by registered accountants and auditors.

Anti-malarial precautions:

The contractor shall at its own expense, conform to all anti-malarial instructions given to him by Engineer-in-charge including the filing up of any borrow pits which may have been dug by him.

SECTION 24: RESPONSIBILITIES

S&H –coordinators:

In connection with (Indian Regulations and standards) the tasks and responsibilities of the S&H coordinator(s) as well as the design- as the construction phase, are as follows:

Design phase:

- Co-ordination of the general aspects with respect to Safety, Health and Welfare.
- Taking care of the set-up of a S&H-plan 'in draft'.
- Putting together the S&H-file.
- Keep up and actualize the S&H-plan 'in draft' -and file.
- Hand-over the S&H-plan 'in draft' -and file to the S&H-coordinator(s) for the construction phase.

Construction phase:

- Organizing and coordinating the cooperation between employers.
- Coordinating the Safety, Health and Welfare measures by the employers.
- Coordinating supervision to meet the joint facilities.
- Give indications to the .
- Coordinating the information to the employees.
- Take measures to assure that only persons which are entitled to can come in at the works.
- Keep up and actualize the S&H-plan 'in draft' -and file.
- Handover the S&H-file to the principal.

SECTION 25: COMMUNICATION

Kick-off meeting

The kick-off meeting should be seen as a start up meeting, preliminary to the general or project oriented activities. In the kick-off meeting, besides technical relevant information, pay attention to the aspects of safety and health in general sense. The Contractor will be required to provide their job site safety program either at kickoff meeting or within a time period as determined by Project Manager after the kickoff meeting along with other pre-start documentation.

Pre-job meeting

The Pre-job meeting is meant for consultation before the activities may start. A part of this meeting is reserved to make detail appointments for specific Plant or Location directed safety- and health matters and 'actual' deviations of the normal situation. This meeting is meant as a supplement to the general information which already has been handed over during the kick-off meeting. At this meeting the **Pre-job Checklist** should be handled and worked out with all persons involved.

Progress Meeting:

The progress meeting is meant to get an update from contractors on project progress and resolve any construction/ coordination issues. It is normally held on weekly basis. This meeting will have EHS component and following items shall be discussed under this head.

Major safety issues at site Actions being taken to resolve them

Toolbox meeting:

Toolbox meetings are company (contractor) internal matters. With this kind of meeting, employees supposed to execute the job are informed about the most actual state of the activities. This information can be appointments, instructions which arethe result of above mentioned meetings. A toolbox meeting is a medium to inform 'executing employees'. Copies of these toolbox meetings (incl. registration forms) should be attached to this chapter.

Safety Meeting:

Safety meetings shall be held on weekly basis to be attended by Project Manager's Safety representative and safety officer from all contractors as well as their subcontractors. The meeting shall be chaired by Project Manager's safety representative and Project Manager may also like to attend the meetings randomly. The topics to be covered shall broadly include:

a. Safety issues at job site
b. Review pre task plans
c. Discuss safety statistics
d. Review safety committee reports/ recommendations
e. Discuss safety training initiatives
f. Review overall job site safety

SECTION 26: INFORMATION

General S&H-instructions

Everyone, who is doing activities at the Client site, should be registered at the job site. After registration, everyone get a Contractor Safety Instruction (video presentation). This presentation shows an explanation on the S&H policy, the most important emergency measures (Fire and Gas alarms) and shows general behavior rules and procedures.

Site Specific S&H-instructions

These instructions can be given when the common interest is served (equal for all facilities and departments) and the necessity exists. Examples are: LoTo, shutdown, etc. Site specific, S&H instructions, needed for this project to follow are as under; _____.

SECTION 27: PRE TASK PLANS (PTP)/ JOB TASK HAZARD ANALYSIS (JTHA)

PTP/ JTHA is the process of systematic investigation of a task and its subtasks, ascertaining the risks associated with carrying out activities associated with those tasks, listing preventive measures to avoid potential hazards associated with executing that activity and developing contingency plan in case of emergencies. The Standard Operating Procedure of the Project

Manager will serve as reference guidelines for the tasks which require development of PTP/ JTHA. However, the listis not all inclusive and if the Project Manager/ Project Manager's safety representative/ 's safety representative determine that the PTP/ JTHA is

required for some other tasks too, the contractor will be obligated to provide that as per the procedure and in the format as indicated by Project Manager (copy of format attached with these guidelines. Subsequent to the kick-off meeting, within the specified time period, the contractor will also provide the list of tasks against which PTP/ JTHA shall be submitted along with the expected time, when it would be submitted. This listing shall be done on the format shown below;

LIST OF PRE-TASK PLANS TO BE SUBMITTED ON THE *Project Name*	
Contractor:	**Trade Package:**

TASK	TIME OF EXECUTION	TARGET PTP SUBMISSION DATE

SECTION 28: ENVIRONMENT

Waste Disposal

Waste originated from activities at the project site should be dumped at the designated location in the designated manner as indicated by / PM. Chemical waste (air-sprays, oil, paint etc.) should be collected separately and, if property of client, shall be offered to the facility / department. This in conjunction with the waste-coordinator of the department concerned, or the In &out Clean department. In case the waste coordinator does not require the chemical waste for re-usage, the contractor will

dispose it off at its own expense at the designated location in the designated manner as directed by Project Manager and in accordance with all Indian Environmental Laws. Chemical waste which originates from Contractor's works should be collected and carried away by Contractor according to the legal regulations. The In & Out Clean department should be informed before carrying away the waste.

Material Safety Data Sheets (MSDS)

The Contractor is obligated to inform about the risks and dangers associated with handling of chemical and hazardous substances at site. Therefore, the information transfer in the form of Material Safety Data Sheets is necessary. The contractor shall list all materials to be used at project site that require submission of MSDS and submit those. The material shall be brought to the site only after obtaining prior approval from 's representatives on the MSDS.

Contractor is required to provide Material Safety Data sheets (MSDSs) for any chemical brought on site. An index of MSDSs for all products proposed to be used on site must be provided. In so far as possible, "environmentally friendly" products should be used (e.g. detergent or citrus based cleaners rather than solvent based cleaners). Low-Volatile Organic Compound (VOC) products should be used at all times. Chlorinated solvents should not be brought on site except on a pre-approved case-by-case basis. The Client/ reserves the right to reject any chemical proposed to be brought on site. Any regulated wastes generated on site (e.g. hazardous, residual or special waste, including regulated wastewaters, waste oil, waste paint), in must be disposed of by Contractor in strict accordance with federal, provincial and municipal or and local standards. No wastes may be disposed of down the drain or in the Client installed dumpster without prior written consent. Contractor must have appropriate training for the work to be done. Training records must be produced upon demand.

Contractors must bring appropriate tools, equipment, safety devices and clothing to the job site. No tools or equipment maybe borrowed from the Client without prior written consent.

Material	MSDS sheet to be submitted by

SECTION 29: REPORTING

The contractor will submit the Monthly man-hour & safety report on the format enclosed in EHS guidelines. The report will be submitted by__ hrs. on_day of every month. In addition, should the Project Manager require any interim man-hourreports on weekly basis or any other frequency determined by Project Manager, those will also be submitted by the contractor. Safety reports submitted are in no way linked with the requirement for submission of Daily report on the part of contractor.

CONTRACTOR HEALTH AND SAFETY Sl. No…… Date……
General information (To be Completed by Safety officer)
Contractor Name : Project Name : On site contractor Representative / Supervisor / Safety
Location of Infraction : Description of Infraction: Observed By : Date : Time :
Status of Project : Project Stopped until correctionProject Continuing W/infraction Corrective Actions Required by (Date/time)
CORRECTIVE ACTION (To be Completed by the Contractor)
Corrective Action : Corrective Action Performed by :Date / time : Name : Signature :
Return to GU
CORRECTIVE ACTION FOLLOW UP (To be completed by Project Manager)
Received / Certified By : GU Date : Remarks :

GALGOTIAS UNIVERSITY

EHS DECLARATION

From:

Name of the Contractor
Name of the organizationTo:

Project Manager

Location – Pin code

Subject: EHS Declaration

I/ we hereby declare to accept the responsibility to carry out the work safely. I/ we have understood the hazards associated with site activity and developed the relevant safety procedures, trained the man power and provided required PPE and equipment. I/ we or the workers working under my/our control will adhere to the site safety rules and EHS

guidelines as stated in this document. The following are the safety practices that will be followed in addition to any other requirements as recommended by Project Manager's EHS Manager/ Site safety officer to work safely at site.

1. Wear safety helmet, safety shoes, eye protection with side shields.
2. Wear safety harness and hooking to the life line rope.
3. Wear appropriate hand gloves like cotton, leather, PVC, rubber or surgical hand gloves.
4. Proper tools will be used and checked for defects and replaced whenever required.
5. Welding torch with ring guard, welding shield, leather hand gloves required.
6. No steel rod will be used as earthing on to the welding machine.
7. Proper working platform with hand rail will be used while working at heights.
8. a) Housekeeping will be done on daily basis and the debris, sand, concrete materials and mortar will be removed andstored at identified place.
9. b) Papers, plastic sheets, rubber materials and wooden pieces have to be put in recycle bin from the work place and thiswill be sent outside the site.
10. I/ we will be appointing one safety officer, safety stewards and group leader of safety.
11. My/ our workmen and I/ we will not create any problem, quarreling with other agents.
12. I/ we will be providing fire extinguishers, fire buckets with water and sand in work place.
13. First aid facility and hospital facility will be provided to my/ our workman.
14. I/ we will be conducting the safety training programs for my/ our workmen, like first aid, fire fighting and safety.
15. I/ we will obtain work permits to work for hazardous area.
16. As per the contract document, we agree with imposition of penalty on us should we violate
17. any safety norms/ practices at the project site, which can be deducted from our invoices.
18. I/ we will submit all the required insurance policies as per the contract documents.

Signature of the contractor

PERSONAL PROTECTIVE EQUIPMENTS CHECKLIST

SL.NO	PARTICULARS	YES / NO
1	Do the Workers Wear Helmet in such a way to protect their head?	
2	Are they wearing hand gloves, Rubber gloves (IS 4770 for electrical purpose), Leather hand gloves of required quality forthe job	
3	Do the workers using appropriate Footwear?	
4	Is there any need for Safety harness (IS 3521-1965) use? If so, are they hooked property?	
5	Is there any need for Ear protection? If so, are they using the device external or internal type?	
6	Are the workers wearing Safety glasses / Safety screens /Safety goggles for the work being done? If so, are they usingappropriate equipment?	
7	Do the Workers have respirator/ protection from inhalation hazards?8 Are the helpers also using proper PPE or not?	
9	Have the Workers been briefed about the Hazards associated with the job and the emergency action to be followed whenever there is requirement?	

EHS Manager/ Site Safety Officer Contractor's Site In-charge/ Safety In-charge

GALGOTIAS UNIVERSITY

PERMIT FOR WORKING AT HEIGHTS

Permit No.: Date:

Project Name: Location:

Contractor: Sub-contractor:

Job description: Area/ location:

A	**SCAFFOLDING & RELATED PROTECTION**	Y	N	N/A
A.1	Scaffolding good construction, adequate strength with 50 cm clear walk ways toeboards with wide screens,			
A.2	Scaffold well secured with stair ways, hand rails. Should be wide enough to pass two persons at a time			
A.3	Maintained good Housekeeping at work location / site			
B	**OVERHEAD CLEARANCE**			
B.1	Required clearance available from all overhead electrical cables			
B.2	**LADDERS**			
B.3	Strong material, well maintained ladders			
B.4	Ladder not placed against loose boxes materials, sound objects, near electricalinstallation.			
B.5	Ladder of sufficient height used, on top tied down and man positioned at the foot at ladder.			
B.6	Safety Footwear provided			
B.7	Ladder placed at an angle of 70 to 75 degrees			
B.8	Area of work barricaded so no person can walk under the ladder.			
C	**PERSONAL PROTECTION EQUIPMENT**			
C.1	Safety harness provided and worn			
C,2	Safety helmet, safety shoes and any other PPE required to perform the job at hand is provided and worn properly			

A. Permission:

Permission granted from _____to_____hrs.on_____

Time_____Date_____Signature of permit issuing authority

B. Receipt:

I hereby declare that I accept the responsibility for carrying out the work as detailed on this permit and no attempt will bemade by me or men under my control to carryout any other work.

Time_____Date _____Signature of Person Receiving Permit

C. Clearance certificate:

Work completed by taking all precautionary steps as approved by permit issuing authority.

Time_____Date _____Signature of Person completing jobs

D. Cancellation:

This permit to work is hereby cancelled.

Time_____Date _____Signature of permit issuing authority/Shift in-charge

GALGOTIAS UNIVERSITY

HOT WORK PERMIT

Permit No.: Date:

Name of the Project: Location:

Name of the Contractor: Sub-Contractor:

A) Person taking permit /permittee to fill up:

1) Exact location where hot work is being planned_____

2) Approximate duration of work From: Date:_____Start Time_____ Finish Time_

Revalidated To: Date:_____ Start Time_____Finish Time_

3) Description of work:

4) Tools & Tackles used:

Points to be checked

SL No	Details	Y	N	N/A
1	Has the area immediately below and adjacent to the work spot been cleared/removed of oil, grease and waste cotton etc?			
2	In case of Gas welding, proper hose pipes and pressure gauges are used?			
3	Have fire extinguishers been kept handy at site?			
4	Has tin sheet / wet gunny bag / fire retardant cloth/ sheet been placed to prevent sparks from causing fire?			
5	Have fire sand buckets been kept handy at site?			
6	Whether cylinders are kept in upright positions?			
7	Whether Proper PPE's are available?			
8	In Electrical Welding whether proper Earthing is provided.			

The above points have been complied with and conditions rendered safe / hazards innocuous to undertake the hot work.

Name of_____Signature _____

Designation_____

Permitee (Site engineer)

Name & Signature of Safety Officer _____

B) The person giving permit (Issuing Authority) to fill up:

After checking all the above precautions the hot work can be carried out in the above area.

1. Date:_____Time:_____Signature of safety Officer_____Permit is revalidated for the Period
2. Date:_____Time:_____Signature of Safety Officer _____

C) Time _____ Date: _ at which the permit closed & filed

DISPOSAL PERMIT FORM

PERMIT NO.: DATE:

Mr._____ Foreman, is authorized to dispose of the followingmaterials in the manner indicated:

MATERIAL METHOD LOCATION

The procedures posted at the burning ground and disposal area must be followed in detail during these operations.

Personnel Authorized _____

Time: _____ Date: _____

_____

(Supervisor)

GALGOTIAS UNIVERSITY

EXCAVATION PERMIT

Permit No:_____Date: _____
Project Name:_____Location: _____

Contractor:_____Sub-contractor:_____

Excavation details:

Purpose:

_____

Area/ Location:_____
Proposed date and time for start of work: _____
Proposed date and time for completion of work:_____
Tools and equipment involved: _____

_____
_____

Length_____m Width _____m Depth_____m

Preparation

1. Underground cables, pipelines, electrical lines etc checked Yes/No
2. Personnel protective equipments to be used to include;

A. Safety Shoe Yes/No
B. Safety Helmet Yes/No
C. Gloves Yes/No
D. Eye Protection Yes/No
E. Ear Protection Yes/No
F. Nose Mask Yes/No

Safety Precautions

1. The proper approach arrangement to be made with required no. of exit points
2. Wear proper PPEs
3. Barricade area and Display Warning boards
4. Ensure good housekeeping before and after the work
5. Ensure the presence of supervisor during the execution of work
6. Use certified machinery
7. Check for possible interference with any underground utilities
8. Check reverse horn for vehicles and driver license
9. Any special safety precautions (specify)_____

Checked By:
Contractor's Safety Officer Signature Date

PERMIT ISSUING AUTHORITY (Permit is granted & valid up to)

1. Date:_____Time:_____Signature of Safety Officer _____ Permit is revalidated for the Period
2. Date:_____Time:_____Signature of Safety Officer _____

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NIGHT WORK PERMIT FORM

PERMIT NO.: _____DATE: _____

Project name:_____ Location: _____
Contractor name:_____Trade Package:_____
Activities scheduled for night work with location:

_____

Reason for conducting these activities at night:

_____

Name of the Supervisor:

Name of workers and designation:

S.No NAME DESIGNATION

Sufficient lighting provided: YES/NO Area
to be cleaned after work: YES/NO

Emergency vehicle available: YES/NO Vehicle No.:

Any other special precautions:

Signature:_____Signature:_____Signature: _____

Supervisor (Contractor) Site In charge (Main Contractor) EHS Manager

Note: CONCERNED AGENCIES ARE RESPONSIBLE FOR ANY UNSAFE ACT/
CONDITIONS

GALGOTIAS UNIVERSITY

PERMIT FOR WORKING IN AHU/ ELECT/ UPS/ SERVER/ BATTERY ROOMS

A.

Date:_____ Permit number:_____

Project:_____Location:_____
Agency requesting permit: _____
Location of work: _____
Permit to work on (date):_____From: _____To:_____
Description of work:_____

_____

Names of Individuals who will work in the area along with the name of supervisor:

_____
_____

LOTO required or not? _____
Hot work/ Height work permit taken, if required. _____
Any other precautions, if required: _____

_____

Signatures of requestor

B.

Permit granted to work on_____from_____to_____.
Signatures of authorized representative

C.

Area cleared after work: _____
Signature of rep of agency which Signatures of representative

Performed work

Copy to: 1. Workers working at site

2. representative
3. Contractor records

GALGOTIAS UNIVERSITY

CONFINED SPACE ENTRY PERMIT

A.

Date:_____Permit no.: _____

Project Name and Location: _____

Permit Requested by:_____

Confined space location:_____Confined space description: _____

Purpose of entry and description of work:_____

_____

_____

Duration of permit: From: _____To: _____

Potential hazards (Mark all that apply):

Oxygen deficiency/ Toxic gases Fire/ explosion /Mechanical hazards

B.

No. Item Yes Not Required1
Proper lighting provided

2 Proper ventilation provided (natural/ artificial)3
Full body harness with lifeline provided

4 Proper access for exit provided5
Entrance barrier provided

6 Method of isolation/ control, purge, flush, etc.7
Lockout provided

8 Respiratory protection provided
9 Rescue team with devices put on stand
by10 Proper PPE provided

11 Tests required (Attach reports):

Oxygen level (19.5% - 23%) Carbon
Monoxide level (<25 ppm)

Name of Entrants Name of Attendants (stand by team)

I have checked the above points and found the conditions compliant to undertake the abovementioned work.

_____ _____ _____

Name of permitee Signature of permitee Designation

C.

The precautions and safe conditions mentioned above have been verified and the work can be started.

_____ _____ _____

Name of Issuing authority Signatures of Issuing authority Designation

D.

Time_____ Date_____Permit closed and filed.

Signature of safety supervisor: _____

GALGOTIAS UNIVERSITY

SHAFT WORK PERMIT

Date:_____ Permit no.: _____

Project name and Location: _____

Name of the agency requesting permit: _____

Location of work: Shaft number:_____Floor:_____

Task to be performed: _____

Start date and time:_____Finish date and time: _____

Safety Precautions required:

No. Item Yes Not required

1 All personnel are wearing proper PPE
2 Workers have been briefed about hazards3 Safe access to shaft available
4 Safe working platform erected
5 Safety harness with lifeline provided
6 Fire extinguisher provided for hot work7 Shaft appropriately barricaded

Names of workmen entering shaft: _____

_____
_____

I have ensured that the safety precautions as listed above for the task to be performed have been taken for this shaft work.

_____ _____

Name of permitee Signature of permitee Designation

_____

Name of Issuing authority Signature of Issuing authority Designation Notes:

1. Separate permit required for work in each shaft.
2. Work permit is valid for the prescribed date, time and in prescribed location only.Time____Date _____Permit is closed.

Name and Signature of the Issuing authority: _____

GALGOTIAS UNIVERSITY

CONTRACTOR INCIDENT/ NEAR MISS REPORTING FORMAT

Project:_____Location: _____
Name of Contractor: _____
Name of Contractor Employee: _____Age:_____Sex:_____
Incident Date:_____ Incident Time:_____Incident Location: _____
Injuries:_____
Treated by:_____Treated at: _____
Type of Incident (First aid/ Recordable/ Lost Work day/ Fatal/ Near Miss): _____
Task assigned to person at the time of incident:_____

_____

Description of the Incident: _____

_____
_____
_____

Primary Root cause for the Incident:_____

_____
_____

Contributory factors: _____

_____
_____

Date when latest safety training was given to employee: _____
Subject of training:_____Given by: _____
Was a Pre task plan required/ submitted for this task:_____
Is there a standard procedure developed to perform this task?_____
If yes, was it reviewed with the worker and when? _____
Preventive measures proposed to avoid recurrence in future:_____

_____
_____
_____
_____

Contractor Site In-Charge Contractor Safety In-Charge

GALGOTIAS UNIVERSITY

PEP TALK REPORT FORM

(To be filled by the person conducting pep talk)

Project:_____ Location: _____
Name of Contractor:_____ Trade: _____
Name of Site In-Charge: _____
Name of Contractor Safety coordinator:_____
Number of Workmen present in Pep talk:_____
Date and Time of Pep talk: _____
Topics discussed: _____

_____
_____

Any significant problems/ issues identified:_____

_____
_____

Remarks (if any):_____

_____

Contractor Safety Representative Safety Representative

MONTHLY EHS STATISTICS REPORT – *Month, Year*

(To be filled and submitted by contractor)

Project:_____Report No:_____Date: _____
Name of Contractor:_____Trade:_____

S.No Description Status

1 No. of Man-hours worked over last month2
Cumulative Man-hours worked till date

3 No. of Reportable Accidents on project4
No. of Near Misses

5 No. of Lost Work Day (LWD) cases6
No. of Safety Pep talks conducted

7 Infraction Notices/ Safety Inspection Reports received8
Infraction Notices/ Safety Inspection Reports closed

9 No. of Fire extinguishers available at site (all types)a Foam Type (Last serviced on____)
b CO2 Type (Last refilled on_____)
c Others

10 No. of Training sessions conducted
a Fire fighting training
b First Aid training

c PPE Usage trainingd
Others

11 Safety Permits Issued
12 No. of Safety sign boards displayed at site
13 Housekeeping practices (Excellent/ V Good/ Good/ Average/ Poor)14 No. of times Equipment, Machinery and Tools inspected
15 Physical condition of the PPE in usage (Good/ Average/ Poor)16
License and vehicle documents available (if applicable)

17 Percentage compliance on the usage of PPE by workers
Submitted by:

Contractor Safety Representative/ Site In-Charge
Safety Representative Comments (if any):

_____

_____

Reviewed by:

Safety Representative Copy
to: Project Manager

MONTHLY EHS STATISTICS REPORT – *Month, Year*

(To be prepared by contractor for submission to Client)

Project:_____Report No:_____Date: _____

Sl# Description Status

1 No. of Man-hours worked over last month2
Cumulative Man-hours worked till date

3 No. of Reportable Accidents on project4
No. of Near Misses

5 No. of Lost Work Day (LWD) cases 6 No.
of Safety Inspections conducted7 No. of
Safety Audits conducted

8 No. of Safety Infraction Notices/ Inspection Reports issued9
No. of Fire extinguishers available at site (all types)

a Foam Type (Last serviced on_____)
b CO2 Type (Last refilled on_____)
c Others

10 No. of Training sessions conducted
a Fire fighting training
b First Aid training

c PPE Usage trainingd
Others

11 No. of Safety pep talks conducted
12 Total number of Safety Permits Issued
13 No. of Safety sign boards displayed at site
14 Housekeeping practices (Excellent/ V Good/ Good/ Average/
Poor)15 Equipment, Machinery & Tools inspection (Satisfactory/
Not)
16 Physical condition of the PPE in usage (Good/ Average/ Poor)17
License and vehicle documents available (if applicable)

18 Percentage compliance on the usage of PPE by workers
19 Overall EHS implementation ((Excellent/ V Good/ Good/ Average/
Poor)Additional Comments (if any):

_____

_____

_____

Safety Representative

GALGOTIAS UNIVERSITY

MONTHLY EHS REPORT – *Month, Year*

A. MAN-HOUR LOG

Sl#	Contractor	Up to Last report	Man-hoursthis report	CumulativeManhours
1				
2				
3				
4				
5				
Grand Total:				

B. INCIDENT REPORT

Sl#	Description	Up to Last report	This report	Cumulative	Remarks
	1 Near Misses				
	2 Recordable Incidents				
	3 Lost Work Day cases				

Sl#	Safety inspection conducted on	No. of Non conformances	No. of Open Non conformances	Remarks

Sl#	Safety Audit Conducted on	Safety Rating/ Score

Average Safety Score:

E. OVERALL JOB SITE SAFETY AND COMPLIANCE WITH EHS STANDARDS

EHS representative to indicate whether Excellent/ V Good/ Good/ Average/ Poor, as the over job site safety and compliancewith EHS Standards and also provide comments (if any).

Attachments: Monthly EHS statistics report

GALGOTIAS UNIVERSITY

PENALTY FOR NON COMPLIANCE WITH EHS GUIDELINES

A.

Project:_____Location:_____Date: _____

Penalty notice issued to: _____

Contractor Site In-charge:_____

Contractor Safety representative: _____

Description of Non-compliance: _____

_____

_____

_____

Location of non-compliance:_____

Have there been similar non-compliances in the past? _____

Have any Safety Infraction Notices been issued in the past? If yes, provide details

_____

S. No.	Degree of violation	Type of violation	Penalty for violation	No. of violations	Penalty Amount
				Total Penalty Amount	

Signature of the Safety Officer/ representative generating this notice

B.

Billing department to proceed with deduction of INR_____ as penalty amount from contractor's next running bill, fornon-compliance with EHS guidelines, duly accepted by contractor as part of tender document as well as through acceptance on EHS Declaration

form.

Signatures of Project ManagerCC
to: Client Project Manager

GALGOTIAS UNIVERSITY

CHECKLIST FOR BUILDING HOIST/ WINCH

Project:_____Location: _____

Name of Contracting agency:_____

S. No Description OK/ Not OK Remarks

A. SUPPORTING STRUCTURE:

1 Condition of steel tubes2
Condition of the Base

3 Bracing (diagonal/horizontal)4
Anchorage with structure

5 Any obstructions to the movement of rope?

B. WINCH MACHINE:

1 Condition of brakes and accessories2
Functioning of brake with load

3 Oil level and condition4
Gear box and motor

5 Coupling bolts and nuts6
Condition of wire rope

7 Anchorage of drum and wire rope8
Pawl arrangement for locking

9 Condition of diversion pulleys, idlers pulleys and fleet angle10
Limit Switches

11 Electrical connection, earthing and insulation

C. UNLOADING PLATFORM:

1 Area Barricaded
2 Stability
3 Sagging
4 Any Over
loading5 Hand
railing
6 Staging

D. OTHERS

1 Is the person authorized/experienced to Operate?
2 Does the person at unloading point use Safety
belt?3 Is the bucket overloaded?
4 Is the Signaling Man present?5 Is
the work permit Obtained?

Signature of Contractor Site In-charge Signatures of Safety Officer/ Rep.
Print Name:_____Print Name: _____

GALGOTIAS UNIVERSITY

CHECKLIST FOR SCAFFOLDING

Project:_____ Project number:_____

Name of Contractor:_____Trade: _____

S. N.	Description	Observation	Yes/ NO/ NA	Remarks / Recommend ation
1	Does the site has a practice of providing suitable and sufficient scaffolds so that the work could be safely done at a height?			
2	Is site engaging suitable/ properly trained/ experienced workmen for constructing / dismantling / shifting scaffolding works?			
3	Are scaffold platforms designed / constructed with aminimum safety factor of four?			
4	Is there a safe means of access to the workingplatform?			
5	Are scaffold structures on a solid base avoiding pavements& manhole covers?			
6	Is the scaffolding structure free from excavation pit / proper distance is maintained?			
7	Is verticality of the structure being properly maintained?			
8	Are ties for scaffold structure properly maintained (vertical as well as horizontal position)?			
9	Is there a provision of toe boards/guard rails and arethey secured?			
10	Whether planks used for working platforms are wooden /metallic?			
11	If wooden plank, whether thickness is maintained asper standard or not, viz.			
12	a. For 1.5 M span -1.5" thick			
13	b. For 2.6 M span -2.0" thick			
14	Is there a system of inspecting scaffolds by a competent person at least once a week and also afterevery prolonged interruption in the work?			
15	Is there a system of inspecting materials of scaffolds oneach occasion before erection?			
16	Is there a system of inspecting scaffolds at every spellof bad weather/ heavy wind condition?			
17	Is over hang of the working platform restricted to lessthan 50 mm/ four times the thickness of the board?			
18	Is their awareness among workmen on the importanceof load distribution on a given working platform?			
19	Is there a check for the condition and correct usage of fittings for scaffolds?			

20	Is the width of a working platform properly maintainedaccording to usage, viz.			
21	a) Minimum 600 mm for footing and not for deposit ofmaterials.			
22	b) Minimum 800 mm for footing and deposit ofmaterials.			
23	c) Minimum 1050 mm when used for heavier loads orto support higher platforms.			
24	Are all the materials stored on the platforms properlysecured or not?			
S. N.	**Description**	**Observation**	**Yes/ NO/ NA**	**Remarks / Recommend ation**
25	Whether planks are tied using proper binding wires?			
26	Are openings in working platform kept safely covered / fenced?			
27	Are the scaffolds being erected on firm and levelsurface?			
28	Does the height of mobile scaffolds exceed four timesthe smaller base dimension?			
29	Are all materials stacked on platform properly securedwhile in motion?			
30	Is the safety rule: Not to ride on a scaffold while inmotion, violated.			
31	Is there a system of checking for obstructions beforethe tower is moved?			
32	Are suitable / correct lifting tackles (wire rope/ chains/ shackles) selected for suspension & used?			
33	Are all the suspension gears correctly spaced andconnected?			
34	Is there a system of using manila rope/coir rope for suspension at any place where such rope would beliable to damage by heat/flames/sharp edges etc.			
35	Are all precautionary measures taken to prevent contact between arc welding apparatus and suspension ropes?			
36	Is there a provision of guardrails and toe boards?			
37	Is hanging platform secured?			
38	Is there a provision of anchoring safety belt. Lanyardsto be tied to guy ropes?			

EHS Manager/ Site Safety Officer

Contractor Site Safety In-charge

GALGOTIAS UNIVERSITY

SAFETY INSPECTION REPORT

Project:_____Report No.:_____ Date: _____

Name of Contractor: _____

Number of non-conformities observed (as per details below): _____

Details of Non-Conformities observed:

The following non-conformances with reference to project EHS guidelines were observed during routine EHS round of the project site;

Sl. #	Description of non-conformity	Target date
1		
2		
3		
4		

Note:

Please take serious note of the above listed non-conformities and initiate corrective action immediately, so as to remove the non-conformity by the Target dates indicated above, failing which shall proceed with imposition of penalty for the observed non-conformities.

Safety Representative

Contractor's Corrective Action Response (*To be filled by contractor*):

All the above listed non-conformities have been rectified. The work is now being executed in compliance with EHS guidelines and applicable Safety Standards. The disposition of the non conformances is listed as under;

S.No	Disposition Description	Status
1		
2		
3		
4		

Contractor's Site In-Charge Contractor's Safety Representative

Dated: _____

Copy to: Project Manager

GALGOTIAS UNIVERSITY

PRE TASK PLAN FORMAT

PROJECT NAME AND LOCATION: **SCHEDULED ON:** **PTP No.:**
CONTRACTOR: **TASK:** **SUBMITTED ON:**

S.N o	Activity Description	Potential Hazard	Preventive Action	Contingency Plan
				Briefly describe the contingency plan in case the preventive actions associated with potential hazards fail to yield results and Accident/ Incident still happens. Contingency plan must list the immediate contact number of Security, Emergency, and Safety representative.

☐ To be

☐ resubmitted

Reviewed

Prepared By:

Safety officer (Contractor)

Approved By: Signature: Safety Officer

Schedule I

Performance Bank Guarantee

(On non-judicial paper of appropriate value)

(By any Nationalized Indian Bank or else obtain confirmation from ARG Outlier Media Pvt. Ltd.)

THIS GUARANTEE made on this [__] day [__] of [__] between [__] ("**Bank**") which expression shall, unless repugnant to the context or contrary to the meaning thereof, include its successors and assigns on the one part and [__], a Company incorporated in India and having its registered office at [__] ("**Client**") which expression shall, unless repugnant to the context or contrary to the meaning thereof, include its successors and assigns, of the other part.

WHEREAS Client has entered into a contract agreement ("**Contract**") at a total value of Rs. [__] with M/s. [__] (hereinafter called Contractor) which expression shall, unless repugnant to the context or contrary to the meaning thereof, includes its successors and assigns.

AND WHEREAS one of the conditions of Contract entered into, is that the Contractor make a payment of Rs. [__] being [5% (five percent)] of Contract Price in the form of a bank guarantee from a bank and in a form acceptable to the Client.

AND WHEREAS THE Contractor has requested the Bank to issue a guarantee of Rs. [__] and the Bank, through its branch at [__], has agreed to furnish this Guarantee in the manner hereunder.

NOW THIS GUARANTEE WITNESSETH that,

1. In consideration of Client, at the request of the Contractor, advancing a sum of Rs. [__], to the Contractor as and by way of Performance Guarantee, the Bank hereby unconditionally and irrevocably guarantees to the Client for due performance of the Contractor's obligations under the Contract and indemnifies the Client in respect of the amount of the Rs. [__] ("**Guarantee Amount**"). The Bank hereby undertakes, without recourse to Contractor and notwithstanding any dispute between the Client and the Contractor under the Contract or any objection by the Contractor, to pay the Client, on its mere demand in the enclosed format a sum upto and not exceeding the Guarantee Amount, being the amount of the 100% (hundred percent) of the payment or such other unadjusted amount of the said Performance Guarantee. If the Client notifies to the Bank that the Contractor has failed to observe, perform and fulfill the terms of the said Contract then the Bank shall immediately pay to the Client, on Client's mere demand in the enclosed format, such sum or sums of money to the extent of Rs. [__] being 5% (five percent) of the value of the Contract Price (as defined in the Contract) as may be claimed by the Client by reason of non-fulfillment by the Contractor of his obligations under the Contract as aforesaid / and shall also indemnify the Client against all losses and damages which may be suffered by the Client as aforesaid and against all costs, charges, expenses which may be incurred by the Client in connection herewith. The Bank shall pay the said amount without demur or protest or without recourse to the Contractor. Any such demand placed in the enclosed format on the Bank shall be conclusive proof with respect to the amount due and payable by the Bank under this Guarantee. The decision of Client as to whether the terms and conditions of this Guarantee or Contract have been observed or not shall be final and binding on Bank and the Bank will not have the discretion to withhold payment to the Client if letter in enclosed format is delivered by the Client to the Bank on or before [__] ("**Claim Period**").

2. This Guarantee is a continuing Guarantee and not revocable except with the previous written consent of the Client and as aforesaid, it will continue in force until the Contractor has maintained the schedule of delivery of the said work under the Contract and observed and fulfilled the terms and conditions of the Contract. The Client has an irrevocable and unconditional right to claim under the Guarantee in case the Guarantee required to be extended in its opinion is not extended by the Contractor or the Bank within the time frames and for the time frames stipulated by the Client.

3. The Client may, without affecting Bank's liabilities and obligations hereunder and without reference to the Bank grant time or other indulgence to or compound with the Contractor or enter into any agreement or agree to forbear to enforce any of the terms and conditions of the Contract.

4. This Guarantee shall not be affected by any change in the Constitution of the Bank, Contractor or the Client or by absorption / merger of the Client, Contractor or the Bank with any other body or corporation or otherwise and this Guarantee will be available to or enforceable by such body or corporation.

5. All composition and payments received by the Client from or on behalf of the Contractor shall be regarded as payments in gross and in the event of the Contractor being wound-up, the Client will be entitled to prove against the properties of the Contractor in respect of the whole of the contractor's indebtedness to the Client without any right on the part of the Bank to stand in the Client's place in respect of or to claim the benefits of such composition and payment or any security held by the Client until the Client shall have received the full amount of the claims against the Contractor.

6. In order to give effect to this Guarantee, the Client will be entitled to act as if the Bank were the principal debtor and the Bank hereby waives all and any of its rights of surety ship.

7. It shall not be necessary, and the Bank hereby waives any necessity, for the Client to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

8. The Guarantee herein contained is unconditional and irrevocable during its currency and will remain in full force for a period of [__] years from the date hereof ("**Expiry Date**"), or if full payment has been made to the Client by BANK, which is earlier. The Bank's liability under this Guarantee is restricted to the Guarantee Amount, i.e. Rs. [__] (Rupees [__]). The Client may claim the full or part of the amount under the Guarantee entirely at its sole discretion and make this claim at one or more times before the expiry of the Claim Period under this Guarantee. The total amount of claims is restricted to the Bank's liability under the Guarantee. The Bank is required to make a payment immediately on receipt of the claim in the enclosed format.

9. This Guarantee shall continue to be in force notwithstanding the discharge of Contractor by operation of law and shall cease only on payment of the full amount by Bank to Client of the amount hereby secured and on the claim of Client against Contractor in respect of Contract being satisfied.

10. This Guarantee shall be in addition to and not in substitution for any other guarantee or security for the Contractor given or to be given to the Client in respect of the Contract by the Bank whether alone or jointly with others.

11. In the event of force majeure, according to the Contract, the validity of the present guarantee shall be extended for a period to be mutually agreed upon by the Client and the Contractor.

12. Unless demand or claim under this Guarantee is made within the Claim Period of this Guarantee, or unless the Guarantee is renewed, or extended in writing by the Bank, all the rights of the Client hereunder shall be forfeited and the Bank shall be relieved and discharged of all liabilities.

13. Any notice by way of request, demand or otherwise hereunder may be sent by post to the Bank, addressed as aforesaid, and if sent by post, it shall be deemed to have been given at the time when it would be delivered in due course of post, and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate of posting from postal Authorities / Agencies, to the effect that the envelope was so posted shall be conclusive.

14. These presents shall be governed by and construed in accordance with Indian Law as applicable.

15. The Bank hereby declares that it has the power to issue this Guarantee and the undersigned has full power to do so.

Notwithstanding anything contained hereinabove our liability under this guarantee is restricted to the Guarantee Amount i.e. Rs. [__] (Rupees [__]). This guarantee is valid upto the Expiry Date i.e. [__]. Any claim arising out of the guarantee must be lodged with the bank at its office at [__] on or before the Claim Period i.e. [__], after which the liability of the bank would be extinguished.

In witness thereof the Bank has executed these present the day and year first above written.

Signed and delivered for and on behalf of the above named.

IMPORTANT NOTE

Following points shall be taken care of while submitting the Bank Guarantee: -

1. The Bank Guarantee shall be on non-judicial stamp paper having a value of Rs. 200/- or as per requirement stamp paper should be purchased in the name of the Bank, who gives the guarantee and not in the name of the supplier/ sub-contractor.

2. The Bank Guarantee shall be strictly as per the pro-forma.
3. Bank Guarantee should be from any of the Nationalized Banks or its subsidiaries only.
4. Correction made on the Guarantee should be endorsed by the Bank with it official seal.

NOTE: The BG format shall not be modified or changed

Schedule II

Contract Agreement

[*To be executed on a stamp paper of appropriate value*]

This Contract agreement ("**Agreement**") is entered into on this [__] day of [__] month, 2023 ("**Execution Date**") at Noida, by and among:

A. **Galgotias University, located at Plot No. 2, Sector 17A, Yamuna Expressway, Gr. Noida, Gautam Buddh Nagar, UP, India running under Smt. Shakuntla Educational & Welfare Society**, a society incorporated under the societies Act, 1860 and having its registered office at 4405/6, Prakash Appt. – 2, 5, Ansari Road, Daryaganj, New Delhi - 110002 (hereinafter referred to as the "**Client**" which expression shall unless repugnant to the meaning or context, be deemed to mean and include, its successors and permitted assignees);

B. **[__]**, a company incorporated under the Companies Act, [1956/2013] and having its registered office at [__] (hereinafter referred to as the "**Contractor**" which expression shall, where the context so admits, include its successors in office and assignees.

The Client and the Contractor are collectively referred to as the "**Parties**" and individually as "**Party**".

WHEREAS:

A. The Client had invited Bidders (as defined in the Instruction to Bidders ("**ITB**")) with requisite technical capability and sound financial position to bid for Works (as defined in the ITB) required to be undertaken for building the New admin. & Engg. Block (as defined in the ITB) including but not limited to construction activities required to be undertaken for building the New admin. & Engg. Block including but not limited to HVAC & CHILLER activities required for development of the Project (as defined in the ITB).

B. The Client is desirous of having provided and executed certain Works mentioned, enumerated or referred to in the Bidding Documents (as defined in the ITB).

C. The Contractor is the successful bidder in respect of the Works to be undertaken pursuant to the Tender issued by the Client.

D. In accordance with the process agreed in the Bidding Documents, the successful bidder will undertake the Works at the Site in accordance with the terms and conditions set out in this Agreement. Accordingly, the Parties have agreed to enter into this Agreement for undertaking the Works for HVAC & CHILLER of the New admin. & Engg. Block at the Site.

NOW THEREFORE THE PARTIES AGREE AS FOLLOWS:

1. **DEFINITIONS & INTERPRETATIONS**

1.1. **Definitions**

All capitalized terms used in this Agreement, but not defined herein shall have the meaning given to it in Clause 1 of the General Conditions of Contract ("**GCC**") which have been attached hereto as **Schedule A**.

The rules of interpretation as set forth in Clause 1 of the GCC shall apply *mutatis- mutandis* to this Agreement.

2. **SCOPE OF WORK**

The Works to be carried out by the Contractor, as part of its scope of work with regard to the HVAC & CHILLER of the New admin. & Engg. Block shall be as specified in Clause 2 of the GCC, Schedule I (*Scope of Works*) of the GCC (attached separately as detailed BOQ), and the Technical Specifications.

3. **CONTRACTOR PERFORMANCE BANK GUARANTEE**

The Contractor Performance Bank Guarantee to be submitted to the Client by the Contractor shall be as specified in Clause 3 of the GCC.

4. **[__] OF NEW ADMIN. & ENGG. BLOCK**

The HVAC & CHILLER of New admin. & Engg. Block by the Contractor shall be as specified in Clause 4 of the GCC.

5. **CONTRACTOR'S OBLIGATIONS**

The Contractor's Obligations shall be as specified in Clause 5 of the GCC.

6. **CLIENT'S OBLIGATIONS**

The Client's Obligations shall be as specified in Clause 6 of the GCC.

7. **TIME FOR COMMENCEMENT AND COMPLETION**

The time for Commencement and Completion of the Works shall be as specified in Clause 7 of the GCC.

8. **MATERIALS AND WORKMANSHIP**

The Materials and Workmanship to be provided by the Contractor shall be as specified in Clause 8 of the GCC.

9. **PERFORMANCE PARAMETERS**

The Performance Parameters to be conducted by the Contractor in the presence of Client in order to ensure the operation of the New admin. & Engg. Block shall be as specified in Clause 9 of the GCC.

10. **LIQUIDATED DAMAGES**

The Liquidated Damages to be paid by the Contractor shall be as specified in Clause 10 of the GCC.

11. **COMPLETION AND ACCEPTANCE OF WORKS**

The Completion and Acceptance of Works to the satisfaction of the Client shall be as specified in Clause 11 of the GCC.

12. **PROJECT MANAGER**

The obligations of the Project Manager shall be as specified in Clause 12 of the GCC.

13. **ARCHITECT**

The obligations of the Architect shall be as specified in Clause 13 of the GCC.

14. **DOCUMENTS**

The Documents to be provided by the Contractor shall be as specified in Clause 14 of the GCC.

15. **CONTRACTOR TO INFORM ITSELF FULLY**

The obligation of the Contractor to inform itself fully shall be as specified in Clause 15 of the GCC.

16. **SUB-CONTRACTORS**

The engagement of Sub-Contractors shall be as specified in Clause 16 of the GCC.

17. **TRANSFER OF OWNERSHIP**

The transfer of ownership of the New admin. & Engg. Block shall be as specified in Clause 17 of the GCC.

18. **REPRESENTATIONS AND WARRANTIES**

The representations and warranties of the Parties shall be as specified in Clause 18 of the GCC.

19. **CONTRACTOR'S WARRANTIES**

The Contractor's Warranties shall be as specified in Clause 19 of the GCC.

20. **INSURANCE**

The Insurance to be obtained by the Contractor shall be as specified in Clause 20 of the GCC.

21. **DEFECT LIABILITY PERIOD**

The Defect Liability Period shall be as specified in Clause 21 of the GCC.

22. **VARIATION AND CHANGE IN CONTRACT ELEMENTS**

The Variation and Change in Contract Elements shall be as specified in Clause 22 of the GCC.

23. **CONTRACT PRICE AND INVOICING**

The Contract Price and Invoicing shall be as specified in Clause 23 of the GCC.

24. **TERMS OF PAYMENT**

The Terms of Payment shall be as specified in Clause 24 of the GCC.

25. **SITE OFFICE, SECURITY AND FACILITIES**

The obligation of the Contractor with respect to the Site Office, Security and Facilities shall be as specified in Clause 25 of the GCC.

26. **SAFETY REQUIREMENTS**

The Safety Requirements to be adhered to by the Contractor shall be as specified in Clause 26 of the GCC.

27. **LIMITATION OF LIABILITY**

The Limitation of Liability shall be as specified in Clause 27 of the GCC.

28. **INDEMNITY**

The Indemnification and payment of indemnities shall be as specified in Clause 28 of the GCC.

29. **CONFIDENTIAL INFORMATION**

The obligations of the Parties with respect to the Confidential Information shall be as specified in Clause 29 of the GCC.

30. **INTELLECTUAL PROPERTY RIGHTS**

The ownership of the Intellectual Property Rights shall be as specified in Clause 30 of the GCC.

31. **FORCE MAJEURE**

The Force Majeure event shall be as specified in Clause 31 of the GCC.

32. **CHANGE IN LAW**

The occurrence of events comprising Change in Law shall be as specified in Clause 32 of the GCC.

33. **SUSPENSION**

The Suspension of Works shall be as specified in Clause 33 of the GCC.

34. **TERMINATION**

The right of Parties to terminate the Agreement shall be as specified in Clause 34 of the GCC.

35. **GOVERNING LAW AND DISPUTE RESOLUTION**

The Governing Law and Dispute Resolution mechanism shall be as specified in Clause 35 of the GCC.

36. **MISCELLANEOUS**

The miscellaneous provisions of the Agreement shall be as specified in Clause 36 of the GCC.

[signature page follows]

IN WITNESS WHEREOF the parties have executed this Contract as of the date first recorded above.

CLIENT

SHAKUNTALA EDUCATIONAL & WELFARE SOCIETY

_____

Name:
Title:

CONTRACTOR

[__]

_____

Name:
Title:

GALGOTIAS UNIVERSITY

GUARANTEE PROFORMA

GUARANTEE FOR CHILLER SYSTEM INSTALLATION

We hereby guarantee that the CHILLER System, which we have installed in the building described below:

Building -

Location -

Owner -

System description -

We confirm having checked / studied the building drawings, building orientation, location of plant rooms and service areas, construction details of glazing, walls, partitions, ceiling & roof and technical features & various constraints & parameters. We confirm having verified internal loads from the Architect / PMC/ Owners.

We confirm having calculated all the heat loads for all the areas for the three seasons and confirm the space loads and plant capacities are as per tender documents are correct.

For a period of one year from the date of acceptance of the installation. We agree to repair or replace to the satisfaction of the Client, any or all such work that may prove defective in workmanship, equipment or materials within that period, ordinary wear and tear and unusual neglect excluded, together with any other work, which may be damaged or displaced in so doing. In the event of our failure to comply with the above mentioned conditions within a reasonable time, after being notified in writing, we collectively and separately, do hereby authorise the Owners to proceed to have the defects repaired and made good at our expense, and we shall pay the cost and charges thereof immediately upon demand.

WE ALSO HEREBY UNDERTAKE to test the entire installation in first SUMMER / MONSOON / WINTER season following the completion of the installation, to check and do every thing necessary to ensure that the specified indoor conditions in all spaces are maintained, that all water and air systems are properly balanced, that all controls are calibrated accurately, and that all units are functioning satisfactorily.

Date: SIGNATURE OF SUPPLIER / CONTRACTOR

SEAL:

Note: Any descripency found in the system, design & the schedule of quantities viz-a-viz owners requirement, need to be brought to the notice at the time of tendering process & alternate system to be suggested.

GALGOTIAS UNIVERSITY

GUARANTEE PROFORMA

GUARANTEE FOR HIGH & LOW SIDE HVAC SYSTEM AND BASEMENT VENTILATION & STAIRCASE, LIFTWELL & LIFT LOBBY PRESSURISATION & SMOKE VENTING ETC. SYSTEM INSTALLATION

We hereby guarantee for adequacy & correctness for the High & Low side HVAC System and Basement Ventilation & Staircase, Liftwell & Liftlobby Pressurisation & Smoke Venting etc . system, which we have installed in the building described below:

Building -

Location -

Owner -

System description -

We confirm having checked / studied the building drawings, building orientation, construction details of glazing, walls, partitions, ceiling & roof and technical features & various constraints & parameters. We confirm having verified internal loads from the Architect / PMC/ Owners.

We confirm having calculated all the heat loads for all the areas for the three seasons and confirm the space loads and plant capacities are as per tender documents.

For a period of one year from the date of acceptance of the installation. We agree to repair or replace to the satisfaction of the Client, any or all such work that may prove defective in workmanship, equipment or materials within that period, ordinary wear and tear and unusual neglect excluded, together with any other work, which may be damaged or displaced in so doing. In the event of our failure to comply with the above mentioned conditions within a reasonable time, after being notified in writing, we collectively and separately, do hereby authorise the Owners to proceed to have the defects repaired and made good at our expense, and we shall pay the cost and charges thereof immediately upon demand.

WE ALSO HEREBY UNDERTAKE to test the entire installation in first SUMMER / MONSOON/ WINTER season following the completion of the installation, to check and do every thing necessary to ensure that the specified indoor conditions in all spaces are maintained, that all water and air systems are properly balanced, that all controls are calibrated accurately, and that all units are functioning satisfactorily.

WE ALSO HEREBY UNDERTAKE to test the entire installation of Basement Ventilation & Staircase, Liftwell & Liftlobby Pressurisation & Smoke Venting etc . system following the completion of the installation, to check and do every thing necessary to ensure the proper working of ventilation & pressurization system as per codes & standards and Fire NOC.

Contractor / Vendor to work out its own Summer / Monsoon / Winter AC heat load calculation to check & verify the AC heat loads & AC equipment selection / scheme.

Contractor / Vendor to highlight any changes / discrepancy found in its calculations & consultant's design/selection as per this tender while submitting the bid / Tender / Quotation and repeating the same process after receiving the order during the preparation of shop drawings and technical submittals but before ordering and installation of equipment / system.

For carrying out all the necessary design calculation, contractor / vendor to visit site / check / collect necessary data from Site / Client / PMC /Consultant.

Contractor/ Vendor to work out its own Basement ventilation, smoke venting & Staircase / Lift well / Lift Lobby pressurization calculation to check its suitability / adequacy as per latest 'NBC' of India & Fire safety norms / codes / fire NOC. Contractor to comment on any inadequacies & propose alternative solution.

Date: SIGNATURE OF SUPPLIER / CONTRACTOR

SEAL:

Note: Any descripency found in the system, design & the schedule of quantities viz-a-viz owners requirement, need to be brought to the notice at the time of tendering process & alternate system to be suggested.

GUARANTEE PROFORMA

GUARANTEE FOR BMS INSTALLATION

We hereby guarantee the year round BMS which we have installed in the Complex described below :

Building –

Location –

For a period of ONE YEAR from the date of acceptance of the total installation, WE AGREE TO repair or replace to the satisfaction of the Owner's, any or all such work that may prove defective in workmanship, equipment or materials within that period, ordinary wear and tear and unusual abuse or neglect excluded, together with any other work, which may be damaged or displaced in so doing. In the event of our failure to comply with the above mentioned conditions within a reasonable time, after being notified in writing, we collectively and separately, do hereby authorize the Owner's to proceed to have the defects repaired and made good at our expense, and we shall pay the cost and charges thereof, immediately upon demand.

WE ALSO HEREBY UNDERTAKE to test the entire installation upon completion and ensure that all systems are functioning satisfactorily.

SIGNATURE OF TENDERER
For LOW VOLTAGE INSTALLATION

DATE :

SEAL