ASIAN UNIVERSITY FOR WOMEN

Request for Proposal (RFP)
Electrical Internal & External & Cable Tray Works, Plumbing & Sanitary Works, Metal Works(Railing & MS/SS Gratings), and Interior Finishing Works (Retender)
Asian University for Women (AUW), Arefin Nagar Campus
Summary Sheet

Name of the company	Asian University for Women
Procurement Reference Number	Package/MEP_ID/25-26
Date of issue of the RFP	27 January 2026
Date and Closing Time for RFP submission	2 March 2026 (12:01PM) (GMT +6)
Quotation submission mail address	tender152@auw.edu.bd (Retender)
Address for Communication	**Asian University for Women** 20/A M. M. Ali Road Chattogram 4000, Bangladesh Tel: +880-31-285-4980 Fax: +880-31-285-4988

Bidders are invited to submit their proposals in accordance with the terms outlined in the enclosed Request for Proposal (RFP).

AUW reserves the right to reject any or all offers without providing any reason.

Confidentiality must be strictly maintained. The information provided here should only be used for its intended purpose and scope. By retaining this RFP, you agree to treat all information as confidential.

All communications regarding this Request for Proposal should be directed to AUW, with copies sent to the email addresses listed in the RFP email.

For any further queries, please contact:

- **Primary Point of Contact for RFP Process and Technical Queries:**
  Mohammed Ishrat Bin Mahbub
  Director of Supply Chain Management
  Email: mohammed.mahbub@auw.edu.bd
  Contact Number: +8801926673027; Whatsapp: +8801671470348

Proposals should be submitted only to the following email: tender152@auw.edu.bd
No other AUW email address should be used in the "To," "CC," or "BCC" fields. Any proposal that violates this instruction may be disqualified.

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RFP and Tender Notice

Asian University for Women (AUW) is committed to adhering to the highest standards of financial integrity and management best practices in all aspects of its operations, including RFPs, Tender Notices, and campus construction. We value respect for all, high standards for occupational health and safety, environmental preservation, and equality of men and women as workers and their entitlements for equal wage for equal work. We encourage all our contractors to employ at least 50% women in their workforce. Should anyone notice or otherwise come to know of any practice or incidence of malfeasance, corruption, unlawful or disrespectful treatment or unsafe living or working conditions, avoidable environmental degradation or mismanagement in any form, they may write in full confidentiality to the Secretary of the Board of Trustees. In case of receipt of any such submission with sufficient specificity, an independent agency may investigate the matter and respond to the writer and if appropriate, to the public.

boardsecretary@asian-university.org

AUW is a privately funded independent international university governed by its Board of Trustees with a public service mission. All decisions relating to its management are at the sole discretion of its Board of Trustees.

Thank you for helping AUW achieve the highest ethical and management standards.

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Proposal Summary

Executive Summary

This Request for Proposal (RFP) seeks qualified and experienced firms to design, supply, install, test, and commission complete Mechanical, Electrical, Plumbing (MEP) and Interior Design (ID) works for the Asian University for Women (AUW) Main Academic Building.

The objective is to ensure that the facility is equipped with comprehensive, compliant, and integrated MEP and ID systems in accordance with national and international safety and quality standards, delivering a fully functional and aesthetically coherent academic environment.

Project Implementation Schedule

The successful bidder shall complete all MEP and ID works within the stipulated time frame stated in the Letter of Award.

Indicative project duration:

20 (twenty) months from the date of commencement.

Proposal Evaluation Methodology

All proposals will be evaluated in accordance with AUW procurement procedures and applicable regulations. Evaluation will be based on the following criteria:

- **Technical compliance with specifications** – 60%
- **Relevant experience and qualifications** – 20%
- **Financial proposal and competitiveness** – 20%

The contract will be awarded to the bidder offering the most advantageous proposal that is both technically compliant and commercially competitive.

Warranty and Post-Installation Support

The contractor shall provide a minimum **one (1) year warranty** as per section 4 ITA 2.7, covering all materials, equipment, and workmanship related to MEP and ID installations.

During this period, the contractor shall perform preventive and corrective maintenance at no additional cost, ensuring the availability of spare parts and service personnel as required.

Training and Handover

Upon completion, the contractor shall conduct comprehensive training for AUW's designated staff on system operation, troubleshooting, and maintenance for all MEP and ID systems.

The contractor shall submit the following documents prior to handover:

- As-built drawings (MEP and ID)
- Operation and Maintenance (O&M) manuals
- Test reports and commissioning certificates
- Warranty certificates
- Final inspection and acceptance documents

Confidentiality and Compliance

The contractor shall maintain strict confidentiality of all information and documentation provided by AUW.

All works shall comply with the **Bangladesh National Building Code (BNBC)**, **NFPA**, **IEC**, **ASHRAE**, **NFPA**, and relevant **local safety and fire regulations**. The contractor shall obtain all necessary approvals, permits, and clearances, ensuring full compliance and site safety during execution.

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Scope of Work

The scope of work covers the **complete execution, design, supply, installation, testing, commissioning, and handover** of all **MEP and Interior Design (ID)** systems in accordance with international codes and standards.
This includes, but is not limited to, the following:

1. Site Assessment and Mobilization

- Conduct site visits and assessments as required for MEP and ID coordination.
- Mobilize resources and set up temporary site facilities and utility connections.

2. Design and Documentation

- Prepare **MEP and ID design drawings** and obtain approval from relevant authorities.
- Develop **shop drawings** based on the GFC layout and secure approval from the Client and Consultant prior to execution.
- Submit execution schedules considering imported and local materials.
- Provide **material and finish samples** (from the approved BOQ brand list) for approval.
- Prepare all required documentation, including as-built drawings, calculations, and handover documents, in compliance with applicable codes.

3. Supply and Installation

- Supply, install, and integrate all **mechanical, electrical, plumbing, fire safety, and interior fit-out** components as per approved drawings and specifications.
- Include necessary **civil, structural, or other coordination works** not explicitly listed in the BOQ but required for successful implementation.
- Manage on-site storage for imported and local materials, with records maintained by the storekeeper.
- Execute works strictly in accordance with approved shop drawings and schedules.

4. Testing, Commissioning, and Balancing

- Perform comprehensive **testing and commissioning** of all MEP systems and visual inspection for ID works.
- Conduct required system tests (e.g., pressure tests for plumbing and chilled water systems, insulation resistance tests for electrical systems, smoke tests for ducts).
- Provide **calibration certificates** for all testing equipment used.
- Submit test and commissioning reports with pictorial and documentary evidence.

5. Technical Team Assignment

- Assign a dedicated project management and technical team, including:
    - Project Manager
    - MEP Engineers (Mechanical, Electrical, Plumbing)
    - Interior Designer / Architect
    - QA/QC Engineer
    - Safety Officer

The team shall remain on-site throughout execution.

6. Reporting and Progress Monitoring

- Prepare and submit the following throughout the project period:
    - Daily field reports
    - Weekly and monthly progress reports
    - Material inspection reports
    - Requests for inspection and approval

7. Post-Handover Documentation and Training

- Submit comprehensive documentation for all MEP and ID systems, including:
  - Operation & Maintenance (O&M) Manuals
  - As-built drawings
  - Warranties and certificates
  - Commissioning and test reports
  - Training materials
  - Spare parts lists
- Conduct **hands-on training** for client personnel on operation and maintenance procedures for all systems.

8. General & Additional Requirements (Civil & MEP)

- Ensure full compliance with design intent, coordination among disciplines, and adherence to codes and standards.
- Prepare shop drawings based on the GFC layout, and need to be approved by the AUW technical team and consultant prior to commencement of execution.
- Submit the actual execution schedule, maintenance schedule taking into account both imported and local materials.
- Prepare documentation works including as-built drawings and handover documents, all types of calculation in compliance with relevant codes upon completion of execution.
- Submit material samples catalogue based on the BOQ brand list for approval by the AUW technical team and consultant.
- Manage on-site storage for imported and local materials.
- Include if any necessary items (i.e, electrical, plumbing, ID, metal framing, rain screening canopy etc.) which is not included in the supporting BOQ, technical specifications & GFC layout should be considered in the shop drawings & need to be approved by the consultant & technical experts of AUW before execution.
- Execution works must be carried out in accordance with the approved shop drawings & necessary calculations.
- All foreign and local items must undergo factory inspection either locally or abroad by the engineers, consultant, and client prior to shipment or delivery.
- The contractor will perform the generator installation and termination to facilitate the testing and commissioning and all necessary internal electrical terminations and connections between distribution boards, equipment, and control systems with their own cost.
- Assign a dedicated technical team/engineers (i.e, Project Manager, Project Engineer, Safety Officer etc.) to be continuously available during execution.
- Ensure the quality of execution meets all compliance and code requirements.
- Prepare and submit all necessary supporting documents such as daily field reports, monthly progress reports, materials inspection reports, check list, test related reports say, pressure test report of plumbing system, thermography & insulation test report of electrical distribution boards, megger test report of power cables and requests for inspection throughout the execution period.
- All testing equipment's must have a valid calibration certificate.
- Prepare post-handover documents for Electrical, and Plumbing (MEP) systems include Operation & Maintenance (O&M) Manuals, as-built drawings, warranties, commissioning reports, test certificates, training manuals, and spare parts lists for all installed systems.
- The attic stock should be calculated as 2% of the total quantity of materials installed, to be provided after project handover.
- During execution, if AUW identifies that any representative assigned by the contractor is not qualified, AUW reserves the right to require a replacement.
- During execution, if any core cutting is required, the contractor shall be responsible for any leakage that occurs after the plumbing work is completed. The contractor must ensure that all core cutting is properly sealed and leak-proof.

DRY WALL PARTITION, GYPSUM FALSE CEILING & BLINDS

- **Once the contract is awarded and prior to execution of work:**

- The contractor shall submit a material sample board and obtain approval from the Client/Consultant.
- The contractor shall submit a detailed work schedule with WBS (Work Breakdown Structure) and resource plan (preferably in bar chart format).
- The contractor shall submit **three (3) sets of shop drawings (A1 size)**, including color images of approved samples. All electrical elements such as switches, sockets, and lighting provisions must be clearly indicated with detailed dimensions.
  No work shall commence without prior approval of the shop drawings.
- The contractor shall submit a detailed **Work Method Statement (WMS)** for approval.
- All necessary **material test reports** shall be submitted, and the contractor shall arrange a factory visit if required by the Client/Consultant.
- The contractor must deploy **qualified technical personnel** (Engineers/Architects) and supervisors at site.
- If the Client/Consultant finds any technical personnel unsuitable, the contractor shall replace them immediately upon notice.
- The **RCP (Reflected Ceiling Plan)** must be coordinated with the **lighting layout**, ensuring necessary provisions for fixtures are made without damaging the ceiling.
- The contractor shall submit a **Request for Information (RFI)** with a minimum lead time of **two weeks** for consultant feedback.
- The contractor must comply with all **EHS (Environment, Health & Safety)** policies and standards.
- Any **substandard work**, use of **unapproved materials**, or **non-compliance with QC standards** will result in a **hefty penalty**, deducted from the R/A bill against the issued NCR (Non-Conformance Report).

TILES / MARBLE / GRANITE WORK

- **Once the contract is awarded and prior to execution of work:**
- The contractor shall submit material samples for approval from the Client/Consultant.
- The contractor shall submit a detailed work schedule with WBS and resource plan (recommended bar chart).
- The contractor shall submit **three (3) sets of shop drawings (A1 size)**, including color images of approved samples.
  No work shall commence without approval of the shop drawings.
- The contractor shall submit a detailed **Work Method Statement (WMS)** for approval.
- All necessary **material test reports** shall be submitted, and the contractor shall arrange factory visits if required by the Client/Consultant.
- The contractor must deploy **qualified technical personnel** (Engineers/Architects) and supervisors.
- If any technical personnel are deemed unsuitable by the Client/Consultant, they must be replaced immediately.
- The contractor shall submit an **RFI** (Request for Information) for drawings/decisions with at least **two weeks' lead time** for consultant feedback.
- Compliance with **standard EHS policies** is mandatory.
- The contractor must maintain the site in a **neat and clean condition**. Debris shall be disposed of at designated areas, and a **separate team** must be deployed for curing works.
- Any **substandard work**, use of **unapproved materials**, or **non-compliance with QC policies** will attract a **hefty penalty**, deducted from the R/A bill against the issued NCR.

METAL & RAILING WORK

- **Once the contract is awarded and prior to execution of work:**
- The contractor shall submit material samples for Client/Consultant approval.
- The contractor shall submit a detailed work schedule with WBS and resource plan (recommended bar chart).
- The contractor shall submit **three (3) sets of shop drawings (A1 size)**, including color images of approved samples.
  No work shall commence without approval of the shop drawings.
- The contractor shall submit a detailed **Work Method Statement (WMS)**.
- All necessary **material test reports** shall be submitted, and factory visits shall be arranged if required by the Client/Consultant.
- Qualified **technical staff and supervisors** must be deployed.
- Any unsuitable personnel identified by the Client/Consultant must be replaced immediately.
- The contractor shall submit **RFI** with at least **two weeks' lead time** for consultant response.

- Compliance with **EHS standards** is mandatory.
- Any **substandard or unapproved work** will result in a **penalty** deducted from the R/A bill against the NCR.
- When fixing metal parts to **RCC structures**, extreme care shall be taken. Any damage shall be properly repaired using **non-shrink grout** (Berger / Fosroc / BASF or equivalent).

WATERPROOFING WORK

- **Once the contract is awarded and prior to execution of work:**
- The contractor shall submit material samples for Client/Consultant approval.
- The contractor shall submit a detailed work schedule with WBS and resource plan (recommended bar chart).
- The contractor shall submit a detailed **Work Method Statement (WMS)**.
- All required **material test reports** shall be submitted, and factory visits arranged as per Client/Consultant request.
- Qualified **technical personnel** (Engineers/Architects) and supervisors must be deployed.
- Unsuitable personnel, if identified, must be replaced immediately upon notice.
- **RFI** must be submitted with a **two-week lead time** for consultant review.
- Contractor must comply with **EHS standards**.
- Any **non-compliance**, **substandard work**, or use of **unapproved materials** will result in a **penalty** deducted from the R/A bill against the NCR.
- The contractor must conduct a **water leakage test**, and the test report shall be attached during **R/A bill submission**.

DOOR WORKS

- **Once the contract is awarded and prior to execution of work:**
- The contractor shall submit material samples (wood, door hardware, etc.) for Client/Consultant approval.
- The contractor shall submit **three (3) sets of shop drawings (A1 size)** with color images of approved samples.
  No work shall commence without approval of the shop drawings.
- The contractor shall submit a detailed **work schedule** with WBS and resource plan (recommended bar chart).
- The contractor shall submit a detailed **Work Method Statement (WMS)**.
- Necessary **material test reports** shall be submitted, and factory visits arranged if required by the Client/Consultant.
- Qualified **technical personnel** (Engineers/Architects) and supervisors must be deployed.
- If any personnel are found unsuitable, they must be replaced immediately upon notice.
- **RFI** shall be submitted with a **minimum two-week lead time** for consultant response.
- Compliance with **EHS standards** is mandatory.
- Any **substandard work**, **use of unapproved materials**, or **violation of QC standards** will result in a **penalty** deducted from the R/A bill against the issued NCR

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Summary of Qualification of Tenderers

The Applicant must meet the following qualification criteria:

1. A minimum of **Ten (10) years** of experience in the **construction works** as Prime Contractor or Subcontractor or Management Contractor.
2. Minimum specific experience of completing at least **2 (two) civil works** contracts, each valued at not less than **BDT 20 (twenty) crore**, within the last **3 (three) years** as Prime Contractor, Subcontractor, or Management Contractor under Government, Semi-Government, Autonomous Bodies or INGO in Bangladesh.
3. Work experience in public university/institute construction work will be preferred.
4. The average annual construction turnover shall be greater than **Tk. 45 (Forty-Five) crore** over the **best 3 (three) years** in the last 5 (five) years. Only Payment received Certificates for construction works, issued by relevant Procuring Entity (ies) will be considered as construction turnover.
5. Last 3 (three) years Audited Balance Sheet.
6. The minimum amount of liquid assets, i.e., working capital or credit line(s), of the Tenderer shall be **Tk. 7.50 (Seven Point Five Zero) crore**.
7. Proven reputation as a constructor in Government, Semi-Government or Autonomous Body, supported by a detailed company profile, client list, and work accomplishment certificates.
8. The applicant must not have any record of contract non-performance in the **last 5 years** from the RFP publication date.
9. All pending litigation must not exceed **15% of the applicant's net worth**.
10. Applicants must demonstrate: Relevant **professional and technical qualifications, Managerial capability,** A **reliable reputation** for contract performance, Adequate and **skilled personnel.**
11. Other qualification criteria as stated in the Instruction to Applicants (ITA) and Application Data Sheet (ADS) of the Pre-qualification Documents, including having First Class Contractor enlistment in Government/Corporation organizations or acknowledged reputation as a Contractor in the Private Sector.
12. Up-to date **ABC category Contractor and Supervisory License** from Electricity Licensing Board, Government of Bangladesh.
13. Applicants must have access to the **necessary equipment and physical facilities** to perform the work, either by: **Owning** the equipment; having **proven access** through a **contractual arrangement** (e.g., lease or hire); Or having **assured access** to such equipment for the required duration. All required equipment must be in **full working condition**.

(Years counting backward from the date of publication of RFP in the newspaper)

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Section 1. Instructions to Applicants

1. Interpretation 1.1 Throughout this qualification Document:

(a) the term **"in writing"** means communication written by hand or machine duly signed and includes properly authenticated messages by facsimile or electronic mail;

(b) if the context so requires, **singular** means plural and vice versa;

(c) **"day"** means calendar days unless otherwise specified as working days;

(d) **"Qualification Document"** means the Document provided by the Employer to an Applicant as a basis for preparation of the Application; and

(e) **"Application"** depending on the context, means an application submitted by an Applicant for Qualification to participate in the subsequent Tenders and to perform the Contract, in response to an Invitation for Qualification.

2. Corrupt, Fraudulent, Collusive or Coercive Practices 2.1 It is the Employer's policy to require that Employer's staff, as well as Applicants/Tenderers, suppliers, and contractors and their subcontractors observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the Authority-.

(a) defines, for the purposes of this provision, the terms set forth below as follows:

(i) **"corrupt practice"** is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

(ii) "fraudulent practice" is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;

(iii) "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

(iv) "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

(v) "obstructive practice" is (aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or (bb) acts intended to materially impede the exercise of the Authority's inspection and audit rights provided.

(b) will reject a proposal for award if it determines that the Tenderer recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;

(c) will sanction a firm or individual, including declaring ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for, or in executing, a contract.

3. Source of Funds

3.1 The Employer will arrange fund towards the cost of the project named in the ADS. The Employer intends to apply a portion of that funds to eligible payments under the contract(s) resulting from the Tendering for which this prequalification is conducted.

4 Eligible Applicants

4.1 This Invitation for Qualification is open to all potential Applicants from all countries, except Israel. An Applicant will be eligible if it is a citizen, or is constituted, registered and operates in conformity with the provisions of the laws of that country.

4.2 Applicants may be a physical or juridical individual or body of individuals, or company, association or any combination of them in the form of a Joint Venture, Consortium or Association (JVCA) invited to take part in public procurement or seeking to be so invited or submitting an Applicant in response to an Invitation for Qualification.

4.3 Applicants shall have the legal capacity to enter into the Contract under the Applicable Law.

4.4 Applicants and all parties constituting the Applicant shall not have a Conflict of Interest. Applicants in its own name or its other names or also in the case of its Persons in different names shall not be under a declaration of ineligibility for corrupt, fraudulent, collusive or coercive practices.

4.5 Applicants with a poor performance, consistent history of litigation or arbitration awards against it shall not be eligible for Qualification.

4.6 Applicants shall not be insolvent, be in receivership, be bankrupt, be in the process of bankruptcy, be not temporarily barred from undertaking business and it shall not be the subject of legal proceedings for any of the foregoing.

4.7 Applicants shall have fulfilled its obligations to pay taxes and social security contributions under the provisions of laws and regulations of the country of its origin.

4.8 Applicants shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer will reasonably request.

4.9 Applicants' requirements for eligibility will extend, as applicable, to each JV partner and Specialist Subcontractor proposed by the Applicant.

5 Eligible Materials, Equipment and Associated Services

5.1 All materials, equipment and associated services to be supplied under the Contract are from eligible sources, unless their origin is from Israel.

5.2 For the purposes of this Clause, **"origin"** means the place where the Materials and Equipment's are mined, grown, cultivated, produced or manufactured or processed, or through manufacturing, processing, or assembly, another commercially recognized new product results that differs substantially in its basic characteristics from its components or the place from which the associated services are supplied.

6 Site Visit

6.1 Applicants are advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the Application, submission of subsequent Tender and entering into a contract.

6.2 Applicants and any of its personnel or agents will be granted permission by the Employer to enter into its premises and lands for the purpose of such visit, but only upon the express condition that the Applicant, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.

6.3 The costs of visiting the Site shall be at the Applicants' own expense.

7 Qualification: General

Qualification Document

7.1 The Sections comprising the Qualification Document are listed below, and should be read in conjunction with any Addendum issued under ITA Clause 11.

- Section 1 Instructions to Applicants (ITA)
- Section 2 Application Data Sheet (ADS)
- Section 3 Application Forms
- Section 4 Scope of Works

7.2 Applicants are expected to examine all instructions, forms, terms, and specifications in the Qualification Document as well as in Addendum to Qualification, if any.

8 Clarification of Qualification Document

8.1 Applicants requiring any clarification of the qualifications Document shall contact the Employer in writing at the Employer's address indicated in the RFP before **two-third** of the time allowed for preparation and submission of Application elapses.

8.2 Non-performance of a contract shall not occur within the last years, prior to the deadline for Application submission based on all information on fully settled disputes or litigation.

9 Litigation History

9.1 For the purpose, a fully settled dispute or litigation is one that has been resolved in accordance with the Dispute Resolution Mechanism under the respective contract and where all appeal instances have been exhausted.

9.2 For a Joint Venture under ITA Sub Clause 18.1, the precise minimum requirements of Leading Partner and other partners shall be as specified in the ADS.

10 Joint Venture, Consortium or Association (JVCA)

10.1 Applicants may participate in the qualification process and subsequent procurement proceedings by forming a Joint Venture, Consortium or Associations (JVCA) or alternately with the intent to enter into such an agreement supported by a Letter of Intent.

10.2 The JV agreement, indicating at least the parts of the Works to be executed by the respective partners, shall be legally entered into case-by-case in the Applicant's Leading Partner's country of origin, as specified in the ADS, duly signed by all legally authorized representatives of the Persons who are parties to such agreement.

10.3 Applicants, as an alternate to ITA Sub Clause 9.2, may intend to enter into a JV agreement case-by-case in the form of a Letter of Intent along with the proposed agreement, indicating at least the parts of the Works to be executed by the respective partners, duly signed by all partners of the intended JV and authenticated by an authority of the Applicant's Leading Partner's country of origin, as stated in the ADS, with the declaration that the partners will execute the Joint Venture agreement in the event the Applicant, in the first place pre-qualified and then successful in the subsequent Tender.

10.4 Applicants shall submit the Letter of Intent and the proposed JV agreement along with the Application.

10.5 For a Joint Venture under ITA Sub Clause 9.1, the precise minimum qualification requirements of Leading Partner and other partners shall be as specified in the ADS.

10.6 In cases where a JV partner's, personnel capacity, equipment capacity and financial capacity individually fulfils the precise minimum qualifying requirement of that particular component as specified, capacities of such partner(s) in the JV will be combined together for summation to determine the total precise minimum qualifying requirements criterion of that JV as stated under ITA Sub Clause 9.5.

10.7 Each partner of the JV shall be jointly and severally liable for the execution of the Contract, all liabilities and ethical and legal obligations in accordance with the Contract terms.

10.8 The JV shall nominate a Representative (partner-in-charge) who shall have the authority to conduct all business for and on behalf of any and all the partners of the JV during the tendering process and, in the event the JV is awarded the Contract, during contract execution including the receipt of payments for and on behalf of the JV.

10.9 The composition or the constitution of a JV once formed shall not be allowed to be altered prior to signing of the Contract.

10.10 Alteration of partners to the composition or constitution at a date later than the signing of the Contract during execution shall be allowed by the Employer only when any of such partners is found to be incompetent or has serious difficulties which may impact the overall implementation of the proposed Works, where the incoming partner shall require to have qualifications higher than that of the outgoing partner.

10.11 Each partner of the JV shall complete the JV Partner Information (Form F3) for submission with the Application.

11 Contents of Application

11.1 The Application prepared by the Applicants shall comprise the following:

11.1.1 Application Submission Letter (**Form F-1**);

11.1.2 Applicant Information (**Form F-2**);

11.1.3 documents demonstrating that they are enrolled in the relevant professional or trade organizations registered in their country of origin;

11.1.4 written confirmation authorizing the signatory of the Application to commit the Applicant;

11.1.5 documents confirming the legal capacity stating that there are no existing orders of any judicial court that prevents either the Applicant or employees of that Applicant subsequently entering into or signing a Contract with the Employer;

11.1.6 documents confirming that the Applicant is not insolvent, in receivership, bankrupt or in the process of bankruptcy, temporarily barred from undertaking business and shall not be the subject of legal proceedings for any of the foregoing;

11.1.7 documents confirming that all claims, arbitration or other litigation cases have been satisfactorily resolved, and if not, they shall have no serious negative impact on the financial capacity of the Applicant;

11.1.8 documents confirming that the Applicant has fulfilled its obligations to pay taxes and social security contributions under the provisions of laws and regulations of its country of origin as a proof of fulfilment of taxation obligations;

11.1.9 documents establishing the Applicant's eligibility to perform the contract;

11.1.10 documents establishing the origin of all Materials, Equipment and services to be supplied under the Contract, as stated under ITA Clause 26;

11.1.11 documents establishing the minimum qualifications of the Applicant required to be met for due performance of the Works and physical services under the contract;

11.1.12 any other document as specified in the ADS.

11.2 In addition to the requirements stated under ITA Sub Clause 9.1, Applications submitted by a JV or proposing a Specialized Subcontractor shall include:

11.2.1 Joint Venture Agreement legally entered into in the Applicant's Leading Partner's country of origin, by all partners, as stated under ITA Sub Clause 18.2;

Or,

11.2.2 Letter of Intent along with the proposed agreement duly signed by all partners of the intended JV and authenticated by an authority of the Applicant's Leading Partner's country of origin with the declaration that it will execute the Joint Venture Agreement in the event the Applicant and the Tenderer is successful in the subsequent Tender, as stated under ITA Sub Clause 18.3;

11.2.3 the JV Partner Information (**Form F-3**), as stated under ITA Sub Clause 18.11;

11.2.4 the Specialist Subcontractor Information (**Form F-4**), as stated under ITA Sub Clause 19.6.

12 **Documents Establishing the Applicant's Qualification**

12.1 Applicants shall complete and submit the Applicant Information (**Form F-2**) and shall include documentary evidence, as applicable to satisfy the following:

12.1.1 details on the financial standing of the Tenderer, such as profit and loss statements and corresponding auditor's report establishing the liabilities and assets;

12.1.2 details of general experience in Fire management works on case-by-case procurement proceedings performed for each of the last years along with the sums, dates and recipients;

12.1.3 details of specific experience in construction works of similar nature and size on case-by-case procurement proceedings performed for each of the last years along with the sums, dates and recipients;

12.1.4 details of average annual turnover for a period;

12.1.5 details of existing commitments and works to assess the minimum Tender Capacity;

12.1.6 details of adequacy of working capital for the subsequent Tender i.e., access to line(s) of credit and availability of other financial resources;

12.1.7 details of numbers of technical and administrative personnel along with their qualification and experience proposed for the subsequent Tender;

12.1.8 details of Applicant's technical facilities, available major construction equipment's, measures for ensuring quality such as, ISO certification and design, research and development facilities proposed to carry out the Contract;

12.1.9 details of Procuring Entities who may be contacted, if necessary, by the Employer; and authority to seek references from the Applicant's bankers or any other sources.

12.2 Applicants, if applying as an existing or intended JV, shall submit documentary evidence to establish its qualifications as stated under ITT and, in particular, it shall submit an affidavit nominating one of the JV partners as the REPRESENTATIVE (partner-in-charge) who shall have the authority to conduct all business for and on behalf of any and all the partners of the JV during the tendering process and, in the event the JV is awarded the Contract, during contract execution including the receipt of payments for and on behalf of the JV.

13 Bank Guarantees

13.1 Performance Bank Guarantee Clause

13.1.1 The successful bidder, upon receiving the Notification of Award (NoA), shall furnish an unconditional and irrevocable **Performance Bank Guarantee** in favor of *Asian University for Women (AUW)*.

13.1.2 The amount of the Performance Bank Guarantee shall be **ten percent (10%) of the total Contract Price**, issued from any scheduled bank operating in Bangladesh and acceptable to AUW.

13.1.3 The Performance Bank Guarantee shall remain **valid until twenty-eight (28) days after the completion of the Defects Liability Period** or final acceptance of the works, whichever is later.

13.1.4 Failure to submit the Performance Bank Guarantee within the stipulated time may result in the cancellation of the award and forfeiture of any right to the contract.

13.1.5 The Performance Bank Guarantee shall be returned to the Contractor upon satisfactory completion of all contractual obligations and submission of all completion documents as per AUW's satisfaction.

13.1.6 AUW reserves the right to **invoke the Performance Bank Guarantee**, in whole or in part, in the event of the Contractor's default, non-performance, or breach of any contractual terms.

13.2 Advance Payment Bank Guarantee (if applicable)

13.2.1 If the Employer provides any **advance payment** to the Contractor, the Contractor shall furnish an **unconditional and irrevocable bank guarantee** for the full amount of the advance, valid until the advance is fully recovered.

13.2.2 The Employer may encash the bank guarantee in the event the Contractor **fails to utilize the advance for the purpose of contract execution**.

13.3 Invocation of Bank Guarantee

13.3.1 The Bank Guarantee shall be **payable on demand** and **irrevocable**, and the Employer's written statement regarding Contractor's default shall be **conclusive** for the purpose of encashment.

13.3.2 The Bank Guarantee shall remain valid regardless of any disputes under the Contract, until it is **released in writing by the Employer**.

14 Liquidated Damages

14.1 If the Contractor fails to complete the Works or any part thereof within the time specified in the Contract, the Contractor shall be liable to pay **liquidated damages** at the rate of **1% (one percent) of the Contract Price per week** of delay, unless otherwise specified in the Contract.

14.2 The total amount of liquidated damages shall not exceed **10% (ten percent) of the Contract Price**.

14.3 Liquidated damages shall be **deducted from any payments due to the Contractor**, including the Performance Security, without prejudice to any other rights of the Employer under this Contract.

14 Termination

14.1**Termination for Default**

14.1.1 If the Contractor:

a. Fails to commence, continue, or complete the Works in accordance with the Contract; or

b. Fails to remedy any breach, delay, or defect within the period specified in a written notice from the Employer; the Employer may, at its sole discretion, **terminate the Contract for default**, in whole or in part.

14.1.2 Upon termination for default, the Employer shall have the right to:

a. **Cancel the Contract** immediately;

b. **Engage another Contractor** to complete the Works at the risk and cost of the defaulting Contractor;

c. **Recover from the Contractor all additional costs, losses, and damages** incurred as a result of the Contractor's

failure, including legal and administrative expenses;

d. **Forfeit any Performance Security or other guarantees** provided by the Contractor;

e. **Restrict or debar the Contractor** from future contracts with the Employer for a period as deemed appropriate.

14.1.3 Termination under this Clause shall be **without prejudice to any other remedies** available to the Employer under the Contract or applicable law, including claims for additional damages or specific performance.

14.2 **Termination for Convenience**

14.2.1 The Employer may, at any time, **terminate the Contract, in whole or in part, for convenience**, without assigning any reason.

14.2.2 In such cases, the Contractor shall be entitled to payment for:

a. Work executed up to the date of termination; and

b. Reasonable costs incurred for materials or commitments directly related to the terminated portion, but **shall not be entitled to any loss of profit or unperformed work**.

14.3 **Termination for Insolvency or Bankruptcy**

14.3.1 If the Contractor becomes **insolvent, bankrupt, or enters into receivership or liquidation**, the Employer may **terminate the Contract immediately**.

14.3.2 The Employer shall have the right to **recover costs incurred to complete the Works** from any outstanding payments or Performance Security.

14.4 **Termination for Force Majeure**

14.4.1 If a **Force Majeure event** persists for a period exceeding [insert period, e.g., 90 days], the Employer or Contractor may terminate the Contract by giving written notice.

14.4.2 Upon termination due to Force Majeure:

a. Neither party shall be liable for damages resulting directly from the termination;

b. The Contractor shall be paid for all work executed up to the date of termination.

14.5 **Acceleration and Material Breach**

14.5.1 In case of delays or partial non-performance, the Employer may issue a **directive for accelerated performance**.

14.5.2 Failure to comply with the acceleration directive shall constitute a **material breach**, justifying immediate termination under Clause 14.1

14.6 **Effect of Termination**

14.6.1 Termination of the Contract under any of the above clauses shall be **without prejudice to any other rights or remedies** of the Employer under the Contract or applicable law.

14.6.2 All obligations of the Contractor regarding **confidentiality, indemnity, and warranty** shall survive termination.

14.7 **Acceleration of Completion**

14.7.1 In the event of any delay or failure to accomplish the task, the Employer may issue a **written directive for accelerated performance**, specifying the revised timeline and milestones.

14.7.2 Failure to comply with the acceleration directive shall be treated as a **material breach**, justifying immediate termination and enforcement of ITA 14.2.

15. Descope and Backcharge

15.1 Descope of Work

15.1.1 The Employer reserves the right to **descope, reduce, or modify the scope of work** under the Contract, in whole or in part, by giving written notice to the Contractor.

15.1.2 Upon receiving a descope notice, the Contractor shall:

a. Immediately **stop work on the descoped items**;

b. Submit a **revised work plan, cost estimate, and schedule** within 7 working days; and

c. **Deliver any completed work, materials, or documentation** related to the descoped items.

15.1.3 The Employer shall **adjust the Contract Price** proportionally to reflect the descoped work. Such adjustment shall include:

a. Reduction of contract payment corresponding to the value of descoped items; and

b. Recovery of any **unapproved costs incurred by the Contractor** on the descoped items.

15.2 Backcharge

15.2.1 The Employer may **backcharge the Contractor** for costs or damages incurred due to:

a. Non-performance, defective work, or delay caused by the Contractor;

b. Failure to comply with specifications, drawings, or contractual obligations; or

c. Additional work or remedial work carried out by the Employer or third parties to complete the Contractor's scope.

15.2.2 Backcharge amounts shall be:

a. **Deducted from any payment due** to the Contractor, including Performance Bank Guarantee; or

b. **Payable by the Contractor directly** within 15 days of written notice.

15.2.3 The Contractor shall **not be entitled to any extension of time, additional payment, or claim** for costs related to the backcharged items.

15.3 Procedure for Issuing Descope or Backcharge Notices

15.3.1 The Employer shall issue **written notice specifying**:

a. The descoped work or backcharged items;

b. The reason for descope or backcharge;

c. The monetary amount, if applicable; and

d. The time for compliance or payment.

15.3.2 The Contractor shall **acknowledge receipt of the notice** and comply with all instructions without delay.

15.4 Survival of Rights

All rights of the Employer to descope, backcharge, recover costs, or enforce compliance under this Clause shall **survive the termination or completion of the Contract**.

16 Engineer's Instructions

The Engineer may issue to the Contractor (at any time) instructions which may be necessary for the execution of the works, all in accordance with the Contract. The Contractor shall only take instructions from the Engineer or from the Engineer's Representative (if appointed) or an assistant to whom the appropriate authority to give instruction has been delegated under Sub-clause 3.4 (Delegation by the Engineer).

Subject to the following provisions of this Sub-clause, the Contractor shall comply with the instructions given by the Engineer or the Engineer's Representative (if appointed) or delegated assistant, on any matter related to the Contract.

If an instruction states that it constitutes a Variation, Sub-Clause 13.3.1 (Variation by instruction) shall apply.

If not so stated and the Contractor considers that the instruction:

(a) Constitutes a Variation (or involves work that is already part of an existing Variation); or
(b) does not comply with applicable laws or will reduce the safety of the works or is technically impossible.

the Contractor shall immediately, and before commencing any work related to the instruction, give a Notice to the Engineer with reasons. It the Engineer does not respond within 7 days after receiving this Notice, by giving a Notice confirming, reversing or varying the instruction, The Engineer shall be deemed to have revoked the instruction. Otherwise the Contractor shall comply with and be bound by the rems of the Engineer's response.

17 Defects and Rejection

If, as a result of an examination, inspection, measurement or testing, any plant, Materials, Contractor's design (if any) or workmanship is found to be defective or otherwise not in accordance with the Contract, the Engineer shall give a Notice to the Contractor describing the item of Plant, Materials, design or workmanship that has been found to be defective. The Contractor shall then promptly prepare and submit a proposal for necessary remedial work.

The Engineer may Review this proposal, and may give a notice to the Contractor stating the extent to which the proposed work, if carried out, would not result in the Plant, Materials, Contractor's design (if any) or workmanship complying with the Contract. After receiving such a Notice, the Contractor shall promptly submit a revised proposal to the Engineer. If the Engineer gives no such notice within 14 days

after receiving the Contractor's proposal (or revised proposal), The Engineer shall be deemed to have given a notice of No-objection.

If the Contractor fails to promptly submit a proposal (or revised proposal) for remedial work, or fails to carry out the proposed remedial work to which the engineer has given (or is deemed to have given) a notice or No-objection, the Engineer may:

(a) instruct the Contractor under sub-paragraph (a) and/or (b) of Sub-clause 7.6 (Remedial work); or
(b) reject the plant, materials, Contractors design (if any) or workmanship by giving a Notice to the Contractor, with reasons, in which case sub-paragraph (a) of Sub-Clause 11.4 (Failure to remedy defects) shall apply.

After remedying defects in any plant, materials, design (if any) or workmanship, if the Engineer requires any such items to the retested, the tests shall be repeated in accordance with Sub-Clause 7.4 (Testing by the Contractor) at the Contractor's risk and cost. It the rejection and retesting cause the Employer to incur additional costs, The Employer shall be entitled Subject to Sub-Clause 20.2 (Claims for payment and/or EOT) to payment of these costs by the Contractor.

18 Employer's Entitlement to Remedy Default

If the Contractor fails to execute any part of the Works, to remedy a defect, or to complete outstanding work within a reasonable time following notice from the Employer, the Employer shall be entitled to carry out all necessary work at the Contractor's cost by employing other persons. All necessary costs so incurred shall constitute a debt due from the Contractor to the Employer, recoverable by deduction from payments due or otherwise; provided always that the Contractor's liability and obligations under the Contract shall not be affected or diminished by the exercise of this right by the Employer.

19 DISPUTES

In no event shall AUW be liable to the Contractor for payments for any extra work the Contractor performs in addition to that required under the Statement of Work above unless the Contractor performs such work by written directive of AUW and unless the contract is amended accordingly. No officer, director, employee, or agent of AUW is authorized to direct any extra work by oral order. In the event of any claims or disputes arising from or relating to this Purchase Order, the parties shall use their best efforts to settle the claims or disputes. To this effect, they shall consult and negotiate with each other in good faith and, recognizing their mutual interests, attempt to reach a just and equitable solution satisfactory to both parties. If they fail to reach such a solution within THIRTY (30) days, either Party may refer the matter to arbitration, as per the law of Bangladesh, which shall be the exclusive method of resolving such disputes. The arbitration shall be conducted in Chattogram, Bangladesh. The results of arbitration shall be final and binding on the Parties and shall be in lieu of any other remedy.

ASIAN UNIVERSITY FOR WOMEN

Section 2. Application Data Sheet

ITA Clause	Amendments of, and Supplements to, Clauses in the Instructions to Applicants
	RFP IDENTIFICATION NO: _____
A. General	
ITA 1.1	The Employer is ***Asian University for Women represented by Deputy Project Director, Asian University for women, 20/A, M.M Ali Road, Chattogram-4000, Bangladesh.***
	The Name of the Subsequent Tender is: ***Interior Finishing works for three storied with a semi-basement Academic Building for Asian University for women at Pahartoli, Chattogram.*** Brief Description of the Works ***The work will include but will not be limited to the following:*** ***The Works consist of Construction of masonry and wooden partition walls, wall finishing, wooden and metal doors, False ceiling, Floor finishing, painting, water supply and bath room fitting and fixtures, etc. detailed in drawings*** Application Ref:..... Package No:..... *[if there is more than one(1) lot, individual lots are to be identified]*
ITA3.1	The source of public funds is: ***AUW own fund.***
ITA3.3	The name of the Development Partner is: ***None***
ITA6.1	Materials, Equipment's and associated services from the following countries are not eligible: ***Israel***

B. Qualification Criteria	
ITA13.1	Non-performance of a contract shall not occur within the last ***5 (five)*** years. [*years counting backward from the date of publication of RFP]*
ITA13.2	All pending litigation shall in total not represent more than ***15 (fifteen)*** percent of the Applicant's net worth.
ITA 14.1 (a)	The minimum number of years of general experience of the Tenderer in the construction works as Prime Contractor or Subcontractor or Management Contractor shall be **10 (Ten) years.** [*years counting backward from the date of publication of RFP]*
ITA14.1 (b)	Minimum specific experience of completing at least **2 (two) civil works** contracts, within the last **3 (three) years** as Prime Contractor, Subcontractor, or Management Contractor under Government, Semi-Government, Autonomous Bodies or INGO in Bangladesh. *[years counting backward from the date of publication of RFP.]*
ITA 14.1(c)	A satisfactory completion of civil works under at least **2 (two) contracts**, each with a minimum value of BDT 20 (twenty) crore, within the last **3 (three) years** shall be required. *[years counting backward from the date of publication of RFP.]*

<table>
<tr><td>ITA 15.1</td><td>The required average annual construction turnover shall be greater than Tk. 45 (Forty-Five) crore over the best 3 (three) years in the last 5 (five) years.
[years counting backward from the date of publication of RFP.]</td></tr>
<tr><td>ITA 15.1(c)</td><td>The minimum amount of liquid assets or working capital or credit facilities of the Applicant shall be greater than BDT 7.50 (seven point five zero) crore on a day after publication of RFP.</td></tr>
<tr><td>ITA 16.1(a)</td><td>A Project Manager shall have the following qualifications and experience:
<table>
<tr><th>No</th><th>Position</th><th>Total Works Experience (years)</th><th>In Similar Works Experience(years)</th></tr>
<tr><td>1.</td><td>Project Manager</td><td>15 yrs</td><td>10 yrs</td></tr>
</table></td></tr>
<tr><td>ITA 16.1(b)</td><td>The minimum number of Engineers with qualifications and experience shall be as follows:
<table>
<tr><th>No.</th><th>Position</th><th>Total Works Experience (years)</th><th>In Similar Works Experience (years)</th></tr>
<tr><td>1.</td><td>Project Engineer, B.Sc. Engr. (Civil)</td><td>Min. 10 yrs</td><td>Min. 7 yrs</td></tr>
<tr><td>2.</td><td>Site Engineer, B.Sc. Engr. (Civil)</td><td>Min. 7 yrs</td><td>Min. 5 yrs</td></tr>
<tr><td>3.</td><td>Project Engineer, B,Sc Engr. (MEP)</td><td>Min. 8 yrs</td><td>Min. 5 yrs</td></tr>
</table></td></tr>
<tr><td>ITA 16.1(c)</td><td>Other key staff with qualifications and experience shall be as follows[state requirements]:
<table>
<tr><th>No.</th><th>Position</th><th>Total Works Experience (years)</th><th>In Similar Works Experience (years)</th></tr>
<tr><td>1.</td><td>Material Engineer, Dip-in Engr. (Civil)</td><td>Min. 10 yrs.</td><td>Min. 07 yrs</td></tr>
<tr><td>2.</td><td>Safety Supervisor, Dip-in Engr. (Civil)</td><td>Min. 10 yrs.</td><td>Min. 05 yrs</td></tr>
</table></td></tr>
<tr><td>ITA 17.1</td><td>The Applicant shall own or have proven access to hire or lease of the major equipments to accomplish the tasks, Mention the equipment lists to accomplish the tasks as below:
<table>
<tr><th>No</th><th>Equipment Type and Characteristics</th><th>Minimum Number Required</th></tr>
<tr><td>1.</td><td>Masonry works equipment</td><td>06 sets</td></tr>
<tr><td>2.</td><td>Essential tools & equipment for Carpenter</td><td>06 sets</td></tr>
<tr><td>3.</td><td>Essential tools & equipment for Tiles and stone/granite works</td><td>06 sets</td></tr>
<tr><td>4.</td><td>Essential tools & equipment for small scale metal works</td><td>06 sets</td></tr>
<tr><td>5.</td><td>Generator</td><td>02 nos</td></tr>
<tr><td>6.</td><td>Metal Scaffolding</td><td>2000 square meter</td></tr>
<tr><td>7.</td><td>Essential tools & equipment for Carpenter</td><td>06 sets</td></tr>
</table></td></tr>
<tr><td>ITA 18.2</td><td>In the case the Applicant’s Leading Partner’s country of origin is Bangladesh, the value of non-judicial stamp for execution of the Joint Venture agreement shall be BDT BDT 300 (three hundred) only</td></tr>
<tr><td>ITA 18.3</td><td>In the case the Applicant’s Leading Partner’s country of origin is Bangladesh, the Letter of Intent along with the proposed agreement shall be authenticated by a Notary Public.</td></tr>
</table>

ITA 18.5

The **minimum qualification** requirements of Leading Partner and other Partner(s) of a JV shall be as follows:

ADS Clauses References	Requirements by summation	Requirements for Leading Partner	Requirements for another Partner(s
ITA-14.1(a)	Summation not applicable	Same as stated in ADS	Same as for Leading Partner
ITA-14.1(b)	100%	At least one characteristic	Not applicable
ITA-14.1(c)	100%	At least one characteristic	Not applicable
ITA-15.1(a)	100%	40%	25%
ITA-15.1(b)	100%	40%	25%
ITA-15.1(c)	100%	40%	25%
ITA-16.1(a)	Summation not applicable	To be appointed by lead partner	Not applicable
ITA-16.1(b)	100%	At least one characteristic	Not applicable
ITA-16.1(c)	100%	At least one characteristic	Not applicable
ITA-17.1	100%	At least one characteristic	Not applicable

ITA 19.4	The Employer intends to execute the following specific components of the proposed Works by the Nominated Subcontractor(s): ***None***
ITA 20.1	Domestic Preference ***shall not*** be applicable for eligible National Tenderers
D. Application Preparation	
ITA 23.4	Use of Qualification Document posted in the website ***is not*** permitted for preparation of Applications.
ITA 25.1	The Applicant shall provide with its Application the following additional documents: ***None***

E. Application Submission	
ITA31.1	For ***Application submission purposes*** only, the Employer's address is: For ***Tender submission purposes*** only, the Procuring Entity's address is: TO AUW PROCURMENT COMMITTEE Email address: tender152@auw.edu.bd The deadline for the submission of Applications is: *Time & Date: 2 March 2026 (12:01PM)*

ASIAN UNIVERSITY FOR WOMEN

Section 3. Application Forms

Form	Title
	Application Forms
F – 1	Application Submission Letter
F – 2	Applicant Information
F – 3	JV Partner Information (*if applicable*)
F – 4	Subcontractor Information (*if applicable*)
F – 5	Historical Contract Non-Performance
F – 6	Personnel Information

ASIAN UNIVERSITY FOR WOMEN

Application Submission Letter (Form F-1)

[This letter should be completed and signed by the Authorized Signatory preferably on the Letter-Head Pad of the Applicant]

To: **Date:[dd/mm/yy]**

[Contact Person]

[Name of Employer]

[Address of Employer]

Invitation for Qualification No: ***[indicate RFP No]***

Tender Package No: ***[indicate Package No]***

This Package is divided into the following Number of Lots ***[indicate number of Lot(s)]***

We, the undersigned, apply to be qualified for the referenced Works and Physical Services and declare that:

(a) We have examined and have no reservations to the Qualification Document, issued by you on *[insert date];* including [*state numbers*].

(b) We, including as applicable, any JVCA partner or Specialist Subcontractor for any part of the contract resulting from this Qualification process, have nationalities from eligible countries according to the ITA.
[insert the nationality of the Applicant, including that of all partners in case of a Joint Venture, and the nationality of each already identified subcontractor, if applicable];

(c) we are submitting this Application as a sole Applicant;
or
we are submitting this Application as the partners of a JVCA, comprising the following other partners;

Sl. No	Name of Partner	Address of Partner
1		
2		
3		

or

(e) we, including as applicable any JVCA partner, declare that we are not associated, nor have been associated in the past, directly or indirectly, with a consultant or any other entity that has prepared the design, specifications and other documents in accordance with ITA;

(f) we intend to subcontract an activity or part of the Works, to the following Specialist Subcontractor(s);

Activity or part of the Works	Name of Specialist Subcontractor with Address

(g) we, including as applicable any JVCA partner, confirm that we do not have a record of poor performance, such as abandoning the works, not properly completing contracts, inordinate delays, or financial failure as stated in ITA, and that we do not have, or have had, any litigation against us, other than that stated in the Applicant Information (**Form -2**);

(h) we, including as applicable any JVCA partner, confirm that we do not have a record of insolvency, receivership, bankrupt or being wound up, our business activities were not been suspended, and it was not been the subject of legal proceedings in accordance with ITA;

(i) we, including as applicable any JVCA partner, confirm that we have fulfilled our obligations to pay taxes and social security contributions applicable under the relevant national laws and regulations of our country(s) of origin in accordance with;

(j) we, including as applicable any JVCA partner or Specialist Subcontractor for any part of the contract resulting from this Qualification process, have not been declared ineligible by any International Development Agency or the Government of Bangladesh on charges of engaging in corrupt, fraudulent, collusive or coercive practices in accordance with ITA; orby an act of compliance with a decision of the United Nations Security Council.

(k) furthermore, we are aware of ITA concerning such practices and pledge not to indulge in such practices in competing for or in executing the Contract;

(l) we are not participating as Applicants in more than one Application in this pre-qualification process;

(m) we understand that you may cancel the prequalification process at any time and that you are neither bound to accept any Application that you may receive nor to invite the pre-qualified Applicants to tender for the contract subject of this prequalification, without incurring any liability to the Applicants.

Signature:	*[insert signature of authorised signatory of the Applicant]*
Name:	*[insert full name of signatory with National ID Number]*
In the capacity of:	*[insert capacity of signatory]*

Duly authorized to sign the Application for and on behalf of the Applicant

[If there is more than one (1) signatory, or in the case of a JVCA, add other boxes and sign accordingly]

Attachment 1:

Written confirmation authorizing the above signatory to commit the Applicant and the subsequent Tenderer
[and, if applicable]

Attachment 2:

JV Agreement / Letter of Intent to form JV with draft proposed Agreement

ASIAN UNIVERSITY FOR WOMEN

Applicant Information (Form -2)

[This Form should be completed only by the Applicant, preferably on its Letter-Head Pad]

Invitation for Qualification No: *[indicate IFP No]*

Tender Package No: *[indicate Package No]*

This Package is divided into the following Number of Lots: *[indicate number of Lot(s)]*

1.	**Eligibility Information of the Applicant [According to ITT]**	
1.1	Nationality of individual or country of registration	
1.2	Applicant's legal title	
1.3	Applicant's registered address	
1.4	Applicant's legal status *[complete the relevant box]*	
	Proprietorship	
	Partnership	
	Limited Liability Concern	
	Government-owned Enterprise	
	Others [please describe, if applicable]	
1.5	Applicant's year of registration	
1.6	Applicant's authorized representative details	
	Name	
	National ID number, if any	
	Address	
	Telephone / Fax numbers	
	e-mail address	
1.7	Litigation ITT	
	Information on non-performance of contract and pending litigation furnished in Form ***F-5***	
1.8	Applicant to attach photocopies of the original documents mentioned aside	[All documents required under ITT Clauses]
The following two information are applicable for national Applicants		

1.9	Applicant's Value Added Tax Registration (VAT) Number	
1.10	Applicant's Tax Identification Number(TIN)	

[The foreign Applicants, in accordance with ITT Clause 5, shall provide evidence by a written declaration to that effect to demonstrate that it meets the criterion]

2. Qualification Information of the Applicant [According to ITT Clause]

2.1 General Experience in HVAC Works of Applicant

Start Month Year	End Month Year	Years	Contract No and Name of Contract Name and Address of Employer Brief description of Works	Role of Applicant [Prime/Sub/Management]

2.2 Specific Experience in HVAC Works of Applicant
Completed Contracts of similar nature, complexity and methods/ technology

Contract No **Name of Contract**	[insert reference no] of [insert year] [insert name]		
Role in Contract ***[tick relevant box].***	Prime Contractor	Subcontractor	Management Contractor
Award date **Completion date** **Total Contract Value**	[insert date] [insert date] [insert amount]		
Employer's Name **Address** **Tel / Fax** **e-mail** **Brief description with justifications of the similarity compared to this Employer's requirements**	[state justification in support of its similarity compared to the proposed works]		

2.3 Average annual turnover
[total certified payments received for contracts in progress or completed for each year of works in progress or completed; using selling exchange rate quoted by the source being Bangladesh Bank on the date reported, if applicable]

Year	Amount & Currency	

<table>
<tr><td>2.4</td><td colspan="4">Existing commitments and works
[targeted to be completed by the Intended Completion Date of the proposed works]</td></tr>
<tr><td rowspan="2"></td><td rowspan="2">Name of Contract
Contract No [reference] of [year]
Name of Employer
Contact Address
Tel/fax
e-mail</td><td rowspan="2">Target Completion Date</td><td colspan="2">Value of Existing Commitments and Works</td></tr>
<tr><td>Amount & Currency</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2.5</td><td colspan="4">Financial Resources available to meet the HVAC System cash flow</td></tr>
<tr><td rowspan="3"></td><td>No</td><td>Source of Financing</td><td colspan="2">Amount Available</td></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td>Amount & Currency</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="5">In order to confirm the above statements the Applicant shall submit, as applicable, the documents</td></tr>
<tr><td>2.6</td><td colspan="4">Contact Details [According to ITT]</td></tr>
<tr><td></td><td colspan="4">Name, address, and other contact details of Applicant’s Bankers and other Employer(s) that may provide references, if contacted by this Employer</td></tr>
<tr><td>2.7</td><td colspan="4">Qualifications and experience of key technical and administrative personnel proposed for Contract administration and management [According to ITT]</td></tr>
<tr><td></td><td colspan="2">Position
Name
Years of General Experience</td><td colspan="2">Years of Specific Experience</td></tr>
<tr><td></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td colspan="5">[Tenderer to complete details of as many personnel as are applicable .Each personnel listed above should complete the Personnel Information (Form-6]</td></tr>
<tr><td>2.8</td><td colspan="4">Major Construction Equipment’s proposed to carry out the Contract [According to ITT]</td></tr>
<tr><td></td><td>Item of Equipment</td><td>Condition
(new, good, average, poor)</td><td colspan="2">Owned, leased or to be purchased
(state owner, lessor or seller)</td></tr>
<tr><td></td><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="5">[Applicant to list details of each item of major construction equipment, as applicable]</td></tr>
</table>

ASIAN UNIVERSITY FOR WOMEN

JVCA Partner Information

(Form -3)

[This Form should be completed by each JVCA partner].

Invitation for Qualification No: *[indicate IFP No]*

Tender Package No *[indicate Package No]*

This Package is divided into the following Number of Lots

1.	**Eligibility Information of the JVCA Partner [*According to ITT*]**	
1.1	Nationality of Individual or country of Registration	
1.2	JVCA Partner's legal title	
1.3	JVCA Partner's registered address	
1.4	JVCA Partner's legal status *[complete the relevant box]*	
	Proprietorship	
	Partnership	
	Limited Liability Concern	
	Government-owned Enterprise	
	Other (please describe, if applicable)	
1.5	JVCA Partner's year of registration	
1.6	JVCA Partner's authorised representative details	
	Name	
	National ID number, if any	
	Address	
	Telephone / Fax numbers	
	e-mail address	
1.7	Litigation	
	Information on non-performance of contract and pending litigation furnished in ***Form-5***	
1.8	JVCA Partner to attach copies of the original documents mentioned aside	[All documents required under ITT Clauses]
The following two information are applicable for national JVCA Partners only		
1.9	JVCA Partner's Value Added Tax Registration (VAT) Number	

1.10	JVCA Partner's Tax Identification Number(TIN)	
[The foreign JVCA Partners, in accordance with ITT, shall provide evidence by a written declaration to that effect to demonstrate that it meets the criterion]		
2.	**Key Activity(ies) for which it is intended to be joint ventured [According to ITT]**	
	Elements of Activity	**Brief description of Activity**

3.	**Qualification Information of the JVCA Partner [ITT]**				
3.1	**General Experience in Construction Works of JVCA Partner**				
	Start Month Year	**End Month Year**	**Years**	**Contract No and & Name of Contract Name and Address of Procuring Entity Brief description of Works**	**Role of JVCA Partner [Prime/Sub/Management]**

3.2	**Specific Experience in Construction Works of JVCA Partner Completed Contracts of similar nature, complexity and methods/construction technology**			
	Contract No **Name of Contract**	[insert reference no] of [insert year] [insert name]		
	Role in Contract [tick relevant box]	Prime Contractor	Subcontractor	Management Contractor
	Award date **Completion date** **Total Contract Amount**	[insert date] [insert date] [insert amount]		
	If partner in a JV, specify participation of the total Contract Amount	_____%	Amount & Currency [insert amount] USD/GBP/EUR/JPY Equivalent [insert amount] delete not appropriate	
	Employer's Name **Address** **Tel / Fax** **e-mail** **Brief description with justifications of the similarity compared to this Employer's requirements**	[state justification in support of its similarity compared to the proposed works]		

3.3	**Average annual construction turnover** ***[total certified payments received for contracts in progress or completed for each year of works in progress or completed; using selling exchange rate quoted by the source being Bangladesh Bank on the date reported, if applicable]***		
	Year	**Amount & Currency**	

3.4	**Existing commitments and works** **[targeted to be completed by the Intended Completion Date of the proposed works;]**			
	Name of Contract **Contract no [reference] of [year]** **Name of Employer** **Contact Address** **Tel/fax** **e-mail**	**Target Completion Date**	**Value of Existing Commitments and Works**	
			Amount & Currency	

3.5	**Financial Resources available to meet the construction cash flow**			
	No	**Source of financing**	**Amount Available**	
			Amount & Currency	
	In order to confirm the above statements the JVCA Partner shall submit, as applicable, the documents mentioned in ITT Clause 28.			
3.6	**Contact Details**			
	Name, address, and contact details of Tenderer's Bankers and other Employer(s) that may provide references if contacted by this Employer			

3.7	**Qualifications and experience of key technical and administrative personnel proposed for Contract administration and management**		
	Position Name Years of General Experience		Years of Specific Experience
	*[Tenderer to complete details of as many personnel as are applicable. Each personnel listed above should complete the Personnel Information (**Form -6**)]*		
3.8	Major items of Construction Equipment proposed for carrying out the works [ITT Clause 28]		
	Item of Equipment	Condition (new, good, average, poor)	Owned, leased or to be purchased (state owner, leaser or seller)
	[Tenderer to list details of each item of Major equipment, as applicable]		

_____

Signatur
e (Name of Authorized Signatory of the JVCA Partner)

ASIAN UNIVERSITY FOR WOMEN

Specialist Subcontractor Information (Form F-4)

[This Form should be completed by each Subcontractor, preferably on its Letter-Head Pad]

Invitation for Qualification No: *[indicate IFP No]*

Tender Package No *[indicate Package No]*

This Package is divided into the following Number of Lots

1.	**Eligibility Information of the Subcontractor [*ITT*]**	
1.1	Nationality of Individual or country of Registration	
1.2	Subcontractor's legal title	
1.3	Subcontractor's registered address	
1.4	Subcontractor's legal status *[complete the relevant box]*	
	Proprietorship	
	Partnership	
	Limited Liability Concern	
	Government-owned Enterprise	
	Other (please describe)	
1.5	Subcontractor's year of registration	
1.6	Subcontractor's authorized representative details	
	Name	
	Address	
	Telephone / Fax numbers	
	e-mail address	
1.7	Subcontractor to attach copies of the following original documents	All documents to the extent relevant to ITT Clause in support of its qualifications
The following two information are applicable for national Subcontractors		
1.8	Subcontractor's Value Added Tax Registration (VAT) Number	
1.9	Subcontractor's Tax Identification Number (TIN)	

[The foreign Subcontractors, in accordance with ITT, shall provide evidence by a written declaration to that effect to demonstrate that it meets the criterion]		
2. Key Activity(ies) for which it is intended to be Subcontracted		
2.1	**Elements of Activity**	**Brief description of Activity**
2.2	**List of Similar Contracts in which the proposed Subcontractor had been engaged**	
	Name of Contract and Year of Execution **Value of Contract** **Name of Employer** **Contact Person and Contact details** **Type of Work Performed**	

_____

Signature (Name of Authorized Signatory of the Proposed Sub-Contractor)

ASIAN UNIVERSITY FOR WOMEN

Historical Contract Non-Performance (Form F-5)

[The following table shall be filled in for the Applicant and for each partner of a Joint Venture]

Applicant's Legal Name: *[insert full name]*
Date: *[dd/mm/yy]*
Joint Venture Party Legal Name:*[insertfull name]* IFP No. and title: *[insert RFP number and title]*
Page *[insert page number]* of *[insert total number]* pages

Non-Performing Contracts in accordance with Qualification Criteria and Requirements			
☐ Contract non-performance did not occur during the *[number]* years specified in Qualification Criteria and Requirements, ☐ Contract(s) not performed during the *[number]* years specified in Qualification Criteria and Requirements,			
Year	**Non performed portion of contract**	**Contract Identification**	**Total Contract Amount (Current value)**
[insert year]	*[insert amount and percentage]*	Contract Identification: *[indicate complete contract name/ number, and any other identification]* Name of Employer: *[insert full name]* Address of Employer: *[insert street/city/country]* Reason(s) for non performance: *[indicate main reason(s)]*	
Pending Litigation, in accordance with Qualification Criteria and Requirements			
☐ No pending litigation in accordance with Qualification Criteria and Requirements,. ☐ Pending litigation in accordance with Qualification Criteria and Requirements, as indicated below.			
Year	**Outcome as Percentage of Total Assets**	**Contract Identification**	**Total Contract Amount (current value)**
[insert year]	*[insert percentage]*	Contract Identification: [indicate complete contract name, number, and any other identification] Name of Employer: *[insert full name]* Address of Employer: *[insert street/city/country]* Matter in dispute: *[indicate main issues in dispute]*	**Total Contract Amount (current value)**

Personnel Information (Form -6)

[This Form should be completed for each person proposed by the Tenderer on Form PW5-2& PW5-3, where applicable]

Name of the Applicant:	*[insert Title]*
Invitation for Tender No:	*[indicate RFP No]*
Tender Package No	*[indicate Package No]*
This Package is divided into the following Number of Lots	*[indicate number of Lot(s)]*

A. **Proposed Position** (tick the relevant box)		
☐ Electrical/Mechanical Engineer	☐ Prime Candidate	☐ Alternative Candidate
☐ Key Personnel	☐ Prime Candidate	☐ Alternative Candidate
B. **Personal Data**		
Name:		
Date of Birth:		
Years overall experience:		
National ID Number:		
Years of employment with the Tenderer:		
Professional Qualifications: 1. 2. 3. 4.		
C. **Present Employment** *[to be completed only if not employed by the Applicant]*		
Name of the Employer:		
Address of the Employer:		
Present Job Title:		
Years with the present Employer:		
Tel No:	Fax No:	e-mail address:

Contact *[manager/personnel officer]:*			
D. Professional Experience			
Summaries professional experience over the last twenty (**20**) years, in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.			
	From	To	Company / Project / Position / Relevant technical and management experience.
1			
2			
3			
4			
5			

(Name and Signature of the
Proposed Personnel)

ASIAN UNIVERSITY FOR WOMEN

TECHNICAL SPECIFICATIONS
INTERIOR FINISHING WORKS
Package-01

ASIAN UNIVERSITY FOR WOMEN

TABLE OF CONTENT

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2.0 SECTION-2: TECHNICAL SPECIFICATION FOR FINISHING WORKS

3.0 SECTION-3: TECHNICAL SPECIFICATION FOR SANITARY & PLUMBING WORKS

4.0 SECTION-4: ELECTRICAL AND LIGHTING WORKS

ASIAN UNIVERSITY FOR WOMEN

SECTION-1

TECHNICAL SPECIFICATIONS FOR GENERAL & MATERIALS WORKS

PACKAGE-1

ASIAN UNIVERSITY FOR WOMEN

SECTION - 01

DETAIL GENERAL AND MATERIALS SPECIFICATIONS

1.00 GENERAL PROVISIONS

1.01 Location and Description of the Project

The project envisages Construction of Asian University for Women at Pahartali, in Chittagong, Bangladesh.

1.02 Scope of Work under the Contract

The work shall consist of finishing work of Academy Building including partition walls, metal and wooden doors, glass railing, false ceiling, floor finish, painting etc. works as per the schedule of items and in accordance with drawings and specifications and approved by the Engineer-in-charge / Consultant.

1.03 Submittal

The submittal by the contractor shall include all shop drawings, reports samples, test results etc. to conform to applicable provisions of the general conditions of contract and as required under various sections of the specifications. The purpose of the submittal required herein is to assure that items furnished and installed are in all matters of consequence equivalent to the specified items and that proper records are maintained of the changes made in the specifications, drawings or in materials used or deviations made in the construction process.

The Contractor shall forward all submittal with a forwarding letter stating that the submittals have been carefully reviewed by the construction and the on-site conditions of dimensions, where necessary and correctness have been verified and checked.

The submittal shall be reviewed by the Engineer-in-charge/ Consultant to verify that the contractor's obligations are fulfilled as per true intention of the contract. In checking and approving submittal, the Owner does not relieve the contractor from responsibility for construction errors or omission, which may occur, even though executed in accordance with approved shop drawings. Any such errors or omissions as are discovered later should be made good by the Contractor irrespective of any approval by the employer at no additional cost to the employer. This does not apply to modifications approved as specified herein.

The Contractor shall make submittal sufficiently in advance of construction requirements to allow time for checking and rechecking if necessary. Any work fabricated or installed by the contractor prior to approval of shop drawings or other required submittal shall be done at his own cost.

1.04 Shop Drawings

The Contractor shall prepare at his own cost Shop Drawings to show all elements of

construction that are required to assure proper shop fabrication or job installation of items requiring Shop Drawings. All materials quality, finishes, construction details as specifically related to the project must be shown on the Shop Drawings.

1.05 Laboratory Test Results

Where laboratory tests are required by the specifications, either before or during construction operations, the Contractor will arrange at his own cost to get such tests done in accordance with the appropriate reference requirements specified in the Contract. Where such tests are conducted prior to actual construction for approval purposes the Contractor shall submit reports of the test results to the Employer/Consultant for approval along with other submittal materials before starting the work.

1.06 Examination and Acceptance

This clause shall be applicable to all items of work under this contract.

During the progress of work each item of work shall be inspected and passed as accepted by the Engineer-in-Charge/Consultant or his representative after proper examination. Any work not conforming to the drawing and specifications and schedule of items shall be rejected and the Contractor shall take all remedial measures as directed by the Engineer-in- Charge/Consultant at the Contractor's expense.

In addition to the examination referred to above the final survey will be made by the Engineer-in-Charge/Consultant before the work is taken over, and if a part the whole is not found to be in accordance with the requirements of the drawings, specifications and schedule of items, the Contractor will be required to correct such discrepancies to meet the limits of specified tolerance for which no extra payment shall be allowed to the Contractor.

2.00 *TAKING OVER POSSESSION OF SITE*

The Contractor shall upon receiving the work order, immediately take possession of the site and move his men and materials to prepare the site in order to create conditions for starting the work as per terms of contract, drawings and specification.

3.00 *MOBILIZATION*

The work of mobilization shall consist of carrying out the following listed actions together with all other requirements of the Contract in regard to commencing the execution of the work by the Contractor, at his own cost.

(a) Procurement, assembly, repairs and makes running condition of all the contractor-owned constructional plant and equipment by the contractor at any other site convenient to him.

(b) Transportation of Contractor-owned constructional plant, equipment and material from the storage site as mentioned in (a) above to the construction site.

(c) Assembly and installation of all items of constructional plants, equipment etc. required for the execution of the works.

(d) All materials shall be properly stored, inventoried and protected until used into the work and all plants and equipments shall be tested and made ready for use.

(e) The Contractor shall at his own cost construct a suitable shed for storage of materials and equipment, workshop, First-Aid Centre attended by suitable Medical Assistants to provide First-Aid.

(f) Maintain all temporary roads, fences and sanitary facilities, keep all areas used by the Contractor clean, neat, and well kept and in good repair and provide proper drainage to protect the area from surface run-off and flooding.

(g) Provide all the required electric power, water supply, gas supply and other utility connections of temporary installations at the site as may be necessary for the execution of the work.

(h) Obtain all insurance Policies, Performance bond and payment guarantees as required under this Agreement and conditions.

(i) Payment of all fees, permits, licenses, etc. As may be required covering the execution of the contract.

4.00CLEANING OF SITE

4.01 Before Starting the Work

The Contractor shall remove all the undesirable materials from the site to facilitate construction work at site through cleaning the site by dismantling and removing temporary sheds, columns, pillars, pavements, rubbish, earth, broken materials, fences, boundary walls etc. at his own cost.

4.02 During Execution of Work

During execution of the work the contractor shall remove or protect, at his own cost, different service line if any, viz. electrical, water supply pipe, drains, electric/telephone cables etc. after taking prior permission from the relevant authorities and Engineer-in-Charge
/ Consultant.

During execution of the work excess unwanted item shall be removed from site by the Contractor at his own cost to a safe place as directed by the Engineer-in-Charge / Consultant.

4.03 After Completion of Work

The work of cleaning the site shall consist of carrying out the following listed actions together with all other requirements of the Contract in regard to completion of the work by the Contractor at his own cost and handing over the work complete to the Employer.

(a) The dismantling and removal of all Contractors' constructional plants and equipment from the Site.

(b) Dismantling and removing of temporary building from the Site.

(c) Dismantling transporting, reconditioning and storing of all constructional plants, equipment, surplus materials (if any) etc. furnished by the Employer to places as directed by the Engineer-in-Charge in a suitable manner.

(d) Over all cleanup of the site and work area in a manner satisfactory to the Engineer-in-Charge.

5.00 TEMPORARY FACILITIES

5.01 General

The Contractor shall, at his own expense, provide all necessary temporary facilities required to accomplish the work in a safe and orderly manner as specified in the contract.

5.02 Field Office and Installation

The Contractor shall provide and maintain a suitable storage sheds and temporary buildings for his staffs and workers as required. The design and location of such structures shall be approved by the Engineer-in-Charge/Consultant.

5.03 Sanitary Facilities

The Contractor shall at his own cost provide adequate number of toilets as necessary for all persons engaged on the work. The provisions for sanitary facilities and the maintenance thereof shall be subject to the approval of the Engineer-in-Charge.

The wastage from toilets shall be disposed of by means of septic tank and soak pit or by some other acceptable disposal system. All sanitary facilities shall be kept clean and shall be frequently disinfected by the Contractor. After completion of works Contractor shall dismantling the temporary structure as per direction of Engineer in Charge / Consultant.

5.04 Drinking Water

The Contractor shall at his own cost provide drinking water for all personnel and workers on the works. All water, which may be used for drinking purposes, shall be obtained from a recognized source of potable water.

5.05 Electric Power and Lighting

The Contractor shall at his own make all arrangements for obtaining temporary electric power and shall pay all costs in connection thereof as well as the costs of all energy consumed during execution of the work until the date of completion.

The Contractor shall, at his own expense provide adequate lighting at the construction site during the execution of work.

The Contractor shall at his own expenses, remove the temporary electrical power and lighting systems after completion of the work as directed by the Engineer-in-Charge.

5.06 First Aid Centre

The Contractor shall take necessary steps at his own cost for a First Aid Medical treatment during execution of the work.

5.07 Fire Fighting Equipment

The Contractor shall arrange at his own cost adequate fire fighting equipment at site for bringing, initial fire hazards, under control.

5.08 Protective Barrier and Hanging Platform

The Contractor shall arrange at his own cost suitable protective barriers at the edge of pits, openings in floors, vertical ducts, at the edge of floors, roof, vertical walls, etc. Especially at higher floor levels so that careless fall of working personnel may be safeguarded.

The Contractor shall provide at his own cost wire net, platform or any other suitable device placed in horizontal plan around the vertical faces of the building at suitable places immediately below the area where work is in progress at a particular time so that careless fall of working personnel may be guarded against.

5.09 Police and health regulations

The Contractor shall obey all municipal/City Corporation, police and health regulations and all other regulations.

6.00 PROTECTION AND SAFETY

6.01 Measures to be Taken

All unusable materials shall be removed from the project site and disposed off at a safe distance as per direction of the Engineer-in-Charge so as not to create any obstruction to work or give rise to health hazards.

The Contractor shall take all necessary precautions to ensure against fire during construction. All necessary arrangements must be made by the Contractor for providing

adequate protection against fire hazards at the construction site during the period of execution of the work.

6.02 Safety Manuals

International Safety Manuals used in Engineering Construction Project shall be adopted for protection and safety at the construction site of the project during the period of construction.

7.00 MATERIALS, TOOLS AND EQUIPMENT

7.01 General

The requirements of this section are applicable to all work under this Contract.

7.02 Products

The Contractor at his own expenses shall provide the materials, products as shown on the drawings or as specified in the Contract. The Contractor shall provide necessary transportation, safe storage, supervision etc.

7.03 Equal Products and Equivalents

Except as specially required otherwise, the mention of any product materials trade name is intended to establish a standard of quality, appearance, size & durability. The products of other manufacturer's may be used subject to the conditions as stated in Clause 7.04 and
7.05 hereinafter.

7.04 Additional Costs Related to Substitutions

Any additional cost, or any loss or damages, arising from the substitution of any material or method from those originally specified shall be borne by the Contractor, unless such substitution was made at the written request or direction of the Owner.

7.05 Failure of Equal Products

Where products are accepted based on representations of the Contractor, as an approved equal, they shall be used subject to the same installation and performance standards as required by the original specification. Approval of a request for substitution shall not modify contract requirements except as specially note. Subsequent failure of 'approved equals' shall be considered first and evidence of improper installation or production in equality and the installation shall be repaired or corrected as directed by the Engineer-in-Charge at no additional cost to the Owner.

7.06 Equipment and Tools

The Contractor shall furnish all constructional plans for the proper execution of the work at his own expense and keep them clean and in proper working condition. The Contractor shall supply the Employer / Engineer-in-charge a list of major items of the constructional plants, equipment and tools that he proposes to use in execution of the work.

8.00 PREPARATION OF SITE

8.01 Mobilization/Site Clearing/Temporary Facilities

Appropriate conditions of clauses from the mobilization, clearing of site and temporary facilities as specified in the previous Article Nos. 3, 4 & 5 herein above shall be completed before starting the work as felt necessary and direction by the Engineer-in-Charge.

9.00 SAMPLES & TESTS

9.01 Samples

In addition to the special provisions made hereafter as to sampling and testing of materials by particular methods, the Engineer-in-Charge may call for samples of all materials together with details of their sources and workmanship proposed to be employed in the execution of the works and such samples shall be furnished by the contractor without delay and without charge. Approved samples will be kept by the Engineer-in-Charge who may reject at any time all materials of workmanship not corresponding in quality and character with the approval sample. The contractor shall provide without extra charges, suitable labeled containers for the storage of samples.

9.02 Tests

The Engineer-in-Charge may send inspectors to the manufacturer's premises to test materials or supervise their manufacture. Should the Engineer-in-Charge decide not to send an inspector to the manufacturers works, the contractor shall obtain from the manufacturer certificates of tests, proof sheets, etc. showing that the materials have been tested in accordance with the requirements of the specification relating thereto. The Engineer-in- Charge shall be at liberty to reject after delivery or after incorporation in the permanent work any materials found to be unsuitable or not in accordance with the specification.

9.03 Standard Specification

Except where otherwise specified or authorized by the Engineer-in-Charge all materials shall conform to the latest edition of the appropriate ASTM (American Society for Testing and Material). Specification or to any other standard specification of whatever origin, that may be approved by the Engineer-in-Charge.

10.00 *TEST TO BE PERFOMED*

Unless provided otherwise in the specification or elsewhere in the Contract Documents, any or all of the following tests shall be performed as may be require by the Engineer in Charge / Consultant to ascertain whether the quality of material and/or of any finished or partially finished work is appropriate for the purpose which it is or was intended to fulfil in accordance with the specifications. All cost including transportation, storage and incidental cost of the tests required hereunder shall be borne by the contractor at any place directed by the Engineer in Charge / consultants.

11.00 BRICKS

11.01 **General:** Bricks shall be manufactured from clay or shale or a combination of these materials and shall be uniformly burnt throughout. They shall be hard and sound and give a clear metallic ring when struck with a small hammer or another brick, and should not break when dropped to the earth from a height of 1.5m with one brick above another forming 'T'. The surface should be too hard to be scratched with the fingernail.

11.02 **Sampling:** Sample shall be taken randomly. For each consignment not exceeding 50,000 bricks at least 10 (ten) bricks shall be tested to ascertain.

First Class Machine made / Hand Made Brick shall comply with the following requirements

11.03 **Brick Dimensions: (BS 3921: 1985)** Brick "Work size" dimensions shall be 244 mm (length) x 118 mm (width) x 74 mm (height). The size of any individual brick in the sample shall not deviate from the work size by more than 6 mm on length or 6 mm on width or height Individual bricks are not required to comply with the "Coordinating size".

The overall measurement of 24 "as-fixed" bricks measured shall not fall outside the limits specify below mentioned.

Brick Dimensions – Overall Limits

Overall measurement of 24 bricks		
"Work size " (mm)	Maximum (mm)	Minimum (mm)
244 (Length)	5952	5760
118 (Width)	2904	2760
74(Height)	1848	1704

11.04 **Absorption Test of Bricks: (BS 3921 : 1985)** Maximum water absorption of a 10 brick when immersed in water for one hour shall not be more than 18% of the oven dry mass.

11.05 Compressive Test of Bricks: (BS 3921 : 1985)

(i) Characteristic Compressive strength (defined as sample mean less 1.64 times the standard deviation) of 10 brick sample shall not be lower than 15 N/mm^2.

(ii) Mean compressive strength of a 10 brick sample shall not be lower than 18 N/mm^2.

(iii) No individual strength lower than 13 N/mm^2.

11.06 First Class Machine mould / Hand Made Bricks

First Class Machine mould Hand Made Brick shall be thoroughly brunt and shall have plane rectangular faces with parallel sides and sharp straight right-angled edges. They shall be of uniform colour (generally deep red or copper), homogeneous in a texture and free from

crack, flaws and nodules of free lime. A fractured surface shall show a uniform compact structure free from limps, grits of holes.

11.07 **Picked, Jhama Bricks:** Picked Jhama Bricks shall be over-burnt First-Class Machine-Made Bricks. Uniformly vitrified throughout with good shape, hard slightly black in colour, and without cracks or spongy areas.

All other requirements for First-Class Machine-Made Bricks shall apply to Picked Jhama except for dimensions.

12.00 GREY CEMENT

12.01 **General**: Cement in the general sense of the word, can be described as a material with adhesive and cohesive properties, which make it capable of bonding mineral fragments into a compact whole. The definition embraces a large variety of cementing materials.

For constructional purposes the meaning of the term cement is restricted to the bonding materials used with stones, sand bricks, building blocks, etc. the principal constituents of this type of cement are compounds of lime, so that in building and civil engineering we are concerned with calcareous cement. Cement shall be Ordinary Portland Cement conforming to requirements of the standard specifications for Portland Cement Type I, ASTM C- 150/Portland cement Type-II conforming to BDS EN 197-1. The physical requirements should conform to ASTM Designation CE-50.

12.02 **Sampling**: Cement shall be sampled in accordance with Standard Test Procedures. For each consignment not exceeding 25 tons at least 3 (three) samples shall be tested to ascertain:
Fineness
Consistency
Initial and Final Setting time
Compressive strength

12.03 **Test on Physical Properties of Cement**: A number of tests are performed in the laboratory to ensure that the cement is of the desired quality and that it conforms to the requirements of the relevant national standards. Tests on the physical properties prescribed by ASTM for ordinary Portland Cements are given below.

i) **Appearance**: Cement shall be free from any hardened lumps and any foreign material.

ii) **Fineness**: The fineness of cement shall be determined in accordance with Standard Test Procedures. Cement shall have a minimum of 90% of particles by weight passing through the 75-micron sieve.

iii) Setting time shall be determined in accordance with Standard Test Procedures. Cement shall have an initial setting time in excess of 45 minutes and a final setting time not greater than 7 hours. The test shall be carried out at 30 degrees Centigrade.

iv) The strength of cement shall be determined in accordance with Standard Test Procedures. The crushing strength of 100mm standard concrete cubes shall not be less than 12.4 N/mm^2 at 3 days and 19.3 N/mm^2 at 7 days & 27.6 N/mm^2 at 28 days.

12.04 **Delivery of Bagged Cement:** Cement shall be delivered in sound undamaged bags uncontaminated by moisture, oil or any other substance. The nominal weight of a bag of cement shall be 50kg. Individual bags which vary by more than 5% from the nominal weight shall be rejected. Where the average weight of 50 bags taken at random from any one consignment is less than the nominal weight, the whole consignment shall be rejected. Every bag shall be marked with the manufacture's brand, the type of cement, identification number or numbers relating to the testing and certification of the cement, and the date the bag was filled. The contents of broken or damaged bags shall not be re-bagged.

12.05 **Storage and Handling of Cement**: The following requirements shall apply to the storage and handling of cement at site or at any intermediate transfer or storage point:

v) All methods for transporting, handling and storing bagged cement shall be planned and arranged to ensure the use or transfer of cement in the approximate chronological order of manufacture.

vi) Batches of cement procured at different times shall be stored separately and shall not be mixed.

vii) All loading and unloading facilities for cement shall be under cover and weatherproof to the satisfaction of the "Engineer-in-Charge".

viii) All bagged cement shall be stored at all times upto its use in the works in completely weatherproof structures which shall include a timber floor raised not less than 300mm above the surrounding ground and be adequately ventilated to prevent the accumulation of moisture.

ix) All storage of bagged cement shall be arranged to permit easy access for inspection and definite identification of all cement in the storage.

x) The temperature of the cement at any time shall not exceed 60°C.

12.06 **Brand to be Used:** Cemex, Holcem, Lafarge, Elephant Brand or approved equivalent

12.07 **Rejection:** The Engineer-in-Charge may reject any cement as the result of any tests thereof notwithstanding the manufacturer's certificate. The Engineer may also reject cement which has deteriorated owing to inadequate protection or from other causes where the cement is not to his satisfaction. The contractor shall remove at his cost all rejected cement from site without delay.

13.00 *WHITE CEMENT*

It shall be made from pure calcite lime stone and have the same physical properties as that of Portland Cement Type I, ASTM C-150.

A typical composition of white cement is as follows:

Cao	-	65.0%
Sio_2	-	25.5%

Al_2, O_2 - 5.9%
Fe_2, O_2 - 0.6%
MgO - 1.1%
SO_2 - 0.1%

14.00 FINE AGGREGATES (SAND)

14.01 General: Sand shall be natural sand composed of clean, hard, durable, uncoated particles resulting from the disintegration of silicaceous and / or calcareous rocks, or manufactured sand resulting from the crushing of boulder or shingle. Fine Aggregate shall consist of natural sand conforming to the requirements of AASHTO standard specification.

14.02 Sampling: Sand shall be sampled in accordance with Standard Test Procedures. Samples thus collected shall be tested for grading, F.M, and any other tests instructed by the Engineer. **Sample shall be collected from a source of 20 cum. of sand or more.**

14.03 Appearance: Sand shall be completely non plastic and free of all clay, roots and other organic materials

14.04 Particle Size: The particle size distribution shall be determined in accordance with standard Test Procedures. The FM shall be calculated in accordance with Standard Test Procedures. The grading of the various sizes of sands shall be as shown in the following tables

Grading Limits for Sands

Nominal FM	2.8-3.1	1.5-2.8	1.0-1.5	0.8-1.0	0.5-0.8
Sieve Size	% Passing				
9.5 mm	100	100	100	100	100
4.75 mm	90-95	90-100	100	100	100
2.36 mm	70-90	90-100	100	100	100
1.18 mm	45-70	70-95	95-100	100	100
600 micron	25-45	45-85	85-95	95-100	100
300 micron	10-20	20-50	50-70	70-80	80-90
150 micron	0-2	0-2	20-35	35-40	40-60

14.05 Impurities: Sand shall be clean and free from injurious amounts of organic impurities. Deleterious substances shall not exceed the following percentages by weight

Material passing No.2000 sieve	2.0
Shale, coal, soft or flaky fragments	1.0
Sulphur compounds	0.3
Clay Lumps (wet, on No.4 sieve)	0.00

14.06 Supply and Stocking: Supply methods and stock piling of sand shall be such as to permit ready identification of the materials delivered and shall be approved by the Engineer-in- Charge.

15.00 COARSE AGGREGATES

15.01 **Aggregates General:** Aggregates for all concrete work shall conform to the standard specification for concrete aggregates according to ASTM C-33. They shall consist of natural stands and gravel, crushed stones, or other approved sound materials, and shall be hard strong, and durable, free from clay films, organic materials and other adherent coatings and shall conform to the dimensions and grading specified for the several parts of the works. Aggregates shall be stored at the works in such a manner as to avoid contamination and shall, if ordered by the Engineer-in-Charge be screened and washed before use. Clean fresh water shall be used for the purpose of washing

15.02 **Sampling:** Samples shall be collected from a stockpile of 20 cum. of stone chips or more as per AASHTO Test No. T2-84.

15.03 **Particle Size Distribution**: The aggregates shall conform to one of the following grading depending on the nominal size of aggregate specified in the schedule and drawings.

Percentage by weight passing of nominal aggregate size

Nominal size/Sieve size	63mm	40mm	20mm	14mm	10mm
75.0 mm	100%	-	-	-	-
63.0 mm	100%	100%	-	-	-
37.5 mm	0-30%	85-100%	100	-	-
20.0 mm	05%	0-25%	85-100%	100%	-
14.0 mm	-	-	-	85-100%	-
10.0 mm	-	0-5%	0-25%	0-50%	85-100%
5.0 mm	-	-	-	0-10%	0-25%
2.0 mm	-	-	-	-	0-5%

The gradation curve should be of "S" shape conforming to a well-graded aggregate mass.

15.04 **Unit weight:** The unit weight shall be determined in accordance with standard test Procedures. The unit weight test shall be carried out on the materials as sampled after drying. The unit weight of aggregates shall not be less than 1610 kg/cum.

15.05 **Abrasion:** The abrasion shall be determined in accordance with standard test Procedures. Aggregate with Nominal sizes 63 mm. 40 mm, and 20 mm shall be tested in accordance with Grade 'B' materials. Aggregate with nominal sizes 14 mm and 10 mm shall be tested in accordance with Grade C materials. The percentage of wear shall not exceed 30%.

15.06 **Soundness:** The weighted average loss after five cycles shall not be more than 12 percent when the coarse aggregate is subjected to the sodium sulphate soundness test, AASHTO Designation T 104.

15.07 **Ten Percent Fines Value (TVF):** The methods are applicable to both weak & strong aggregate passing a 14.0 m test sieve and retained on a 10.0 mm test sieve. Ten Percent Fines Value should not be less than 150 KN.

15.08 **Flakiness Index:** The test procedure describes the method for the determination of the flakiness index of coarse aggregate. The flakiness index is found by separating the flaky particles and expressing their mass as a percentage of the mass of the sample tested. The flakiness Index should not be greater than 35% of the sample tested.

15.09 **Elongation Index:** This test procedure describes the method for the determination of the elongation index of coarse aggregate. The Elongation Index is found by separating the elongated particles and expressing their mass as a percentage of the mass of sample tested. The Elongation Index should not be less than 25% of the sample tested.

15.10 **Deleterious Substances:** The amount of deleterious substances shall not exceed the following limits:

Deleterious Materials	Max. Permissible Limits % by weight
• Soft fragments	3
• Coal and Lignite	1
• Shale	1
• Clay Lumps	0.25
• Materials passing the no. 200 sieve	1
• No other deleterious substances such as chart and limonite concretions, which will readily disintegrate.	

15.11 **Prior Approval Aggregates:** The type and source of all aggregate shall be approved by the Engineer-in-Charge before the materials are delivered to site.

15.12 **Storage of Aggregates**: The handling and storage of concrete aggregates shall be such as to prevent segregation or the inclusion of foreign materials. The Engineer may require that aggregates be stored on separate platforms at satisfactory locations. When specified in the documents, the coarse aggregate shall be separated into two or more sizes in order to secure greater uniformity of the concrete mixture. Different sizes of aggregates shall be stored in separate stockpiles sufficiently apart from each other to prevent the materials at the edges of the piles from becoming intermixed.

16.00 GYPSUM WALL BOARD

16.01 **General:** Gypsum board comply with Federal specifications SS-L-30D in 48" width and in such length as will result in a minimum of joints, gypsum board shall be a accurate thick as mention in the drawing and BOQ. All gypsum board to have tapered edges. Manufacturers shall be members of the Gypsum board Association.

16.02 **Product Data:** Manufacturer data sheet for the product to be used, including dimension, finishes, storage and handling requirements and recommendations, and installation recommendation.

16.03 **Delivery, storage and handling:** Transport, lift and handle units with care, avoiding excessive stress and preventing damage; use appropriate equipment. Store products in manufacturer's unopened packaging until ready for installation, in a clean dry area protected from weather, moisture and damage; store units upright and not stacked unless permitted by manufacturer.

Care should be taken when handling the blocks to avoid scratching faces and chipping edges.

16.04 **FIRE performance:** Gypsum Plaster board dry wall partition system has a two hours fire rating in accordance to BS476

16.05 **Acoustic performance: Gypsum** Plaster board dry wall partition system has an acoustic rating of 46db

16.06 **Joint System:** Provide a strong cross fibered paper tape with minimal longitudinal Stretch, spark perforated. Tape shall meet ASTM C475 and Federal specifications SS-J-570a Type II.

16.07 **Joint Compound**: Provide a ready mixed vinyl-based compound containing no Asbestos. Compound shall meet ASTM C475 and federal specifications SS-J-570a- Type I.

16.08 **Fasteners:** For fastening gypsum wall board in a place on metal studs and metal channel, use flat head screws, shouldered, specially design for use with power driven tools, not less than 1" long, with self tapping threads and self drilling points.

For fastening gypsum wall board wood, use 1.25" tape W bugle head screws, or use annular ring type nails complying with ASTM C514 and of the length required by governmental agencies having jurisdiction.

17.00 TIMBER

17.01 **General:** All timber for temporary or permanent work shall be of the best quality, sound, straight, well seasoned, free from sap, defects, radial cracks, cup-shakes, large, loose or dead knots, or other imperfections and shall show a clean surface wit cut.

17.02 **Inspection: All** timber shall be subject to inspection on the site, piece by piece and shall be to the approval of the Engineer-in-Charge who may reject such timber as is considered by him to be below specification and in the case of timber specified to be creosoge, may reject such timber before or after creosoting. The contractor shall provide all necessary labour labour for handing the timber during inspection free of charge.

17.03 **Wrought Faces and Allowances on Joiner's Work:** All joiners' work shall be wrought and finished with a clean, even and smooth face, the thickness given to include 2 mm for each wrought face in soft wood and 1.5 mm for hard wood.

18.00 PLY WOOD

18.01 **Name of the board:** MDF with raw veneer.

18.02 **Colour:** One face white Oak

18.03 **Size:** 1220mmx2440mm

18.04 **Thickness:** As specified in the schedule of items and bill of quantities.

18.05 **Density:** 830-850 kg/cum

18.06 **Country of made :** China.

19.00 *STRUCTURAL STEEL*

All steel used in doors & windows and all metal works shall be the products of reputable manufacturer and shall conform to the American Standard Specifications. The section sizes and profile shall be as per requirement for the specific works as shown in the drawings

20.00 GRANITE

20.01 Granite Stone: Marble shall be of Italian origin or equivalent, in size as per drawing having approved colour and texture on CC/RCC slab on sand cement mortar bed as specified in the drawings or schedule of items and bill of quantities.

Compressive strength	562-844 kg/cm^2	(8000 – 12000 psi)
Specific gravity	2.72	
Unit Weight	2563-2724 kg/m^3	(160-170 p/ cft)

21.00 PAINTS AND PROTECTIVE MATERIALS

21.01 General: Knotting shall be uniform dispersion of lac or suitable resin (natural or sympathetic) in a suitable solvent.

White lead paint shall be made from pure white lead in accordance with B.S. 239. Mixed with the boiled linseed oil turpentine, driers and pigments and strained free from skins and all extraneous matter before being pigments, and if so used, the quantity shall not exceed 8% of the paint mixed ready for the brush No other ingredient except the coloring matter. The proportions of the ingredients for the various coats shall be subject to the approval of the Engineer-in-Charge.

21.02 Red Lead Paint: Red lead paint shall be made from non-setting red lead in accordance with B.S. 217, thoroughly ground and well and freely mixed with approximately 15% of boiled linseed oil to give a paint with good covering power, bobby and adhesion shall be determined by tests to be made by the contractor to the satisfaction of the Engineer-in- Charge. The Engineer-in-Charge may select samples of the paint for analysis after a sufficient quantity for the work about to be painted has been mixed.

21.03 Varnishes/Wood Polish: The material is required to be clear and transparent and who applied shall on dry, give a glossy coating free from fun and specks. The composition of the varnish shall conform to the requirements of B.S. 274.

21.04 Emulsion Paints: BERGER or approved equivalent paints shall be preferably used but the Engineer-in-Charge may allow any other brand of equivalent standard, subject to the production of appropriate test certificates and guarantees.

ASIAN UNIVERSITY FOR WOMEN

SECTION-2

TECHNICAL SPECIFICATIONS
FOR ARCHITECTURAL & CIVIL WORKS

PACKAGE-1

ASIAN UNIVERSITY FOR WOMEN

SECTION – 02

DETAIL SPECIFICATION OF FINISHING WORKS

PARTITION WALL WORK

1.00 BRICK WORK (125 MM)

1.01 **Description:** This item shall consist of constructing brick masonry work in 1:4 cement mortars in such thickness and at such heights as required by the drawings.

1.02 Construction Requirements

All materials shall mean the requirements of the relevant sections of Material specifications.

a. Bricks shall be 1st Class brick unless otherwise required.
b. Cement shall be Portland cement Type-1 ASTM C-1.5
c. Sand shall be clean, well graded natural sand having a minimum FM of 1.5
d. Water shall be same as required for concrete.

Mortar for brickwork unless otherwise required shall consists of 1 part of cement and 4 parts of sand.

Cement and sand shall be mixed dry in the specified proportions until the color of the mixture is uniform. Water shall then be added sparingly, only the minimum necessary being used to produce a workable mixture of normal consistency. The water cement ratio in no case shall exceed 0.50 by weight, or as directed by the Engineer-in-Charge/Consultant.

The mixing shall be done on a clean hard platform within water-tight points to avoid leakage. At the close of each day's work, the mixing through and the pans shall be thoroughly cleaned and washed.

Mortar shall be mixed in quantities required for immediate use. Mortar, which has taken its initial set, shall, on no account be used on work, not shall be remixed with or without additional materials or re-tempered by other means.

1.03 **Workmanship:** No bricks shall be used until they have been thoroughly soaked in clear water for at least eight hours. Soaking shall be discontinued one hour before use. Care shall be taken that the bricks are clean and free from slime or dirt of any kind. If necessary, bricks shall be scrubbed clean. Brickwork shall be built plumb and shall be carried up regularly throughout the entire length of the structure. Unless otherwise specified bricks shall be laid in English Bond each brick being set with mortar in bed vertical joints. All Bricks shall be whole expected where necessary for closer and where expressly authorised. All horizontal joints shall be parallel and level. Vertical joints in alternate courses shall come

directly over one another. Joints thickness shall be minimum 6 mm and shall in no case exceed 10 mm. The height of four courses including four bed joints as laid shall not exceed more than 40 mm the height of four bricks if put over one another. Exposed joints shall be raked and flush pointed unless otherwise specified and the face of the work shall be kept clean as work proceeds. The height of day's work shall be limited to 1200 mm unless otherwise permitted. In exposed situations the day's work shall be protected against harmful effect of weather during and for a period immediately following construction until the mortar sufficiently hardened. All brickwork shall be thoroughly cured for a period of at least 7 days.

Fixture in masonry such as anchors, clamps, brackets, pipes etc. shall be built-in during construction at no additional cost to the contract.

1.04 **Method of Measurement:** This item shall be measured by square meter (sqm) of brickwork built in place to the next lines of the structures shown on the drawings.

1.05 **Basis of Payment:** Payment shall be made at the Contract unit price per square meter (cum) of completed and accepted work measured as provided above which price shall constitute full compensation for furnishing, storing, transporting, preparing, laying and curing all materials and for all labour scaffolding, tools and equipment and for all incidentals necessary to complete the item.

2.00 GYPSUM PLASTERBOARD DRY WALL SINGLE LAYER IN EACH SIDE AND 70MM ACOUSTICAL BATT./GLASS WOOL INSULLATION BETWEEN THEM.

2.01 **Description:** The worked covered by this item consist of constructing plaster board dry wall with 1(One) layers of 12.50 mm plaster board in one side and as per drawings and instruction of the Engineer-in-Charge.

The boards are manufactured from high grade Gypsum with glass fiber reinforcement.

2.02 **Construction Requirements:** The dry wall shall consist of Single layer 12.50mm thick board of both side secured to galvanized steel studs and tracks, with in between both side boards the void shall infill with 70 mm acoustical batt/glass wool insulation. 70mmx40mm 24 BWG thick metal studs @ 600 O.C in between two plaster board in each side and 70 mm 25-gauge metal continuous runner in floor, wall, ceiling, and intermediate or any other means or anywhere is required to fixed with 3 mm fastener, penetrate minimum 19 mm @ 610mm O.C, providing fire sealant. Wall shall be erected plumb, square, level, straight and true. All joints on exposed surface shall be flush and tight, neatly cutt, and fit etc. In/c 3 coats plastic emulsion painting in the surfaces with BERGER or approved equivalent etc. complete as mentioned in the drawing or as stated in the schedule of items and bill of quantities or in the drawing.

2.03 **Delivery, storage and handling:** Transport, lift and handle units with care, avoiding excessive stress and preventing damage; use appropriate equipment. Store products in manufacturer's unopened packaging until ready for installation, in a clean dry area protected from weather, moisture and damage; store units upright and not stacked unless permitted by manufacturer.

Care should be taken when handling the blocks to avoid scratching faces and chipping edges.

2.04 **Workmanship:** One-layer plaster board wall shall be built plumb and shall be carried up regularly throughout the entire length of structure by very skilled workmanship. Dry wall shall be erected as per design and drawing and the face of the dry wall shall be fair. The face of the work shall be kept clean as work proceeds. Greatest care shall be exercised during erection of plaster board dry wall without any harm. The work shall be protected against harmful effect of weather during and for a period immediately following construction:

Gypsum board comply with Federal specifications SS-L-30D in 48" width and in such length as will result in a minimum of joints, gypsum board shall be a accurate thick as mention in the drawing and BOQ. All gypsum board to have tapered edges. Manufacturers shall be members of the Gypsum Board Association.

2.05 Installation:

a) Install all gypsum board in accordance with manufacturer's recommendations.

b) All gypsum board walls shall be erected plumb, level, square, straight, and truce. All joint of exposed surfaces shall be flush and tight, neatly cut, and fit around openings for the work of other trades so as to leave on open joints or gaps. Screws and nails shall be spaced 6" on edges and 12" in field. Dry wall shall be installed horizontally with joint

2.06 Joint treatment:

a) A uniform thin layer of joint compound shall be applied over the joint to be reinforced, approximately 3" to 4" wide. The taped shall be centered over the joint and embedded into the compound leaving sufficient compound under the tape to provide proper bond. Inside corners and wall angles shall be reinforced with the tape folded to conform to the angle and embedded into the compound. A skim coat of compound shall be applied immediately after embedding tape. Excessive compound shall be cleaned from the surface of the wall board.

After compound has been allowed to dry thoroughly, the tape shall be covered with joint compound spread evenly over the tape and sufficiently beyond each side of the tape to permit a smooth feathered edge. After the previous coat is thoroughly dry, another coat of joint compound shall be applied with a slight smooth uniform crown over the joint. The edge of this coat shall be feathered beyond the preceding coat. Compound shall be sanded smooth. One layer of core board and two layer of 5/8" fire rated gypsum board shall be installed over ½' metal channel framing for two hours' fire rated.

2.07 Miscellaneous:

a) All work under this section shall be properly coordinated with the work of other sections. No partitions or ceiling shall be covered until all necessary and required tests and inspections have been made and approval given for electrical plumbing and or mechanical works.

b) Caulking shall be applied in two continuous 3/8" diameter beads as recommended by the manufacturer to achieve acoustic ratings where required to seal inter-sections with adjoining structure and other partitions.

c) The contractor for this section shall inspect all grounds, all concrete, masonry or other surfaces to receive dry wall finish before beginning his work and shall report to the Engineer-in-Charge in such work which might, in his opinion, affect the satisfactory execution and stability of the work. Starting of work means acceptance of conditions.

d) All scaffolding necessary for the proper execution of the work of this section shall be provided for under this section. Scaffolding shall be constructed and maintained in strict conformity with the local laws and regulations governing the same. Scaffolding shall be so erected as to interfere as little as possible with the work of other sections.

e) Gypsum board wall finish with defects of such character as will mar the appearance of finish work, or which is otherwise defective, will be rejected and shall be removed and replaced at no expense to the owner. All partition shall be plumb and straight.

f) Gypsum board wall shall be installed at partitions, walls, and ceiling in accordance to the manufacturer's instructions by skilled workmen. All joint shall be taped, spackled and sanded, nails holes or their indentations shall be filled and sanded flush and smooth, in accordance with the manufacturer's requirements.

2.08 **Protection:** Protect install products until completion of the project and also handing over the authority. Touch up repair or replace damaged products before substantial completion.

2.09 **Method of Measurement:** Plasterboard dry partition walls shall be measured in square meter (sq.m) of actually covered surfaces. Deducting all opening and incorporated foreign structures, such as lintels, columns, beams, etc. Portion of single layer plaster board dry wall shall be measured separately in separate items.

2.10 **Basis of Payment:** Payment shall be made at the contract unit price per square meter **(sqm)** of completed and accepted work measured as provided above which price shall constitute full compensation for furnishing, storing, transporting, preparing, laying, erecting all materials, painting and for all labour, scaffolding, tools and equipment and for all incidentals necessary to complete the item.

3.00 MELAMINE BOARD SLIDING PANEL PARTITION.

3.01 **Description:** This item shall consist of manufacturing supplying fitting and fixing Melamine board sliding panel partition as stated in the schedule of items and bill of quantities and in accordance with these Specification.

3.02 **Construction Requirements:** Melamine sound proof board with necessary hardware etc. Melamine board shall be 20mm thick approved best quality (PARTEX , AKI J or approved equivalent fixed with galvanized metal frame around the melamine board, fabricating of metal frame , fixing with melamine board as per Architectural drawing, providing full locking arrangement , the top and bottom metal rail shall be embedded with floor and wall with cement concrete (1:2:4) including, cutting holes and mending good the damages, finishing, curing-and where necessary ,providing galvanized metal rail and wheel for smooth movement of the gate etc.

3.03 **Method of Measurement:** The work shall be measured in square meter (sq.m) of actual area. Height should be top rail from finished floor level.

3.04 **Basis of Payment:** Payment shall be made for the amount of completed and accepted work measured as provided above at the contract unit price per square meter (sq.m) which price shall constitute full compensation for furnishing all materials, erection, necessary hardware, labour, painting (if any) etc. as well as incidentals necessary to complete the work according to the applicable Plans.

WALL SURFACE FINISHING WORK

4.00 GYPSUM PLASTERBOARD WITH SINGLE LAYER IN EACH SIDE/ BOTH SIDE OF R.C.C WALL/MASONRY WALL.

4.01 **Description:** The worked covered by this item consist of supplying, fitting and fixing single layers of 12.50 mm gypsum plaster board in one side or both side of R.C.C/Masonry wall as per drawings and instruction of the Engineer-in-Charge.

The boards are manufactured from high grade Gypsum with glass fiber reinforcement

4.02 **Construction Requirements:** The work shall consist of single layer 12.50mm thick gypsum board in one side/both side of R.C.C / Masonry wall secured to galvanized steel studs and tracks, 70mmx40mm 24 BWG thick metal studs @ 600 O.C ,70 mm 25 gauge metal continuous runner in floor, wall, ceiling, and intermediate fix with fixed with 3 mm fastener, penetrate minimum 19 mm @ 610mm O.C, providing fire sealant, metal shim to match the gap between R.C.C wall and metal runner wall shall be erected plumb, square, level, straight and true. all joints on exposed surface shall be flush and tight, neatly cut, including 3 (three) coats plastic emulsion paint etc. complete as per drawing or as stated in the schedule of items and bill of quantities.

4.03 **Delivery, storage and handling:** Similar to item no.2.03

4.04 **Workmanship:** Similar to item no.2.04

4.05 **Installation :** Similar to item no.2.05

4.06 **Joint treatment:** Similar to item no.2.06

4.07 **Miscellaneous:** Similar to item no.2.07

4.08 **Protection:** Protect install products until completion of the project and also handing over the authority. Touch up repair or replace damaged products before substantial completion.

4.09 **Method of Measurement:** Plasterboard dry partition walls shall be measured in square meter (sq.m) **of** actually covered surfaces. Deducting all opening and incorporated foreign structures, such as lintels, columns, beams, etc. Portion of single layer plaster board dry wall shall be measured separately in separate items.

4.10 **Basis of Payment:** Payment shall be made at the contract unit price per square meter **(sqm)** of completed and accepted work measured as provided above which price shall constitute full compensation for furnishing, storing, transporting, preparing, laying, erecting all materials, painting and for all labour, scaffolding, tools and equipment and for all incidentals necessary to complete the item.

5.00 ACOUSTIC WALL PANELING

5.01 **Description:** This item shall consist of manufacturing supplying fitting and fixing with approved best quality perforated MDF Board Acoustic wall paneling (melamine finish) as stated in the schedule of items and bill of quantities and in accordance with these Specification.

5.02 **Construction Requirements** perforated MDF Board with necessary hardware etc perforated MDF Board shall be 12mm thick approved best quality (PARTEX , AKIJ or approved equivalent fixed with galvanized metal frame around the perforated MDF Board, fabricating of 75mm x 40mm galvanized metal "C" Channel framing, fixing with perforated MDF Board as per Architectural drawing, providing full locking arrangement , the top and bottom metal rail shall be embedded with floor and wall with cement concrete (1:2:4) including, cutting holes and mending good the damages, finishing, curing-and where necessary ,providing galvanized metal rail and wheel for smooth movement of the gate etc.

5.03 **Method of Measurement:** The work shall be measured in square meter (sq.m) of actual area. Height should be top rail from finished floor level.

5.04 **Basis of Payment:** Payment shall be made for the amount of completed and accepted work measured as provided above at the contract unit price per square meter (sq.m) which price shall constitute full compensation for furnishing all materials, erection, necessary hardware , labour, painting (if any) etc . as well as incidentals necessary to complete the work according to the applicable Plans.

6.00 12MM THICK PLASTER (1:4).

6.01 **Description:** This item shall consist of providing 12 mm thick 1:4 cement sand plaster on wall surfaces and where necessary as stated in the schedule of items and bill of quantities

6.02 Construction Requirements

Materials shall meet requirements specified below and in the relevant section of Materials specifications:

a. Cement shall be Portland cement Type-1, ASTM C-150
b. Sand shall be clean well-grade natural sand having a fineness module of 1.50
c. Water shall be portable and clean and contain no salt or organic materials

Plaster shall consist of 1 part of cement to 4 parts of sand and have a nominal thickness of 12mm.

Only enough water shall be added to provide plasticity. Mortar shall be mixed only in quantities for immediate use. Mortar, which has taken initial set, shall not be used on the work with or without addition of fresh materials.

Before application of plaster, the joints in brick-walls shall be adequately raked out where necessary and smooth concrete surfaces shall be roughened to provide key. The surfaces shall be scrubbed clean of loose materials and soaked with water and dept damped for 24 hours in case of brick masonry and 2 hours in case of concrete before plastering. A neat cement coat shall be applied on all concrete surfaces before placing plaster.

Plaster shall consist of two coats, under and finish, when applied over brick masonry and shall consist of a grout application and finish coat when applied direct to concrete, the under and finish coats shall be applied without any interval to permit the undercoat to set.

The undercoat shall have minimum thickness of 6mm and shall be leveled with straight-edge and scratched for key, the finished coat shall be toweled over with care and leveled with a straight-edge to obtain a flat smooth surface. All edges and corners unless otherwise shown on the Plans shall be rounded or chamfered as directed by the Engineer-in-Charge. All moldings shall be neat, clean and true to template.

Plaster shall be kept moist and protected from weather for 10 days immediately following completion.

If any cracks appear in the plaster or any parts sound hollow when tapped or are found to be soft or otherwise defective after the plaster has dried, the defect shall be made good by cutting out and re-plastering at the Contractors own cost.

6.03 **Method of Measurement:** The work shall be measured in square meter (sq.m) of actual plastered with neat cement finishing surface.

6.04 **Basis of Payment:** Payment shall be made for the amount of completed and accepted work measured as provided above at the contract unit price per square meter (sq.m) of plaster which price shall constitute full compensation for furnishing all materials, mixing of mortar, plastering surfaces and corners, plaster after completion, provision, erection and removal of scaffolding as well as incidentals necessary to complete the work according to the applicable Plans.

7.00 GLAZED WAL TILES.

7.01 **Description:** The work covered under this item shall consist of supplying and fixing of approved-glazed ceramic tiles on Wall and where necessary on 1:4 cement-sand screed in accordance with the applicable drawings and these specifications. Tiles shall be of country made complying BDS ISO 13006: 2015, 150mm x75mm x 6mm or any approved size Matt finish Tile.

7.02 **Construction Requirements:** Glazed tiles unless otherwise specified, shall be standard grade 150 mm x 75 mm x 6 mm /150mmx150mmx6mm or as approved by the Engineer MATT finish wall tiles free from blemishes and dimensional defects and conforming to the standards of Federal Specification SS-T-308b.

Mortar for installation shall consist of 1 part cement to 3 parts sand (FM 1.5).

Grout for tile joints all is made of white cement, coloured as and where specified with inert pigments. Supplying and applying COTTO Hygienic grout (anti-bacteria, anti-fungi, ant algae, anti-crack, acid resistance) Modified ASTM-D5590 & ASTM-D5589, JIS Z-2801, ANSI A118.6 i Preparation of wall surface and specification of mortar bed shall comply with the provisions of specified item. If the surface needs leveling a scratch cost of plaster shall be applied leveled and scratched key and allowed to dry for 12 hours before installing tiles. The setting mortar shall be applied evenly and a neat cement paste to a thickness of about 2 mm shall be trowel led to the back of title

7.03 **Method of Measurement:** Measurement for payment shall be made in square meter (sqm) finished tiled surface. No allowance will be made for cutting and wastage.

7.04 **Basis of Payment:** The amount of completed and accepted work measured as provided above shall be made on the contract unit price per square meter (sqm) which payment shall constituted full compensation for furnishing all materials, equipment and labour, including storage, handling and transport of materials, cleaning, preparing and laying bed and cutting, fixing grouting, and curing ties as well as all incidentals necessary to complete the work.

8.00 GLAZED SKIRT TILES

8.01 **Description:** The work covered under this item shall consist of supplying and fixing of approved glazed ceramic tiles on walls and where necessary on a 1:3 cement-sand screed in accordance with the applicable drawings and these specifications. Tiles shall be of country made complying BDS ISO 13006: 2015, 150mm x75mm x 6mm or any approved size Matt finish Tile.

8.02 **Construction Requirements:** Glazed tiles unless otherwise specified, shall be standard grade 150 mm x 75 mm x 6 mm /150mmx150mmx6mm or as approved by the Engineer MATT finish wall tiles free from blemishes and dimensional defects and conforming to the standards of Federal Specification SS-T-308b.

Mortar for installation shall consist of 1part cement to 3 parts sand (FM 1.5).

Grout for tile joints all is made of white cement, coloured as and where specified with inert pigments. Supplying and applying COTTO Hygienic grout (anti-bacteria, anti-fungi, ant algae, anti-crack, acid resistance) Modified ASTM-D5590 & ASTM-D5589, JIS Z-280, ANSI A118.6 i Preparation of wall surface and specification of mortar bed shall comply with the provisions of- specified item. If the surface needs leveling a scratch cost of plaster shall be applied leveled and scratched key and allowed to dry for 12 hours before installing tiles. The setting mortar shall be applied evenly and a neat cement paste to a thickness of about 2 mm shall be trowel led to the back of title.

8.03 **Method of Measurement:** Measurement for payment shall be made in square meter (sqm) finished- tiled surface. No allowance will be made for cutting and wastage.

8.04 **Basis of Payment:** The amount of completed and accepted work measured as provided above shall be made on the contract unit price per square meter (sqm) which payment shall constituted full compensation for furnishing all materials, equipment and labour, including storage, handling and transport of materials, cleaning, preparing and laying bed and cutting, fixing grouting, and curing ties- as well as all incidentals necessary to complete the work.

9.00 WOOD WORK IN SKIRT

9.01 **Description:** The work to be performed under this section shall consist of supplying, fitting and fixing of 12.50 mm thick wood(finished) in skirt including all finish hardware.

9.02 **Samples:** Before execution of work, samples of wood specimens shall be submitted to the Engineer for approval. Approved sample may be installed in the works or kept at site for verification of material supplied by the Contractor.

9.03 Materials:

WOOD

Before execution of work, samples of wood specimens shall be submitted to the Engineer for approval. Approved sample may be installed in the works or kept at site for verification of material supplied by the Contractor.

9.04 Fabrication

All wood work shall be fabricated to conform to the details and dimensions indicated on the drawings and as directed by the Engineer-in-Charge.

a. Wood shall be properly cut, housed together and joined with mortise and tenon joints. All exposed surfaces shall be sanded smooth. Back faces of wood which will be in contract with or against concrete or masonry shall be treated with a minimum of two coats of wood preservation such as creosote or so lignum approved paint. Providing sealant as instructed in the drawing. Wood preservative to be used shall be approved by the Engineer-in-Charge.

Wood shall be fitted in skirt in position true and plumb and fixed with galvanized screws, nails etc.

All hardware shall be installed, and shall fit properly with minimum clearances. operation without hinge bind.

After wood fixed in skirt all wood surfaces shall be French polished /Enamel painted as specified below:

Varnishing / French Polishing

i. All wood surfaces to receive varnish shall be cleaned from dirt, oil and other foreign substances, the surfaces shall be made smooth by rubbing with sand paper. Recesses, cracks, joints shall be filled with red lead and glue mixed in equal quantities and sanded flush with the wood surface.

ii. Varnish shall be made by dissolving shellac (Chanc gals) and mentholated spirit (1 to 1.5 pounds of shellac in 1 gallon of spirit) and applied over the finished surfaced with a piece of lined cloth.

iii. Unless otherwise directed by the Engineer-in-Charge no pigment shall be added to the varnish.

iv. Three (3) coats varnishing shall be applied. While applying the final cast a little quantity about 1 chhatak (14 pound) of "Karfa" shall be added to varnish prepared in above to heighten the brilliancy of the varnished surface.

If the surface to be enamel painted which to be followed as specified item.

9.05 Method of Measurement:

Wood work in skirt shall be measured in lineal meter (rm) of accepted

9.06 **Basis of Payment:** Wood work in skirt will be paid at the contract unit rate per running metre (Rm) for the approved and accepted installed work. which payment shall constituted full compensation for furnishing all materials, equipment and labour, including storage, handling and transport of materials, cleaning, preparing and laying bed and cutting, fixing, as well as all incidentals necessary to complete the work. No payment shall be made for submitting any sample for approval.

DOORS WORK

10.00 METAL DOOR (FRAME & SHUTTER)

10.01 **Description:** The work to be performed under this section supplying fitting and fixing metal door including frames and shutter as per door schedule, drawings, as specified in the schedule of items & Bill of quantities and as specified herein.

All steel materials shall meet the requirement of steel as on the specific items. As welds, both shop and field shall be indicated by standard welding symbols of the American Welding Society, Drawing shall show the size, length and type of each weld.

10.02 **10.02 Construction Requirements :** Hollow metal single leaf/double leaf door shutter made of 18 BWG galvanized M.S sheet and metal frame made of 16 BWG galvanized M.S

sheet of 50mm thick with wall flush or as per drawing and fill up the void with 1:1.50:3 concrete in/c 7 days curing and fitted with 250 mm long 8 Nos. of iron clamps of same size (with one end bifurcated) with the vertical members of the frame, fixing the door in wall with cement concrete (1:1.50:3), mending good the damages.

10.03 **Method of Measurement:** All metal doors (Double and single shutter doors) including frames all foreign made hardware in/c lock, installed in place, paint/polish etc all complete will be measured in Each.

10.04 **Basis of Payment:** The amount of completed and accepted work, measured as provided, shall be paid at the contract unit price Each which payment shall constitute full compensation for furnishing all materials, equipment and labour including transport, storage and handling of materials, cutting, forming, fabricating, placing, fixing, finishing, painting, foreign hard ware in/c lock as well as all incidentals necessary to complete the work according to applicable plans and door schedule.

11.00 WOOD WORK (DOOR FRAME AND SHUTTER)

11.01 **Description:** The work to be performed under this section shall consist of finishing and installing of wooden doors, whose shape shown on the drawings or in the doors schedule or as directed by the Engineer-in-Charge including supplying and fixing of all finished hardware and glazing.

11.02 Shop Drawings

a. Detailed shop drawings of doors and windows and other wooden works including glazing and installation details, shall be submitted to the Engineer-in-Charge for approval.

b. Shop drawing shall include the submission of manufacturer's literature, brochures and delivery date for all finish hardware and manufacturer's literature or specification for glass.

c. Manufacturer of fabrication of wooden doors shall not be started until the shop drawings have been approved by the Engineer-in-Charge.

11.03 Samples

a. Within 35 days (thirty-five) days after contract is awarded, the Contractor shall furnish for approval of the Engineer-in-Charge a complete list in 4 (four) copies of all hardware proposed for use on the contract, scheduling all hardware for every door.

b. Two pieces of samples of wood specimens 150 mm x 250 mm in area by 25 mm thick shall be submitted for all types of wooden works for approval by the Engineer-in-Charge.

c. One sample of each type of finish hardware for doors and windows shall be submitted to the Engineer-in-Charge for approval, the hardware shall be of the quality equal to or better than the samples available in the Engineer-in-Charge's office. Approved hardware samples to be kept at site for verification of material supplied by the Contractor.

d. Two pieces of 150 mm x 200 mm samples of glass proposed for glazing shall be supplied to the Engineer-in-Charge for approval.

11.04 Materials

a. Timber

1) Timber used for woodwork shall be well seasoned, kiln dry, free from large or loose knots, saps and shakes and will be finished to the exact dimensions shown on the drawing or as directed by the Engineer-in-Charge. The piece of wood shall be properly finished before joining and the completed wood work shall be accepted by the Engineer-in-Charge before fixing in position.

2) Wood for frame: High quality Chittagong Teak shall be used for frame work and any where required.

3) Wood veneered flush door shutter: Burma Teak veneered door shall be used for door shutter or sash.

4) Wood for solid door shutter: High quality Chittagong Teak wood shall be used for solid door shutter and anywhere required.

b. Finish Hardware

1) **Door hinges:** Foreign made satine chrome finish Offset pivot hinge at all doors, Concealed bearing butt hinges, bearing butt hinges, as approved the Engineer.

2) **Door Stopper:** shall be made foreign made wall mounted and floor mounted.

3) **Door handle:** shall be foreign made satine chrome finish HAGGER 921 P or equivalent C- shaped, 483mm, HAFELE CAPO 903.99.057 or equal, liver handle on rose & cylinder Escutcheon, HAFELE 903.99.057 or equal pull handle back-to-back fixing 32 mm dia 300mm C/C. as approved by the Engineer.

4) **Door Closer:** shall be foreign made best quality satine chrome finish DORMA TS83 series concealed overhead, DORMA TS93 series, DORMA ITS83 series concealed overhead installed on all double shutter door etc as approved by the Engineer.

5) **Door Lock:** shall be foreign made best quality satine chrome finish HAFELE 911 series or approved best quality of HAFELE lock.

6) **Door hinge:** shall be foreign best quality offset pivot hinge

7) **Panic exit device:** shall be foreign made satine chrome finish HAFELE rim push bar exit device 911.52/911.52.632 as approved by the Engineer.

8) **Glass:** shall be locally available best quality, Nasir ,PHP or approved equal and shall be 10 mm thick tempered, etc. as approved by the Engineer.

11.05 Fabrication

All wood work shall be fabricated to conform to the details and dimensions indicated on the drawings, doors schedule and as directed by the Engineer-in-Charge.

a. Door frame shall be properly cut, housed together and joined with mortise and tenon joints. The frames will be rebelled on one side by a cut measuring 13 mm in one direct ion and the full thickness of the shutter in the other. Frames shall be plumb and level with corners at right angles. All exposed surfaces shall be sanded smooth. Back faces of wood which will be in contract with or against concrete or masonry shall be treated with a minimum of two coats of wood preservation such as creosote or solignum approved paint. Wood preservative to be used shall be approved by the Engineer-in-Charge.

The frame shall be fitted vertically in position true and plumb and fixed M.S. clamps 375 mm x 40 mm x 6 mm set in cement concrete within the masonry wall. There shall be eight or ten clamps, for door frames (as per drawing. The clamps shall be fitted by making recess in the frame so that the frame nicely fits with the wall surface.

b. Door sash shall be of panel design and constructed as shown on the drawings. Panel-sash frame shall be housed and joined with mortise and tennon joints. Panels for doors shall be solid wood, placed properly in retaining grooves with 4 mm (3/16") gap between adjacent panels on all sides as indicated on the drawings.

Door frames and door sash shall be approved by the Engineer-in-Charge after assembling and before installing in position.

All hardware shall be installed as per door hard ware schedule, and all door assemblies shall fit properly with minimum clearances. Hinges shall be recessed flush with surrounding wood surfaces. All sashes shall be tested for proper and smooth operation without hinge bind.

After the door installation is completed all wood surfaces shall be painted/polished as specified below:

11.06 Varnishing / French Polishing

i. All wood surfaces to receive varnish shall be cleaned from dirt, oil and other foreign substances, the surfaces shall be made smooth by rubbing with sand paper. Recesses, cracks, joints shall be filled with red lead and glue mixed in equal quantities and sanded flush with the wood surface.

ii. Varnish shall be made by dissolving sheltac (Chanc gals) and methylated spirit (1 to 1.5 pounds of sheltac in 1 gallon of spirit) and applied over the finished surfaced with a piece of lined cloth.

iii. Unless otherwise directed by the Engineer-in-Charge no pigment shall be added to the varnish.

iv. Three (3) coats varnishing shall be applied. While applying the final cast a little quantity about 1 chhatak (14 pound) of "Karfa" shall be added to varnish prepared in above to heighten the brilliancy of the varnished surface.

11.07 Enamel painting

i) Enamel painting works in wooden surface or where water proofing is required as directed by the Engineer-in-Charge with synthetic enamel paint of any approved brand and colour .

ii) Paint shall consist of synthetic enamel of approved type supplied in original sealed containers bearing the manufacturer of the paint. Application in all other respect shall conform to the requirements.

11.08 Method of Measurement: All door (Double shutter& single shutter) including frames, louver all hardware, installed in place, paint/polish etc. all complete will be measured in Each.

11.09 Basis of Payment: The amount of completed and accepted work, measured as provided, shall be paid at the contract unit price Each which payment shall constitute full compensation for furnishing all materials, equipment and labour including transport, storage and handling of materials, cutting, forming, fabricating, placing, fixing, finishing, spry painting, varnishing and wax polishing as well as all incidentals necessary to complete the work according to applicable plans.

12.00 METAL FIXED LOUVER

12.01 Description: The work covered under this item shall consist of constructing metal Fixed louver fixed on galvanized M.S post for screwed to galvanized vertical plate, fitting and fixing galvanized tube horizontally, fitting fixing galvanized metal M.S frame in accordance with applicable drawings, design and these specifications.

12.02 Construction Requirements: Galvanized M.S sections meeting the requirements stated under mild steel item and size should be according to the drawings.

Louver shall be fabricated of materials indicated on the plans and fixed to accurate form and position. Where the design provides for fixing M.S frame on floor, the fixing M.S frame shall be cast in proper location and shall be square of 10mm larger than the square size of the

baluster base plate and extend 125 mm deep into the floor concrete. The holes shall be caulked with molten lead after setting balusters base plate in position. Baluster base plate side mounted to stringer shall be secured by adequate anchors embedded in concrete. The contractor shall submit shop drawing respecting this job.

All railing work shall be carried out, finished and varnished and waxed polished as per design drawing.

12.03 Galvanized metal

Galvanized metal louver shall meet the requirement of the specification and fixed as per approved drawing.

12.04 Method of Measurement: Measurement shall be made in square meter (sqm) basis for exposed area of metal louver.

12.05 Basis of Payment : The amount of completed and accepted work, measured as provided, shall be paid at the contract unit price per square metre (sqm) which payment shall constitute full compensation for furnishing all materials, equipment and labour including transport, storage and handling of materials, cutting, forming, fabricating, placing, fixing, finishing, galvanizing, painting, varnishing and wax polishing of baluster, opening holes, restoring louver and wall floor finishing as well as all incidentals necessary to complete the work according to applicable plans.

13.00 FAIR FACE BRICK VENEERED WORK.

13.01 Description: The worked covered by this item consist of constructing 242mmX70mm facing brick work in 6mm thick mortar joint with 50% sorted out 1st class handmade, machine mould, gas burn CFC (CONFORCE LIMITED) bricks of size 242mmx115mmx70mm with 1:3 cement mortar paste on wall, including high class recessed pointing 1:2 (proportion of White : Grey cement shall be 2:1) sand cement mortar in column, beam, floor, wall and elsewhere required as per drawings, stated in the schedule of item:1 and bill of quantities and instruction of the Engineer-in-Charge.

13.02 Workmanship: Brickwork shall be built plumb and shall be carried up regularly throughout the entire length of structure by very skilled mason. Brick shall be laid as per design and drawing and only the smooth face of the handmade bricks shall be used as exposed Thickness of horizontal & vertical joints are as per drawing. Exposed joints shall be raked and pointed. The face of the work shall be kept clean as work proceeds. In exposed situations the work shall be protected against harmful effect of weather during and for a period immediately following construction until the mortar has sufficiently hardened. All brick work shall be thoroughly cured for a period of at least 15 days.

13.03 Method of Measurement: Brick veneered walls shall be measured in square meter (sq.m) of actually exposed brick surfaces wall. Deducting all opening and incorporated foreign structures, such as lintels, columns, beams, etc. Square, rectangular, circular section brick veneered work shall be measured through the centre length of brick work and then multiplied with the height.

13.04 **Basis of Payment:** Payment shall be made at the contract unit price per square meter (sqm) of completed and accepted work measured as provided above which price shall constitute full compensation for furnishing, storing, transporting, preparing, laying, recessed pointing and caring all materials and for all labour, scaffolding, tools and equipment and for all incidentals necessary to complete the item.

GLASS RAILING WORKS

14.00 GLASS RAILING

14.01 **Description:** The work covered under this item shall consist of supplying, fabrication, fitting and fixing glass railing in accordance with applicable drawings, design and these specifications.

14.02 **Construction Requirements:** Glass railing should be according to the drawings. Railing shall be as indicated on the plans and fixed to accurate form and position. Where the design provides for fixing the railing in position associated finishing works to be done. All railing work shall be carried out, finished as per design drawing.

14.03 **Method of Measurement:** Measurement shall be made in square meter (sqm) basis for exposed area of glass railing.

14.04 **Basis of Payment:** The amount of completed and accepted work, measured as provided, shall be paid at the contract unit price per square meter (sqm) which payment shall constitute full compensation for furnishing all materials, equipment and labour including transport, storage and handling of materials, cutting, forming, fabricating, placing, fixing, finishing, galvanizing, glass as well as all incidentals necessary to complete the work according to applicable plans.

FALSE CEILING WORKS

15.00 FALSE CEILING WORKS (GYPSUM BOARD)

15.01 **Description:** The work under this item shall of consist Materials for false ceiling shall be board made of gypsum board of thickness 12.50mm of ceiling as specified in the drawings and schedule of items & Bill of quantities.

15.02 **15.02 Construction Requirements:** Materials for false ceiling shall be board made of gypsum board of thickness 12.50mm and suspended from reinforced concrete roof by

means of adjustable height suspension system and on a frame work of, imported furring channels, furring channel joineries, locking keys fasteners, renal plugs etc.

The ceiling shall be supplied with adjustable height, corrosion resistant metal, suspension systems with necessary accessories all in adequate quantities as recommended by the manufacturer. Rates shall be inclusive of every materials, labour accessories tools and plants painting etc. to produce the false ceiling complete in all respect.

15.03 **Method of Measurement:** False ceiling including all hardware, installed in place will be measured in square metre (sqm) of the installed board surface.

15.04 **Basis of Payment :** The amount of completed and accepted work measured as provided above shall be made on the contract unit price per square meter (sqm) which payment shall constituted full compensation for furnishing all materials, equipment, fabrication, fitting and fixing in position, including storage, handling and transport of materials, galvanizing the metal frame, furring channel, necessary hard ware etc. to perform the function as well as all incidentals necessary to complete the work.

16.00 PERFORATED GYPSUM BOARD FALSE CEILING

16.01 **Description:** The work under this item shall of consist Materials for false ceiling shall be **perforated** board made of gypsum board of thickness 12.50mm of ceiling as specified in the drawings and schedule of items & Bill of quantities.

16.02 **Construction Requirements:** Materials for false ceiling shall be board made of gypsum board of thickness 12.50mm and suspended from reinforced concrete roof by means of adjustable height suspension system and fixed with galvanized metal furring channel (imported) which is to be placed @ 600 mm C/C and providing 1200mm C/C primary galvanized metal Channel support which is to be fixed and rest on perimeter galvanized metal channel runner, galvanized metal primary support on a frame work of, imported furring channels, locking keys fasteners, renal plugs etc.

The ceiling shall be supplied with adjustable height, corrosion resistant metal, suspension systems with necessary accessories all in adequate quantities as recommended by the manufacturer. Rates shall be inclusive of every materials, labour accessories tools and plants painting etc. to produce the false ceiling complete in all respect.

16.03 **Method of Measurement:** False ceiling including all hardware, installed in place will be measured in square metre (sqm) of the installed board surface.

16.04 **Basis of Payment :** The amount of completed and accepted work measured as provided above shall be made on the contract unit price per square meter (sqm) which payment shall constituted full compensation for furnishing all materials, equipment, fabrication, fitting and fixing in position , including storage, handling and transport of materials, galvanizing the metal frame , furring channel, necessary hard ware etc to perform the function as well as all incidentals necessary to complete the work.

17.00 FALSE CEILING (PLY WOOD)

17.01 **Description:** The work under this item consists of ply wooden false ceiling as specified in the drawings and schedule of items & bill of quantities.

17.02 **Construction Requirements:** Materials for ply wooden false ceiling shall be approved best quality 12mm thick ply wood with 6mm thick Burma Teak veneered as specified in the drawings. Ply Wooden false Ceiling shall be fixed with metal frame or suspended from ceiling/beam as per drawing or directed. The overall surface should be finished as stated in the drawing or as directed. Rates shall be inclusive of every material, labour accessories tools and plants finishing etc. to produce the false ceiling complete in all respect.

17.03 **Method of Measurement**: Ply Wooden False ceiling including metal frame, all hardware, installed in place will be measured in square metre (sqm). Actual horizontal length and breadth of the false ceiling shall be measured only.

17.04 **Basis of Payment:** Ply Wooden false ceiling will be paid at the contract unit rate per square metre (sqm) of the measured areas of approved and accepted installed work. which price shall constitute full compensation for material, metal frame, labour, fitting fixing, storage, carriage etc. all incidental necessary to complete the work.

FLOOR FINISH WORKS

18.00 ARTIFICIAL PATENT STONE FLOORING

18.01 **Description:** The work covered by this item shall consist of constructing 38 mm thick steel-toweled 1:1.50:3 concrete topping including neat cement finishing with 10 mm downgraded stone chips, sand and cement in panels not exceeding 900 mm on floor slabs and elsewhere in accordance with these specifications.

18.02 **Construction Requirements:** Materials and construction shall be in accordance with the requirements concrete.

The flooring shall be laid preferably not late than 24 hours after the floor slab is poured. When flooring is to be laid on an older concrete slab, the base surface shall be thoroughly cleaned of laitance and all loose materials by stiff wire brush, roughened if deemed necessary, and washed and soaked and clean water. Surplus water shall be removed and neat-cement coating supplied to the surface before flooring is placed.

The floor shall be divided into panels of specified sized by means of wooden battens. The top of the battens shall be at the level of the finished floor surface.

The mixture shall be spared evenly between the battens in alternate panels and shall be uniformly consolidated and leveled by a strike off. When the moisture has disappeared from the surface, the surface shall be steel-trawled under firm pressure to produce a dense uniform smooth surface free from trowel marks.

The dividing battens shall be removed carefully after 16 hours and the remaining panels shall be completed in the aforesaid manner.

The neat cement application shall be minimum 2.0 mm thick. A little extra thickness shall be allowed for polishing. The floor shall be polished, 3 weeks after it is laid, step by step, with different grades of soft polishing store till a perfectly smooth glazy surface is obtained. The work shall be cured and protected for at last 21 days immediately following the laying.

18.03 **Method of Measurement:** Measurement for payment shall be made in square meter (sqm) finished artificial flooring surface.

18.04 **Basis of Payment:** The amount of completed and accepted work measured as provided above shall be made on the contract unit price per square meter (sqm) which payment shall constituted full compensation for furnishing all materials, equipment and labour, including storage, handling and transport of materials, cleaning, preparing and laying bed, form work fixing and removing if necessary, neat cement finishing and curing as well as all incidentals necessary to complete the work.

19.00 NON-SLIP UNGLAZED MATT FINISH FLOOR TILES

19.01 Description: The work covered under this item shall consist of supplying and fixing of approved non slip unglazed Matt. Finish floor tiles on floor and where necessary on 1:4 cement-sand screed in accordance with the applicable drawings and these specifications. Tiles shall be of any approved size country made non-slip unglazed Matt finish floor tiles.

19.02 Construction Requirements: Non slip Unglazed floor tiles unless otherwise specified, shall be standard grade of 300 mm x 300 mm x 6 mm or as approved by the Engineer white or colour in floor free from warp age, blemishes and dimensional defects and conforming to the standards of Federal Specification SS-T-308b.

Mortar for installation shall consist of 1 part cement to 4 parts sand (FM 1.5).
Supplying and applying country made non-slip unglazed Matt finish floor tiles complying BDS ISO13006: 2015, water absorption ≤ 0.5%, modulus of rupture (MOR) ≥ 27 N/mm2,).

Grout for tile joints shall be made of white cement, coloured as and where specified with inert pigments.

If the surface needs leveling a scratch cost of c.c shall be applied leveled and scratched key and allowed to dry for 12 hours before installing tiles. The setting mortar shall be applied evenly and a neat cement paste to a thickness of about 2 mm shall be trowel led to the back of title. Water proofing sealant shall be applied before and after tiles fitting work executed and completed.

19.03 Method of Measurement: Measurement for payment shall be made in square meter (sqm) finished tiled surface. No allowance will be made for cutting and wastage.

19.04 Basis of Payment: The amount of completed and accepted work measured as provided above shall be made on the contract unit price per square meter (sqm) which payment shall constituted full compensation for furnishing all materials, equipment and labour, including storage, handling and transport of materials, cleaning, preparing and laying bed and cutting, fixing grouting, water proofing sealant and curing ties as well as all incidentals necessary to complete the work.

20.00 18MM THICK MATT FINISH KOTA STONE FLOORING

20.01 Description: The work covered by this item shall consist of supplying and placing of 18 mm thick matt finish kota stone (foreign made) Greens or approved equivalent on floor or any where is required as shown in the drawing and as stated in the schedule of items and bill of quantities and this specification.

20.02 Construction Requirements: Natural Stone shall be of foreign made Green or approved equivalent in size 300mmx 300mmx18mm or as approved by the Engineer having approved colour on 25 mm thick sand cement mortar bed (1:2) including providing cement slurry and water proofing sealant immediately before laying the stone slab with sight pressure to

ensure close contact with bed. Joint should be straight and thin not exceeding 1.50 mm gap filled with white cement grout and colour pigments matching with the stone and then grinding, rubbing, washing and polishing as mirror glazed. Supplying and applying COTTO sealers FILA MP/90 @ 1 liter for 40 square meters. All stone shall be square edge.

20.03 **Method of Measurement:** Measurement for payment shall be made in square meter (sqm) finished surface. No allowance will be made for cutting and wastage.

20.04 **Basis of Payment:** The amount of completed and accepted work measured as provided above shall be made on the contract unit price per square meter (sqm) which payment shall constituted full compensation for furnishing all materials, equipment and labour, including storage, handling and transport of materials, cleaning, preparing and laying bed and cutting, fixing grouting, water proofing sealant as well as all incidentals necessary to complete the work.

21.00 GRANITE STONE

21.01 **Description:** The work covered by this item consist of supplying and placing of 18 mm, and 50mm thick or any approved thick granite stone (foreign made) Greens or approved equivalent Matt finish Matt. Finish, flame finish steel grey granite, matt polish still grey granite on floor or any where is required as shown in the drawing, as stated in the drawing and these specification.

21.02 **Construction Requirements:** Natural Stone shall be of foreign made Green or approved equivalent in size 300 mm x 300 mm x 18 mm, 400mm x 400mm x 18mm, 600mm x 600mm x 18mm, 400mm x 800mm x 18mm, 400mm x 800mm x 35mm, 600mm x 200mmx50mm or any approved size as approved by the Engineer having approved colour on 25 mm thick sand cement mortar bed (1:2) including providing cement slurry and water proofing sealant immediately before laying the stone slab with sight pressure to ensure close contact with bed. Joint should be straight and thin not exceeding 1.50 mm gap filled with white cement grout and then grinding, rubbing, washing and polishing as mirror glazed. Supplying and applying COTTO sealers FILA MP/90 @ 1 litre for 40 square metre.

21.03 **Method of Measurement:** Measurement for payment shall be made in square meter (sqm) finished stone surface. No allowance will be made for cutting and wastage.

21.04 **Basis of Payment :**The amount of completed and accepted work measured as provided above shall be made on the contract unit price per square meter (sqm) which payment shall constituted full compensation for furnishing all materials, equipment and labour, including storage, handling and transport of materials, cleaning, preparing and laying bed and cutting, fixing grouting, water proofing sealant as well as all incidentals necessary to complete the work.

22.00 CARPET TILES

22.01 **Description :** The work covered under this item shall consist of supplying and fixing of approved best quality Carpet tiles on patent stone finished floor with adhesive as per drawings and these specifications. Carpet Tiles shall be of Milken or Interface.

22.02 **Construction Requirements:** Carpet tiles unless otherwise specified, shall be standard grade of 600 mm x 600 mm or any approved size with integrated cushion back, custom colour and any pattern free from dimensional defects.

Adhesive for installation shall be of approved best quality or as per manufacturer's recommendations.

22.03 **Method of Measurement:** Measurement for payment shall be made in square meter (sqm) finished Carpet tiled surface. No allowance will be made for cutting and wastage.

22.04 **Basis of Payment:** The amount of completed and accepted work measured as provided above shall be made on the contract unit price per square meter (sqm) which payment shall constituted full compensation for furnishing all materials, equipment and labour, including storage, handling and transport of materials, adhesive, cleaning, preparing and laying bed and cutting, fixing as well as all incidentals necessary to complete the work.

23.00 WOOD FLOORING WORK

23.01 **Description:** The work to be performed under this section shall consist of supplying, fitting and fixing wood in floor on painted metal framing work as shown in the drawings, schedule of items and bill of quantities or as directed by the Engineer-in-Charge.

23.02 **Construction Requirements:** Timber flooring work with Supplying fitting and fixing Chittagong teak in floor or any where is required with 38 mm thick or any approved thick best season Chittagong teak wood with Burma teak veneered 75mmx75mmx6mm thick M.S angle framing in 600mm grid in/c embedded the frame with concrete floor and painting three coats of synthetic enamel paint over a coat of red lead primer ,fitting fixing wood planks with screw, nails etc and greatest care should be exercised during fitting fixing wood on M.S frame so that proper level with true to line and level or proper gradient etc can be provided .

23.03 Samples

a. Sample of wood shall be submitted for approval by the Engineer-in-Charge before execution of work.

b. Approved samples may be installed in the works or kept at site for verification of material supplied by the Contractor.

23.04 Materials

a. Wood

1) Wood used for wood flooring work shall be Chittagong teak wood with well seasoned, kiln dry, free from large or loose knots, saps and shakes and will be finished to the exact dimensions shown on the drawing or as directed by the

Engineer-in-Charge. The piece of wood shall be properly finished before joining and the completed wood work shall be accepted by the Engineer-in-Charge before fixing in position.

23.05 Fabrication

All wood work shall be fabricated to conform to the details and dimensions indicated on the drawings and as directed by the Engineer-in-Charge.

a. All exposed surfaces shall be sanded smooth. Back faces of wood which will be in contract with or against M.S angle framing shall be treated with a minimum of two coats of wood preservation such as creosote or so lignum approved paint. Wood preservative to be used shall be approved by the Engineer-in-Charge.

38 mm thick or as per drawing Chittagong teak wood or as per drawing shall be fitted with 75mmx75mmx6mm size M.S angle frame as per drawing. The M.S angle frame shall be embedded with concrete floor as shown in the drawing .The frame shall be 3 (three) coats of enamel painted as per specification of enamel painting works before fixing with concrete floor.

b. All plunks width shall be similar. Lapps, face to face joint shall be avoided. All hardware shall be installed as mentioned in the drawing or as required
After wooden floor installation is completed all wood surfaces shall be polished and to be Burma Teak veneered as directed in the drawing.

23.06 Associated metal works: Similar to the respective items where specified.

23.07 Method of Measurement: Measurement for payment shall be made in square metre (sq.m) of actual covered area of wood flooring works. No allowance will be made for cutting and wastage, lapping etc.

23.08 Basis of Payment: Wood work in floor will be paid at the contract unit rate per square meter (sqm) for the approved and accepted installed work. which payment shall constituted full compensation for furnishing all materials, equipment and labour, including storage, handling and transport of materials, cleaning, preparing and laying M.S frame including fabrication welding and cutting, fixing, painting, polishing as well as all incidentals necessary to complete the work. No payment shall be made for submitting any sample for approval.

24.00 BASIN/SINK COUNTER

24.01 Description: The work to be performed under this section shall consist of constructing, basin/sink counter as specified in the schedule of items and bill of quantities or as per drawing and these specifications.

24.02 Construction requirements : All materials shall meet the requirement of specification in the respective items. All related items of work below and above of the counter shall be done properly.

24.03 **Method of Measurement:** The item works shall be measure in running meter (Rm) basis. Length of horizontal plane for each of the basin/ sink counter shall be measured for payment.

24.04 **Basis of Payment:** The amount of completed and accepted work measured as provided above shall be made on the contract unit price per Running meter (Rm) which payment shall constituted full compensation for furnishing all materials, equipment and labor, including storage, handling and transport of materials, cleaning, providing reinforcement, R.C.C work
,Brick work, plastering form work and removing, fitting and fixing granite in top and bottom floor wall etc as well as all incidentals necessary to complete the work as per drawing.

PAINTING WORK

25.00 SYNTHETIC ENAMEL PAINT

25.01 **Description:** The work covered by this item shall consists of painting Metallic surface, or Wooden surface, plastered surface or any where is prescribed and where water proofing is required as directed by the Engineer-in-Charge with synthetic enamel paint of any approved brand and colour in accordance with these specifications.

25.02 **Construction Requirements:** Paint shall consist of synthetic enamel of approved type supplied in original sealed containers bearing the manufacturer of the paint. Application in all other respect shall conform to the requirements of consultant.

25.03 **Method of Measurement:** Measurement for payment shall be made in square meter (sq.m) of painted surface. Opening shall be deducted from the measured area.

25.04 **Basis of Payment:** The amount of complete and accepted work measured as provided above shall be paid for at the contract unit price per square meter (sqm) which payment shall constitute full compensation for furnishing all materials, equipment and labour including storage, transport, preparing, mixing and applying putty, primer and paint and providing scaffolding as well as all incidentals necessary to complete the work.

26.00 LOW SHEEN ACRYLIC EMULSION PAINTING

26.01 **Description :** The work covered this item shall consist of painting plastered wall or ceiling surfaces, where necessary with low sheen acrylic emulsion paint in accordance with these specifications.

26.02 **Construction Requirements :**Paint shall consist of low sheen acrylic emulsion resign base water-thinned approved products supplied in original sealed containers bearing the manufacturer's trade mark**.**

Prime-sealer shall be alkali resisting rapid drying primer of approved made supplied in the original sealed containers bearing the manufacturer's trade mark.

Paint shall be in 3(Three) coats.

Filter shall be approved proprietary product or unless otherwise recommended by the manufacturer of primer/paint consists of a mixture of whiting or plaster of parts with primer well mixed to a smooth paste of knife consistency.

Three thin coats shall be applied over a coat of primer with 6 hours intervals between each application, the paint may be applied by brush or roller.

Prior to application of paint, the surface to be painted shall be dry, well cleaned and free from efflorescence, dirt, stain or grease. The surface shall be given a thorough rub down to remove all loose materials and all cracks and surface irregularities shall be prepared with patching plaster and filter to obtain a smooth and even surface to the satisfaction of the Engineer-in-Charge. The filler shall always be spread from the same face of the filling knife, the other face shall be kept clean and free. Brush shall always be cleaned after use. Filler shall be applied before priming, and the surface shall be rubbed before the application to ensure clean work and again after application after allowing 12 hours to dry.

All application of paints, primer and filler shall be in accordance with the manufacturer's instruction.

26.03 **Method of Measurement:** Measurement for payment shall be made in square metre (sq.m) of painted surface. Opening shall be deducted from the measured area.

26.04 **Basis of Payment:** The amount of completed and accepted work measured as provided above shall be paid at the contract unit price per square metre (sqm) which payment shall constitute full compensation for furnishing all materials, equipment and labour including storage, transport, preparing, mixing and applying putty, primer and paint providing scaffolding as well as all incidentals necessary to complete the work.

27.00 FLAT ACRYLIC EMULSION PAINTING

27.01 **Description:** The work covered this item shall consist of painting plastered wall or ceiling surfaces, where necessary with flat acrylic emulsion paint in accordance with these specifications.

27.02 **Construction Requirements :**Paint shall consist of flat acrylic emulsion resign base water-thinned approved products supplied in original sealed containers bearing the manufacturer's trade mark.

Prime-sealer shall be alkali resisting rapid drying primer of approved made supplied in the original sealed containers bearing the manufacturer's trade mark.
Paint shall be in 3(Three) coats over lime putty.

Filter shall be approved proprietary product or unless otherwise recommended by the manufacturers of primer/paint consist of a mixture of whiting or plaster of parts with primer well mixed to a smooth paste of knife consistency.

Three thin coats shall be applied over a coat of primer with 6 hours intervals between each application, the paint may be applied by brush, roller or spray.

Prior to application of paint, the surface to be painted shall be dry, well cleaned and free from efflorescence, dirt, stain or grease. The surface shall be given a thorough rub down to remove all loose materials and all cracks and surface irregularities shall be prepared with patching plaster and filter to obtain a smooth and even surface to the satisfaction of the Engineer-in-Charge. The filler shall always be spread from the same face of the filling knife, the other face shall be kept clean and free. Brush shall always be cleaned after use. Filler shall be applied before priming, and the surface shall be rubbed before the application to ensure clean work and again after application after allowing 12 hours to dry.

All application of paints, primer and filler shall be in accordance with the manufacturer's instruction.

27.03 **Method of Measurement:** Similar to item No.26.03

27.04 **Basis of Payment:** Similar to item no.26.04

28.00 WATER REPELLENT PAINT

28.01 **Description:** The work covered this item shall consist of painting brick veneered surfaces and fair face R.C.C surfaces or any where is suggested with clean silicon water repellent paint in accordance with these specifications.

28.02 **Construction Requirements:** Paint shall consist of clean silicon water repellent paint of approved products supplied in original sealed containers bearing the manufacturer's trade mark..

Two coats shall be applied, the paint may be applied by brush, roller or spray.

Prior to application of paint, the surface to be painted shall be dry, well cleaned and free from efflorescence, dirt, stain or grease. The surface shall be given a thorough rub down to remove all loose materials.

All application of paints shall be in accordance with the manufacturer's instruction.

28.03 **Method of Measurement:** Measurement for payment shall be made in square metre (sq.m) of painted surface. Opening shall be deducted from the measured area.

28.04 **Basis of Payment:** The amount of completed and accepted work measured as provided above shall be paid at the contract unit price per square metre (sqm) which payment shall constitute full compensation for furnishing all materials, equipment and labour including storage, transport, preparing, mixing and applying putty, primer and paint providing scaffolding as well as all incidentals necessary to complete the work

29.00 BLINDS WORKS

29.01 Description: The work covered this item shall consist of grey colour Chain operated roller blinds NYSAN or imported approved equivalent which meet the following specification such as Fabric weight - 11oz/yd2 , Fabric thickness - 16 mil , Breaking painting brick veneered surfaces and fair face R.C.C surfaces or any where is suggested with clean silicon water repellent paint in accordance with these specifications.

29.02 Construction Requirements: Paint shall consist of clean silicon water repellent paint of approved products supplied in original sealed containers bearing the manufacturer's trade mark.

Two coats shall be applied, the paint may be applied by brush, roller or spray.

Prior to application of paint, the surface to be painted shall be dry, well cleaned and free from efflorescence, dirt, stain or grease. The surface shall be given a thorough rub down to remove all loose materials.

All application of paints shall be in accordance with the manufacturer's instruction.

29.03 Method of Measurement: Measurement for payment shall be made in square metre (sq.m) of painted surface. Opening shall be deducted from the measured area.

29.04 Basis of Payment: The amount of completed and accepted work measured as provided above shall be paid at the contract unit price per square metre (sqm) which payment shall constitute full compensation for furnishing all materials, equipment and labour including storage, transport, preparing, mixing and applying putty, primer and paint providing scaffolding as well as all incidentals necessary to complete the work.

30 METAL WORK

30.1 Description: The work to be performed under this section includes, but is not limited to, the furnishing and installing of all structural steel and miscellaneous metal work, anchors, bolts, and fastenings, and metal fabrications as shown and noted on the drawings and as specified herein.

a. Metal work includes the steel doors, the steel window and glazing thereof, the security grilles, stair railing, collapsible gate, M.S. pipe hand rails rolling shutter, boundary gates and other metal works shown on the drawings or as directed by the Engineer-in-Charge.

b. The materials, fabrication, workmanship, and installation of the entrance gates shall conform to the requirements of this section.

30.2 Shop Drawings: Submit fully details, large scale shop drawings of all structural steel and metal work, showing sizes, details of fabrication and construction, methods of assembly, and installation details to the Engineer-in-Charge for review and approval include manufacturer's literature for fabricated items, where necessary.

a. As welds, both shop and field, shall be indicated by standard welding symbols of the American Welding Society, Drawing shall show the size, length and type of each weld.

30.3 Materials: General: All materials shall be new and of the best commercial quality. Stock items shall be well manufactured by concerns specializing in the particular items and subjected to approval of the Engineer-in-Charge. Manufactured steel clips and angles will

be accepted where such is the obvious intent of the drawings.

30.4 Steel Materials:

i **Structural Shapes:** All structural and miscellaneous steel members and components shall be standard structural sections, shapes and plates, as indicated on the drawings, conforming to ASTM A36 (minimum yield point of 2530 $kg.cm^2$). (36,000 psi) or approved equal.

i. **Structural Tubing:** Steel tubes, where indicated, shall be welded steel tubing, conforming to BS 1387:1967 (medium), of size and shape indicated on drawings.

ii. **Bars:** Steel bars shall be made from billet steel and shall conform to ASTM A-616 or approved equal.

30.5 **Anchors, Bolts and Fastening:** Bolts and studs, nuts and washers shall conform to ASTM A-307, A-449 and A-563, as applicable or approved equal.

i **Anchors, Bolts and Fastening:** Bolts and nuts, other than those with self locking screw thread, shall be coarse-thread series. Bolts and nuts shall be the regular hexagon head types.

i. **Washers:** Round washers shall be American National Standard B 27.2 Type, or approved equivalent. Cut washers shall be placed under all bolts and nuts, bearing on steel and at other locations indicated on the drawings. Beveled washers shall be square, smooth, and sloped so hat contact surfaces of bolt head and nuts are parallel.

ii. **Galvanizing:** All exposed bolts, studs, nuts and washers shall be hot-dip galvanized in accordance with ASTM A-153.

30.5.1 **Pipe Sleeves:** Pipe sleeves through concrete or masonry walls and footings shall be standard weight, wrought iron, mild steel, or cast iron sleeves with not less than 6 mm space all around between the sleeve and pipe or conduit.

Pipe

30.5.1.1 Pipe for handrails, railings, and pipe guards, if shown on the drawings, shall be welded steel pipe conforming to ASTM A-53, Type E or S, grade A or approved equal. All pipes shall be galvanized pipe.

30.5.1.2 Pipe for gate frames and other locations indicated on the drawings shall be welded steel pipes, conforming to BS 1387 (medium), pipe fitting, where indicated or required (if any), shall conform to ASTM A-420. Standard manufacturer's weldable steel pipe, conforming generally to the foregoing requirements, will be acceptable. All pipe and pipe fittings shall be galvanized.

30.5.2 **Electrodes:** All arc-welding electrodes shall conform to AWS standards for steel Arc- Welding Electrodes. Electrodes shall be rods or wire of size and classification number as recommended by their manufacturers for the positions and other conditions of actual use.

30.5.3 **Concrete and Masonry Anchors:** Where anchors are not included in the concrete or masonry construction, anchors shall be Phillips "Read Head" Concrete or Masonry Anchors on manufactured by Phillips Drill Co. "Wej-lt" Expansion Products, Inc., or equal of the sizes.

30.6 **Welded Connections:** Welders shall be experienced in the type of welding work to be performed. If at any time the quality of a welder's work is not satisfactory, as determined by the Engineer-in-Charge, the welder shall be replaced.

Welded connections shall be made in accordance with AWS D1.I.

Welds exposed in the finished work shall be ground and dressed smooth so that the shape and profile of the item welded is preserved. Embedded metal frames for floors and deck openings shall be with continuous welds at corners, ground smooth where exposed to view.

Railing shall be fabricated in straight run sections with top and intermediate rails, posts and flange connections welded ready for installation in the field. Splices where required shall be reinforced with sleeved within the pipe and secured with set screws on the underside of the pipe.

30.7 **Shop Cleaning and Painting:** All structural steel materials shall first be thoroughly cleaned by mechanical means to remove all mill scale, rust, grease, oil and any other foreign matter. Field welds shall be thoroughly wire brushed. After cleaning, steel and iron materials shall be washed with phosphoric acid to remove dust and residue to assume maximum paint adherence.

After cleaning and washing, steel and ferrous metal materials shall be primed with one coat of approved red lead primer, the Contractor shall submit the manufacturer's specification for approval prior to applying. Steel in the vicinity of a proposed field weld, facing surfaces of bolted joints, or steel to be encased in concrete shall not be painted.

30.8 Installation

Genral

i. Installation of miscellaneous metal work and metal fabrications shall be in accordance with drawings and approved shop drawings, true and horizontal and perpendicular, as the case may be, plumb, level and square, with angles and edges parallel with related lines of the work.

ii. Shop fabricated items subjected to damage shall be braced and carefully handled to prevent distortions or other damage.

iii. Items to be installed before concrete is placed shall be properly braced to prevent distortion by pressure of concrete.

iv. Field welding, where required, shall conform to the requirements specified for shop fabrication.

Anchors, Bolts, Studs and Fasteners

i. All anchors, bolts and washers, inserts etc. as required for the installation and completion of the work and other miscellaneous steel or iron fastenings to be installed in forms before concrete placement, or built into concrete, shall be provided as indicated on drawings, details, and schedules at the time schedule for the concrete work. Bolts and anchors shall be present by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.

ii. Expansion bolts, where approved, shall be carefully installed in snug-fitting, smoothly drilled holes, all in accordance with the manufacturer's instructions. Expansion bolts shall be installed so that the load acts on the bolt in shear and withdrawal. Expansion bolts shall be carefully located in order to eliminate the risk of damage to concrete reinforcement and other embedded items. Expansion bolts shall not be used except where indicated on Drawings or where first approved by the Engineer-in-Charge in writing.

Base and Bearing Plates: Bases and plates and pipe posts where shown in the drawings shall be set accurately using a high strength, non-shrink grouting mortar as hereinbefore specified to obtain uniform bearing. Grouting mortar shall be mixed and installed in accordance with the manufacturer's specifications and instructions. Surfaces to receive the grout shall be cleaned and moistened thoroughly immediately before the grout is placed. Exposed surfaces of grout shall be water-cured with wet burlap or rags for 7 days.

Doors, Windows and Gates: Door, windows units and entrance gates shall be expertly installed with all hardware and accessories furnished and installed as shown on the drawings and as required for complete and finished installations. Doors, windows and gates shall operate properly and smoothly at completion. Glazing of windows and gates shall operate properly and smoothly at completion. Glazing of windows shall conform to 27.00.

30.9 Painting

After installation of steel work and metal fabrications, abraded areas, field areas, field bolts, and welds to be touched up and spot shall be painted with the same corrosion-inhibitive

primers as were used for shop painting. Field welds shall be thoroughly wire brushed or sanded prior to touch up painting.

All metal surfaces shall then be painted with three costs of an approved enameled exterior paint for metal as manufactured by “Berger” or approved equal.

30.10 **Method of Measurement:** The various items of structural and miscellaneous metal work, as indicated on the drawings and specified herein, will be not be measured for payment because the item rate is included in with the miscellaneous metal works.

40 Record Drawings, As-Built Drawings

The contractor shall keep a complete set of contract drawings and specifications on site with all latest amendments,

Revisions and the like. As the work progresses, the contractor shall make all deviations and changes from the contract drawings thereon, due to site conditions, variations, and other reasons, keeping an accurate record of work as actually installed.

After consultation with the Authority/Consultant for correct presentation and contents of "as-built" drawings, the contractor shall supply a full set of prints of these documents to the Authority within 30 days of practical completion. The prints shall show in detail the full extent of existing and new installations in a logical sequence. Shop drawings, unless suitable shall not be used as record drawings or as-built drawings. No reference shall be made on record drawings or as-built drawings to any item as being supplied and or installed "by others".

Upon approval of these record drawings, the contractor shall present the drawings in the following formats and quantities to the Authority.

(a) Four (4) sets of full A3 sized paper prints.
(b) One (1) set of A2 full sized transparencies.
(c) One (1) set of A1 sized prints.

ASIAN UNIVERSITY
FOR WOMEN

SECTION-03

TECHNICAL SPECIFICATIONS
FOR SANITARY & PLUMBING WORKS

PACKAGE-1

ASIAN UNIVERSITY FOR WOMEN

SECTION – 03

TECHNICAL SPECIFICATION

SANITARY & PLUMBING

1.0 SPECIAL CONDITIONS

1.1 General

The general conditions of the Contract shall apply to all work included in this section of the works and shall form part of this specification.

These Special Conditions are complementary to the Contract document wherever applicable to the work of the Air Conditioning services. In the event that any variance occurs between the Contract Conditions and these Special Conditions, then the Contract Conditions shall prevail.

Where items of the above documents are repeated in this specification, it is intended to call particular attention to or qualify them. It is not intended that any part shall be omitted, if not repeated herein.

Special care has to be taken by the equipment supplier and the contractor that all the steel materials which is subjected to contract with air shall be specially protected from corrosion as the environment at site is with sea salty air. All MS materials shall be either hot deep galvanized or 40-micron film galvanized.

0.1.1 Drawings:

Refer to the appendix for a schedule of drawings, which will form part of this contract and referred to herein, Tendered drawing (to be provided at the time of contract) shall be a reference drawing only. The Contractor has to prepare working drawing before execution of work. The tendered drawing is an indicating one and good for assessment of quantity. At the time of construction variation may be done by the Authority within the stipulated budget.

1.2 Intent

0.2.1. General

It is the intent of this specification and drawings to call for the full supply; installation, testing and commissioning of air-conditioning and ventilation system complete with plant, equipment and associated services.

The contractor shall provide the whole of the labor and all materials necessary for the complete installation and for such tests, adjustments, commissioning and maintenance as prescribed, including all items of plant and equipment shown or specified, and all incidental sundry components necessary for the complete execution of the work and for the proper operation of the installation, with their labor charges, whether or not these sundry components are mentioned in detail in the specification and drawings. *Where disagreements occur between the drawings and the specification or within either document, the item or arrangement of better quality, greater quantity, or higher cost shall be deemed to be included in this contract within the stipulated budget.*

0.2.2 Manufacturers

Equipment and controls shall be supplied and installed strictly in accordance with the relevant clauses of this specification and incorporating components from the Schedule of Approved Country of origin/Manufacturers. The contractor shall submit a list of manufacturers of the equipment.

The contractor shall assure that the equipment and materials offered in the tender are obtainable from the local or foreign market and that delivery will conform to the working program.

1.3 Works Program and Time Chart

The contract works shall be completed according to the agreed program.

The works program shall include start and completion dates and the man-days of the various operations including:

a. Preparation and Submission of Shop Drawings.
b. Manufacturing of Pump and other imported items.
c. Supply of Imported materials at site.
d. Installation of imported items
e. Installation of pipe work
f. installation of plant and equipment
g. installation of Pipe accessories & Fittings
h. Installation of electrical works
i. Commissioning of piping system
j. Commissioning of plant and equipment
k. Commissioning of control systems

1.4 General Items

All pipes, equipment, cable shown on the drawings are diagrammatic. The contractor should consult the architect's details and construction drawings for actual spaces available and for building details before installing pipes, ducts, conduits, cable trays and equipment and apparatus. He should make such offsets and deviations from work shown on the drawings as may become necessary to fit the actual space conditions and to accommodate apparatus and equipment installed by other trades.

The contractor shall locate all equipment, which must be serviced, operated or maintained in fully accessible positions. Supply access doors as required for this purpose. If any equipment cannot be so located inform the Consultant / Authority immediately.

The contractor shall at all times be fully responsible for the correct positioning and installation of all work and equipment installed by him in accordance with this specification and in consultation and co- operation with all other trades. No extras of any kind shall be allowed if work and equipment has to be removed and replaced due to incorrect installation, and lack of co-ordination by the contractor.

All materials and apparatus required for the work shall be new, of first-class quality, and shall be supplied, delivered, erected, connected and finished in every detail. Where no specific kind or quality of materials is specified or shown, first class articles as approved by the Authority/Consultant shall be supplied, and at no extra cost.

The contractor shall co-ordinate his work with the others and shall, in the preparation of shop and working drawings and ensure that these are co-ordinate with all other relevant trades and latest drawings.

1.5 Codes and Standards

The work shall be carried out in strict accordance with the latest/ current applicable standards, codes published and specification, as follows:

- BNBC-Bangladesh National Building Code
- IPC-International Plumbing Code
- BS-British Standard
- ASTM-American Society for Testing and Materials
- ASME-American Society of Mechanical Engineers

The contractor shall include all items of material and labor required to comply with such standards and codes.

1.6 Cutting, Providing Openings and Making Good

The contractor shall supply accurate and dimensioned drawings showing the locations and sizes of all openings, sleeves, inserts, etc. required for the installation of his work, not less than 30 days before the relevant floors and walls are built. The Contractor shall make all openings, shall supply and install all sleeves and inserts, required for the work and shall make good the damages at his own cost.

The contractor shall be held responsible for all costs incurred in the repositioning and/or relocation of any sleeves or inserts initially incorrectly positioned and/or omitted by him. The contractor shall check and verify the correct positioning of all openings required for the work of his contract.

No structural member shall be cut without the written agreement of the Authority/Consultant and all such cutting shall be done in a manner approved by the Consultant / the Authority.

1.7 Foundations, Supports, Piers

The contractor shall supply and install all necessary and specified concrete and steel foundations, supports, pads, bases, required for all piping, tanks, conduit, panels, racks etc. and for all other equipment supplied under this contract.

For all equipment where foundations and concrete inertia blocks are specified to be provided, furnish and install such foundations and inertia blocks by the contractor in accordance with the details on the drawings. Insert 150 mm steel dowel rods into floors to anchor fixed pads and kerbs prior to pouring of the structural floor slabs. In all foundations, pads and inertia blocks supporting equipment, set machinery anchor bolts as necessary for the equipment may be used. The exact positioning of all pads and reinforcing shall be the responsibility of the contractor.

The contractor shall furnish for approval, shop drawings of all foundations, bases and inertia blocks showing all details of mounting and operating weight.

The finishing of such foundations, supports, pads, bases and piers, where mounted on the floor, shall be of the same as materials and same quality of finish like as the adjacent and surrounding flooring material.

1.8 Contractors, Equipment and Materials Acceptance

The contractor shall comply with the following in order to obtain approval of Authority for the use of Contractor's

equipment and materials.

The contractor shall submit a list, which includes a list of the manufacturer equipment of materials proposed for the contracted works. Each item of equipment shall be a standard catalogue product of an established, reputable, approved manufacturer. All similar equipment shall be of the same manufacturer, type, class and finish, unless otherwise specified.

Where no alternative materials are noted in this specification or on the drawings and where the words "equal", "approved equal" or "as approved" etc do not appear, the exact make specified must be supplied and installed.

1.9 Equipment Deviations

The dimensions and ratings of equipment specified herein or indicated on the drawings are intended to establish the outlines and characteristics of equipment furnished by the particular manufacturer or manufacturers, specified.

Where a contractor intends to use an item of equipment other than that specified or shown on the drawings or in the schedules, approval from the Authority must be obtained in writing within the stipulated budget.

The Contractor shall give all necessary notices, make all applications, obtain all permits, perform all tests and pay all fees and other costs in connection with the work. The Contractor shall file all necessary plans and obtain all necessary approvals from all statutory authorities having jurisdiction over the work.

2.1 SHOP DRAWING

2.2 Shop Drawings and Details

The Contractor shall prepare and submit shop drawings for approval before commencing manufacture or installation, from which the relevant works shall be built. Any deviations or variations on the approved shop drawings must be endorsed by the Consultant. The contractor shall provide a schedule of shop drawings with submission dates within two weeks after the award of the tender.

Drawings shall be generally accordance to the specification drawings, which refer to the general principle of design only. Identify any errors, omissions and interference where noticed to the Consultant/ Authority. Any deviation and variations on the shop drawings must be endorsed by the Consultant and the contractor before submission to the Authority.

Shop drawing submissions shall be in print form with **4 copies** of each drawing, all be on the same size drawing sheets and to a scale of not less than 1:100 and larger where necessary.

The contractor may submit shop drawings progressively and allow five working days for examination by the Consultant for each submission of drawings. Drawings returned for amendment shall be amended and re-submitted within sufficient time to prevent delay to the programmed works. Re- submission shall be made until the drawings are considered satisfactory.

2.3 Record Drawings, As-Built Drawings

The contractor shall keep a complete set of contract drawings and specifications on site with all latest amendments,

Revisions and the like. As the work progresses, the contractor shall make all deviations and changes from the contract drawings thereon, due to site conditions, variations, and other reasons, keeping an accurate record of work as actually installed.

After consultation with the Authority/Consultant for correct presentation and contents of "as-built" drawings, the contractor shall supply a full set of prints of these documents to the Authority within 30 days of practical completion. The prints shall show in detail the full extent of existing and new installations in a logical sequence. Shop drawings, unless suitable shall not be used as record drawings or as-built drawings. No reference shall be made on record drawings or as-built drawings to any item as being supplied and or installed "by others".

Upon approval of these record drawings, the contractor shall present the drawings in the following formats and quantities to the Authority.

(a) Four (4) sets of full A3 sized paper prints.
(b) One (1) set of A2 full sized transparencies.
(c) One (1) set of A1 sized prints.

The prints shall be neatly bound with cover sheet and index and shall incorporate all existing and new installation conditions.

All drawings and prints shall be at the contractor's expense.

2.4 Operation And Maintenance - Instructions And Manuals

Upon completion of all works and after completion of all tests furnish the necessary skilled labors and helpers for operating and maintaining all systems and equipment for a period of seven (7) days of eight hours each within 3 days of the issue of the Certificate of Practical Completion.

During this period, The contractor shall instruct the Authority/Consultant or his representative fully in the operation, adjustment, and maintenance of all equipment, systems and controllers and shall give 2 days prior notice to the Authority.

The contractor shall be fully responsible for the operation of all plant and equipment supplied and installed by him until the Authority/Consultant acknowledges having received all necessary instructions in the operation of equipment and systems.

Operating and maintenance instruction manuals shall be submitted by the contractor as drafts for examination prior to final issue and shall be ready for issue prior to Practical Completion.

Six (4) copies of each operating and maintenance manual shall be supplied by the contractor concerned to the Authority.

Manufacturer's advertising literature or advertising catalogues shall not be accepted for operating and maintenance instructions, but may be included for classification purposes.

Operating and maintenance instruction manuals shall take generally the following form:

The manuals shall be bound by the contractor in hard cover with the name and the title of the installation clearly marked thereon. They shall contain all material in A4 size pages in loose-leaf form

and shall be sufficiently sized to prevent crimping or binding. The manuals shall be properly indexed and shall contain dividers with tabs between each section. All data shall be organized in a neat and concise manner. The sections shall generally consist of, but not be limited to the following:

General description of systems and equipment:

The Contractor shall include brief overall description of systems, design references and description of each individual system and equipment involved.

Operation of system and equipment:

The Contractor shall include general operation of plant, operation of each system and the equipment involved, starting and shutting down of all systems, location of starting gear, etc.

Manufacturer's Literature:

The Contractor shall include manufacturer's data on maintenance and operation of all equipment. Do not include irrelevant data or data that does not pertain to the model of equipment actually installed.

Miscellaneous:

The Contractor shall include any miscellaneous charts, graphs, descriptions, data, etc. needed for complete maintenance and operating instructions of all systems and equipment installed.

Nameplates Schedule:

A schedule of nameplates for all equipment installed shall be provided. The schedule of nameplate data shall clearly indicate the operating characteristics of each item of equipment. Where items of equipment contain separate components (e.g. fans and motors), each component is to be individually scheduled. Submit schedule of nameplates for approval prior to making them.

2.5 Certificates of Conformity

Prior to the issue of the Certificate of Practical Completion, the contractor shall deliver to the Authority for approval, a draft copy, of the operating and maintenance instructions for the equipment specified.

Within 30 days of the issue of the Certificate of Practical Completion, the contractor shall deliver the following documents to the Authority for approval as appropriate to the work required to be carried out for Practical Completion.

Acknowledgement from the Authority/Consultant authorized representative of having received instruction in operation of the equipment and systems.

- As-built record drawings.
- Operation and maintenance manuals.

2.6 Operation and Maintenance

Preventative and breakdown maintenance of equipment supplied and installed under this contract shall be carried out by the contractor during the 52-week defects liability period.

The cost for preventative maintenance during the defect liability period shall be deemed to have been

included in the contract sum under separate item. The contractor shall supply all necessary replacement parts, free of charge, excepting for lubricating oils, indicator lamps and filter media, which shall be provided by the Authority as consumable.

Preventative maintenance shall be carried out by the contractor in accordance with the provisions of the maintenance manuals and the specification on all equipment and systems supplied by the contractor.

The Contractor shall have to confirm that all the safely protection for all the equipment are in good condition and functioning well. He has to submit written confirmation at the end of monthly maintenance of the system.

The proforma to be used and the full details of maintenance procedures shall be subjected to the approval of the Authority/Consultant and shall be submitted at tender stage.

2.7 Commissioning Data

The contractor shall carry out all commissioning as specified and shall provide a complete schedule of all commissioning results within 30 days of the issue of the Certificate of Practical Completion.

2.8 Maintenance after Warranty Period

After completion of the defects liability period, the operation and maintenance of all plant, equipment and services shall become the responsibility of the Authority and a full preventative maintenance program shall be brought into effect.

Prior to the end of the Defects Liability Period, the contractor shall submit a proposal to the Authority for an ongoing annual preventative maintenance schedule/programmed, in accordance with the operating and maintenance instructions.

3.0 CO-ORDINATION WITH OTHER SERVICES

The contractor shall be responsible for co-ordination with the inspection Authorities, the Building contractor and all other contractors working on the project.

4.0 SCOPE OF WORK

The scope of work of the CONTRACTOR shall include provision, installation, testing and balancing, commissioning of equipment and accessories as per Drawings and Specification to achieve a complete plumbing & sanitary system as per international standard. (Should be checked the general & additional work scope)

4.1 Certified Institutes:

In case testing or certifying is called for equipment and accessories which the Contractor intends to use for the Project, the Contractor shall be responsible at his own expense to submit test reports and certificates from the following institutes:

a) BUET, Bangladesh University of Engineering and Technology
b) Any other reputable institutes accepted by the Employer.

5.0 TESTING OF SYSTEMS

Comply with the project construction schedule for the date of final performance and acceptance testing, and complete work sufficiently in advance of the contract completion date to permit the execution of the testing prior to occupancy and contract closeout.

Complete any adjustments and/or alterations which the final acceptance tests indicate as necessary for the proper functioning of all equipment prior to the completion date. Provide a detailed schedule of completion indicating when each system is to be completed and outlining when field testing will be performed. Submit completion schedule for review after the notice to proceed by Client's Representative has been given. Update this schedule periodically as the project progresses.

Provide all miscellaneous materials including drain and air vent valves, connections, water, temporary power, chemicals, etc. as required for various systems described elsewhere to complete testing and commissioning of services.

5.1 VERMIN PROOFING AND CLEANING

On completion of the installation, the contractor shall check and ensure that all openings, core holes, etc. are properly sealed with fire rated material and rendered vermin proof and water tight. The floors, trenches and surroundings shall be cleaned, mopped, and left in a clean, dust free-state on completion. Building works and paint work of equipment damaged during the
Installation works shall be made good to the satisfaction of the Client's Representative. All costs involved in the above shall be deemed to be included in each installation.

5.2 G.I. PIPE

Supply, fitting and fixing of G.I. pipe complete with bends, tees, unions, reducers, sockets etc. according to specification and as per direction. Samples of pipes to be used in the construction, shall be supplied by the Sub-Contractor for approval of the Engineer-in-Charge.

Approved samples shall be retained by the Engineer-in-Charge and shall be used as standard of comparison for the materials delivered to the site and used in the Contract. Galvanized iron pipes shall have socket joints with threaded ends.

Threads at the end of the G.I. pipes and inside the socket shall be examined and cleaned. Damaged threads shall be cut with sharp dies. Before installation thread shall be coated with approved jointing compound (Graphite and oil mixed) and the pipes shall be fitted into the socket tightly with the help of chain tongs or wrenches.

If a pipe is embedded in wall with insufficient cover (less than 38 mm) or if it is carried exposed it shall be supported by clamps and nails/nuts and bolts according to approved designs/methods. The distance between supports shall not exceed 760 mm and U-bolt shall not be less than 10mm. Pipes vertical or horizontal within shaft or exposed shall be clamped to wall or hanged from roof using approved type of bolt, pipe support, hanger etc. Pipe shall be supported or hanged at an interval of 3
m. Hanger bolt or support shall have sufficient strength to bear weight of pipe with water. All M.S. material shall be painted with two coats of red oxide paint before installation. All pipe works shall be concealed and embedded in wall, floor roof and below grade or ground unless otherwise specified.

In brick walls, the pipes shall be surrounded by concrete 1:3:6 at least 38 mm thick all around. The coarse aggregate

of the concrete being 10 mm downgraded of jhama brick chips/gravel and fine aggregate being medium sand. All valves shall be installed as per drawing and direction. Approved type of sealing compound or Teflon tape shall be used on thread to make threaded valve joint water tight. During cutting of thread on pipe care must be taken not to damage or break threads.

Approved type gasket shall be used between flanges of flanged end valve. Nut, bolt shall be properly tightened to make the joint water tight under test pressure. Cement or permanent joint shall not be used at any circumstances. After complete installation, piping system along with pipe fitting shall be tested under 175psig pressure for 2 hours and 100psig pressure for 24 hours. Testing devices along with pressure gauge and pump shall be arranged by the Contractor. Test report shall be submitted to the Engineer-in- Charge for approval. Pressure test shall be done in presence of the Engineer-in-Charge. After acceptance of pressure test the system shall be made free from all dirt and foreign materials.

6.0 CPVC PIPE

Supply, fitting and fixing of **CPVC, Chlorinated Polyvinyl Chloride** pipe complete with bends, tees, unions, reducers, sockets etc. according to specification and as per direction. Samples of pipes to be used in the construction, shall be supplied by the Contractor for approval of the Engineer-in-Charge. Normal cold water and hot water line shall be done with CPVC pipe.

CPVC pipe with all accessories shall meet cell class 23447, ASTM D1784 and shall have a design stress of 200 psi and a maximum service temperature of 93˚C. All the shall be of Schedule 40 (s). Specification of pipe with fittings shall be as follows.

PROPERTY	TEST	CONDITION	UNIT
GENERAL			
• Specific Gravity	ASTM D792	73ºF/23ºC	1.55g/cm^3
• Specific Volume		73ºF/23ºC	0.645 cm^3/g
• Water Absorption	ASTM D570	73ºF/23ºC	+0.03%
		212ºF/100ºC	+0.55%
• Rockwell Hardness	ASTM D785	73ºF/23ºC	119
• Cell Class	ASTM D1784		23447-B
MECHANICAL			
• Izod Impact	ASTM D256	73ºF/23ºC	1.5 ft lbs/in o.n
• Tensile Strength	ASTM D638	73ºF/23ºC	8000 psi
• Tensile Modulus	ASTM D638	73ºF/23ºC	360,000 psi
• Flexural Strength	ASTM D790	73ºF/23ºC	15,100 psi
• Flexural Modulus	ASTM D790	73ºF/23ºC	415,100 psi
• Compressive Strength	ASTM D695	73ºF/23ºC	10,100 psi
• Compressive Modulus	ASTM D695	73ºF/23ºC	196,000 psi
THERMAL:			
• Coefficient of Thermal Expansion	ASTM D696		3.4x10^{-5} in/in/ ºF
• Thermal Conductivity	ASTM C177		0.95 btu in/hr/ft^2/ ºF
• Heat Distortion Temperature	ASTM D638		217 ºF
• Heat Capacity	DSC	73ºF/23ºC	0.21 BTU/LB ºF
		212ºF/100ºC	0.26 btu/lb ºF
FLAMMABILITY:			
• Flammability Rating	UL 94	0.062	V-0, 5VB, 5VA
• Flame Spread	ASTM E84	cm	15
• Smoke Developed	ASTM E84		70-125

• Limiting Oxygen Index	ASTM D2863		60%
ELECTRICAL:			
• Dielectric Strength • Dielectric Constant • Power Factor • Volume Resistivity	ASTM D147 ASTM D150 ASTM D150 ASTM D257	 60 Hz, 30°F/-1°C 1000 Hz 73°F/-23°C	1250 V/mil 3.70 0.007% $3.4x10^{15}$ ohm/cm

CPVC Pipe dimension shall be as follows;

Dia of pipe	Oute Dia (mm)	Inner Dia (mm)	Wall thickness (mm)
100 mm	114.3	101.55	6.02
80 mm	88.9	77.26	5.49
65mm	73.0	62.07	5.16
50 mm	54		4.00
40 mm	41.3		3.06
32mm	34.9		2.59
25mm	28.6		2.12
20mm	22.2		1.65
15mm	15.9		1.40

Approved samples shall be retained by the Engineer-in-Charge and shall be used as standard of comparison for the materials delivered to the site and used in the Contract. Pipes shall have socket joints with approved type of sealant.

If a pipe is embedded in wall with insufficient cover or if it is carried exposed it shall be supported by clamps and nails/nuts and bolts according to approved designs/methods. The distance between supports shall not exceed 760 mm and U-bolt shall not be less than 10mm. Pipes vertical or horizontal within shaft or exposed shall be clamped to MS angle support fixed on wall or hanged from roof using approved type of bolt, pipe support, hanger etc. Pipe shall be supported or hanged at an interval of 2.0 M. Hanger bolt or support shall have sufficient strength to bear weight of pipe with water. All pipe works shall be concealed and embedded in wall, floor roof and below grade or ground unless otherwise specified.

In brick walls, the pipes shall be surrounded by concrete 1:3:6 at least 38 mm thick all around. The coarse aggregate of the concrete being 10 mm down graded of jhama brick chips/gravel and fine aggregate being medium sand.

All valves shall be installed as per drawing and direction. Approved type of sealing compound or Teflon tape shall be used on thread to make threaded valve joint water tight. During cutting of thread on pipe care must be taken not to damage or break threads.

Approved type gasket shall be used between flanges of flanged end valve. Nut, bolt shall be properly tightened to make the joint water tight under test pressure. Cement or permanent joint shall not be used at any circumstances.

After complete installation, piping system along with pipe fitting shall be tested under 175psig pressure for 2 hours and 100psig pressure for 24 hours. Testing devices along with pressure gauge and pump shall be arranged by the Contractor. Test report shall be submitted to the Engineer-in- Charge for approval. Pressure test shall be done in presence of the Engineer-in-Charge. After acceptance of pressure test the system shall be made free from all dirt and foreign materials.

7.0 VALVE AND FITTING

All valves and pipe fittings shall be suitable to use with black steel pipe as specified in item no. 4 Valves 3" dia or more than 3"dia shall be flanged end type complete with companion flanges suitable to use with ABS pipe and shall be with required gasket, nut-bolt etc. valves and fittings shall be suitable to withstand a test pressure of 150 psi and working pressure of 100 psi.

Lever operated butter fly valves shall be anti corrosive cast iron body, gear operated lever, resilient seat and O-ring,
Disc of the valves shall be of ductile iron with hard chromium plated. Butter valves upto 3"dia and smaller shall be screwed bonnet threaded end type.

Globe Valves : Globe valves 3" and larger dia shall be of iron body, bolted bonnet, outside screw and yoke, rising stem, levelled wedge disc and flanged end type and shall be complete with companion flanges, nut-bolt, gasket etc. Globe valves less than 3" dia shall be threaded end type and shall be of bronze body, screwed bonnet, renewable resilient disc and Solid wedge.

Check Valves : Check valves (non return) 3" and larger dia shall be cast iron body, bolted cover, flanged end, swivel type disc and complete with companion flanges with nut-bolt, gasket etc. check
less than 3"dia shall be bronze body, screwed cover lift check type screwed end.

Strainer : The strainer shall be of cast iron body, quick opening yoke type cover with gasket and brass basket. The body shall be 125 lb. coat iron with flanged connections and bottom drain plug. The lid, yoke and handle shall be machined for proper alignment and sealing on gasket to body. The strainer basket shall be brass with 9/64" perforation having a minimum total open flow area of at least 4 times the open area of the pipe size.

Flexible Joint: Flexible joint shall be precision machine molded neoprene and nylon construction internal reinforced by means of steel wire. Flexible joint shall incorporate cadmium plated steel flanges tapped to mate with 150 # ASA companion flanges. Flexible joint shall be capable of operating at a temperature of 20 to 240 F and a pressure of 16"vacum to 10kg. working pressure and shall be capable to take 15 angular deflection.

Foot Valves: Float valve shall be a combination of shut off valve with float, linkage, electric contact to operate remote solenoid valve, pump motor and also remote indication system. Depending on splashing water and level of water in surge tank float valve will operate. Shut off valve shall be motor operated butter fly type. The system shall be complete with under water cables, electrical accessories, all mountings etc. complete.

Pressure Reducing Valves: Pressure reducing valves shall be suitable to maintain outlet pressure from 7.5psi to 20 psi adjustable. Inlet pressure may vary from 20psi to 100psi. At no flow condition outlet pressure shall be within specified set pressure. Valves shall be bronze/stainless steel body threaded end type.

Drain Valves : Drain valves shall be ball valve type to be located

Automatic vent valve shall be free floating type as per schedule. Vent valve shall be installed at every highest point of horizontal line and shall be as per direction. Drain port of the vent valve shall be connected with pipe extended upto nearer drain.

8.0 PRESSURE GAUGE

Pressure gauge shall be direct reading type and shall be suitable for installation on G.I. pipe. The gauge shall be of 100 mm dia dial type and shall be screwed in type for installation of 6 mm dia nipple on G.I. pipe. The pointer shall be plain type black finished, red tipped with white background and shall be suitable to read 0 to 18 Kg/Cm^2 pressure. Pressure Gauge shall have both British as well as S.I. unit scale. All fittings and accessories for mounting on pipe shall be supplied. Pressure gauges shall be complete with pet cock.

Pressure gauge shall be installed by the contractor at location shown in the drawing or as per direction of the Engineer-in-Charge using 3 mm tap on the main pipe. Pressure gauge shall be well positioned so that reading can be taken easily.

9.0 FOOT VALVE

Foot Valve shall be flanged end type complete with companion flanges, nuts, bolts, gaskets etc. The valve shall be installed as per drawing and direction. Valve shall be suitable to withstand a pressure of 100psig

10.0 uPVC PIPE & PIPE FITTING

All uPVC pipe and pipe fitting such as Pipe, P-trap, S-trap. Y-joint, T-joint, Bend, Door bend, Offset Bend, service door, Loose socket, Vent Cowl adopter etc. shall be as per ASTMD-792 standard. Specification of pipe and pipe fittings of uPVC pipe shall be as follows;

SL	Items	Unit
i)	Specific gravity	1.40
ii)	Hardness	120 Rockwell R
iii)	Water Absorption	5.7- 8.5 x 10^{-6}
iv)	Tensile strength at 15¤C	500-550 kg/cm^2.
v)	Bending Strength	850 kg/cm^2
vi)	Compressive strength	650 kg/cm^2
vii)	Shearing strength	400 kg/cm^2
viii)	Elongation at UTS	100-170%
ix)	Modulus of Elasticity	4.10x10^5 kg/cm^2
x)	Impact strength	5.0 kg-cm/cm^2
xi)	Flame Resistance	Self Extinguishing
xii)	Softening Temperature	75¤C

uPVC Pipe dimension shall be as follows;

Dia of pipe	Nominal dia of pipe	Minimum wall thickness
300 mm	315 mm	11.5 mm
250 mm	250 mm	9.7mm
200 mm	200 mm	7.8 mm
150 mm	160 mm	6.6 mm
100 mm	110 mm	4.5 mm
80 mm	82.4 mm	3.5 mm
50 mm	55.75 mm	2.5 mm
40 mm	42.75 mm	2.5 mm
32mm	32mm	2.20mm

Before installation all pipe fittings shall be cleaned properly.
Pipe fittings shall be installed as per drawing and direction. Fittings shall be located in such a way so that clean out door shall be accessible easily. Hangers, clamps or wall bracket shall be used at all ends of each fittings and it shall be of approved type.

Pipe joints as per schedule shall be sufficiently water tight to withstand a water column of 4 m. Approved type of solvent shall be used for pipe and pipe fittings joint. All M.S. material required shall be corrosion painted before installation.

13.1 Y-Joint

Supply, fitting and fixing of Y-Joint shall be all hub end type and shall be with door as per schedule shall be as per drawing and direction. Any leak or sweating in the wall or at the Joint shall not be acceptable. Before fixing, fitting shall be properly cleaned.

13.2 T-Joint

Supply, fitting and fixing of T-Joint shall be with hub on all end and with service door and shall be as per schedule drawing and direction. Before fixing T- Joint shall be leak tested by water. Any leak or sweating in the wall or at the Joint shall not be acceptable.

13.3 P-Trap

Supply, fittings, fixing, of P-Trap, U-trap, S-trap etc. shall be with hub in inlet and 50 mm dia vent connection and shall be as per schedule, drawing and direction. Trap shall be P or S type as per site requirement. Each trap shall be provided with vent door. Water level inside trap shall be within 19 mm to 25 mm above air break.

Before fixing, fittings shall be properly cleaned.

13.4 Bend

Supply, fittings, fixing, of Bend shall be with double hub and shall be as per schedule, drawing and direction. uPVC. Bend shall be provided with clean out door as per site requirement. Long Bend or Short Bend shall be provided as per direction.

13.5 Door Bend

Supply, fittings, fixing, of Door Bend shall be with double hub and shall be as per schedule, drawing and direction uPVC Door Bend shall be provided with clean out door as per site requirement. Long Door Bend or Short Door Bend shall be provided as per direction.

13.6 Offset Bend

Supply, fittings, fixing, of Offset Bend shall be with double hub and shall be as per schedule, drawing and direction uPVC offset Bend shall be provided with clean out door as per site requirement. Offset Bend shall be provided as per direction.

13.7 Vent Cowl

Supply, fittings, fixing, of Vent Cowl as per schedule shall be as per drawing and direction. Before fixing, fittings shall be properly cleaned.

13.8 Loose Socket

Supply, fittings, fixing, of Loose Socket with both side hub to adopt straight pipe and shall be as per schedule.

11.0 R.C.C. PIPE

Concrete pipe shall be used for underground drainage purpose. These shall be of reinforced concrete machine made, best quality available in Bangladesh. The thickness shall be as per standard practice and approved by Engineer-in-Charge.

Socket joints shall be made compact with shrouded jute socked with cement. The end of the collar shall be finished off with stiff mixed mortar 1:1 proportion of cement and sand trawled to a convex fillet. Pipes

shall be laid as per drawing on C.C. bed over a brick flat soling inside the trenches. After laying of the pipes trench shall be refilled with earth layer including watering and to be as compact as possible.

Excavation of trenches for drains shall be made true to drawing and gradient. Over excavation shall be avoided. If over excavation is done, this shall be filled up by the contractor at his own cost with 1:5:7 cement concrete in jhama chips and medium sand, if during excavation existing utility lines are exposed they shall be well secured according to Engineer-in-Charge's instruction. Care shall be taken for securing the utility lines. The width of the trench shall be at least 355mm greater than the diameter of the pipe.

Any shorting and de-watering required during excavation shall be done at the Sub-Contractor's own cost. Before laying the pipes, inspection and approval of the Consultant shall be sought and secured by the Sub-Contractor.

All excavation material shall be deposited away from the edge of the trench keeping at least 460mm margin concrete bedding of the pipes and joints and filling of the trench shall not commence till the drain pipes are inspected and approved by the Engineer-in-Charge. A depth of 300mm above the top of the pipes shall be filled by hand packing of selected soil out of the spoils. It shall be watered liberally and compacted with great care.
In selecting the soil for filling, all lump and clods larger than 25mm size shall be powdered or avoided. The filling above this 300mm shall be done in the usual way as specified under side filling of trenches. If the route is covered with grass, during excavation of trenches, the top grades bearing layer shall be separately preserved and replaced after filling the trench and nursed till original grass cover is restored. The work of preservation of grass top and relaying will not be paid separately, its cost being deemed to have been included in the rate for pipe laying. Surplus spoils of excavation shall be disposed according to the instruction of the Engineer-in-Charge.

No bend or junction shall be used in the buried drain pipes except at inspection chambers. All junctions shall be oblique. Immediately after the drains are laid and jointed but before bedding in concrete they shall be inspected, tested and passed by the Engineer-in-charge as satisfactory. The testing shall be done by water pressure for a head 3m more than the highest point. Testing may be done section by section.

The trench bottom shall be rammed and compacted to the satisfaction of the Engineer-in-Charge. The drain pipe shall be laid and supported on false supports. The jointing shall then be done and after the pipe network is tested under pressure and approved by the Engineer-in- charge the concrete bed in 1:3.5:5.5 using 6 mm down jhama bricks chips and medium sand shall be placed. The width of the bed at the bottom will be 350mm wider than the internal diameter of the pipe. The side slopes will join the edges of the bottom of concrete bed and the pipe tangentially. The depth of concrete bed shall be 100mm minimum below the pipe and shall be increased at joints as needed to maintain 100mm minimum from socket surface bed shall be cured for 10 days.

Breaking of wall/floor and making good the damages properly shall be done by the Sub-Contractor at his own cost and upto the satisfaction of the Engineer-in-Charge. Most of the fixing work as much as permissible shall be done before finishing work. After finishing wall/floor breaking, cutting etc. shall not be permitted without Engineer-in-Charge's approval.

11.1 PLUMBING FIXTURES

CPVC WATER SUPPLY PIPES:

The contractor shall all CPVC pipefitting and fixing like bends, tees, unions, crosses, reducers, sockets, etc. according to ASTM, BS specification or its equivalent. Gate valves of approved sizes shall be made of cast iron, bronze trim, conforming to specification B.S.

Pipes shall have socket joints with threaded brass ends. Threads at the ends of the CPVC pipes and inside the socket shall be examined and cleaned. Damaged threads shall be cut off and new threads cut with sharp dies. Before installation thread shall be coated with approved jointing compound and the pipes shall be fitted into the socket tightly. For CPVC joints shall be of same manufacturer's solvent solution. .

All pipe works shall be concealed and embedded in wall, floor, and roof and below grade or ground unless otherwise specified the roughing in of the plumbing works inside the building must proceed the construction of masonry work phase by phase. In the straight reaches in brick walls, the alternative of leaving a recess in the wall for future insertion of the pipe may be allowed.

Access and inspection doors and covers shall be provided in all bends and junctions. These covers shall be neatly provided and housed in the surface of the wall opposite to one facing the pipe.

Measurement for the actual number of linear meter measured along the piping axis, including length of fittings like tee, bend, socket, reducer, nipple & union including making holes and chase in walls and floor.

12.0 TOILET/KITCHEN ROOM FITTINGS

Supply of each item of Toilet fittings shall conform to specifications and schedule of items and shall be fixed in position as per approved drawing and direction upto the satisfaction of the Engineer-in- charge.

Measurement of the work for payment shall be on the basis of each set properly installed and approved by Engineer-in-Charge.

Breaking of wall/floor if required and making good the damages properly shall be done by the Sub-Contractor at his own cost and upto the satisfaction of the Engineer-in- Charge. Most of the fixing work as much as permissible shall be done before finishing work. After finishing wall/floor breaking, cutting etc. shall not be permitted without Engineer-in-Charge's approval.

12.1 Stop Cock

Supply, fitting, fixing of stop cock as per schedule. Stop cock shall be screwed end type suitable to be installed on threaded end. G.I. pipe of dia 13 mm. Approved type of sealing compound or Teflon tape shall be used on pipe thread to make the joint water tight. The contractor shall have to submit sample of stop cock to the Engineer-in- Charge for approval. If the stop cock does not withstand test pressure it will not be acceptable. Stop cock shall be well positioned so that operation and servicing become easy.

Measurement for payment for stop cock shall be on the basis of complete installed unit properly tested and approved.

12.2 Angle Cock

Supply, fitting, fixing of Angle cock shall be as per schedule. Sub-Contractor shall have to submit sample of Angle cock, best quality available in the market, to the Engineer-in-Charge for approval. Each and every Angle cock shall be pressure tested by the contractor. The cock which will not be able to take test pressure and will be rejected.

Approved type of sealing compound or Teflon tape shall be used on pipe thread before fixing of threaded end Angle cock on G.I. pipe work.

12.3 Open Tap

Supply, fitting, fixing of open tap shall be as per schedule. Sub-Contractor shall have to submit sample of open tap, best quality available in the market, to the Engineer- in-Charge for approval. Each and every tap shall be pressure tested by the Sub-contractor. The tap which will not be able to take test pressure will be rejected.

Approved type of sealing compound or Teflon tape shall be used on pipe thread before fixing of threaded end open tap on G.I. pipe work.

12.4 Cool Pillar Cock

Supply, fitting, fixing of Cool Pillar cock shall be as per schedule. Sub-Contractor shall have to submit sample of Pillar cock, best quality available in the market, to the Engineer-in-Charge for approval. Each and every tap shall be pressure tested by the Sub-contractor. The tap which will not be able to take test pressure will be rejected.

Approved type of sealing compound or Teflon tape shall be used on pipe thread before fixing of threaded end Pillar cock on G.I. pipe work.

12.5 Basin Mixture

Supply, fitting, fixing of Basin mixture shall be as per schedule. Contractor shall have to submit sample of Basin mixture. Best quality available in the market, to the Engineer- in-charge for approval. Each and mixture shall be pressure tested by the contractor. The tap which will not be able to take test pressure will be rejected.

Approved type of sealing compound or teflon tape shall be used on pipe thread be fore fixing of threaded end mixture on G.I pipe work.

12.6 Shower Mixture

Supply, fitting, fixing of Shower mixture shall be as per schedule. Contractor shall have to submit sample of Shower mixture. Best quality available in the market, to the Engineer- in-charge for approval. Each and mixture shall be pressure tested by the contractor. The tap which will not be able to take test pressure will be rejected.

Approved type of sealing compound or teflon tape shall be used on pipe thread before fixing of threaded end mixture on G.I pipe work.

12.1 Kitchen Sink Mixture

Supply, fitting, fixing of CP Kitchen Sink mixture shall be as per schedule. Contractor shall have to submit sample of Kitchen Sink mixture. Best quality available in the market, to the Engineer- in-charge for approval. Each and mixture shall be pressure tested by the contractor. The tap which will not be able to take test pressure will be rejected.

Approved type of sealing compound or teflon tape shall be used on pipe thread before fixing of threaded end mixture on G.I pipe work.

12.7 Kitchen Room Sink Cock

Supply, fitting, fixing of CP Kitchen Room Sink Cock shall be as per schedule. Sub-Contractor shall have to submit sample of Kitchen Room Sink Cock, best quality available in the market, to the Engineer-

in-Charge for approval. Each and every Cock shall be pressure tested by the contractor. The Cock which will not be able to take test pressure will be rejected.

Approved type of sealing compound or Teflon tape shall be used on pipe thread before fixing of threaded end mixer on G.I. pipe work.

12.8 Bottle Trap

Supply, fitting, fixing of CP Bottle Trap shall be as per schedule. Sub-Contractor shall have to submit sample of Bottle Trap, best quality available in the market, to the Engineer-in-Charge for approval.

Approved type of sealing compound or Teflon tape shall be used on pipe thread before fixing of threaded end of Bottle Trap. Any other consumable such as nipple, washer etc. required for installation of Bottle Trap with Basin, Sink, Stand Urinals etc. shall be provided by the contractor. All connections shall be leak proof. Thread of trap shall be good enough to protect leakage when closed.

12.9 Washing Hand Basin

Supply, fitting, fixing of super vitreous China clay washing basin shall be as per schedule. Washing basin shall be in- stalled at location shown in the drawing and as per direction of Engineer-in-Charge.
C.I wall bracket shall be fixed on wall by using approved type of rowel bolt. Before fixing, bracket shall be painted with two coats of paint over a coat of primmer. Pedestal type washing basin shall be with combined central pillar cock of CP brass, rubber plug with CP chain.

12.10 Kitchen Sink

Supply, fitting, fixing of best quality stainless steel Kitchen Sink (Single/Double) shall be as per schedule. Kitchen Sink shall be installed at location shown in the drawing and as per direction of Engineer-in-Charge. C.I wall bracket shall be fixed on wall by using approved type of rowel bolt. Before fixing, bracket shall be painted with two coats of paint over a coat of primmer.

Sink shall be placed over wooden/concrete cabinet where and when used as per direction and no loose settings shall be accepted. Steel Sink shall be provided with rubber plug with CP chain.

12.11 Pedestal

Supply, fitting, fixing of super vitreous China clay Pedestal shall be as per schedule. Installation of Pedestal with Wash basin shall be well fitted at location shown in the drawing and as per direction of Engineer-in-Charge.

12.12 Flexible Connection

Supply, fitting, fixing of Stainless Steel flexible connection pipe shall be as per schedule. The Sub-contractor shall have to submit to the Engineer-in-charge the sample of flexible pipe best quality available in the market for approval. Both end of the flexible pipe shall be complete with C.P. flare nut and socket to adopt 13 mm dia threaded end.

12.13 Automatic Shop Dispenser

Supply, fitting, fixing of Automatic Shop Dispenser with Battery-operated system. To complete the shop dispenser shall be wall type fixed at location shown as per schedule. The Sub-contractor shall have to submit to the Engineer-in-charge the sample of soap dispenser American standard best quality.

12.14 Automatic Hand Dryer

Supply, fitting, fixing of Automatic Hand Dryer with AC-Operated system. Complete the Hand Dryer shall be wall type fixed at location shown as per schedule. The Sub-contractor shall have to submit to the Engineer-in-charge the sample of soap dispenser American standard best quality.

12.15 New Madera Commode (Combi)

Supply, fitting and fixing of New Madera Commode shall be as per schedule and approval. The contractor shall have to submit one complete set of the sample of Commode to the Engineer-in-Charge for approval.

The commode shall be of wash down closed suit with horizontal out go to closet bowl and the cistern shall have the capacity to contain and flush down about 11 liters of water at each flush.

The closet bowl shall be provided with 4 holes for fixing into the floor with four round headed wooden screw. The cistern shall be provided with a flush bend and float valve to control the water. The W. C. shall have holes suitable for fitting the vent pipe.
The cistern closet bowl and bend shall be white/colored glazed high polish and of porcelain ware of proprietary products of American Standard or approved equivalent.

The commode shall be installed at a distance not less than 300 mm from the back wall. It shall be screwed with the floor with four wooden screws. The closet shall be placed at least 300 mm apart from the adjacent side wall. The seat shall be black or as specified, heavy duty, solid plastic complete with cover and self sustaining hinge. The flush equipment shall be of silent fitting type.

12.16 American Squat (Long pan)

Supply, fitting and fixing of Long pan shall be as per schedule and approval. The contractor shall have to submit one complete set of the sample of long pan to the Engineer-in-Charge for approval.

The long pan shall be of wash down pan suit with horizontal out go to closet bowl and the cistern shall have the capacity to contain and flush down about 11 liters of water at each flush.

The pan bowl shall be provided with 4 holes for fixing into the floor with four round headed wooden screw. The cistern shall be provided with a flush bend and float valve to control the water. The long pan shall have holes suitable for fitting the vent pipe.
The cistern pan bowl and bend shall be white/colored glazed high polish and of porcelain ware of proprietary products of American Standard or approved equivalent.

The long pan shall be installed at a distance not less than 300 mm from the back wall. It shall be screwed with the floor with four wooden screws. The closet shall be placed at least 300 mm apart from the adjacent side wall. The seat shall be black or as specified, heavy duty, solid plastic complete with cover and self sustaining hinge. The flush equipment shall be of silent fitting type.

12.17 Standing Urinal (Vacuum Break)

Supply, fitting and fixing of supper vitreous porcelain standing urinals shall be as per schedule and direction. Urinal shall be complete with all other accessories as per schedule. Waste pipe shall be properly clamped to wall by using U-bolt.

Urinal shall be installed at location shown in the drawing and as per direction of Engineer-in-Charge. Urinal shall be directly clamped to wall by using screws. Urinal shall be complete with automatic cistern with flashing arrangement. Measurement for payment shall be made on the basis of complete supply,

Fitting, fixing of unit set and accepted by Engineer-in-Charge.

12.18 Shower Assembly

Supply, fitting and fixing of Shower Assembly shall be as per schedule and complete with all standard accessories and fitting.
Shower Assembly shall be installed as per drawing and direction Engineer-in-Charge and shall be fitted to pipe end by using approved type of sealing compound to make the joint water tight.

Wall/Ceiling Shower head shall have at least 20 nos. of 0.8mm dia hole and shall be suitable to maintain a pressure of 20psig maximum. Shower Head shall be provided with air inlet to admit air above trapped water to avoid drip.
Telephone type shower shall be complete with stainless steel flexible metal connection chain, handle, holder to fix the shower handle on wall clamp. Stainless steel flexible pipe shall be 600mm length. One end shall be connected with Shower Head and other end shall be suitable to fix with 13mm dia G.I. pipe.

Wall clump shall be fixed to wall by using two nos. of counter sunk screws and plastic plug of approved type.

12.19 Glass Mirror

Supply, fitting, fixing of beveled edge plate glass mirror of American made and shall be 5 mm thick silvered Electro coppered with red back.

Mirror shall be fitted on wall, at a height as directed by Engineer-in-Charge with plastic plug. At back ply wood of 6 mm thick shall be provided for damp protection. Corner of the glass shall be rounded and polished. Glass plate shall be fixed through four nos. of 6 mm holes with CP screws.

12.20 Glass Shelf

Supply, fitting, fixing of glass shelf with CP bracket shall be as per schedule and direction of Engineer- in-Charge. Edges of the glass shall be properly rounded and polished. Clamping arrangement of glass plate with bracket shall be provided.

CP bracket shall be fixed to the wall properly by using plastic bolt and CP screws.

12.21 Towel Rail

Supply, fitting, fixing, of chrome plated, brass towel rail of size 610mm x 25mm dia shall be complete with CP wall bracket. Each leg of bracket shall be fixed to the wall by using two nos. of plastic plug and screws.

12.22 C.P Soap Case

Supply, fitting, fixing of chromium plated soap case shall be of plate type as approved by the Engineer-in-Charge. The contractor shall have to submit best quality of local market available soap case to the Engineer-in-Charge for selection and approval of soap case.

Soap case shall be fixed on wall with two nos of plastic plug and counter sunk screw. Location of the soap case shall be as per drawing and as per direction of the Engineer-in-Charge.

12.23 C.P. Toilet Paper Holder

Supply, fitting, fixing of chromium plated brass toilet paper holder complete with wall bracket, wooden roller, fixing screws etc. The contractor shall have to submit best quality of available paper holder for approval. Paper holder shall be rigidly fixed to the wall at location as approved by the Engineer-in-Charge.

12.24 3-Piece Upvc Strainer

Supply, fitting, fixing of uPVC Square Strainer shall be as per schedule and approved quality. Contractor shall have to submit best quality of locally available strainer to the Engineer-in-Charge for approval. Strainer shall be fixed on floor drain.

12.25 C.I. Gratings

Supply, fitting, fixing of CI gratings shall be as per schedule and approved quality. Contractor shall have to submit best quality of locally available gratings to the Engineer-in-Charge for approval. Gratings shall be fixed on floor drain.

12.26 Automatic Water Heater

Supply, fitting, fixing of Automatic water Heater of capacity shall be as per schedule. Inside container shall be rust proof galvanized steel pressure tested to leaks. Out side jackets shall be sprayed with scratch and rust proof high gloss backed enamel paint. Inner container shall be insulated with fiber glass placing in between inner and outer jackets.

The Water Heater shall be provided with automatic pressure release.

13.0 CATCH PIT

The work covered by this item shall consist of construction of Catch chamber on the underground rain & waste pipes where necessary. Catch chamber shall be as per schedule and drawing and to be constructed with concrete bottom on brick soling, 250mm brick walls with water proof plastering in side and pre-cast reinforced concrete slabs having lifting arrangement with heavy MS rod grating . Rod Grating or wrought iron steps of approved quality are to be provided inside catch chamber. All necessary earth work shall be done by the Sub-contractor up to the satisfaction of the Engineer-in- Charge.

Measurement for payment shall be made on actual number of catch chamber of each type constructed and accepted by the Engineer-in-Charge.

14.0 INSPECTION PIT

The work covered by this item shall consist of construction of inspection chamber on the underground drainage and sewerage pipes where necessary. Inspection chamber shall be as per schedule and drawing and to be constructed with concrete bottom on brick soling, 250mm brick walls with water proof plastering in side and pre-cast reinforced concrete slabs having lifting arrangement with heavy cast iron cover. Cast iron or wrought iron steps of approved quality are to be provided inside inspection chamber. All necessary earth work shall be done by the Sub-contractor up to the satisfaction of the Engineer-in-Charge. Measurement for payment shall be made on actual number of inspection chamber of each type constructed and accepted by the Engineer-in-Charge.

15.0 C.I. COVER

Supply and installation of heavy duty C.I. manhole covers shall be as per schedule and conforming super grade local quality and shall be approved by the Engineer-in-charge.

16.0 SEPTIC TANK

Septic Tank of different sizes as specified in the schedule shall be done by the contractor. All necessary earth work in excavation and shorting, bailing out water and side filling including the cost of all materials, operations and incidental charges etc. all complete shall be done as per Type plan up to the satisfaction of the Engineer-in-charge.

Construction of Septic Tank in position shown in the drawing with brick work in cement mortar (1:6) as per approved type plan over a brick flat soling and 150mm thick cement concrete flooring (1:2:4) with 125mm thick walls in partition and 20mm thick cement plaster (1:4) to insides of walls with
N.C.F. and 25mm thick patent stone (1:2:4) flooring with N.C.F. and the size of the Septic Tank chambers shall be as per drawing and direction following Indian Standard Codes.

Supplying, fitting and fixing of two nos. of R.C.C Tees as per drawing and providing 500mm dia water sealed heavy type C.I. Manhole Cover with locking arrangement. Top slab of the Septic Tank shall be constructed with 100mm thick R.C.C (1:2:4) with minimum 1% reinforcement including centering, shuttering, fabricating, casting and curing etc. complete up to required depth. Cast iron or wrought iron steps of approved quality shall be provided on inside wall of Septic Tank.

Measurement for payment shall be made for actual number of Septic Tank of each type constructed, finished and accepted by the Engineer-in-Charge.

17.0 WASA CONNECTION

WASA connection shall be provided as per drawing, direction and approval of the WASA authority. Required all construction work and earth finishing as per direction shall be provided by the contractor.

18.0 WATER SUPPLY PUMP

The pump shall be factory rated and shall be of single/ multi stage end suction, vertical discharge centrifugal type complete with coupled pump motor and starter.

The pump shall be highly volute type with flanged discharge branches. The suction cover shall be supplied with flanged pipe connection. The impeller shall be highly efficient shrouded single suction type and shall be statically balanced to ensure smooth operation. Stuffing box shall be packed with high quality gland packing and incorporate a wear resistant pressure reducing bush. The shaft shall be constructed of light quality treated (steel) material and shall have sufficient strength (robust) so as not to vibrate to any speed within the operating range of the pump.

Bearing shall consist of two heavy duty ball bearing firmly located within a strong cast iron frame and effectively sealed against ingress of dust and moisture. The discharge cover and suction cover shall be provided with gauge taping and fixed with pressure gauge of appropriate scale. The pump set shall be completed with pump motor starter, discharge and suction flange, companion flanges for suction and discharge pipe, adopting rigid steel base plate holding down bolts, heavy gauges coupling guards, spring type vibration isolator suitable for inertia block. All lists of detail accessories must be supplied along with the offer. The pump starter shall be drip proof with push button, starter coil shall be 230V + 5%, single phase and shall be completes with one set of auxiliary contact point for control connection and shall be suitable for remote push button operation.

The Sub-contractor shall carry and installation complete pump set on foundation pad made by the Sub-contractor. Vibration isolator shall be used. The foundation shall be approx. 152 mm and minimum 51 mm grouting. All pipe and electrical connections shall be done by the Sub-contractor and pump shall be properly aligned. All cost of consumable materials shall be included in the rate quoted.

19.0 VARIABLE FREQUENCY DRIVE (VFD)

Variable Frequency Drive (VFD) shall be used for primary chilled water pumps, secondary chilled water pumps, air handling unit fans and air handling unit return fans as specified in Book-03.
Selection of VFD for motors shall be in proper way as per actual requirement and specification of different motors which will be supplied along with pumps and fans.
VFD shall be with micro-controller, digital signal processors, application specific integrated circuits (ASIC) and shall good to following signals

- Multiple programmable digital inputs
- Multiple programmable digital outputs
- Multiple programmable analogue inputs
- Multiple programmable analogue outputs
- Closed loop high accuracy speed control
- An array of motor protection function
- Simple PLC type function
- Torque controller
- Communication bus.

Variable Frequency Drive (VFD) shall be good to take inrush current at the time of starting the motor. Starting current should not be more than 150% of the motor name plate current. The motor connection to VFD shall be on delta mode and VFD will start the motor smoothly without current surge.

The VFD shall be with

- Input rectifier
- DC bus
- Output stack or VFD
- Controller.

The VFD shall have a bus voltage monitoring circuit to reduce regeneration until bus voltage falls to an acceptable level. DFD shall be with breaking resistor which shall be carefully selected to ensure its reliability.
A proper degree of fixed voltage boost shall be provided so that there will be no overheating. Auto V/F adjustment shall be provided. VFD shall be used for the motors having maximum 1500 rpm. Maximum speed of the motor with VFD shall not exceed 1800 rpm. VFD shall be with charging resistor to reduce current surge magnitude. It shall be suitable to withstand system power up down ratio of 10 cycles/ hour. AC line choke arrangement shall be provided to reduce DC bus ripple current within the tolerance of the capacitor.

VFD for Secondary chilled water pumps shall be operated on the signals from return chilled water temperature. Supply chilled water temperature shall remain constant as per chiller setting.

Enclosure for VFD shall be well ventilated and shall be provided with earthing leads. Cable for VFD to Motor shall be armored.

Note: All fittings and fixtures shall be as per plumbing and sanitary finish schedule.

20.0 PRESSURE TEST OF PIPELINE

During execution, the supply water pipeline pressure should be monitored using a pressure gauge calibrated in standard bar/psi. Additionally, drinking water must be tested for pH, turbidity, and TDS, using standard reference values.

ASIAN UNIVERSITY FOR WOMEN

SECTION-04

ELECTRICAL AND LIGHTING WORKS

PACKAGE-2

SPECIFICATION FOR ELECTRICAL WORKS

1.00 STANDARD CODES AND REGULATIONS

The installation in general shall be carried out in conformity with the Electricity Rules of the Govt. of Bangladesh (Indian Electricity Act and Rules as adopted in Bangladesh), and the 14th edition of THE REGULATION FOR THE ELECTRICAL EQUIPMENT OF BUILDINGS of the Institute of Electrical Engineers (London), hereinafter referred I.E.E. wiring regulations and the British Standard code of Practice for the relevant works. But where the under noted specifications differ from these rules and standards, the specification written hereunder shall be followed. Any special requirement of the Electrical Inspector, Govt. of Bangladesh or the Power Development Board, or the Telegraph and Telephone Board, or any other Legal Authority shall also be complied with at no extra cost to the Employer.

Only licensed skilled workmen, authorized by the Government of Bangladesh to undertake such electrical works under the provision of the Indian Electricity Act and Rules as adopted in Bangladesh shall be engaged under the direct supervision of full time electrical supervisor having a certificate of competency for the type of work under execution. The name of Electrical Supervisor and particulars of his license shall be submitted in writing to the Engineer-in-charge

2.00 WORKMANSHIP AND MATERIALS:

The materials used or supplied by the Contractor and workmanship must be approved quality. The Tenderer shall supply and fix all cables, wire, conduits, switches, ceiling roses, all consumables, materials and labour etc. Complete in every respect. Besides all tools and tackles, the contractor shall also provide ladders, planks, scaffolding etc. For his own use cost and expense to the satisfaction of the Engineer-in-charge and these will be removed from site at his own cost after the completion or work. The materials shall, if not specifically mentioned otherwise, generally conform to the British Standards. If the specifications contained herein differ from B.S. the specifications and stipulations written hereunder shall have precedence.

3.00 SAMPLES:

Samples of conduit, cables, bends, socket outlets, fans, luminaries, switched sockets, steel boxes, various fittings, etc, shall be submitted to the Engineer-in-charge for his approval prior to use and this shall be kept in his office (properly tagged) till completion of the entire job. Materials actually used in the work must conform to such approved sample.

4.00 SETTING OF ELECTRICAL EQUIPMENT:

The setting of conduit runs, cables, controls, fittings, accessories, etc., shall be in accordance with the drawings and settled on site in conjunction with the direction of the Engineer-in-Charge. Any deviation from the drawings and specifications shall be always properly written and entered as built. The height from finished floor level to the bottom of fitting shall be as follows, unless otherwise specified in the drawings or directed by the Engineer-in-Charge.

i.	Switches	...	1275mm from F.F.L.
ii.	Fan Regulators	...	1275mm from F.F.L.
iii.	5 Amps Switched Socket Outlets	...	200mm from F.F.L.
iv.	13 Amps Switched Socket Outlets	...	200mm from F.F.L.
v.	15 Amps Switched Socket Outlets	...	200mm from F.F.L.
vi.	Telephone Socket Outlets	...	200mm from F.F.L.
vii.	Pendants and other interior brackets	...	To be propose by Architect.

5.00 CUTTING AND REPAIRS:

The Contractor shall perform all excavations in the ground and fill the same as laid down hereinafter. Conduits shall be placed neatly into masonry works and the grooves filled in with 1:2:3 cement concrete or in 1:3 cement mortar (depending on the size of grooves) making good all walls and ceilings, if damaged during installation of boards and fittings. No extra payment shall be made for this.

6.00 LAYOUT OF CIRCUITS, POSITION OF POINTS:

The Contractor shall do the work according to the drawings and specifications and the layout of circuit shall be as laid down and/or as directed by the Engineer-in-Charge. No work shall be allowed to be deviated without prior approval of the Engineer-in-Charge. Shifting of any point, switch board or other fitting from that shown on the drawings, if required, shall have to be approved by the Engineer- in-Charge. No extra charge shall be allowed for such shifting.

7.00 CONDUIT WORK:

7.01 General :

The work under this item consists of supply and installation of rigid, water grade PVC conduit with G.I pull wire and necessary accessories concealed or exposed in/on floors, roof slabs, walls and column where necessary in accordance with drawing, specification as stated hereunder and direction of the Engineer-in-charge.

PVC pipe shall be of standard manufacture to meet the requirement of BS 4607, NEMA TC-2 and WC-1094 water grade rigid PVC conduit must have 1.72mm wall thickness and pressure tolerance 217 P.S.I for conceal in roof slabs or column and rated 90°C cable. Junction boxes, Pull boxes, circular boxes, bends, sockets, elbows etc., shall be made of PVC or other similar inert synthetic materials, press fitted and then sealed with PVC, solvent cement or by any other standard glue as prescribed by the manufacturers. When sheet steel accessories are used except pull or junction boxes shall be fabricated form 16SWG plain either galvanized or black enameled over two prime coats. Rubber bushes are to be fixed at the conduit and where it enters the sheet steel boxes through knock outs. Each junction box shall have and earth point where earth continuity conductor can be connected. The circular boxes shall be of PVC materials with ¾" long hub and machine screwed cover. Pull wires, to draw the copper conductors through conduits shall be of 10SWG and galvanized.

The conduits to be concealed in slabs shall be installed along with G.I. Pull wire in between top and bottom bar immediately after placement of reinforcement bar as per applicable routing shown on the drawing. Conduits shall be tied with bar by 2X20SWG, G.I. wire @ 3'-0" c/c. Conduits over false ceiling will remain exposed. All these non-concealed conduits are to be secured with concrete surface or

timber frame by galvanized saddle or cleats @ 1'-6"c/c. concealed conduits in concrete wall or column surface shall be placed along with shuttering or form work before concrete poured in.

Any change in routing necessitated because of job condition shall have prior approval of the Engineer-in-Charge. All such change shall be marked on the plans as field records. Conduits in brick wall shall be installed during construction of wall. No chasing in masonry wall shall be allowed without prior approval.

PVC Pipes shall be bent either by using a hot box bending or by using flame. In any event bending radii shall be 0'-6" minimum. The conduit run shall be continuous throughout its length and kept straight as far as possible. It shall have either horizontal or vertical run but shall never run at an angle. Routing of conduits in between walls at right angle shall be not allowed.

All conduits run shall be kept at least 6" clear of gas, sewerage, water and other services pipes. Where necessary it shall be rerouted or set out to maintain the specified separation.

In installation the conduits particular care shall be taken in cutting them to the proper lengths so that the ends will fit exactly in to the outlet boxes. After installation the open end shall carefully be plugged with a bush to prevent intrusion of plaster, dust etc.

All conduits along with accessories required for complete installation shall be furnished and installed in a best workmanship manner.

i. PVC Conduit

PVC conduit must conform to NEMA TC-2 and WC 1094 designed for installation in underground, in slabs, encases or exposed. These shall be heavy rigid type – 40, rated for 90° cable. Recommended specification of PVC conduit of schedule A-1 are as follows:

Schedule-A.1

Nominal Size	Outer Dia (mm)		Class B (6bar)		Class C (9bar)		Class D (12bar)		Class E (15bar)		Class 7 (22-40bar)	
			Wall thickness (mm)									
inch	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
.75"	26.6	26.9	…	…	…	…	…	…	1.9	2.1	3.9	4.5
1.00"	33.4	33.7	…	…	…	…	…	…	2.2	2.4	4.5	5.2
1.25"	42.1	42.4	…	…	…	…	2.2	2.4	2.7	3	4.8	5.5
1.50"	48.1	48.4	…	…	…	…	2.5	2.8	3.1	3.4	5.1	5.9
2.00"	60.2	6.5	…	…	2.5	2.8	3.12	3.4	3.9	4.3	5.5	6.3
3.00"	88.7	89.1	2.9	3.3	3.5	3.9	4.6	5.1	5.7	6.3		
4.00"	114	115	3.4	3.8	4.5	5	6	6.6	7.3	8		
5.00"	140	140	3.8	4.2	5.5	6.1	7.3	8	9	9.9		
6.00"	168	169	4.5	5	6.6	7.3	8.5	9.7	10.8	11.9		

Appropriate samples shall be submitted for prior approval before installation

ii. Junction Boxes, Pull Boxes, Circular Boxes, etc.

Junction boxes and pull boxes shall conform to BN.S. 4662 and shall be made of 16 SWG (minimum) sheet steel galvanized, or any other materials as directed by the Engineer-in- Charge, depending on where it is installed to match with the existing construction in which these are installed. The circular boxes shall be of PVC. The cover of the metallic boxes should be fixed by using countersunk brass screw or galvanizes machine screw. Box ears shall be at least 14 SWG. Each box (except circular boxes) must have an earth block of copper of brass of appropriate size (minimum) 9.5mmx9.5mmx9.5mm (3/8"x3/8"x3/8") block with 4.76mm (3/16") drilled hole being for one earthing lead and 3.175mm (1/8") machine screw (tapped for 24 t.p.i) where earth continuity conductors shall be screwed in. The circular boxes shall have at least 12.7mm (1/2") long hub.

Appropriate samples shall be submitted for piror approval before installation of these boxes.

7.02 Installation

i. PVC Conduit

In general, pipes shall have concealed installation sand shall be placed over the re-bar as per drawings in the centre of the slab.

Pipe systems of each circuit must be completely erected before any of the cables are drawn-in. The pipe run should be continuous throughout its length and kept straight as far as possible. It should run either horizontally or vertically and never at an angle. The pipes are to be properly tied with the re-bar @ 0.914 m (3'-0") spacing using 18 SWG G.I. wire and pacers. If the pipes are installed exposed in wall / over false ceiling these shall be placed over 3.175 mm (1/8") space-bar and clamped with saddle of M.S. Flat bar 25.5 mm x 3.18 mm (1" x 1/8") @ 0.914 m (3-0") spacing using rope-plug / rowel bolt as per direction of the Engineer-in-Charge at no extra cost to the Owner.

During the laying of Conduit G.I. wires of 12 SWG shall be installed inside the Conduit although the length of Conduit runs. The ends of the pull wires must have sufficient length to facilitate pulling of cables and must terminate in the Switch Board, Junction Box, Circular Box or any other outlet of the conduits. The cost of pull wires and their installation shall be deemed to be included in the rates of the conduit work.

As pipe runs should be kept clear of gas, air and steam pipes, and pipes of other services. To avoid other services pipes, the pipe should be either rerouted or set out so that at least 76.2mm (3") separation is maintained between other pipes and electrical pipes. Conditions other than these stated above, if encountered by Contract or must be brought to the notice of the Consultant/Engineer-in-Charge for instructions.

Pipes installed in wall shall be placed at the time of construction of the wall. No cutting in wall shall be allowed without prior approval.

ii. Conduit

Whenever possible, instead of using bends, the conduit should be bent to the required angle using Pipe Bender. The minimum bending radius shall be such as to allow compliance with Act. 3.02 Of this specification for bends in cables and in addition the internal radius of bends shall not be less than 2½" times the outside diameter of the conduit. PVC pipes shall be bent either by using a pipe bender or by using a hot-box bender or by using a flame. The bend must be well formed & be without reduction in internal diameter.

If the situation warrants use of separate bends, for the PVC conduit such bends shall be made of PVC fiber or other insulating materials. No inspection bents shall be used and at place were inspection is required, steel boxes must be used.

Separate bends shall be used only after obtaining expressed approval of the Engineer-in-Charge / Consultant.

iii. Conduit Termination and Fittings

At the run, the PVC Conduit must terminate in a metal box galvanized or black enameled. When a conduit is terminated in a metal box (except circular boxes) a smooth bore brass/PVC bush or ring bush must be used along with brass lock-nuts of the following specification

IV. Conduit in Floor

All conduits shall be installed having a slope of 1,1000 towards the floor mounted pull box or cable duct so that condensate or leakage water drains out easily to the pull box or cable duct. For runs of more than one conduit in the same floor the direction of slope of different conduits should be decided in such systematic manner as to ensure a uniform drain out of the leakage. All socket joints shall be made water tight. No U-bend in floor shall be installed.

7.03 Method of Measurement

Measurement of payment shall be in linear meter of pipe / conduit in place for vertical and horizontal runs as measured from the 'As built' drawing. Junction boxes, Pull boxes and any other boxes including their covers shall be deemed to be included with the rate of pipes. No measurements shall be made for Junction boxes. Pull boxes including their covers, unless such boxes appear as a separate item in the Schedule.

8.00 CABLE RACE WAY:

The work under this item consists of supply and installation of sheet steel made cable race way to be concealed in the brick wall or hanged from the ceiling at the location shown in the drawing.

The race way shall be fabricated form 18SWG sheet steel with internal supports. The section must be true to the drawing without sharp edges. The cover shall be fabricated form same material and screw fitted with neat finishing so that no dust can accumulate upon the surface.

The race shall be installation concealed in the brick wall 1'-0" above the floor level. It is advisable to fix the race way during construction of brick wall to avoid future chiseling.

9.00 CABLE WORK

9.01 Materials

i. Single Core Cable and Conductors

Single core low voltage cables and conductors shall be as per B.S. 6004 (1975) of as per VDE 0271 specifications of copper conductor and PVC insulated conduct ors shall have 600/1000 volt grade of PVC insulation. All sizes over 2.5 mm^2 shall be standard.

All flexible cable shall be as per B.S 6004 (1975) unless otherwise specified.

ii. Multicore Cables

Multicore low voltage cable shall be bold PVC insulated & PVC sheathed non-armored direct burial type, termite proof, made and tested according to VDE 0271/3.69 for this type of installation, rated voltage being 600/1000 V.

Multicore high voltage cables shall be PVC insulated, field limiting conducting layers over each individual conductor & core, copper shield also over each individual core. PVC inner sheath over common covering of cores, flat steel wire armoring, helical steel taping & PVC outer sheath direct burial type, termite proof, made & tested according to VDE0271/3.69 for this type of installation, rated voltage being 7000/12000 volts.

iii. Telephone Cables

a. Subscriber Cables

The subscriber cables shall be suitable for each laying and shall be made according (polyethylene) insulated and laminated PE sheathed, Star-quad formation basic unit stranding and core wrapping. The cables shall be tested (at 20° C) for voltage not less than 500V (rms) wire to wire and 2000V (rms) wire to shield with operating voltage of 150V (rms), shall have minimum insulation resistance (tested with mm 100 V.D.C.) of 500M ohm-Km and mutual capacitance of not more than 50mF/km (for 0.6 mm^2) / 50mF km (for 0.8 mm^2)

b. Insulation Cables

The insulation cables shall be suitable for exposed or concealed installation of 0.6 mm^2 copper conductors, with PVC insulation and PVC sheathed star-quad formation, basic unit stranding, and core wrapping. The cable shall be tested (at 20° C) for voltage of 200volts (mms), shall have minimum insulation resistance (tested with min. 100D.C) of 100M ohm/km, and mutual capacitance of not more than 130mF/km (at 800 Hz).

9.02 Installation

i. Cable in Conduits

Generally, single core cable (non-sheathed) is to be installed in PVC conduits. The conduit sizes shall be as specified in the drawing. It must be ensured that cables are not scratched/damaged during pulling. For long lengths, pull boxes must be used even if not shown/indicated in the drawings. Cable shall not be drawn round more than two 90 bends (or their equivalent) between drawing-in-boxes, and any single bend must not be less than 90^{o}.

i. Cable Bending Radii

The internal radius of every bend in a cable shall be not less than the appropriate value stated below:

Insulation	Finish	Overall diameter	Factor to be applied to overall diameter of cable to determine minimum internal radius of bend
Rubber or PVC	Non-armored	i) Not exceeding 10mm^2 ii) Exceeding 10mm^2 but not exceeding 25mm^2 iii) Exceeding 25mm^2	3 4 6
	Armored	Any	6
PVC (solid Non-standard aluminium or shaped copper conductors)	Armored or non-armored	Any	8

iii. Cable Termination and Joints

The cables up to 2.5 mm^2 size shall be solid conductor and therefore, jointing of these cables is to be done through porcelain/plastic connector and the connector shall be wound with PIB tape before placing in the box. Termination of cable up to 2.5 mm$^{2.}$ shall be done by making a hook at the end, and for higher sizes, brass cable terminals must be used. Tee-off joint in the cable to lighting point, switches, etc. shall not be made Looping in system of wiring is to be followed and the joints are to be made in the switch boards only. All 3-4 core PVC cables shall be terminated using brass glands of proper size.

iv. Connection of Switches

The phase wire should be connected to the switches and the neutral wire is to be kept solid in all switch connections.

v. Cable Color

All cables used must have color as stated below:

Two Wire Single Phase A.C. System

Red, Yellow or Blue for phase line or switch wire. Black for neutral line, Green for earth when flexible cords are used.

Three Wire Two Phase A.C. System

Red for one phase
Black for common return
Yellow for other phase

Three of Four Wire Three Phase A.C. System

Red for first phase
Yellow for second phase
Blue for third phase
Black for neutral

Two Wire D.C. System

Red for positive or switch wire
Black for negative

For two wire final sub-circuits

Whether A.C. or D.C. supply lighting fan or power circuit, the neutral or middle wire shall always be black, and the phase or outlet wire (no matter, which phase it is connected to) shall always be red. The red wire shall always feed the switch, and the same were shall always be used from the switch to the light, fan of power outlet.

vi. Construction Joint Crossing

At construction joint crossing, and expansion joint fitting as per drawing is to be installed and the cables are to be run through such fittings.

vii. Earth Cable Trench

The size of the trench shall be of minimum 2'-9" depth and 1'-6" width for each cable to be laid, where more than one cable is to be laid in the trench, the width of the trench is to be increased by 6" for each extra cable for size below 70 mm2 (4 core) & 12" for bigger size cable.

A cushion of sand (F.M. 1.5) of 6" thick is to be placed over the bed of the trench over which the cables are to be laid.

After laying the cable, first class brick on edge of flat are to be placed as separators in between the cables. After installation of the brick separators, sand filling is to be done up to 6" from the top of the bigger cable. After sand filling, two layers of first-class brick flats are to be placed along the length and breadth of the trench as a protection against injury and indication that a power cable is laid. The rest of the trench shall be filled with earth, watered and rammed at 6" layers. After cables are laid the original ground conditions shall be

Restored. But if brick pavement drain concrete road, or bituminous carpeted road are cut across or damaged, they shall be remedied and restored to the original specification.

viii. Concrete Cable Trench

Trench for running cables shall be made of concrete (1:2:4) base and first class brick walls (1:4) with inside plastering (1:4) including neat cement finishing. Trench shall be constructed with a slope of about 1" in 50'-0" starting from some midpoint of the trench for disposal of sewage, if any, at outside the building including taking proper care for final disposal of the sewage. Specification for materials and construction for trench shall be the same as provided for similar works in the specifications of civil works under this contract.

Trench shall have cover with slip resisting checkered steel plates of min ½" thickness and non-corrosive surface. Cover plates shall be of stiffened type to have sufficient strength to take care of vehicle load. Cover plates shall be placed in such a way that those can easily be opened and surface level remains in the same plane of the floor having smooth finishing.

ix. Cable Laying

The cable route shall be as direct as possible and shall receive the Consultant's/ Engineer- in-Charge's approval before excavation.

All cable bends shall have a radius of not less than 2time the diameter of the cable drum, or 20 times the diameter of the cable whichever is greater.

G.I. Pipes shall be provided for all road and drain crossing. These pipes shall be laid direct in the ground without any sand bed sand layer, brick or cable covers.

Cables shall always be laid out or laid into the ground through G.I. pipe of suitable size as decided by the Consultant / Engineer-in-Charge. The length of the pipes over the ground shall not be less than 4'-0". No extra payment shall be paid for such pipes. The exposed end of the pipes shall be sealed using PVC or wooden plugs.

The Contractor shall exercise great care in handling the cable and avoid forming "KINKS". The cable drums shall preferably be conveyed on wheeled cable-drum carried and unrolled and laid directly from the drum carrier. Carriage by trailer or trucks can be allowed only if proper care is taken during unloading the drums and unrolling is done after placing the drum on drum-jacks and spindle. The cable shall be unrolled in the directions indicated on the drum by the manufacturer.

G.I. Cable marker is to be installed at every point of the trench.

After the cable is laid, it shall be tested by the Contractor in presence of the Consultant / Engineer-in-Charge. If the test is unsatisfactory, the cost of all repairs and replacement shall be borne by the Contractor.

All surplus earth shall be removed to the indicated places by the Contractor at his own cost. No extra charges shall be allowed for this work.

Any damage done to any other services by the Contractor for cable laying operations shall be made good by the Contractor.

All chasings and passages necessary fiord lying of cables indoor shall be done by the Contractor and the same shall be made good to the satisfaction of the Consultant/Engineer-in-Charge by the Contractor without any extra charge to the Owner.

When trenches are left open overnight, and where road is to be cut the Contractor shall exhibit suitable danger signal such as banners, red flags and red lamps at his own cost. Temporary arrangement by placing wooden sleepers/sheet steel, etc. across the road cutting for vehicular traffic are also to be made by the Contractor at no extra cost. The contractor shall be wholly responsible for any accident which may occur due to the negligence of the Contractor.

No trench shall be dug until all cables meant for laying have been procured and brought at site store. Cost of any centering or shuttering and shoring of trench require to be done shall be borne by the Contractor.

x. Regulations

Relevant requirements of IEE Regulations, e.g. those stated under 'defined conditions', and the VDE shall be applied for cable installation work. For cables in Air the following, shall apply:

a) Ambient air temperature = 35°C.

b) One single core d.c. cable installed separately free in air, or, one Multicore cable installed separately free in air, or, one three phase system, comprising three single core cables, installed separately free in air in flat formation with a clearance of one diameter be wear individual single core cables or in trefoil formation each individual single-core cables being in touch with each other.

c) One single core d.c. cable, one multicore cable or one three phase system of three single sore cables installed free in air with minimum clearance of:

   i) 2cm from floor, wall or roof of the room,

   ii) Twice the cable diameter between two cables and four times the cable diameter between two systems,

   iii) 30cm vertically between layers installed one above the other.

d) Cable is protected against radiation of heat from sun or any other source.

For cables in ground the following shall apply:

a) One single core d.c. cable installed separately, or, one multicore cable installed separately, or, three single core cables in three phase system installed in flat formation with clearance of 7 cm, or in trefoil formation, touching each other.

b) The cable way is through pipe of length not more than 6 meters.

xi. Insulation Test

Insulation test of the whole installation shall be carried out using 500 V Mugger, in presence of authorized representative of the Owner, and result submits to Consultant/ Engineer-in-Charge for approval.

xii. Cable Tray

The cable tray shall be installed in accordance with the applicable layout drawings.

The location of tray in drawing shall be considered as approximate and it shall be incumbent upon the Contractor before installation of tray to study all pertinent drawings and obtain precise information from the architectural schedule, scale drawings, large scale and full size details of finished and approved shop drawings of other trades. Trays incorrectly located are properly located at the Contractor's expenses.

9.03 Method of Measurement

Measurement for payment shall be in linear meter of cables, cable trays & trenches in place for vertical and horizontal run as applicable. The lengths shall be rounded to nearest meter and calculated from the 'As built' drawings.

9.04 Basis of Payment

The quantity of completed and accepted work measured as provided above shall be paid for at the contract price, per meter, which payment shall constitute full compensation for furnishing all materials, equipment, and labour, providing all incidental and consumable necessary to complete this item of work including the installation test.

10.00 EARTH CONTINUITY CONDUCTORS

10.01 Materials

These shall be electrolytic annealed copper/insulated copper conductor of 100% conductivity at 20°.C (68° F) (International/Annealed copper stranded) with weight resistively of 0.15328 ohm-grm/m^2 at 20°.C (68° F) and density of 0.32117 lb/m^3, for meeting the requirement of BS 6360:1969 or its metric adoption.

The earth continuity conductor and earthing lead shall be run in accordance with the drawings and direction, and all metal fittings shall be earthed with continuity conductors. The entire earth continuity conductor from the various circuits, sockets, etc. shall be connected to the earthing block located near the DB/SDB. Sizes of earth continuity conductors shall be as stated in the drawings. All DB/SDB/SB shall be interconnected with earth continuity conductor. The earth continuity conductor shall be allowed from earthing block to the respective earth point. Light and fan points, expect where indicated otherwise, shall not be earth.

10.02 Installation

The earth continuity conductor and earthing lead shall be run in accordance with the drawings and direction, and all metal fittings shall be earthed with continuity conductors. All the earth continuity

Conductors from the various circuits, switch boards, sockets, etc. shall be connected to the earthing block located in the DB/EDB/SDB/ESDB shall be inter connected with earth continuity conductor. The earth continuity conductor shall be drawn along with the cables and no joint shall be allowed from earthing block to the respective earth point. Light and fan points, except where indicated otherwise shall not be earthed.

10.03 Method of Measurement

Measurement for payment shall be made by linear meter of earth continuity conductor in place for vertical and horizontal run. The lengths shall be rounded to nearest meter and measured from the 'As built' drawings.

10.04 Basis of Payment

The quantity of completed and accepted works measured as provided above shall be paid for at the contract unit price, per meter, which payment shall constitute full compensation for furnishing all materials, labour, tools and installation including termination of copper wire and all accessories, consumable and incidentals necessary to complete this item of work including installation test.

11.00 SOCKET OUTLETS:

The work under this item shall consist of supply and installation of concealed type sockets as per schedule and these sockets specifications at location shown on the drawing.

The sockets outlets shall comply with BS546: 1950 or equivalent. Three pin sockets these shall be switched and un-shuttered molded type for flush mounting and shall be suitable for three pin plugs. The size shall be 83mm X 83mm and the color of the plate shall be ivory white. These shall be supplied with countersunk cadmium plated fixing screws and mounted in hammer painted steel sheet box having earth point. Sockets shall be for 250V A.C.

The fixing of the units on the outlets boxes shall be by means of flat hears galvanized screws. The flat head of the screw shall be sunk in the plates so as to finish flush with the surface of the cover. The mounting heights of the outlets shall be as shown on the drawings. The earth wire shall be connected to earth point of the boxes and to the 3rd pole of the 3 pin of the socket.

The socket shall be installed on wall with lower end of the face plates at skirt level or as directed by the Engineer if not specified otherwise, and at locations shown in applicable layout drawing

12.00 TELEPHONE SYSTEM:

12.01 Materials

i. PVC Conduit

Same as Art 2.02 (i)

ii. G. I. Pipe

Same as Art.2.01 (ii) **Appropriate samples shall be submitted prior to the installation of Conduit/G.I. Pipe.**

iii. Telephone Pull Box, Junction Box etc.

The item consists of supplying and installation of telephone junction box at the location shown on the drawing.

The box shall be totally insulated and made of poly-stroll /poly-carbonate the boxes shall be type tested assemblies (TTA) conforming to IEC439-1 & 2shall have ISO9001 certifications.

The telephone junction box shall be installed either surface/concealed as per direction of the Engineer-in-charge.

iv. Telephone Grommet

The telephone grommet shall be foreign made MK type or equivalent as per schedule and shall comply with the relevant requirements of applicable DIN (German Standard).

v. Telephone Cable

Telephone Cable shall be PVC insulated and PVC insulated PVC sheathed copper conductor type JYY=0.6 Bd. St (Bangladesh Cable Shilpa).

vi. Telephone Outlet:

The work under this item consists of supply and installation of telephone outlets at locations shown in the plains.

Telephone outlet consists of 16SWG sheet steel box.

The steel shall be anti-dust truanted grey hammer painted. All screws to be used shall be cadmium plated. The covers shall have central knock-out for telephone connecting wire entry.

The boxes shall be placed in position during construction of the wall to avoid chasing in wall at a later date. PVC bush shall be used for connecting the PVC pipe with the M.S. Box.

12.02 Installation

i. PVC Conduit etc.

In general, Conduit shall be installed as per Art. 2.02

Where PVC conduit uses fittings made of 16 SWG sheet steel or other materials, these shall be thread fitted and then sealed with metal solvent cement.

All PVC conduits run shall be up to a height of 7 or as shown in the drawing from the floor and shall be protected by a metal enclosure.

PVC conduit shall be bent either by using a pipe bender as detailed in Art.2b (ii). In any event, the bending radius shall conform to relevant portion of Art.2b (ii) and the bend must be well-formed and be without reduction in internal diameter.

ii. Telephone Pull Boxes, Distribution Boxes, Junction Boxes etc.

The pull boxes, distribution boxes and junction boxes shall be installed flush in wall/ column. The boxes shall be placed in position during construction of the wall. Also, relevant portions of Art. 2.01 (iii) shall apply.

iii. Telephone Grommet

i. The Telephone Grommet shall be installed on wall to accommodate lower end of the face plates of grommet at a height of 152 mm/228 mm (6”/0”) from the floor i.e. at skirting level, if not specified otherwise, and locations shown in applicable layout drawings.

ii. The fixing of the units on the outlet boxes shall be by means of flat head cadmium plated screws. The flat head of the screw shall be sunk in the plates so as to finish flush with the surface of the cover. The mounting heights of the outlets shall be as shown in the drawings.

iii. The location of Grommets shown on diagrammatic wiring plans shall be considered as approximate and it shall be incumbent upon the Contractor, before installation of outlet boxes to study all pertinent drawings and obtain precise information from architectural schedule, scale drawings, large scale and full size details of finished rooms and approved shop drawings of other trades. It shall be understood that outlet may be relocated of a distance of a not exceeding 4.57 m (15’-0”) from the location shown on the drawings. In centering outlets, due allowance shall be made for overhead piping ducts, window and door trim variation of thickness of furring plastering etc. as erected regardless conditions which may be otherwise shown on small scale drawing. Outlets incorrectly located shall be properly relocated of the Contractor’s expense.

12.03 Method of Measurement

Measurement for payment shall be unit of telephone grommet, pull/junction box and linear meter of pipes and cables installed in place complete with M.S. Box cover accessories, fittings, consumable etc.

12.04 Basis of Payment

The amount of complete and accepted work measured as provided above shall be paid for at the contract unit price, per each/per Rm (as applicable) which payment shall constitute full compensation for furnishing all materials, labour, tools and equipment and installing materials including telephone grommet/PB/JB.M.S. Box and all other accessories, consumable and incidentals necessary to complete this item of work. [The unit price shall also cover testing and commissioning of installation and equipments]

13.00 LIGHT FITTINGS

13.01 Materials

The light fitting shall be constructed as per schedule, and shall comply with the relevant requirements of applicable B.S. Including B.S. 4533.

All light fittings have been selected & design by Adex) Lamp Partners calculated by them

13.02 Installation

i. The light fittings shall be installed in accordance with the applicable fittings layout drawings.

ii. All pendent fittings shall be supported from brass ceiling base plate with at least 9.525 mm (3/8") screw-hub.

iii. The location of outlets shown on conduit layout and wiring plans shall be considered as approximate and it shall be incumbent upon the contractor, before installation of outlet boxes, to study all pertinent drawings and obtain precise information from the architectural schedules, scale drawings, large scale and full size details of finished rooms and approved shop drawing of other trades. It shall be understood that any outlet may become necessary to be relocated at a distance not exceeding 15 from the location shown on the drawings. In centering outlets due allowance shall be made for overhead piping ducts, window and door trim, variation in thickness of furring plastering etc. as erected, regardless of conditions which may be otherwise shown on small scale drawings. Outlets incorrectly located shall be properly relocated at the Contractor's expense.

13.03 Method of Measurement

Measurement for payment shall be made by units of lights installed in place. Each fitting complete with all accessories and consumable shall be considered as one unit.

13.04 Basis of Payment

The quantity of completed and accepted work, measured above shall be paid for at contract unit price, per unit number (each) which payment shall constitute full compensation for furnishing all labour, tools and materials including supply of consumable, accessories and incidentals necessary to complete this item of work.

14.00 CEILING FAN / EXHAUST FAN

14.01 Materials

a. Ceiling Fan:

i. Fans

Fans of approved quality shall be provided and shall be complete with suspension rod of required length, canopy, and speed regulators etc., speed regulators shall be electronic type with non-stop increasing/decreasing speed and off position.

ii. **Fan Clamps**

The Concealed fan clamps shall be made of at least 12.7 mm (1/2") dia M.S. Rod as per drawings. The ceiling rose shall be of molded plastic of approved quality.

b. **Exhaust Fan:**

Fans of approved quality shall be provided and shall be complete with steel frame louver, Shutter etc.

14.02 **Installation**

i. The ceiling fans shall be installed in accordance with the applicable fan layout drawings. If otherwise not mentioned in the drawings and specifications, all fans shall be suspended at a height of 2.59 m (8'-6") from the finished floor level.

ii. Fan clamps shall be installed as detailed in the drawings. Circular box with ceiling rose for fan outlets shall be at the center of the clamps. The clamp shall be installed in such a manner that clamps, ceiling rose, etc. shall be completely concealed by the fan canopy.

iii. The exhaust fans shall be installed in accordance with the applicable for layout drawings. If otherwise not mentioned in the drawings and specifications, all fans shall be installed at a height of 2.13 m (7.-0") form the finished floor level or above lintel level as directed by the Engineer-in-Charge.

14.03 **Method of Measurement**

i. Measurement for payment shall be made by units of Fans/Exhaust fans installed in place. Each fan/exhaust fan complete with all accessories and consumable shall be considered as one unit.

ii Measurement for payment shall be made by units of clamps installed in place. Each fan clamp complete with all accessories e.g. ceiling rose, etc. shall be considered as one unit of fan clamp.

14.04 **Basis of Payment**

The quantity of completed and accepted work measured as provided above shall be paid for the contract unit price, per each unit which payment shall constitute full compensation for furnishing all labour, tools and installation materials including fan regulators and all other consumable and incidentals necessary to complete this item of work in all respect.

15.00 DISTRIBUTION BOARDS/EMERGENCY DISTRIBUTION BOARDS/SUB-DISTRIBUTION

The distribution boards shall be totally insulated and made of poly stroll/polycarbonate/sheet steel.

The distribution boards shall be type tested assemblies (TTA) , conforming to IEC 439-1 & 2 shall have ISO9001 certifications.

The DB/SDB shall be as per schedule and shall be safety dead front fixed type having circuit breakers/isolators/contractors. Panels shall be designed for operation on a 240/415V, 50Hz, 3 phase, 4 wire system.
The board shall be chemical resistance to dilute acids 10%, dilute alkalis 10%, paraffin, petrol, etc. self-extinguishing and should conform to climatic test conforming to IEC 68 Part 2-3 & 2-30. The board shall have necessary cable glands depending on the size of the cables.

Breakers shall have inverse time tripping with thermal magnetic trip element. All circuit breaker shall be trip free and shall be of the indicating type.

The panels shall have the phase clearly marked, and where required, must have solid neutral buses. The panels shall be constructed as per schedule, and shall comply with relevant requirements of applicable BS including BS 4649, where applicable, and standard concentric knockouts of required sizes all around. The panels shall have directory frames and printed directory on / inside of door.

The MCB/MCCB/MPCB/ELCB/DS's shall be quick-make, quick-break trip free, indicating type, and shall (contact positions visible from outside the circuit breaker) conforming to IEC 947 & having adjustable overload & adjustable short circuit releases. The circuit breaker shall have standard auxiliary contacts, rotary door coupling handle. All circuit breaker shall be in accordance with schedule. All lugs must be of the solder less mechanical type. The MCB/MCCB/MPCB/ELCB/DS's must comply with IEC-947, BS 3871: part 1 (1965) category M4 (5A-60A). Rated voltage 240/415V, A.C., 50Hz, capable of providing overload and short circuit protection, through thermal magnetic trip actions respectively; temperature rating, 40°C preferably tropical (moisture fungus corrosion treated), with contact of silver alloy, terminal capability as per requirement. The motor protective circuit breakers shall have 60-100% adjustable overload & 850- 1400% adjustable short circuit releases. The response of current of short current release of triple pole MCB shall be 5-10 times rated current.

The Board shall be installed in accordance with applicable layout drawings. Minimum height to bottom of the Board from the floor level shall be 650~1500mm and maximum height of any circuit breaker/switch shall be 1800 from the same level.

The location of MDB/SDB/EMDB/ESDB shown on diagrammatic wiring plans shall be considered as approximate and it shall be incumbent upon the contractor, before installation of DB to study all pertinent drawings and obtain precise information from the architectural schedule scale drawings, large scale and full size details of finished rooms and approved shop drawings of other trades. It shall be understood that any MDB/SDB/EMDB/ESDB may be relocated at a distance not exceeding 5000mm from the location shown on the drawings. In centering MDB/SDB/EMDB/ESDB due allowance shall be made for overhead piping, ducts, window and door trim, variations in thickness of furring, plastering etc as erected, regardless of conditions which may be otherwise shown on shall drawings. MDB/SDB/EMDB/ESDB incorrectly located shall be properly relocated at the contractor's expense.

Number of outgoing circuits in different panel boards may be varied by ±3 at the time of installation

15.02 Installation

i. The Board shall be installed in accordance with the instruction of the Engineer-in-Charge or as shown in the applicable layout drawings. Minimum height to bottom of the Boards from the floor level shall be 0.76 m (2'-6") and maximum height of any circuit breaker/switch shall be 1.83 m (6'-0") from the same level, or as shown in the detail drawing.

ii. The location of DB/EDB/ESDB shown on layout drawings shall be considered as approximate and it shall be incumbent upon the Contractor, before installation of DB/EDB/SDB/ESDB to study all pertinent drawings and obtain precise information from the architectural scale drawings, large scale and full size details of finished rooms and approved shop drawings of other trades. It shall be understood that any DB/EDB/SDB/ESDB may be relocated at a distance not exceeding 15 'from the location shown on the drawings. In centering DB/EDB/SDB/ESDB due allowance shall be made for overhead piping, ducts, window and door trim, variations in thickness of furring, plastering, etc. As erected, regardless of conditions which may be otherwise shown on small drawings, DB/EDB/SDB/ESDB incorrectly located shall be properly relocated at Contractor's expenses.

15.03 Method of Measurement

Measurement for payment shall be by units of DB/EDB/SDB/ESDB installed in place completely wired and connected to the circuits. Each DB/EDB/SDB/ESDB complete with all accessories and consumable shall be considered as one unit.

15.04 Basis of Payment

The amount of complete accepted work, measured as provided above shall be paid for at the contract unit price, per each which payment shall constitute full compensation for furnishing all labour, tools materials such as DB/EDB/SDB/ESDB cubicle breaker, bus bar, equipment, and accessories fabricated angle-iron platform, pipe supports, cable gland etc. and all other consumable and incidentals necessary to complete this item of work in all respects.

16.00 DISTRIBUTION BOARD

16.02 Installation

i. The board shall be installed in wall with lower end of the board at a height of 1500mm) from the finished floor level or it will be installed as per Consultant/Engineer-in-Charge's written instruction. If not specified the board shall be installed at the location shown in the drawing.

ii. The boards shall be concealed and cover plates shall be flush to the finished surface of the wall.

16.03 Method of Measurement

Measurement for payment shall be by units of boards installed in place. Each board complete with sheet steel box, meter, MCCB/MCB and locking arrangement, any other accessories required to complete the work shall be considered as one unit.

16.04 Basis of Payment

The amount of complete and accepted work measured as provided above shall be paid for at the contract price, per set, which payment shall constitute full compensation for furnishing all labour, tools, materials, installation of materials including meter MCCB/MCB, sheet steel box, all consumable and incidentals necessary for storage, transportation to work site and to complete this item of work in all respects.

17.00 SWITCH BOARDS AND FAN REGULATOR BOARDS

17.01 Materials

Switch boards and fan regulator boards shall be as per schedule and drawing and shall have rocker/piano switches shall be vertical single pole (1-way / 2 -way) 5A A.C. architrave rocker/piano operated switches white (or as approved by the Engineer-in-Charge) in colour, to B.S. 3676:1963, complying with the test requirements for inductive or resistive loads specified, and satisfies the best requirements of the circuits up to the ratings of these switches, as set out in B.S. 3676 amendment 3:1969. The switches must have a minimum clearance of 3 mm between the contracts, and a similar minimum creping distance. All contacts shall be faced with pure silver/silver-cadmium oxide alloy. The switch operating member shall pivot independently of the rocker, making the speed of 'make' and 'break' independent of the speed at which the rocker is operated. Terminal capability minimum 2x2.5 mm^2 conductors for each **appropriate sample shall be submitted prior to installation of switches.**

Each board shall have an earthing block of cooper/brass 50.8mm x 9.53 mm x 9.53 mm (2" x 3/8" x 3/8") with 4 x 4.76 mm (4 x 3/16") drilled holes and 4 x 1.59 mm (4 x 1/16") machine screw tapped hole for 24 t.p.i. The box of the switch/regulator boards shall be made of 16 SWG sheet steel and shall be painted with three coats of approved anticorrosive grey paint. Box ears shall be adequate to accommodate at least 14 SWG ground wires.

17.02 Installation

The switch boards and fan regulator boards shall be installed on wall at a height of 4'-0", if not specified otherwise, from the floor and at locations shown in applicable layout drawings. The regulators shall be installed inside the box with regulator's knob projected over the covering if not specified otherwise. The phase wire shall be connected to the switches and the neutral wire shall be kept solid in all switch connections. The Earth Continuity Conductor (ECC) shall be connected to the earth point inside the switch board. The approved size steel boxes shall be installed at the time of construction of the wall to avoid chasing in wall.

The location of boards shown on conduit layout and wiring plans shall be considered as approximate and it shall be incumbent upon the Contractor, before installation of switch board/regulator board boxes to study all pertinent drawings and obtain precise information from the architectural schedules, scale drawings, large scale and full size details of finished rooms and approved shop drawings of other trades. It shall be understood that any switch/regulator board may be relocated at a distance not exceeding 4.57 m (15'-0") from the location shown on the drawing. In centering the boards due allowance shall be made for overhead piping, ducts, window and door trip, variations in thickness of furring, plastering, etc. as erected, regardless of conditions which may be otherwise shown on shall scale drawing. Switch boards/regulator boards incorrectly located shall be properly relocated at the Contractor's expense.

17.03 Method of Measurement

Measurement for payment shall be units of switch boards and/or fan regulator boards in place. Each switch board or regulator board with cover switches, sheet steel box etc. shall be considered as one unit.

17.04 Basis of Payment

The quantity of completed and accepted work measured as provided above, shall be paid for at contract unit price, per each, which payment shall constitute full compensation for furnishing all materials, labour, tools and equipment and installation materials including switch board/fan regulator board complete with plate, switches, regulators and other accessories, consumable and incidentals necessary to complete this item of work.

18.00 SOCKET / MCB / MCCB OUTLETS

18.01 Materials

i. All socket outlets shall be MK type, white (or as approved by the Engineer-in-Charge) in colour, conforming to B.S. 546:1950 (3 pins) and B.S. 372 part 1:1930 (2 pins). The socket tubes shall be self-adjusting for pitch with a non-expanding size-limiting entry to protect the internal contacts from distortion. All socket, switches (where applicable) shall have pure silver/silver-cadmium oxide alloy contact in which contract pressure shall be permanently maintained by subsidiary helical compression springs. All moldings shall be made of amino plastic urea molding powder to B.S. 1322: 1956 or revised and shall possess high track resisting qualities. These shall be supplied with countersunk cadmium plated fixing screws and mounted in 16 SWG hammer painted sheet box having brass earth point as per drawing and direction.

ii. The controlled sockets of MCB/MCB, if applicable, shall be un-switched and the box shall have earth point. For specifications of MCB/ MCCB, refer to Art. 7.01 (ii)

iii. The lift indicator outlets shall be made of 16 SWG sheet steel hammer painted.

18.02 Installation

i. The socket/MCB/MCCB shall be installed on wall with lower end of the face plates at a height of 152.4 mm / 228.6 mm (6”/9”) from the floor i.e. at skirting level, if not specified otherwise, and locations shown in applicable layout drawings.

ii. The controlled outlet (socket or black box) of MCB/MCCB shall be on wall with the lower end of the face plates at a height of 152.4 mm (6”) above the upper edge of the lintel, if not specified otherwise.

iii. The fixing of the units on the outlet boxes shall be by means of flat head cadmium plated screws. The flat head of the screw shall be sunk in the plates so as to finish flush with the surface of the cover. The earth wire shall be connected to earth point of the boxes to the 3rd pole of the 3 pin sockets, 2 pin socket outlets on switch boards are for light loads only.

iv. Conditions set out in Art. 5.02 (iii) shall also apply.

18.03 Method of Measurement

Measurement for payment shall be by units of sockets/MCB/MCBB indicator outlets installed in place. Each socket/MCB/indicator outlet complete with sheet steel box, socket, controlling MCB/MCCB, cover, etc. (where applicable) shall be considered as one unit.

18.04 Basis of Payment

The quantity of completed and accepted work measured as provided above shall be paid for at the contract price, per each, which payment shall constitute full compensation all labour, tools, materials installation materials including socket/MCB/MCCB outlets, sheet steel box, covers all consumable and incidentals necessary to complete this item of work.

19.00 DISTRIBUTION SYSTEM EARTHING

19.01 Materials

i. Earth Electrode

a. Pipe Electrode (Where Applicable)

This earth electrode shall be 38mm (1½") dia minimum 36m(120'-0") long G.I. pipe with two 3.17(1/8") dia holes across the pipe diameter at every 1.22m (4'-0") length of the pipe.

b. Pipe Electrode (Where Applicable)

This earth electrode shall be cold rolled single/double copper plate 600mmx 600mmx13mm (2'-0"x2'-0"x½") having provision for connecting the earthing lead as shown in the drawing and as per schedule.

ii. Earthing Lead

a. Earthing lead shall consist of copper conductor of 2x1/0SWG as per specification given in Art. 4.01 all terminal lugs shall be of copper & nut-bolts of brass.

b. Conductors for interconnection between the electrodes in any group & between groups shall have twin conductors with a combined rating of 20KA for 3 seconds.

Earthing conductors shall be of annealed high conductivity copper and shall be stranded in accordance with IEC 228 Table-VII Class-2. They shall be protected with an extruded PVC sheath of 1000 volts grade.

iii. Earthing Block

The earthing block shall be of solid electrolytic copper, cast and machined of size as per schedule; having at least 15Nos. 6.35mm (1/4"dia) drilled holes for accommodating the terminal of the Earth continuity conductor. Requisite number of brass nuts and bolts shall also be provided.

iv. Earth Inspection Pit (if necessary)

Bricks used shall be of 1st class. Only approved quality cement shall be used. For R.C.C. cover 12.7 mm (1/2") rods @150mm (6") c/c with two 9.53mm (3/8") M.S. hook of 50.8mm (2" diameter) shall be provided in the cover slab.

19.02 Installation

i. Earth Electrode

a. Pipe Electrode

The pipe earth electrode shall be buried below ground level, as per schedule, by tube-well sinking method. The earthing lead from the distribution board to the main earth electrode shall be installed in G.I. pipe of specified diameter. The terminal connected to the earth electrode shall use a brass clamp. After making the connection, the clamp shall be covered with bitumen poured hot, and covered with jute cloth.

a. Plate Electrode

The plate earth electrode (if applicable) shall be buried below ground level as per schedule and installed in an upright position and completely surrounded by a bed of at least one foot of charcoal mixed with sodium chloride salt, lime and packed hard as per drawing. Distance between any two earth electrodes shall be at least 7.62 m (25-0").

ii. Earthing Leads

The earthing lead from the earth electrode shall be connected to the earthing block near DB/EDB/SDB/ESDB. A double run of specified copper conductor shall be brought out as earthing lead for the earth electrode through G.I. pipe from the electrode and connected to the earth blocks. There shall be no joint in the copper earthing lead. All earthing lead shall follow the shortest and most direct route to earth electrode and sharp bends and joints shall be avoided. The earthing leads shall be connected to the earth electrode as per drawings. The joints shall be made mechanically strong and electrically continuous with minimum of resistance.

iii. Earth Inspection Pit (if necessary)

The earth inspection pit shall be constructed as per schedule and direction of the Consultant/Engineer-in-Charge. The slab shall have level surface and the pit shall have well formed regular sides.

iv. Maximum Earth Loop Resistance

The maximum earth loop resistance from any point in the installation including earthing lead to the earth electrode shall not exceed the resistance of one ohm or specified in the schedule, or that indicated by the Consultant/Engineer-in-Charge. The Contractor must ensure that the leads are efficiently bonded to all metal works other than the current carrying part, so that the above resistance level is not exceeded it will be the duty of the Contractor to provide earth tester, test the installation in presence of the authorized representative of the Owner and submit earth test report to the Consultant/Owner for approval.

19.03 Method of Measurement

i. Earth Electrode

Measurement for payment shall be per set/per each (as applicable) of earth electrode(s) installed in place as described in the schedule and as shown in the drawing.

ii. Earthing Lead

Measurement for payment shall be made by linear meter of earthing lead installed in place including necessary pipes, terminal lugs, nuts, bolts, etc. as described in the schedule and showing the drawing.

iii. Earthing Block

Measurement for payment shall be made by units of earth block installed in place complete with all accessories, connections, consumable etc. as described in the schedule and as shown in the drawing.

iv. Earth Inspection Pit

Measurement for payment shall be per unit of earth inspection pit installed in place or as described in the schedule and as shown in the drawing.

19.04 Basis of Payment

The amount of completed and accepted work measured as provided above shall be paid for at contract unit price, "per unit" 'per set / Rm' (as applicable) which payment shall constitute full compensation for furnishing all materials, labour tools, equipment and materials including supply of all accessories, consumable and incidental necessary to complete this item of work including carrying out the necessary test, commissioning.

20.00 LIGHTNING PROTECTON SYSTEM

20.01 Materials

i. Air Terminals

Air terminal shall be of copper of grade required for commercial electrical works, generally designate as being of minimum 98 percent conductivity when annealed. The size and shape of the air terminal shall be as per detail drawings and schedule.

ii. Roof and Intermediate Conductor

Roof conductor and intermediate conductor shall be made of copper as detailed in (i) above and of size as indicated in the detail drawing and schedule.

iii. Down Conductor

Same as item (ii) above.

iv. Test Point

The test point shall be made as per schedule and detail drawing. The bus bar assembly shall be well-formed and shall be without fitting. The conductor terminals shall be provided with copper lugs of size as detailed in the schedule and drawing.

v. Earth Inspection Pit

Earth inspection pit shall be made as per schedule and detail drawings. Bricks used shall be 1st class. For R.C.C. cover 12.7 mm (1/2") dia rods @ 152 (6") c/c with two 9.5mm (3/8") dia. M.S. hook of 50.8 mm (2") diameter shall be provided in the cover slab.

vi. Earth Electrode

Earth electrode shall be cold rolled single copper plate of size 600 mm x 600 mm x 13 mm (2'-0" x 2'0" x ½") as per drawings and specification having provision for connection the earthing load.

vii. Earth Lead

Earthing lead shall consists of copper conductor to 1/10 SWG as per specification given in Art. 4.01. All terminal lugs shall be of copper and nut bolts of brass.

20.02 Installations

Lighting protection system shall be supplied and installed as per relevant IEC standard and CP 326. Under no circumstances lighting protection network will be connected to sub-station earthing network of distribution system earthing net work. Minimum distance of separation from one earth electrode of lighting protection system to another shall be 7 meter (23'-0").

i. Air Terminals

Air terminals shall be clamped with the building, as pr detail drawing and in a manner that there is no possibility of over turning. An air terminal shall be fixed with copper/bronze metal base by means of brass bolts, nuts and washer etc. All air terminals shall be interconnected by means of roof conductor. Subsequently the entire air terminals shall be connected to the earth electrode through down conductors.

The supporting base for air terminal shall be of extra heavy duty copper/bronze with arrangements for fixing to the RCC column, the sockets having female thread for fixing the air terminal and with clamp type fasteners to suit the sizes of the horizontal & down conductors.

ii. Roof and Intermediate Conductor

Roof and Intermediate Conductors shall be continuous and without any joint between termination. All terminations shall be permanent, both electrically and mechanically. Where joints in a conductor is absolutely unavoidable, it shall be made after expressed comment of the Consultant/Engineer-in-Charge, shall be mechanically strong and well made and provide adequate electrical conductivity, which shall be sectional area of the conductors.

No bend in the conductor shall have radius of less than 203 mm (8") and the angle of any

turn shall not be less than 90°. All conductor runs shall preserve a downward or horizontal course.

The conductor shall be securely attached to the building by means of fasteners at intervals not exceeding 50.8 mm (2'-0"), shall be embedded under roof finish or concealed in plaster. Fasteners shall have cross-section not less than 14 SWG be made of brass or copper.

Appropriate sample of conductor and fastener shall be submitted prior to installation of roof Conductor.

iii. Down Conductor

The down conductor shall be continuous and shall be installed as indicated in the schedule.

These shall be securely installed from the roof the roof top to the plinth level of the Building by two screw masonry fastener.

Also, appropriate portions of Article 12.02 (ii) shall apply.

iv. Joints

Joints in the entire system shall be avoided as far as possible. However, any joint found necessary shall be made with approved type and size of heavy duty jointing clamps of bronze, brass/copper. All joint and bends of the conductors shall be mechanically effective, i.e. clamped, screwed, bolted, crimped, riveted of welded, with over lapping points, the length of the overlap being not less than 25 mm (1") and shall be electrically continuous.

v. Test Point

Each down conductor shall be provided with a test point (M.S. Box made of 16SWG sheet steel) and earth termination in accordance with the drawings, installed at a height specified in the drawing or as per the direct ion of the Engineer-in-Charge.

The test point shall be installed during construction of the building wall, and made flush with the outside wall finish.

Copper lugs shall be press-fitted with the conductor terminals with crimping tools, or shall be brazed, or shall use cast brass lug-hook. The lug shall be bolted with the bus bar by means of brass nuts and bolts.

vi. Earth Terminals

Earth terminals shall be bare copper standard wire and shall connect the test point at the end of the down conductor directly to the earth electrode without any joints.

Vii. Earth Inspection Pit (if necessary)

The earth inspection pit shall be constructed as per schedule and direction. The slab shall have level surface and the pit shall have well formed regular sides.

viii. **Earth Electrode**

Plate Electrode: The plate earth electrode shall be buried as per drawing and details and specification. The earthing lead from the test point to the main earth electrode shall be installed in G.I. pipe of specified diameter. The terminal connected to the earth electrode shall use a brass clamp. After making the connection, the clamp shall be covered with bitumen poured hot and covered with jute cloth.

ix. **Earthing Leads**

The earthing leads from the earth electrode shall be connected to the earthling block in the test point. A double run of specified copper conductor shall be brought out from the electrode (to be connected in a ring if required) and connected to the earth block. There shall be no joints in the copper earthing lead. All earthing lead shall follow the shortest and most direct route to earth electrode and sharp bends and joints shall be avoided. The earthing leads shall be connected to the earth electrode as per drawings. The joints shall be made, mechanically strong and electrically continuous with minimum resistance.

x. **Maximum Earth Loop Resistance**

The maximum earth loop resistance from any point in the installation including earthing lead to the earth electrode shall not exceed one ohm resistance specified indicated by the Consultant/Engineer-in-Charge. The Contractor must ensure that leads are efficiently bonded with all metal works other than the current carrying parts so that the above resistance level is not exceeded. It will be the duty of the Contractor to provide Earth Tester to test the installation in presence of the authorised representative of the Owner and submit Earth Test Report to the Consultant/Owner for approval.

20.03 Method of Measurements

i. **Air Terminal**

Measurement for payment shall be per each air terminal installed in place. One air terminal including its base plate, bolts, washers, consumable etc. to complete the work in all respect, shall be considered as one unit.

ii. **Down and Intermediate Conductor**

Measurement for payment shall be made by linear meter of conductor installed in place including pipe, terminal lugs, nut bolts etc. to complete the work in all respect.

iii. **Roof Conductor**

Measurement for payment shall be made by linear meter of roof conductor installed in place including necessary fasteners, terminal lugs, nuts, bolts, etc. to complete in the work in all respect.

iv. **Test Point**

Measurement for payment shall be made per each test point installed in place to complete the work in all respect.

v. **Earth Inspection Pit**

Measurement for payment shall be made per each. Each Inspection Pit constructed in place, which shall include all material, labour, consumable, incidentals etc.

vi. **Earth Electrode**

Measurement for payment shall be per set of earth electrode installed in place to complete the work in all respect.

vii. **Earthing Lead**

Measurement for payment shall be made by linear meter of earthing lead installed in place including pipe of earthing terminal lugs, nuts, bolts, etc. to complete the work in all respect.

20.04 Basis of Payment

The quantity of complete and accepted work measured as provided above shall be paid for at the contract price per each/set/meter (as applicable) which payment shall constitute full compensation for furnishing all labour, tools, equipment, materials including supply of all accessories, consumable and incidentals necessary for storage, transportation to work site and to complete this item of work in all respect.

22.00 INSPECTION AND TESTING

21.00 General

Every installation shall, on completion and before being energized, be inspected and tested in accordance with the requirements of IEE Regulations 611 to 614 of Fifteenth Edition 1981 to verify, as far as practicable, that the requirements of these Regulations have been met.

The methods of test shall be such that no danger to persons of property or damage to equipment can occur even in the circuit tested is defective.

The cost of the test shall be deemed to be included in the item rates of the installation.

21.01 Visual Inspection

A visual inspection shall be made to verify that the installed electrical equipment is

- In compliance with the applicable British Standards of IEC or any other standard mentioned in the specification.

- correctly selected and erected in accordance with these Regulations
- Not visibly damaged so as to impair safety.

Note: Appendix 14 of IEE wiring regulation lists the principal features of an installation to be visually inspected in order to verify compliance with the Regulations

21.02 Testing

The following items, where relevant, shall be tested in the sequence indicated weather is not mentioning in any part of the specification as installation and Sub-station and in addition to those test mentioned elsewhere in the specification. Standard methods of testing, in respect of some of the test are given in Appendix-15 of IEE wiring regulation, the use of other methods is not precluded provided that they give no less effective results.

- Continuity of ring final circuit
- Continuity of protective conductors, including main and supplementary equipotential bonding
- Earth electrode resistance
- Insulation resistance
- Insulation of site-built assemblies
- Protection by electrical separation
- Protection by electrical separation
- Protection by barriers or enclosures provided during erection
- Insulation of non-conducting floors and walls
- Polarity
- Earth fault loop impedance
- Earth continuity conductor
- Operation of residual current device

In the event of any test indicating failure to comply, that test and those preceding, the results of which may have been influenced by the fault indicated, shall be repeated after the fault has been rectified

i. Continuity of Ring Final Circuit Conductors

A test shall be made to verify the continuity of all conductors (including the protective conductor) of every ring final circuit.

ii. Continuity of Protective Conductors

Every protective conductor shall be separately tested to verify that it is electrically sound and correctly connected. This test shall include all conductors and extraneous conductive parts used for equi-potential bonding.

iii. Earth Electrode Resistance

Where it is necessary to measure the resistance of an earth electrode the test method described in Item-4 of Appendix-15 of IEE regulation, 15th Edition shall be used.

iv. Insulation Resistance

The tests described in regulations 613-6 to 613-8 shall be made before the installation is permanently connected to the supply. For these tests installations may be divided into

groups of outlets, each containing not less than 50 outlets. For the purpose of this regulation the term 'Outlet' includes every point and every switch except that a socket outlet, appliance or luminary incorporating a switch is regarded as one outlet. A.D.C. Voltage not less than twice the nominal voltage of the circuit concerned (r.m.s value for an A.C. supply) shall be applied for the measurement of insulation resistance, provided that the test voltage need not exceed 500 V.D.C. For installations rated up to 500 or 1000 V.D.C. for installations rated above 500 V up to 1000 V.

a. When measured with all fuse links in place, all switches (including, if practicable, the main switch) closed and, except for TN-C systems, all poles or phases of the wiring electrically connected together, the insulation resistance to Earth shall be not less than 1 mega ohm.

b. When measured between all the conductors connected to any one phase of pole of the supply and, in turn, all conductors connected to each other phase or pole, the insulation resistance shall be not less than 1 mega ohm. Wherever practicable, all lamps shall be removed and all current using equipment shall be disconnected and all local switches controlling lamps or other equipment shall be closed so that all parts of the wiring may be tested. Where the removal of lamps and/or the disconnection of current-using equipment are impracticable, the local switches controlling such lamps and/or equipment shall be open. Particular attention shall be given to the presence of electronic devices connected in the installation and such devices shall be isolated so that they are not damaged by the test voltage.

c. Where equipment is disconnected for the tests prescribed in regulation 613-7 and 613-7 and the equipment has exposed conductive parts required by these regulation to be connected to protective conductors, the insulation resistance between the exposed conductive parts and all live parts of the equipment shall be measured separately and shall comply with the requirements of the appropriate British Standard for the equipment. If there is no appropriate British Standard the insulation resistance shall be not less than 0.5 mega ohm.

v. **Insulation of Site-built**

a. Where protection against direct contract is intended to be afforded by insulation applied to live parts during erection in accordance with regulation 412-2, it shall be verified that the insulation is capable of withstanding without breakdown or flash over, and applied voltage test equivalent to that specified in the British Standard for similar factory built equipment.

b. Where protection against indirect contact is provided in supplementary insulation applied to equipment during erection in accordance with regulations 413-18 to 413- 26, it shall be verified by test.

c. Test the insulating enclosure affords a degree of protection not less than IP2X (see BS 5490) and that the insulating enclosure is capable of withstanding, without breakdown is capable of withstanding, without breakdown or flashover an applied voltage test equivalent to that specified in the British Standard for similar factory built equipment.

v. Electrical Separation of Circuits

Where protection against electric hock is provided by safety extra-low voltage (Regulations 411-2 to 411-10) or by electrical separation (Regulations 413-35 to 413-39(the electrical separation of the separated circuits shall be inspected and/or tested.

Where the source of separated circuit is other than a safety isolating transformer complying with BS 3535 or a source independent of a higher voltage circuit, it shall be verified that source provides a degree of safety equivalent to that of a BS 3535 safety isolating transformer, if necessary, by performing the applicable tests of insulation resistance and electric strength specified in BS 3535.

It shall also be verified that live parts of equipment of the separated circuit, other than cables, having a degree of electrical separation from other circuits not less that between the input and output winding of BS 3535 safety isolating transformer Regulations 411-6 and 413-37 (iv), if necessary by performing the applicable tests of insulation resistance and electric strength specified in BS 3535.

For cables of separated circuits, Regulations 411-7 and 413-37 (iii) of IEE regulation 15th edition shall be followed.

vi. Protection against Direct Contract, by Barriers or Enclosures provided during Erection

Where protection against direct contract is intended to be afforded by barriers or enclosures provided during erection in accordance with Regulations 412-3 to 412-6, it shall be verified by test that the enclosures of barriers afford a degree of protection not less than IP2X or IP4X as appropriate, where those regulations so require.

vii. Insulation of Non-conducting Floors and Walls

Where protection against indirect contract is to be provided by a non-conducting location intended to comply with Regulations 413-27 to 413-31 and 471-19, the resistance of the floors and walls of the location to the main protective conductor of the installation shall be measured at not less than three points on each relevant surface, once of which shall be not less than 1 m and not more than 1.2 m from any extraneous conductive part in the location. Any insulation or insulating arrangement of extraneous conductive parts intended to satisfy Regulation 413-31 (a) item (iii) shall be able to withstand a test voltage of at least 2 KV and shall not pass a leakage current exceeding 1mA in normal conditions of use.

ix. Polarity

A test of polarity shall be made and it shall be verified that all fuses and single pole control devices are connected in the phase conductor only, that central contact bayonet and Edison-type screw lamp holders in circuits having and earthed neutral conductor have their outer of screwed contact s connected to that conductor, and that wiring has been correctly connected to socket outlets.

x. Earth Fault Loop Impedance

Where protective measures are used which required knowledge of earth fault loop impedance, the relevant impedance shall be measured or determined by an equally effective

method.

xi. **Earth Continuity Conductor**

Earth continuity conductor of the entire earthing network shall be tested to verify the earth continuity.

xii. **Operation of Residual Current Operated Devices**

Where protection against indirect contract is to be provided by a residual current device its effectiveness shall be verified by a test simulating an appropriate fault condition and independent of any test facility incorporated in the device.

Note: All luminaries, switches, sockets etc. shall be as specified in the schedule of item of work. Specification for item of works not stated above shall strictly conform to specification/description of items as per schedule of item of works.

21.00 Certificate

Following the inspection and testing required by this Article, a completion certificate shall be given by the Contractor or other person responsible or by an authorized person acting on his behalf to the Owner. The certificate shall be in the form set out in Appendix-16 of IEE Regulation 15th Edition or in any other suitable form required by the Engineer-in-Charge/Consultant. Any defect or omission revealed by inspection or test shall be made good before a completion certificate is issued.

21.01 Testing of Equipment's & Signage

- All power cables must be megger tested before termination, and the test report should be submitted.
- For domestic cables, I-Lux cables should be used for termination with the switchboard.
- Positive and negative conductors must be used for external light connections and terminations.
- All sockets should be tested using a socket tester.
- Illumination (lumen) levels of lights should be measured using a lux meter.
- All nameplates, danger signage, EPR signage, capacity information, and SLDs must be installed on the type-tested distribution panels.
- Metal flexible conduits should be used for vertical pipeline connections.
- All MK boxes must be coated with red oxide before installation.
- All capsule-type cable trays should be galvanized, and outdoor trays should be painted as required.
- All outgoing and incoming circuit breakers must be numbered, and switchboards, power sockets, and UPS sockets must be properly marked.
- Thermography and insulation resistance tests must be conducted on all distribution boards after the completion of terminations and connections.
- All power cables should be tested by BUET.

ASIAN UNIVERSITY FOR WOMEN

ABSTRACT

PHASE-II - PACKAGE-1

Interior Finishing works for Three Storied with a Semi-Basement Academic Building for Asian University for Women, AUW, Pahartoli, Chattogram.

S.L NO	DESCRIPTION	AMOUNT IN TAKA
1	2	3
A.	BILL NO.-1: PARTITION WALLS	
B.	BILL NO.-2 : WALL FINISHING WORKS	
C.	BILL NO.-3 : DOORS	
D.	BILL NO.-4 : GLASS RAILING WORKS	
E.	BILL NO.-5 : FALSE CEILING WORKS	
F.	BILL NO.-6: FLOOR FINISHING WORKS	
G.	BILL NO.-7: PAINTING WORKS	
H.	BILL NO.-8: BLINDS WORKS	
I.	BILL NO-9: METAL WORKS	
J.	BILL NO-10:- WATER PROOFING WORKS	
	GRAND TOTAL TK =	

(In Word: Taka .....

... .only)

ASIAN UNIVERSITY FOR WOMEN

Schedule of Items & Bill of Quantities (BoQ)

Interior Finishing works for Three Storied with a Semi-Basement Academic Building for Asian University for Women, AUW, Pahartoli, Chattogram.

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
A: BILL NO:1:- PARTITION WALL					
1.1	**Brick works with first class bricks with cement sand (F.M. 1.2) mortar (1:4)** in **exterior/interior walls** including filling the interstices with mortar, raking out joints, cleaning and socking the bricks at least for 24 hours before use and washing of sand, necessary scaffolding, curing at least for 7 days etc. all complete including cost of water, electricity and other charges (measurement to given as 250 mm width for one brick length and 375 mm for one brick and a half brick length) accepted by the Engineer-in-charge. (Cement: CEM-II/B M)				
i.	Level -0	cum	18.00		
ii.	Level-1	cum	17.00		
iii.	Level- 2	cum	9.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
iv.	Level -3	cum	3.00		
1.2	**125 mm brick works with first class bricks with cement sand (F.M. 1.2) mortar (1:4)** and making bond with connected walls including necessary scaffolding, raking out joints, cleaning and soaking the bricks for at least 24 hours before use and washing of sand, curing at least for 7 days including cost of water, electricity and other charges etc. all complete and accepted by the Engineer-in-charge. (Cement: CEM-II/B-M)				
i.	Level -0	Sqm.	514.00		
ii.	Level-1	Sqm.	1,450.00		
iii.	Level- 2	Sqm.	2,100.00		
iv.	Level -3	Sqm.	684.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
1.3.a	Providing **Gypsum plaster board dry wall with 1(one) layers** of 12.50mm thick plaster board on each side of 70mmx40mm, 24 gauge thick metal frame with studs @ 600 O.C and 70 mm 25 gauge metal continuous runner in floor, wall, ceiling and intermediate or any other means or any where is required to fixed with 3 mm fastener, penetrate minimum 19 mm @ 610mm, O.C, providing fire sealant in/c 70 mm acoustical batt/ glass wool insulation inside . Wall shall be erected plumb, square, level, straight and true. all joints on exposed surface shall be flush and tight, neatly cut, and fit painting 3(three) coats with approved best quality plastic emulsion paint of BERGER or approved equivalent in/c supplying all kinds of materials, labor, tools, metal scaffolding etc. complete in all respect as per drawing, specification and direction of the Engineer- in-Charge / Consultant.				
i.	Level -0	Sqm.	395.00		
ii.	Level-1	Sqm.	50.00		
iii.	Level- 2	Sqm.	70.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
iv.	Level -3	Sqm.	70.00		
1.3.b	Providing **Gypsum plaster board dry wall with 2(two) layers** of 12.50mm thick plaster board on each side of 70mmx40mm, 24 gauge thick metal frame with studs @ 600 O.C and 70 mm 25 gauge metal continuous runner in floor, wall, ceiling and intermediate or any other means or anywhere is required to fixed with 3 mm fastener, penetrate minimum 19 mm @ 610mm, O.C, providing fire sealant in/c 70 mm acoustical batt/ glass wool insulation inside . Wall shall be erected plumb, square, level, straight and true. all joints on exposed surface shall be flush and tight, neatly cut, and fit painting 3(three) coats with approved best quality plastic emulsion paint of BERGER or approved equivalent in/c supplying all kinds of materials, labor, tools, metal scaffolding etc. complete in all respect as per drawing, specification and direction of the Engineer- in-Charge / Consultant.				
i.	Level -0	Sqm.	200.00		
ii.	Level-1	Sqm.	25.00		
iii.	Level- 2	Sqm.	35.00		
iv.	Level -3	Sqm.	35.00		

1.4	Providing double leaf **sliding panel partition** with sound proof melamine board with galvanized metal frame around 20mm thick approved best quality (PARTEX, AKIJ or approved equivalent melamine board in/c supplying, fabricating of metal frame, fixing with melamine board as per Architectural drawing, providing full locking arrangement, the top and bottom metal rail shall be embedded with floor and wall with cement concrete including cutting holes and mending good the damages, finishing, curing as and where necessary, providing 50 x 6 mm M.S. rail and 50 mm wheel for smooth movement of the gate etc. supplying all kinds materials and labor, tools, scaffolding, panel partition shall be erected plumb, square, level, straight and true. all joints on exposed surface shall be flush and tight, neatly cut, and fit etc. complete in all respect at any height any floor as per drawing, specification and direction of the Engineer-in-Charge / Consultant.	Sqm.	90.00		
		TOTAL FOR BILL NO:1 TK			

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
B: BILL NO:2: WALL SURFACE FINISHING					
2.1.a	Providing **Gypsum plaster board on wall of single layer** 12.50mm thick plaster board in one side of 125 mm thick brick work/both side of R.C.C wall or any where is suggested in/c 70mmx40mm, 24 gauge thick metal studs @ 600 O.C and 70 mm 25 gauge metal continuous runner in floor, wall, ceiling, and intermediate or any other means or any where is required to fixed with 3 mm fastener, penetrate minimum 19 mm @ 610mm O.C, providing fire sealant, providing metal shim to match the gap between masonry wall and metal runner, Gypsum plaster board shall be erected plumb, square, level, straight and true. All joints on exposed surface shall be flush and tight, neatly cut, and fit, painting 3(three) coats with approved best quality plastic emulsion paint BERGER or approved equivalent in/c supplying all kinds of materials, labor, tools, scaffolding etc. complete in all respect as per drawing, specification and direction of the Engineer- in-Charge / Consultant.				
i.	Level -0	Sqm	1,068.00		
ii.	Level-1	Sqm.	961.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
iii.	Level- 2	Sqm.	788.00		
iv.	Level -3	Sqm.	671.00		
	Providing **Gypsum plaster board on wall of double layer** 12.50mm thick plaster board in one side of 125 mm thick brick work/both side of R.C.C wall or any where is suggested in/c 70mmx40mm, 24 gauge thick metal studs @ 600 O.C and 70 mm 25 gauge metal continuous runner in floor, wall, ceiling, and intermediate or any other means or any where is required to fixed with 3 mm fastener, penetrate minimum 19 mm @ 610mm O.C, providing fire sealant, providing metal shim to match the gap between masonry wall and metal runner, Gypsum plaster board shall be erected plumb, square, level, straight and true. All joints on exposed surface shall be flush and tight, neatly cut, and fit, painting 3(three) coats with approved best quality plastic emulsion paint BERGER or approved equivalent in/c supplying all kinds of materials, labor, tools, scaffolding etc. complete in all respect as per drawing, specification and direction of the Engineer- in-Charge / Consultant.				
i.	Level -0	Sqm	600.00		
ii.	Level-1	Sqm.	500.00		

iii.	Level- 2	Sqm.	400.00		
iv.	Level -3	Sqm.	350.00		
2.2	Supplying, fitting and fixing approved best quality 12mm thick **Acoustic wall paneling** (melamine finish) with approved best quality perforated MDF Board fixed on 75mm x 40mm galvanized metal "C" Channel framing including supplying all types of materials, labour and hardware, cost of all accessories, scaffolding etc. complete in all respect for all floors at any level as per design and direction of the Engineer in Charge / Consultant.				
i.	Level -0	Sqm	752.00		
ii.	Level-1	Sqm.	54.00		
iii.	Level- 2	Sqm.	307.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
iv.	Level -3	Sqm.	316.00		
2.3	**Minimum 12 mm thick cement sand (F.M. 1.2) plaster (1:4)** with fresh cement to both inner-and outer surface of wall, finishing the corner and edges including washing of sand, cleaning the surface, curing at least for 7 days, cost of water, electricity, scaffolding and other charges etc. all complete in all respect as per drawing and accepted by the Engineer-in- charge. (Cement: CEM-II/B-M)				
i.	Level -0	Sqm	1,028.00		
ii.	Level-1	Sqm.	2,900.00		
iii.	Level- 2	Sqm.	4,200.00		
iv.	Level -3	Sqm.	1,368.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
2.4	Supplying, fitting and fixing approved best quality country made AKIJ or approved best quality complying BDS ISO 13006: 2015, **300mm x600mm x 6mm or any approved size Matt finish Tiles** (TL1) with cement sand (F.M. 1.2) mortar (1:3) in wall as shown in the drawing with staggered bond or any approved system with 1mm wide narrow joint, filling the narrow joint with white cement and colour pigment, supplying and applying approved best quality Hygienic grout (anti-bacteria, anti-fungi, ant algae, anti-crack, acid resistance), Modified ASTM-D5590 & ASTM-D5589, JIS Z-2801, ANSI A118.6 including cutting, laying and hire charge of machine and finishing with care etc. including cost of water, electricity and other charges complete in all respect as per drawing, finish schedule and direction of the Engineer-in-Charge/ Consultant. **(Contractor shall prepare a sample at his own cost for approval before execution of the work)**				
i.	Level -0	Sqm	756.00		
ii.	Level -1	Sqm	589.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
iii.	Level -2	Sqm	198.00		
iv.	Level- 3	Sqm	138.00		
2.5	Supplying, fitting and fixing approved best quality country made complying BDS ISO 13006: 2015, **600mm x600mm x 6mm or any approved size Matt finish Tiles** (TL1) with cement sand (F.M. 1.2) mortar (1:3) in **Basin and Urinals area** wall as shown in the drawing with staggered bond or any approved system with 1mm wide narrow joint, filling the narrow joint with white cement and colour pigment, supplying and applying approved best quality Hygienic grout (anti-bacteria, anti-fungi, ant algae, anti-crack, acid), Modified ASTM-D5590 & ASTM-D5589, JIS Z-2801, ANSI A118.6 including cutting, laying and hire charge of machine and finishing with care etc. including cost of water, electricity and other charges complete in all respect as per drawing, finish schedule and direction of the Engineer-in-Charge/Consultant. **(Contractor shall prepare a sample at his own cost for approval before execution of the work)**				

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
i.	Level -0	Sqm	504.00		
ii.	Level -1	Sqm	393.00		
iii.	Level -2	Sqm	133.00		
iv.	Level- 3	Sqm	93.00		
2.6	Supplying, fitting and fixing foreign made 600mm x600mm x 6mm or any approved size slab Mist skirt tiles complying BDS ISO 13006: 2015, water absorption ≤ 0.5%, modulus of rupture (MOR) ≥ 27 N/mm2, including cutting and laying the tiles in proper way and finishing with care Skirt Tiles as shown in the drawing placed edge to edge with a 1mm wide narrow joint with 20mm or thick cement sand (F.M. 1.2) mortar (1:4) base and raking out the joints, filling the narrow joints to be filled up white cement and colouring pigments matching with the tiles. supplying and applying approved best quality COTTO or approved equivalent Hygienic grout (anti-bacteria, anti-fungi, antialgae ,				

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
	anti-crack, acid resistance) Modified ASTM D5590 & ASTM-D5589, JIS Z-2801 , ANSI A118.6 including cutting and laying the tiles in proper way and finishing with care etc. all complete in all respect as per finish schedule, drawing, specification and direction of Engineer-in-Charge /Consultant. **(Contractor shall prepare a sample at his own cost for approval before execution of the work)**				
i.	Level -0	Sqm	89.00		
ii.	Level -1	Sqm	35.00		
iii.	Level -2	Sqm	11.00		
iv.	Level- 3	Sqm	5.00		
2.6.a	Tiles fixing work with adhesive of Conmix and equivalent as per direction of Engineer in charge	Kg	500		

2.6.b	12 mm Rough Plaster work with 1:3 cement and sand ratio as per direction of Engineer in charge	sqm	500		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
2.7	Supplying ,fitting and fixing **Ctg. Teak wood in skirt** with 12.50 mm thick wood up to 100mm height from finish floor in/c necessary molding (if any) finishing the corner and edges, fixing with necessary galvanized screws true to line and levels, high class enamel paint / polishing, providing necessary sealant in/c supplying all kinds of materials and labour, etc. complete at any levels in all respect as per attached finish schedule, drawing, specification. and direction of Engineer-in- Charge /Consultant.	Rm	2,909.00		
2.8	**Fair Face brick veneered work** with 6mm thick mortar joint with 242mm x 70mm mm facing in superstructure with 50 % sorted out hand made, cool burn 242mmx 115mmx 70 mm size 1st class bricks of CONFORCE LIMITED (CFC) or approved equivalent quality in cement sand (F.M. 1.2) mortar (1:3), including racking out joints, cutting the bricks to required size with grinding machine or by any other means wherever necessary with high class recessed pointing 1:2 sand cement mortar (proportion of cement shall be of 2:1 white : grey cement), providing necessary tools during work to keep each joint true to uniform and level, cleaning and soaking the bricks at least for 24 hours before use and washing and screening of sand, appropriate metal scaffolding, shuttering, curing at least for 7 days including cost of water, electricity, wire & nails for proper addition and other charges etc. all complete as per drawing and direction of the Engineer-in-Charge / Consultant.				

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
	(242mmx70mm face should be placed for facing). **(Contractor shall construct a sample at his own cost of Fair face Brick Veneered work as per instruction for approval be the Engineer-in-Charge / Consultant before start the work.)**				
i.	Level -0	Sqm.	56.00		
ii.	Level-1	Sqm.	86.00		
iii.	Level- 2	Sqm.	80.00		
iv.	Level -3 and above	Sqm.	75.00		
		TOTAL FOR BILL NO:2 TK			

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
C: BILL NO: 3:- DOORS					
3.1	Supplying, fitting and fixing two hour fire rated 980mm x 2550mm size **hollow metal single leaf door (D1**) in back of house or any where is required , 38mm or required thick (as per drawing) shutter made of 18 BWG galvanized M.S sheet, providing cork sheet inside both side of M.S steel sheet and metal frame made of 16 BWG galvanized M.S sheet of 50mm thick with wall flush or as per drawing and fill up the void of the frame with 1:1.50:3 concrete in/c 7 days curing and fitted with 250 mm long 8 Nos. of iron clamps of same size (with one end bifurcated) with the vertical members of the frame, fixing the frame in wall with appropriate method or cement concrete (1:1.50:3), mending good the damages, fixing door closer DORMA TS 93, HFELE rim push bar panic exit device 911.52.631/ 911.52.632, HAFELE 911 series, Mortise lock, wall mounted door stopper, concealed overhead DORMA TS83 series closure, HAFELE CAPO 903.92.080 or similar accessories or approved equivalent lever Handle on rose & cylinder Escutcheon, 4(four) no's bearing butt hinges, smoke barrier, panic bar, master key etc. Polyurethane two pack clear finish10% satin (PT4) over a coat of red lead primer etc. all complete including cutting, sizing, welding, fabricating, and local carriage, curing etc. complete as per drawing, door hardware & finishes schedule, specification and direction of the Engineer-in-Charge / Consultant.	Each	3.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
	(All hardware shall be satin chrome finish) Width and height of Doors may increase or decrease up to 50mm. Cost variation shall not be applicable.				
3.2	Supplying, fitting and fixing two hour fire rated 1800mm x 2550mm size pressure **hollow metal double leaf door (D1A)** in mechanical lock door, 38mm or required thick (as per drawing) shutter made of 18 BWG galvanized M.S sheet, providing cork sheet inside of both side M.S steel sheet and metal frame made of 16 BWG galvanized M.S sheet of 50mm thick with wall flush or as per drawing and fill up the void with 1:1.50:3 concrete in/c 7 days curing and fitted with 250 mm long 8 Nos. of iron clamps of same size (with one end bifurcated) with the vertical members of the frame, fixing the frame in wall with appropriate method or cement concrete (1:1.50:3), mending good the damages, Panic exit device- HAFELE rim push bar panic exit device 911.52.631 / 911.52.632, HAFELE wall mounted door stopper article No. 937.53.536 , fixing door closer DORMA TS 83, 8 (eight) no's bearing butt hinges, HAFELE 911 series Mortise lock, HAFELE CAPO 903.92.080 or similar appearance or approved equivalent lever Handle on rose & cylinder Escutcheon, Polyurethane two pack clear finish10% satin (PT4) over a coat of red lead primer etc. all complete including cutting, sizing, welding, fabricating and local carriage, curing etc. complete as per drawing, door hardware schedule, specification and direction of the Engineer-in-Charge/ Consultant.	Each	1.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
	(All hardware shall be satin chrome finish) (All hardware shall be satin chrome finish) ***Width and height of Doors may increase or decrease up to 50mm. Cost variation shall not be applicable.***				
3.3	Supplying, fitting and fixing 900mm x 2550mm size **hollow metal single leaf door (D1B)** in Class room, lab, library , storage, service etc. or any where is required, 38mm or required thick (as per drawing) shutter made of 18 BWG galvanized M.S sheet, providing cork sheet inside of both side M.S steel sheet and metal frame made of 16 BWG galvanized M.S sheet of size 50mm thick with wall flush or as per drawing and fill up the void with 1:1.50:3 concrete in/c 7 days curing and fitted with 250 mm long 8 Nos. of iron clamps of same size (with one end bifurcated) with the vertical members of the frame, fixing the frame in wall with appropriate method or cement concrete (1:1.50:3), mending good the damages, fixing concealed over head door closer DORMA TS 83 series, HAFELE 911 series Mortise lock, HAFELE CAPO 903.92.080 or similar appearance or approved equivalent lever Handle on rose & cylinder Escutcheon, HAFELE	Each	3.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
	wall mounted door stopper article No. 937.53.536, 4(four) no's bearing butt hinges etc. complete in/c Polyurethane two pack clear finish10% satin (PT4) over a coat of red lead primer etc. all complete including cutting, sizing, welding, fabricating and local carriage, curing etc. complete as per drawing, door hardware & finishes schedule, specification and direction of the Engineer-in-Charge / Consultant. **(All hardware shall be satin chrome finish) Width and height of Door may increase or decrease up to 50mm. Cost variation shall not be applicable.**				
3.4	Supplying, fitting and fixing two hour fire rated 1800mm x 2550mm size **hollow metal double leaf door (D1C)** in transition between back & front house or any where is required , 38mm or required thick (as per drawing) shutter made of 18 BWG galvanized M.S sheet, providing cork sheet inside of both side M.S steel sheet and metal frame made of 16 BWG galvanized M.S sheet of of size 50mm thick wall flush frame or as per drawing and fill up the void with 1:1.50:3 concrete in/c 7 days curing and fitted with 250 mm long 8 Nos. of iron clamps of same size (with one end bifurcated) with the vertical members of the frame, fixing the frame in wall with appropriate method or cement concrete (1:1.50:3), mending good the damages,, HFELE rim push bar panic exit device 911.52.631 / 911.52.632, fixing door closer DORMA ITS 96 series concealed overhead closer, HAFELE 911 series Mortise lock , 8 (eight) nos. concealed bearing butt hinges,	Each	2.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
	HAFELE wall mounted door stopper article No. 937.53.536, HAFELE CAPO 903.92.080 or similar appearance or approved equivalent lever Handle on rose & cylinder Escutcheon, etc. complete in/c Polyurethane two pack clear finish10% satin (PT4) over a coat of red lead primer etc. over a coat of red lead primer etc. all complete including cutting, sizing, welding, fabricating, and local carriage, curing etc. complete as per drawing, door hardware & finishes schedule, specification and direction of the Engineer-in-Charge / Consultant. (All hardware shall be satin chrome finish) ***Width and height of Doors may increase or decrease up to 50mm. Cost variation shall not be applicable.***				
3.5	Supplying, fitting and fixing two hour fire rated 1000mm x 2550mm size 36 mm thick and having density 400 kg/cum solid particle board **single leaf flush door (D2)** having Burma teak veneered acoustic shutter and frame size 50mm thick wall flush or as per drawing made of well matured natural seasoned Chittagong teak wood frame for shutter having finished size 35 x 50 mm around upon which 1.4 mm thick veneer (total two Nos. of veneers one of 0.7 mm horizontally and another of 0.7 mm vertically made of Burma Teak wood) with necessary screws are pasted on each side by mechanized process and provided fittings, 4 (four) no's concealed bearing butt hinges, DORMA ITS 96 series concealed overhead installed on all double doors, HAFELE Rim push bar exit device 911.52.631/911.52.632, HAFELE 911 series Mortise cylinder	Each	9.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
	look etc. Lacquer finish (MATTE finish) with polyurethane based 2(Two) packs clear wood finishes as per door hardware schedule in/c supplying fitting and fixing all kinds of materials, accessories at any level as per drawing, specification, door finish schedule and direction of the Engineer-in- Charge/ Consultant. **(All hardware shall be satin chrome finish) Width and height of Doors may increase or decrease up to 50mm. Cost variation shall not be applicable.**				
3.6	Supplying, fitting and fixing **985mm x 2550mm size door (D3**) in Toilet with 38 mm thick well matured, natural seasoned (min 10" wide plank) Chittagong teak wooden solid wood single leaf door shutter and 50mm thick wall flush Ctg teak wooden frame, top, lock and bottom rail of sections as per drawing, DORMA TS 93 door closer, 4 (four) nos. bearing butt hinges, HAFELE CAPO 903.92.080 or similar appearance or approved equivalent lever Handle on rose & cylinder Escutcheon, HAFELE 911 series Mortise lock, HAFELE wall mounted door stopper article No. 937.53.536, painting 3 (three) coats with BERGER or approved equivalent synthetic enamel paint etc. all complete in all levels as per drawing, door hardware & finishes schedule, specification and direction of the Engineer-in-Charge/ Consultant. (All sizes of wood are finished and all hardware shall be satin chrome finish) ***Width and height of Doors may increase or decrease up to 50mm. Cost variation shall not be applicable***.	Each	17.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
3.7	Supplying, fitting and fixing 985mmx2550mm size **hollow metal single leaf door (D3A)** in service (security), 38mm or required thick (as per drawing) shutter made of 18 BWG galvanized M.S sheet, providing cork sheet inside both side M.S steel sheet and metal frame made of 16 BWG galvanized M.S sheet of size 50mm thick with wall flush or as per drawing and fill up the void with 1:1.50:3 concrete in/c 7 days curing and fitted with 250 mm long 8 Nos. of iron clamps of same size (with one end bifurcated) with the vertical members of the frame, fixing the frame in wall with appropriate method or cement concrete (1:1.5:3), mending good the damages, 4 (four) nos. bearing butt hinges, HAFELE CAPO 903.92.080 or similar appearance or approved equivalent lever Handle on rose & cylinder Escutcheon, HAFELE 911 series Mortise lock, HAFELE wall mounted door stopper article No. 937.53.536, Polyurethane two pack clear finish10% satin (PT4). over a coat of red lead primer etc. all complete in all levels as per drawing, door hardware & finishes schedule, specification and direction of the Engineer-in-Charge / Consultant. (All hardware shall be satin chrome finish) ***Width and height of Door may increase or decrease up to 50mm. Cost variation shall not be applicable.***	Each	2.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
3.8	Supplying, fitting and fixing 750mm x2550mm size **Chittagong teak wood door (D5)** with 38 mm thick well matured, natural seasoned (min 10" wide plank) solid wood single leaf flush door shutter and frame 50mm thick wall flush size or as shown in the drg. shutter top, lock and bottom rail of sections shall be as per drawing, screwed to each face and provided all fittings as per schedule, HAFELE CAPO 903.92.080 or similar appearance or approved equivalent lever Handle on rose & cylinder Escutcheon, HAFELE 911 series, Mortise Cylinder Lock, bearing butt hinges and finished by sand papering, laminate as per finished schedule etc. all complete in all levels as per drawing, door hardware & finishes schedule, Specification and direction of the Engineer-in-Charge/ Consultant. (All sizes of wood are finished and all hardware shall be satin chrome finish) ***Width and height of Doors may increase or decrease up to 50mm. Cost variation shall not be applicable.***	Each	15.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
3.9	Supplying, fitting and fixing 1845mm x 2550mm size Chittagong teak solid **wood door with apportion of glazed and glazed swing (casement type) at top (D6)** with square edge wood frame and side light with 38 mm thick well matured, natural seasoned (min 10" wide plank) Chittagong teak wooden solid wood single leaf flush door shutter in/c a portion wood glazed door shutter fixed or operable, portion of wood glazed swing (casement type) and frame size 50mm thick wall flush or as per drawing, shutter top, lock and bottom rail of sections as per drawing, screwed to each face and provided all fittings as per schedule, such as satin chrome finish concealed bearing butt hinges, HAFELE CAPO 903.92.080 or similar appearance or approved equivalent lever Handle on rose & cylinder Escutcheon, Floor mounted door stopper, HAFELE 911 series Mortise cylinder look, Lacquer finish (MATTE finish) (Polyurethane based two packs clear wood finishes, finished by sand papering etc. supplying fitting and fixing of approved best quality PHP, NASIR or equivalent 10mm thick tempered glass in glazing portion, Polyurethane two pack clear finish10% satin (PT4) all complete in all levels as per drawing, door hardware & finishes schedule, specification and direction of the Engineer-in-Charge / Consultant. (All sizes of wood are finished and all hardware shall be satin chrome finish) ***Width and height of Doors may increase or decrease up to 50mm. Cost variation shall not be applicable.***	Each	111.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
3.10	Supplying, fitting and fixing 1855mm x2550mm size **Chittagong teak wood door (D6A)** with square edge, wood frame with viewing panel with 38 mm thick well matured, natural seasoned (min 10" wide plank) single leaf flush door shutter in/c 1/2 or more portion wooden glazed fixed or swing glazed door shutter and frame size 70mm thick wall flush or as per drawing, shutter top, lock and bottom rail of sections shall be as per drawing, screwed to each face and provided all fittings as per schedule such as concealed bearing butt hinges, DORMA ITS96 series concealed over head door closer, HAFELE CAPO 903.99.730 or equivalent lever handle on rose and cylinder Escutcheon HAFELE 911 series Mortise cylinder look, floor mounted door stopper, etc. Lacquer finish (Polyurethane based two packs clear wood finishes). supplying fitting and fixing of approved best quality PHP, NASIR or equivalent 10mm thick tempered glass in glazing portion all complete in all levels as per drawing, door hardware schedule. Polyurethane two pack clear finish10% satin (PT4). over a coat of red lead primer etc. as per door hardware & finishes schedule, specification and direction of the Engineer-in-Charge / Consultant. (All sizes of wood are finished and all hardware shall be satin chrome finish) ***Width and height of Doors may increase or decrease up to 50mm. Cost variation shall not be applicable.***	Each	6.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
3.11	Supplying, fitting and fixing 1855mmx2550mm size **Chittagong teak wood door (D6B)** with square edge, wood frame with viewing panel with 38 mm thick well matured, natural seasoned (min 10" wide plank) single leaf flush door shutter in/c 1/2 or more portion wooden glazed fixed or swing glazed door shutter and frame size 70mm thick wall flush or as per drawing, shutter top, lock and bottom rail of sections shall be as per drawing, screwed to each face and provided all fittings as per schedule such as concealed bearing butt hinges, DORMA ITS96 series concealed over head door closer, HAFELE CAPO 903.99.730 or equivalent lever handle on rose and cylinder Escutcheon HAFELE 911 series Mortise cylinder look, floor mounted door stopper, etc. Lacquer finish (Polyurethane based two packs clear wood finishes) supplying fitting and fixing of approved best quality PHP, NASIR or equivalent 10mm thick tempered glass in glazing portion all complete in all levels as per drawing, door hardware schedule. Polyurethane two pack clear finish10% satin (PT4). over a coat of red lead primer etc. as per door hardware & finishes schedule, specification and direction of the Engineer-in-Charge /Consultant. (All sizes of wood are finished and all hardware shall be satin chrome finish) ***Width and height of Doors may increase or decrease up to 50mm. Cost variation shall not be applicable.***	Each	2.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
3.12	Supplying, fitting and fixing two hour fire rated 1800mm x 2550mm size **Chittagong teak wood double shutter door (D7)** with 38 mm thick well matured, natural seasoned (min 10" wide plank) double leaf flush door shutter and frame size 50mm thick wall flush or as per drawing, shutter top, lock and bottom rail of sections as per drawing, screwed to each face and provided DORMA ITS 96 series concealed overhead closure, Concealed Bearing Butt hinges, HAFELE CAPO 903.92.080 or similar appearance or approved equivalent lever Handle on rose & cylinder Escutcheon, HAFELE 911 series Mortise cylinder look, wall mounted door stop, powder coated (3 coats heat paint) as per door finish schedule, finished by sand papering etc. all complete in all levels as per drawing, door hardware & finishes schedule, Specification and direction of the Engineer in-Charge / Consultant. (All sizes of wood are finished and all hardware shall be satin chrome finish) ***Width and height of Door may increase or decrease up to 50mm. Cost variation shall not be applicable.***	Each	3.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
3.13	Manufacturing and supplying, fitting, fixing well matured, natural seasoned **Chittagong teak wood louver door (DX) with 12mmx12mm frame and louver with 12mmx12mm** with lacquer finish (MATTE finish) including 3mm thick plastic sheet, hanger, approved best quality imported adequate number of special self closing hinges, special door handle, bolt lock etc. all as per drawing, provided all fittings as per door hardware & finishes schedule , etc. complete in all respect as per drawing, specification and direction of the Engineer in Charge / Consultant. ***Width and height of Doors may increase or decrease up to 50mm. Cost variation shall not be applicable***.	sqm	45.00		
3.14	Supplying, fitting and fixing **38 mm thick and having density 400 kg/cum solid particle board triple leaf flush door (Door Y) of any approved size shown in the drawing having Burma teak veneered** and wood frame size 50mm thick wall flush or as per drawing made of well matured natural seasoned Chittagong teak wood, frame for shutter having finished size 38 x 50 mm around upon which 1.4 mm thick veneer (total two Nos. of veneers one of 0.7 mm horizontally and another of 0.7 mm vertically made of Burma Teak wood) with necessary screws are pasted on each side by mechanized process and provided fittings, closer, lock etc. as per door hardware etc. in/c Supplying fitting and fixing of Aluminum fixed louver/grille at bottom of shutter as per the standard specification fixed with above mentioned frame will be anodized to aluminum any approved color including all accessories, neoprene, sealant,	sqm	540.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
	nuts and bolts (all nuts and bolts shall be galvanized, finished as per door hardware schedule) etc. complete in all respect as per drawings, door hardware & finishes schedule, specification and direction of the Engineer-in-Charge / Consultant. (All hardware shall be satin chrome finish) ***Width and height of Doors may increase or decrease up to 50mm. Cost variation shall not be applicable.***				
3.15	Supplying fitting and fixing of **fixed louver** made with galvanized M.S frame etc. complete in all respect as per drawing , specification door hardware and finishes schedule and direction of the Engineer-in- Charge/Consultant.	Sqm	50.00		
3.16	Supplying, fitting and fixing 2 hour fire rated 750mm x2550mm size **metal door** with vision panel all necessary additional items as per Specification and direction of the Engineer-in-Charge/ Consultant. ***Width and height of Doors may increase or decrease up to 50mm. Cost variation shall not be applicable.***	Each	12		
		TOTAL FOR BILL NO:3 TK			

D: BILL NO:4: GLASS RAILING WORKS					
4.1	Manufacturing, supplying, fitting and fixing **Glass railing** of any height and any design and shape including providing metal support 8mm dia galvanized Metal pipe (M.S) with 38mm thick galvanized Metal (M.S) pipe handrail, 6mm thick M.S : "U"-clamp embedded into floor, supplying fitting and fixing frameless 6mm thick tempered glass, accessories etc. all complete in all respect as per drawing, specification and direction of the Engineer-in-Charge / Consultant. **(Contractor shall submit sample for approval as suggested by the Engineer - in -Charge at his own cost before execution of the work)** (Exposed area of railing will be considered for measurement)	Sqm	32.00		
		TOTAL FOR BILL NO:4 TK			

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
E: BILL NO:5:-FALSE CEILING					
5.1	Supplying fitting and fixing approved best quality and color 12.50mm thick **Gypsum Board False Ceiling, fire rated** fixed with galvanized metal furring channel (imported) which is to be placed @ 600 mm C/C and providing 1200mm C/C primary galvanized metal Channel support which is to be fixed and rest on perimeter galvanized metal channel runner, galvanized metal primary support angle to be suspended from ceiling with galvanized metal clip angle continuous runner @ 1200 mm C/C in ceiling , fixing of all galvanized metal channel in wall and ceiling by rowel plugs, screws, hooks, nails or any approved system, welded/Nuts & Bolts joint to be provided between metal support angle and ceiling runner / primary support angle etc. maintaining straight lines and desired finished level at bottom face in/c making holes in slabs, beams, walls by electric drill machine and mending good the damages (if any) during execution of the work in/c cost of all materials, accessories, appropriate metal scaffoldings, labor for installation, screws, nails, galvanized metal angle channel, painting etc. The board edge should be tapered and joint should be finished with reinforced fabric tape, finished with gypsum putty. The over all surface should be finished with one base coat paint and all complete as per drawing, specification and direction of the Engineer-in-Charge / Consultant. (Contractor shall construct a sample at his own cost for approval before execution of of the work)				

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
i.	Level 0	Sqm	1,124.00		
ii.	Level 1	Sqm	2,165.00		
iii.	Level 2	Sqm	2,032.00		
iv.	Level 3	Sqm	1,671.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
5.2	Supplying fitting and fixing approved best quality and color 12.50mm thick **Gypsum Board Perforated False Ceiling fire rated** fixed with galvanized metal furring channel (imported) which is to be placed @ 600 mm C/C and providing 1200mm C/C primary galvanized metal Channel support which is to be fixed and rest on perimeter galvanized metal channel runner, galvanized metal primary support angle to be suspended from ceiling with galvanized metal clip angle continuous runner @ 1200 mm C/C in ceiling, fixing of all galvanized metal channel in wall and ceiling by rowel plugs, screws, hooks, nails or any approved system, welded/Nuts & Bolts joint to be provided between metal support angle and ceiling runner/primary support angle etc. maintaining straight lines and desired finished level at bottom face in/c making holes in slabs, beams, walls by electric drill machine and mending good the damages (if any) during execution of the work in/c cost of all materials, accessories, appropriate metal scaffoldings, labor for installation, screws, nails, galvanized metal angle channel, painting etc. The board edge should be tapered and joint should be finished with reinforced fabric tape, finished with gypsum putty. The over all surface should be finished with one base coat paint and all complete as per drawing, specification and direction of the Engineer-in-Charge / Consultant. **(Contractor shall construct a sample at his own cost for approval before execution of of the work)**				

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
i.	Level 0	Sqm	1,105.00		
ii.	Level 1	Sqm	22.00		
iii.	Level 2	Sqm	175.00		
iv.	Level 3	Sqm	200.00		
5.3	Supplying fitting and fixing Chattogram Teak **wooden rib false Ceiling** fixed with pre fixed frame or suspended from ceiling as per drawing or directed. The over all surface should be finished as stated in the drawing or as directed including supplying all kinds of materials, tools, appropriate scaffolding, labour etc. all as per drawing, specification and direction of the Engineer- in-Charge / Consultant. **(Contractor shall construct a sample at his own cost for approval before execution of the work)**				
i.	Level 1	Sqm	58.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
5.4	Supplying fitting and fixing **false ceiling with 12 mm thick ply wood with 6mm thick Burma teak veneered** for covered the surface of beam rib and in between wooden grille false ceiling fixed with metal frame as per design. The over all surface should be finished as stated in the drawing or as directed including supplying all kinds of materials, tools, appropriate scaffolding, labour etc. all as per drawing, specification and direction of the Engineer-in-Charge / Consultant. **(Contractor shall construct a sample at his own cost for approval before execution of the work)**				
i.	Level 1	Sqm	91.00		
5.5	Supplying fitting and fixing approved best quality and color 12.50mm thick **Gypsum Board False Ceiling, moisture resistant** fixed with galvanized metal furring channel (imported) which is to be placed @ 600 mm C/C and providing 1200mm C/C primary galvanized metal Channel support which is to be fixed and rest on perimeter galvanized metal channel runner, galvanized metal primary support angle to be suspended from ceiling with galvanized metal clip angle continuous runner @ 1200 mm C/C in ceiling , fixing of all galvanized metal channel in wall and ceiling by rowel plugs, screws, hooks, nails or any approved system, welded/Nuts & Bolts joint to be provided between metal support angle and ceiling runner / primary support angle etc. maintaining straight lines and desired finished level at bottom face in/c making holes in slabs, beams, walls by electric drill machine and mending good the damages (if any) during execution of the work in/c cost of all materials, accessories, appropriate	Sqm	400.00		

	metal scaffoldings, labor for installation, screws, nails, galvanized metal angle channel, painting etc. The board edge should be tapered and joint should be finished with reinforced fabric tape, finished with gypsum putty. The over all surface should be finished with one base coat paint and all complete as per drawing, specification and direction of the Engineer-in-Charge / Consultant. (Contractor shall construct a sample at his own cost for approval before execution of of the work)		
	TOTAL FOR BILL NO:5 TK		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
F: BILL NO:6:-FLOOR FINISH					
6.1	**38 mm thick artificial patent stone (NCF-1) (1:1.5:3) flooring work** in floor or in the gutter /drain as shown in the drawing with cement, best quality coarse Sylhet sand of F.M. 2.50 and 12 mm down well graded stone chips, laying the concrete in alternate panels (1.5mx1.5m), compacting and finishing the top with neat cement in/c forms work for preparing panels and curing at least 7 days including cost of water, electricity and other charges etc. all complete as per finish schedule, drawing and direction of Engineer-in-Charge/ Consultant.				
i.	Level 0	Sqm	1,890.00		
ii.	Level 1	Sqm	965.00		
iii.	Level 2	Sqm	773.00		
iii.	Level 3	Sqm	532.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
6.2	Supplying, fitting and fixing approved best quality **400mm x 400mm size or any approved size country made non-slip unglazed Matt finish floor tiles complying BDS ISO 13006: 2015, water absorption ≤ 0.5%, modulus of rupture (MOR) ≥ 27 N/mm2,** as shown in the drawing placed edge to edge with a 1mm wide narrow joint with 20mm or above thick cement sand (F.M. 1.2) mortar (1:4) base and raking out the joints, filling the narrow joints with white cement and colouring pigments matching with the tiles. Supplying and applying approved best quality COTTO or approved equivalent Hygienic grout (anti-bacteria, anti-fungi, antialgae, anti-crack, acid resistance) Modified ASTM D5590 & ASTM-D5589, JIS Z-2801, ANSI A118.6 including cutting and laying the tiles in proper way and finishing with care etc. all complete in all respect as per finish schedule, drawing, specification and direction of Engineer-in-Charge/Consultant. **(Contractor shall prepare a sample at his own cost for approval before execution of the work)**				
i.	Level 0	Sqm	95.00		
ii.	Level 1	Sqm	50.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
iii.	Level 2	Sqm	30.00		
iv.	Level 3	Sqm	20.00		
6.3	**Supplying, fitting and fixing foreign made 600mm x 600mm size** or any approved size matt finished tiles complying BDS ISO 13006: 2015, water absorption ≤ 0.5%, modulus of rupture (MOR) ≥ 27 N/mm2 as shown in the drawing placed edge to edge with a 1mm wide narrow joint with 20mm or thick cement sand (F.M. 1.2) mortar (1:4) base and raking out the joints, filling the narrow joints to be filled up white cement with white cement including cutting and laying the tiles in proper way and finishing with care etc. all complete and accepted by the Engineer-in-charge. (Cement: CEM-II/B-M) supplying and applying approved best quality COTTO or approved equivalent Hygienic grout (anti-bacteria, anti-fungi, antialgae , anti-crack, acid resistance) Modified ASTM-D5590 & ASTM-D5589, JIS Z-2801 , ANSI A118.6 including cutting and laying the tiles in proper way and finishing with care etc. all complete in all respect as per finish schedule, drawing, specification and direction of Engineer-in- Charge /Consultant. **(Contractor shall prepare a sample at his own cost for approval before execution of the work)**				-

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
i.	Level 0	Sqm	65.00		
ii.	Level 1	Sqm	31.00		
iii.	Level 2	Sqm	21.00		
iv.	Level 3	Sqm	12.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
6.4	Supplying, fitting and fixing foreign made slab Mist floor tiles 600mm x 600mm size or any approved size water absorption ≤ 0.5%, modulus of rupture (MOR) ≥ 27 N/mm2, including cutting and laying the tiles in proper way and finishing with care as shown in the drawing placed edge to edge with a 1mm wide narrow joint with 20mm or thick cement sand (F.M. 1.2) mortar (1:4) base and raking out the joints, filling the narrow joints to be filled up white cement and colouring pigments matching with the tiles. supplying and applying approved best quality COTTO or approved equivalent Hygienic grout (anti-bacteria, anti-fungi, antialgae , anti-crack, acid resistance) Modified ASTM-D5590 & ASTM-D5589, JIS Z-2801 , ANSI A118.6 including cutting and laying the tiles in proper way and finishing with care etc. all complete in all respect as per finish schedule, drawing, specification and direction of Engineer-in-Charge /Consultant. ***(Contractor shall prepare a sample at his own cost for approval before execution of the work)***				
i.	Level 0	Sqm	530.00		
ii.	Level 1	Sqm	1,795.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
iii.	Level 2	Sqm	1,165.00		
iv.	Level 3	Sqm	405.00		
6.5	Supplying fitting fixing **imported (Italian) 18 mm thick flame finish still grey granite or jet black or any approved** (Greens or approved equivalent) as shown in the drawing flooring size 300mmx300mm or any approved size fixed edge to edge with 1mm wide narrow joint of approved quality, complying accepted National / International standards, texture and size over 25 mm thick cement sand (50% F.M. 1.2 and 50% F.M 2.2) mortar (1:2) including. placing cement slurry below the stone, cutting the granite stone to desired size, grinding and finishing the edges, setting in position in proper level, filling the narrow joints with white cement and colouring pigments matching with the stone. All stone shall be square edge but not chamfered any way. Supplying and applying approved best quality COTTO or approved equivalent sealers FILA MP/90 @ 1 liter for 40 square meter including supplying all necessary equipment's / materials and finishing the top, polishing and necessary auxiliary materials and water, electricity and other charges etc. complete in all respect as per finish schedule, drawing and direction of the Engineer-in-Charge/ Consultant. (Cement: CEM-II/B-M)					

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
	(Contractor shall at his own cost prepare a sample for approval before execution of the work)				
i.	Level 0	Sqm	1575.00		
ii.	Level 1	Sqm	1605.00		
iii.	Level 2	Sqm	945.00		
iv.	Level 3	Sqm	495.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
6.6	Supplying fitting fixing **imported 18 mm thick matt polish granite or any approved colour (Greens or approved equivalent)** as shown in the drawing as flooring size 800mmx400mm or any approved size fixed edge to edge with 1mm wide narrow joint of approved quality, complying accepted National / International standards, texture and size over 25 mm thick cement sand (50% F.M. 1.2 and 50% F.M 2.2) mortar (1:2) including. placing cement slurry below the stone, cutting the granite stone to desired size, grinding and finishing the edges, setting in position in proper level, filling the narrow joints with white cement and colouring pigments matching with the stone . All stone shall be square edge but not chamfered any way. Supplying and applying approved best quality COTTO or approved equivelent sealers FILA MP/90 @ 1 liter for 40 square meter including supplying all necessary equipments / materials and finishing the top, polishing and necessary auxiliary materials and water, electricity and other charges etc. complete in all respect as per finish schedule, drawing and direction of the Engineer-in-Charge / Consultant. (Cement: CEM-II/B-M) **(Contractor shall at his own cost prepare a smple for approval before execution of the work)**				
i.	Level 0	Sqm	220.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
ii.	Level 1	Sqm	170.00		
iii.	Level 2	Sqm	128.00		
iv.	Level 3	Sqm	125.00		
6.7	**Supplying fitting fixing imported 35 mm thick matt polish granite or any approved colour** (Greens or approved equivalent as shown in the drawing as (STONE-4) flooring size 800mmx400mm or any approved size fixed edge to edge with 1mm wide narrow joint of approved quality, complying accepted National / International standards, texture and size over 25 mm thick cement sand (50% F.M. 1.2 and 50% F.M 2.2) mortar (1:2) including. placing cement slurry below the stone, cutting the granite stone to desired size, grinding and finishing the edges, setting in position in proper level, filling the narrow joints with white cement and colouring pigments matching with the stone . All stone shall be square edge but not chamfered any way.				

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
	Supplying and applying approved best quality COTTO or approved equivelent sealers FILA MP/90 @ 1 liter for 40 square meter including supplying all necessary equipments / materials and finishing the top, polishing and necessary auxiliary materials and water, electricity and other charges etc. complete in all respect as per finish schedule, drawing and direction of the Engineer-in-Charge / Consultant. (Cement: CEM-II/B-M) **(Contractor shall at his own cost prepare a smple for approval before execution of the work)**				
i.	Level 0	Sqm	17.00		
6.8	**Supplying fitting fixing imported (Italian) 50 mm thick matt polish granite (Greens or approved equivalent) as shown in the drawing** size 600mmx200mm or any approved size fixed edge to edge with 1mm wide narrow joint of approved quality, complying accepted National / International standards, texture and size over 25 mm thick cement sand (50% F.M. 1.2 and 50% F.M 2.2) mortar (1:2) including. placing cement slurry below the stone, cutting the granite stone to desired size, grinding and finishing the edges, setting in position in proper level, filling the narrow joints with white cement and colouring pigments matching with the stone . All stone shall be square edge but not chamfered any way.				

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
	Supplying and applying approved best quality COTTO or approved equivelent sealers FILA MP/90 @ 1 liter for 40 square meter including supplying all necessary equipments / materials and finishing the top, polishing and necessary auxiliary materials and water, electricity and other charges etc. complete in all respect as per finish schedule, drawing and direction of the Engineer-in-Charge / Consultant. (Cement: CEM-II/B-M) **(Contractor shall at his own cost prepare a smple for approval before execution of the work)**				
i.	Level 0	Sqm	200.00		
ii.	Level 1	Sqm	60.00		
iii.	Level 2	Sqm	34.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
6.9	"**Flotex Carpet :** Supply and installation of flotex roll type flooring material of Forbo or approved equivalent brand. The material compiling with EN 1307 production standard. The technical specification being as follows: Total thickness - 4.3mm Commercial heavy - Class 33 Roll width - 2.00 m, Roll length - 30 m Total weight - 1.8 kg/m2 Dimension stability - < 0.2% Abrasion resistance - < 35 g Pile loss Castor chair continuous - r = > 2.4 Continuous use Light fastness - > 6 Slip resistance - > 0.7 Dry and wet Acoustic character - Impact sound Δ Lw =20dB Sound absorption = 0.10" etc complete as per design, drawing and specification and direction of the Engineer in Charge / Consultant.				-
i.	Level -0	Sqm	970.00		
ii.	Level -1	Sqm	556.00		
iii.	Level -2	Sqm	768.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
iv.	Level -3	Sqm	470.00		
6.10	**Timber flooring work** with Supplying fitting and fixing Chittagong teak wood in Class room, library and study carrels room or any where is required flooring work with 38 mm thick (finished) or as per drawing best season Chittagong teak wood over 75mm x 75mm x 6mm thick M.S angle framing in 600mm grid in/c embedded the frame with concrete floor and painting three coats of synthetic enamel paint over a coat of red lead primer, fitting fixing wood planks with screw, nails etc. and greatest care should be exercised during fitting fixing wood on M.S frame so that proper level with true to line and level or proper gradient etc. can be provided etc. complete including supplying all kinds of materials, labours at any level as per drawing, specification and direction of Engineer-in-Charge / Consultant. **(Contractor shall at his own cost prepare a sample for approval before execution of the work)**	Sqm	1,020.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
6.11	Construction of **Basin Counter** including R.C.C work (1:1.50:3) with cement, coarse sand of F.M 2.5 and crushed stone chips with 1% reinforcement, Brick walls etc. fitting and fixing 18 mm thick granite top over 25mm thick cement mortar (1:3) with cement and sand F.M 1.5, fitting and fixing granite stone in front wall and side wall on 12mm thick cement mortar(1:4), supplying and applying COTTO sealers FILA MP/90 @ 1 liter for 40 square meter ,molding , finishing the corners, cutting, polishing the granite top in/c supplying all kinds of materials, labours etc. complete in all respect for all level as per drawing, specification and direction of the Engineer- in-Charge/Consultant.	Rm	43.00		
		TOTAL FOR BILL NO:6 TK			
G: BILL NO: 7:-PAINTING					
7.1	**Premium synthetic enamel paint** of approved best quality and colour delivered from authorized local agent of the manufacturer in a sealed container, having high water resistance, high bondibility, flexibility property; using specified brand thinner applying to metallic or wooden surface by brass/roller/spray in two coats over single coat anti-corrosive coating including cleaning, drying, making free from dirt, grease, wax, removing all chalked and scaled materials, all complete in all floors and accepted by the Engineer-in-charge. Priming elapsing time for drying including surface cleaning from dust, oil or dirt, smoothening, finishing and polishing with sand paper and necessary tools, appropriate metal scaffolding, testing charges etc. all complete at any level as per direction of the Engineer-in-Charge /Consultant.	Sqm	116.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
7.2	**Low sheen Acrylic emulsion painting** of approved best quality and colour BERGER or approved equivalent delivered from authorized local agent of the manufacturer in a sealed container, applying to wall in two coats over lime putty of specified brand applied on primer or sealer elapsing specified time for drying/recoating including cleaning drying, making free from dirt, grease, wax, removing all chalked and scaled materials, fungus, mending good the surface defects, sand papering the surface and necessary scaffolding, spreading by brush/ roller/spray etc. all complete in all levels as per finish schedule and direction of the Engineer-in-Charge / Consultant.	Sqm	16,261.00		
7.3	**Flat Acrylic emulsion painting** of approved best quality and colour BERGER or approved equivalent delivered from authorized local agent of the manufacturer in a sealed container, applying to ceiling in two coats over lime putty of specified brand applied on primer or sealer elapsing specified time for drying/recoating including cleaning drying, making free from dirt, grease, wax, removing all chalked and scaled materials, fungus, mending good the surface defects, sand papering the surface and necessary scaffolding, spreading by brush/ roller/spray etc. all complete in all levels as per finish schedule and direction of the Engineer-in-Charge / Consultant.	Sqm	3,035.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
7.4	Applying **2 coats of clean silicon water repellent paint** of BERGER or approved equivalent on fare face brick veneered surfaces, fair face R.C.C surfaces or any where is prescribed using approved product supplied in original sealed containers bearing the manufacturer trademark including cleaning the surface as required before applying. Appropriate metal scaffolding etc. all complete in any level as per specification and direction of the Engineer-in-Charge/Consultant.	Sqm	27,157.00		
		TOTAL FOR BILL NO:7 TK			
H: BILL NO: 8:-BLINDS WORKS					
8.1	Supplying, fitting and fixing approved best quality and grey colour **Chain operated roller blinds** NYSAN or imported approved equivalent which meet the following specification such as Fabric weight - 11oz/yd2, Fabric thickness - 16 mil, Breaking strength warp 240 da N/5cem, weft 200da N/5cm, Flame Resistance - 0.00 sec after flame, Fuel contributed value - 0, Average Openness: +/- 10 % , Elongation to break point - 3.5 % , Color fastness to light - Excellent except white, Tear Resistance- 13-18 lbs/2" ,Char Length (inches)-0.2 Color-standard colour, Composition- Fabric made with PVC coated fiberglass yarns(Fiberglass 36% , PVC- 64%), Fabric shall be waterproof, washable, rot proof , Flame resistance in accordance with California Flame Test , Title 19 public safety , Section 1237.1 small scale test.Tested in accordance with ASHRAE Standard 74073, "Methods of Measuring Solar-Optical Properties of Materials" and	Sqm	6,925.00		

Sl. No.	Description of Items	Unit	Quantity	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
	flame spread to NFPA 703: Small Scale Test for Curtains and Draperies 1989" and NFPA 701: "Large Scale Test for Single Strip Specimens." Toxicity: UPITT Fungal resistance: ASTM G21 Bacterial Resistance, ASTM G22 including supplying fitting and fixing 40mm dia tumbler, thickness 1.00mm, control unit set 40mm dia, side plate set with quick release 40mm dia , Aluminum painted bottom rail, round type, Chain jointer, tumbler hold down strips, bottom rail hold down strips, complete with galvanized metal appropriate bracket and metal left bracket etc. all materials etc. complete in all respect for all levels as per specification and direction of the Engineer-in-Charge/Consultant.				
		TOTAL FOR BILL NO:8 TK			

Sl. No.	Description of Items	Quantity	Unit	Quotated rate in Tk. (Both in fig. & words)	Amount in Taka
I: BILL NO:9: MEATAL WORKS					
1	Supplying, fitting and fixing any height and design and shape **Metal guard rail in arch way** with galvanized M.S section, Galvanized M.S tube, galvanized M.S handrail as per drawing. The galvanized M.S flat bar post shall be embedded	1,176.00	Sqm		

	125 mm into the R.C.C floor (provision for embedding the vertical post shall be kept during pouring concrete for the floor slab) with concrete as on floor slab and mending good the damages with scheduled materials including supplying all kinds of materials, labour, galvanizing, polishing etc. all complete as per design, specification and direction of Engineer-in- Charge/Consultant. **(Contractor shall submit a sample at his own cost before execution of the work)** (Exposed area of railing will be considered for measurement)				
2	Manufacturing, supplying, fitting and fixing **stair railing** of any height and any design and shape with galvanized M.S section, Galvanized M.S tube, Chittagong teak wood handrail etc. The galvanized M.S flat bar post shall be 125 mm embedded into the R.C.C floor (provision for embedding the vertical post shall be kept during pouring concrete for the floor slab) with concrete as on floor slab and mending good the damages with scheduled materials including supplying all kinds of materials, labour, galvanizing, polishing etc. all complete as per design, specification and direction of Engineer-in-Charge / Consultant. **(Contractor shall submit a sample at his own cost before execution of the work)** (Exposed area of railing will be considered for measurement)	541.00	Sqm		
3	Manufacturing, supplying, fitting and fixing **stainless steel railing** of any height and any design and shape etc. all complete in all respect as per drawing, specification and direction of the Engineer-in-Charge / Consultant. **(Contractor shall submit a sample at his own cost before execution of the work)** (Exposed area of railing will be considered for measurement)	10.00	Sqm		

Sl. No.	Description of Items	Quantity	Unit	Quotated rate in Tk. (Both in fig. & words)	Amount in Taka
4	Supplying fitting and fixing **100 mm inside dia metal HCl pipe** for disposal of roof water each piece having over length 1800 mm, thickness 6.5 mm, spigot diameter 117mm, weight min 24.85 kg fitted and fixed in position with sockets thickness min 6.5 mm, internal depth min 75 mm, bead's outside diameter mini 55 mm, ears flange length min 208 mm, caulking clearance min 8 mm produced in foundry grade pig iron as per BSTI approved manufacturer standard fitting and fixing in position including head and shoes bends made of minimum 20mm x 3 mm F.I. bar or equivalent, trap, tee, offset, clamps and nails etc. providing metal net grating on pipe mouth on the roof top with M.S section etc. complete in all level as per drawing and direction of the Engineer-in-Charge /Consultant.	231.00	rm		
5	Manufacturing, supplying, fitting and fixing **Metal grating/grill** on floor drain/roof drain at any level of any design with galvanized 38mmx38mmx 6mm M.S angle and 38mmx 3mm F.I bar including fabricating, welding, grinding placing in position local carriage in/c supplying all kinds of materials labours, tools and plants etc. all complete in all respect as per drawing, specification and direction of the Engineer-in-Charge / Consultant.	404.00	Sqm		
6	Manufacturing, supplying, fitting and fixing **Metal stair** for water reservior, leading to the roof or any where is required made with galvanized M.S section in/c railing and 6mm thick checker plate as trade and riser supplying all accessories etc complete in all respect as per drawing, specification and direction of the Engineer-in-Charge / Consultant.	32.00	Sqm		
7	Pit top slab metal cover as per drawings	400.00	Sqm		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
			TOTAL FOR BILL NO:9 TK		

J: BILL NO: 10:-WATER PROOFING WORKS					
1	Supplying and applying best quality of **Sarnafil G476** or approved equivalent self adhesive water proofing membrane of approved brand / origin / manufacturer from an authorized local agent which meet properties all conforming to ASTM standards and laying, placing, fixing on made up firm and dry surfaces free from hollows, sharp protrusions, contaminates etc. ensuring good initial bond with the surfaces all complete under the strict accordance with the manufacturer recommendations and instructions providing all safety provisions in all respects as per drawing, specifications and direction of the Engineer in Charge / Consultant.	1,296.00	Sqm		
2.	Supplying and applying best quality of **cementitious water proofing chemical,** approved brand / origin / manufacturer from an authorized local agent which meet properties all conforming to ASTM standards and laying, placing, fixing on made up firm and dry surfaces free from hollows, sharp protrusions, contaminates etc. ensuring good initial bond with the surfaces all complete under the strict accordance with the manufacturer recommendations and instructions providing all safety provisions in all respects as per drawing, specifications and direction of the Engineer in Charge / Consultant.	700.00	Sqm		
3.	Supplying and applying best quality of **acrylic polymer based water proofing chemical,** approved brand / origin / manufacturer from an authorized local agent which meet properties all conforming to ASTM standards and laying, placing, fixing on made up firm and dry surfaces free from hollows, sharp protrusions, contaminates etc. ensuring good initial bond with the surfaces all complete under the strict accordance with the manufacturer recommendations and instructions providing all safety provisions in all respects as per drawing, specifications and direction of the Engineer in Charge / Consultant.	1500.00	Sqm		

ASIAN UNIVERSITY FOR WOMEN

			TOTAL FOR BILL NO:10 TK	

(In Word: Taka ……

……. only)

ASIAN UNIVERSITY FOR WOMEN

PACKAGE-1

Schedule of Items & Bill of Quantities (BoQ)

Plumbing & Sanitary Works for Construction of Three Storied with a Semi-Basement Academic Building for Asian University for Women, Pahartoli, Chattogram.

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
	Note: The work shall be complete with Supply, Cleaning, Carrying, Installation, Fitting, Fixing, Testing and Commissioning of all the items with all consumables.				
1.00	**uPVC PIPE:**				
	Supply, fitting and fixing of Extra heavy uPVC pipe shall be made uPVC as per BS4514/ISO4422/ SS213 standard. Pipe shall be bell end socket type. Approved type of solvent sealant shall be used to install pipe and jointing the pipe with pipefittings. Joint shall be watertight. In brick wall pipe shall be surrounded by concrete in 1: 3.5: 5.5 and shall be clamped to wall properly at an interval of not more than 1200 mm. Pipe laying shall have the following gradient unless otherwise specified. Nominal dia of pipe with thickness shall be as follows. Product shall be of GINDE/L&S, China/National Polymer Ltd. Bangladesh or equivalent. This product shall be approved by Consultant.				
1.1.	300 mm dia, 11.5mm thick.	185	Rm.		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
1.2.	200 mm dia, 7.8mm thick.	380	Rm.		
1.3.	150 mm dia, 6.2 mm thick.	487	Rm.		
1.4.	100 mm dia,4.5 mm thick	2600	Rm.		
1.5.	80 mm dia, 3.5 mm thick.	10	Rm.		
1.6.	50 mm dia, 2.5 mm thick	150	Rm		
1.7.	40 mm dia, 2.5 mm thick.	40	Rm		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
1.8.	32 mm dia, 2.2 mm thick.	20	Rm		
2.00	**uPVC PIPE FITTINGS**				
	Supply, fitting and fixing of uPVC pipe fittings such as bends, tees, Y-joints, socket, reducers, U-trap, S-trap, drain strainer, elbows, offset bends etc. made of uPVC having minimum thickness as specified in uPVC pipe and shall be complete with threaded service door with cover etc. Fittings shall be bell and spigot type to adopt pipes. Product shall be as per SS213/ BS4514/ BS5255/ ISO4422/ ISO3633/AS1415. Fittings shall be installed as per drawing and direction and shall be properly plumbed and fixed. The fittings shall be of GINDE/L&S, China/ SNOW, Singapore or equivalent foreign made. This product shall be approved by Consultant.				
2.1.	**uPVC T-Joint : 88°**				
	Supply, fitting and fixing of Extra heavy uPVC standard T-joint of 88° sweep with door and vent as per direction and drawing.				
a)	150mm x 150mm x 100 mm dia	42	No		
b)	100mm x 100mm x 100 mm dia	318	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
c)	100mm x 100mm x 80 mm dia	12	No		
d)	100mm x 100mm x 50 mm dia	192	No		
e)	80mm x 80mm x 80 mm dia	5	No		
f)	50mm x 50mm x 50 mm dia	120	No		
g)	50mm x 50mm x 40 mm dia	25	No		
h)	50mm x 50mm x 32 mm dia	15	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
i)	40mm x 40mm x 40 mm dia	15	No		
j)	40mm x 40mm x 32 mm dia	14	No		
2.2.	**uPVC DOUBLE T-Joint : 88°**				
	Supply, fitting and fixing of Extra heavy uPVC standard T-joint of 88° sweep with door and vent as per direction and drawing.				
a)	100 mm x 100 mm x 100 mm x 100 mm dia	22	No		
2.3.	**uPVC Y-Joint : 45°**				
	Supply, fitting and fixing of Extra heavy uPVC standard Y-joint, as per direction and drawing.				
a)	100mm x 100mm x 100 mm dia	24	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
b)	100mm x 100mm x 80 mm dia	2	No		
c)	100mm x 100mm x 50 mm dia	10	No		
d)	50mm x 50mm x 50 mm dia	10	No		
2.4.	**uPVC DOUBLE Y-Joint : 45°**				
	Supply, fitting and fixing of Extra heavy uPVC standard Y-joint, as per direction and drawing.				
a)	150 mm x 150 mm x 150 mm x 150 mm dia	2	No		
b)	100 mm x 100 mm x 100 mm x 100 mm dia	6	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
2.5.	**uPVC P-Trap 100mm dia :**				
	Supply, fitting and fixing of 100 mm dia uPVC P-trap with 50mm vent and shall have minimum 50mm water seal.				
a.	100mm dia	120	No		
2.6.	**uPVC S-TRAP :**				
	Supply, fitting and fixing of uPVC 100 mm dia uPVC S-Trap with 50mm vent and shall have 50mm water seal.				
a.	100mm dia	6	No		
2.7.	**uPVC Bend angle 88°/63°/45°/43°. :**				
	Supply, fitting and fixing of uPVC Bend shall be with service door (Side door, back side door, left & right door) with cap. Bend angle 88°/63°/45°/43° etc.				
a.	Bend, 200 mm dia.	12	No		
b.	Bend, 150 mm dia.	23	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
c.	Bend, 100 mm dia.	380	No		
d.	Bend, 50 mm dia.	200	No		
e.	Bend, 40 mm dia.	38	No		
f.	Bend, 32 mm dia.	25	No		
2.8.	**uPVC Loose Socket/Coupler :**				
	Supply, fitting and fixing of uPVC Loose Socket/Coupler shall be good to adopt straight pipe.				
a.	150 mm dia	10	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
b.	100 mm dia	80	No		
c.	80 mm dia	2	No		
d.	50 mm dia	20	No		
2.9.	**uPVC Offset Bend :**				
	Supply, fitting and fixing of uPVC Offset Bend shall be good to adopt straight pipe.				
a.	100 mm dia	24	No		
b.	80 mm dia	1	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
c.	50 mm dia	12	No		
2.10.	**uPVC Vent Cowl :**				
	Supply, fitting and fixing of uPVC Vent Cowl as per drawing and direction.				
a.	150 mm dia	2	No		
b.	100 mm dia	16	No		
c.	80 mm dia	1	No		
d.	50 mm dia	6	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
2.11.	**uPVC U-Trap 100mm dia. :**				
	Supply, fitting and fixing of uPVC U-trap shall be with door with cover.				
a.	100 mm dia	10	No		
2.12.	**uPVC SQUARE GRATING FLOOR DRAIN :**				
	Supply, fitting and fixing of SS Square gratings shall be 150mm x 150mm with holes of four piece type-frame, perorated cover, strainer and water seal cover. Grating cove shall be hinge type.				
a.	100 mm dia	86	No		
b.	50 mm dia	148	No		
2.13.	**uPVC/HCI Bell Mouth Roof Drain :**				
	Supply, fitting and fixing of Upvc/HCI Bell Mouth Roof Drain shall be 200mm x 200mm & 150mm x 150mm size to adopt upvc pipe two pieces with socket.				
a.	150 mm dia	6	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
b.	100 mm dia	397	No		
2.14.	**uPVC Square Grating Clean Out:**				
	Supply, fitting and fixing of uPVC square cleat out gratings shall be 100mm x 100mm with no hole cover. Cover shall be hinge type. It shall be four piece type.	20	No		
2.15.	**uPVC Clean out Cap:**				
	Supply, fitting and fixing of uPVC clean out cap shall be installed at end of the pipe used when servicing is required.	38	No		
2.16.	**CLUMP/HANGER :**				
	Supply, fitting and fixing of Pipe Support Clump/Hanger (UPVC or MS) for Vertical & Horizontal used with SS screw, roul bolt, read oxide etc.				
a.	150 mm dia	120	No		
b.	100 mm dia	300	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
c.	50 mm dia	60	No		
2.17.	**uPVC Reducing Bush Socket :**				
	Supply, fitting and fixing of uPVC Reducing bush Socket shall be good to adopt straight pipe.				
a.	150x100 mm dia	10	No		
b.	100x80 mm dia	2	No		
c.	100x50 mm dia	28	No		
d.	50x40 mm dia	12	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
e.	50x32 mm dia	8	No		
f.	40x32 mm dia	12	No		
2.18.	**uPVC Test Opener/ Door Socket :**				
	Supply, fitting and fixing of uPVC Test Opener/ Door Socket shall be good to adopt straight pipe.				
a.	150 mm dia	12	No		
b.	100 mm dia	68	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
3.00	**WATER SUPPLY PIPE :**				
3.01	**cPVC PIPE :**				
	Supply, fittings, fixing and laying of cPVC Pipe. Pipe work of Standard thickness as specified in group-ka or approved equivalent shall be complete with bends, tees, elbows, socket, union, reducers, hanger, bracket, clamp etc. complete. Approved type of sealant shall be used on thread to make it leak proof. All the pipe work shall be tested at 680 kpa for 24 hours in presence of the representative of the Owner/consultants. Product shall be of National Tube Ltd, Bangladesh.				
a.	150mm dia, 4.85mm thick (GI)	10	Rm		
b.	100mm dia, 6.2mm thick CPVC	30	Rm		
c.	80mm dia, 5.49mm thick CPVC	230	Rm		
d.	65mm dia, 5.16mm thick CPVC	140	Rm		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
e.	50mm dia, 4mm thick CPVC	360	Rm		
f.	40mm dia, 3.06mm thick CPVC	220	Rm		
g.	32mm dia, 2.59mm thick CPVC	60	Rm		
h.	25mm dia, 2.12mm thick CPVC	205	Rm		
i.	20mm dia, 1.65mm thick CPVC	80	Rm		
j.	15mm dia, 1.4mm thick CPVC	169	Rm		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
3.02	**HOT WATER PIPE :**				
	Supply, fittings, fixing and laying of cPVC Pipe for Hot water supply and return work shall be complete with bends, tees, elbows, socket, union, reducers, hanger, bracket, clamp etc. All joints shall be Hot-melt, 100% Approved type & Welled shall be used secondary on thread to make it leak proof. All the pipe work shall be tested at 1.6Mpa for 24 hours in presence of the representative of the Consultants. All MS & GI Materials used in pipe work shall be painted with two coats of prime coat of approved quality by the Engineer/Consultants.				
a.	20mm dia, 1.65mm thick CPVC	185	Rm		
b.	15mm dia, 1.4mm thick CPVC	218	Rm		
4.00	**SUPPLY & FIXING OF TOILET FITTINGS :**				
	Supply, Fitting & 'Fixing of Toilet fittings in Toilets with all hardwares and consumables (SS Bush, SS Screw, SS fancy Bush, Nut bolt, Taflon, Solvent Cement, white Cement, Gasket etc) required for complete installation and function of the fittings. Fittings shall be suitable for a testing pressure of 400 Kpa. for 24 hours.				

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
4.01	**Concealed Shower tap** Supply, fitting and fixing of Concealed Shower Tap, Winston Concealed Mono Shower (I HANDLE) (Model No.FFAST605-7T9500BTO Built in Valve American Standard Thailand) as per drawing and direction of the Engineer/Consultant..(See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. TW06) Sample to be approved by Consultant.	4	No		
4.02	**Angle Stop Valve :** Supply, fitting and fixing of (Model No.TOTO TX277SV1) Angle Stop Cock complete in all respect as per drawing and direction of Consultant.(See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. TW04 .Sample to be approved by Consultant.	142	No		
4.03	**WC Shower Rose(Push Shower)** Supply, fitting and fixing of (Model No.TOTO THX 20PIV (IVORY) Hand Shower complete in all respect as per drawing and direction of the Engineer/ Consultant. (See detail sanitary ware, Tapware & Bathroom Accessories schedule of code No. TW03)	56	No		
4.04	**Twin Bib Cock :** Supply, Fitting and fixing of Two in one Bib Cock MODEL, No:TOTO TX131l, shall be constructed with bronze and shall have rising stem screwed bonnet, disc. and screwed end type. Valve shall be installed at location shown in the drawing and as per direction of Consultant. Threaded joint shall be made properly sealed. Sample to be approved by Consultant. (See detail sanitary ware, Tapware & Bathroom Accessories schedule of code No. TW07)				
4.4.1	Product shall be of TOTO.	7	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
4.05	**Open Tap/Bib Cock :** Supply, fitting and fixing of (Model No.FFAS4610-405500BCO) Wall Tap of American standard, Thailand or equivalent from Thailand) complete in all respect as per drawing and direction of the Engineer/Consultant. Sample to be approved by Consultant..(See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. TW08)	5	No		
4.06	**Pillar Cock (Self Closing) :** Supply, Fitting fixing of (Model No.TOTO /TS 135HM) Pillar Cock shall be constructed with brass rising stem screwed bonnet, solid wedge and screwed end type. Valves shall be suitable to withstand a pressure of 344 kPa. Valve shall be instal. (See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. TW02)	7	No		
4.07	**AUTO SENSOR FAUCET** Supply, Fitting fixing of (Model No.TOTO TEN12AWRV500) Auto Sensor Faucet Size: 50 x 161 x 169 (See detail sanitary ware, Tapware & Bathroom Accessories schedule of code No. TW01)	39	No		
4.08	**Basin Mixture :(Single Lever Lavatory Faucet)** Supply, fitting fixing of (w/ pop-up waste)LF Series Single Lever Lavatory Faucet Basin Mixture complete in all respect as per drawing and direction of the Engineer/Consultant. Product shall be Model No. TOTO TLS04301B.(See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. TW09)	45	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
4.09	**Laboratory Sink Mixture :** Supply, Fitting fixing of Laboratory Sink Mixture shall be constructed with brass rising stem (Nozzle type) screwed bonnet, solid wedge and screwed end type. Valves shall be suitable to withstand a pressure of 344 kPa. Valve shall be installed at location Product shall be Model No.TOTO TTKC301FK.(See detail sanitary ware, Tapware & Bathroom Accessories schedule of code No. TW05)	30	No		
4.10	**P-Trap :** Supply, fitting fixing of (Model No.TOTO THX1A-5N) P-Trap complete in all respect as per drawing and direction of Consultant. (See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. BH06)	55	No		
5.00	**SUPPLY, FITTING & FIXING OF TOILET FIXTURES :** Supply, fitting and fixing of Toilet fixtures of approved colour with all hardwares and consumables required for complete installation and function of the fixtures.				
5.01	**Washing Hand Basin** Supply, fitting and fixing of washing wall Hung Half Padestal Lavatory white colour hand basin TOTO LW240CJ .Size- 600 x 420 mm attached venity with SS Screw, SS Bush, Solvent cement, thread tap, white cement, Gasket etc. including Wall Hung Half Pedestal Lavatory. Color Must be White. Making holes and fitting in walls and mending good the damages etc. complete in all respect as per drawing and direction of the Engineer/Consultant.				

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
a.	PLAZA Counter top Wash Basin (See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. TOTO LW240CJ,SW02) Half Pedestal Lavatory Width: 500 mm Depth: 350 mm	5	No		
b.	(See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No.TOTO L710CSRE,SW01) Consol Lavatory Size: W500*D450*H7mm	15	No		
c	(See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No.TOTO LW103JT.SW11) Accessible Restroom Lavatory 1 Tap Hole Size: 580 mm X 550 mm ,SW11)	35	No		
5.02	**LABORATORY SINK** Supply, Fitting and fixing of Super quality Laboratory Sink in position with heavy type CI wall brackets, SS Screw, Solvent cement, thread tap, white cement, Gasket including making holes in walls and fitting with CI wall brackets and mending good the damages etc. complete as per direction of the Consultant. TOTO ES-RD5045 Description Color: Black Single Bowl Stainless steel > HAND MADE SINK > OVERALL SIZE (MM) : 500x450x230 R10 > BOWL SIZE (MM) : 460x410x230 > THICKNESS : 1.0-3MM > MATERIALS : 304G stainless steel > WASTE : 110 mm > WASTE POSITION : In Mid > OVERFLOW HOLE : 1 > ACCESSORIES : S1) (See detail sanitary ware, Tapware & Bathroom Accessories schedule of code No. SW06)	30	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
5.03	**Flexible Connection** Supply, fitting and fixing of Steel flexible connecting pipe of (Model No.TOTO T025005) with SS flare nut, SS Bush, SS Fancy Bussh PVC taflon and Socket on both end to adapt 13 mm dia threaded G.I. Pipe etc. complete in all respect as per drawing and direction of the Engineer/ Consultant. (See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. SW07)	56	No		
5.04	**Commode** Supply, fitting and fixing of Porcelain Commode 'P' or 'S' type trap, with ebonite including socket etc. preparing the base with cement concrete and wire net or rod if necessary with heavy type SS Screw, SS Bush, SS Nut Bolt, Rubber Buffer, Solvent cement, thread tap, white cement, Gasket including making holes in all floors wherever required and mending good the damages, fitting, fixing with all necessary fittings and connection etc. complete in all respect as per drawing and direction of the Engineer/Consultant. **Sample to be Approved by Consultant.**				
a.	Commode shall be TOTO W C WALLHUNG Including Concealed Tank and Push Plate Seat & Cover: TC281SJ 'Access door. TOTO CW 822NJ (See detail sanitary ware, Tapware & Bathroom Accessories schedule of code No. SW02A) .	53	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
b.	TOTO C887RE#XW Description: Flush system TORNADO FLUSH Water Use 4.8L Rough-in 305 mm Bowl Shape Elongated Size 428Wx727Dx657H mm Seat & Cover Model: TC600VS#W (See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. SW03)	15	No		
c.	Supply, fitting and fixing of TOTO WH172A MB170P#WH Water Use : 4.5L / 3L Water Pressure: 0.05MPa~0.75MPa Conceal Tank (See detail sanitary ware, Tapware & Bathroom Accessories schedule of code No. SW02B)	39	No		
5.05	**Squat (Long Pan)** Supply, Fitting and fixing of Orrisha type pan with foot rest and preparing the base of pan in cement concrete wire net or rods if necessary in all floors where necessary and mending good the damages. Complete as per direction of the Consultant. Product shall be Model No .**ARZAIQ Code-309**,CHINA,Outlet Vertica, Regular Flush valve, Ceramic - Vitreous China product (See detail sanitary ware, Tapware & Bathroom Accessories schedule of code No. SW08)	2	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
5.06	**Urinal** Supply, fitting and fixing of **TOTO U-104** Wall Hung Urinal Height: 540 mm, Width: 340 mm, Depth: 320 mm with heavy duty waste pipe wherever required CI wall brackets, SS Screw, Solvent cement, thread tap, white cement, gasket including making holes in wall and fitting mending good the damages etc. complete in all respect as per drawing and direction of the Engineer / Consultant. (See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. SW04)	5	No		
5.07	**Urinal Sensor Flash Valve** Supply, fitting and fixing of **TOTO DUE110PBK** : DC type Sensor Flush Valve Power: Dry Cell Water Volume: 1.9L Sensor Flush Valve Size: W50×D107×H150mm with heavy duty waste pipe wherever required CI wall brackets, SS Screw, Solvent cement, thread tap, white cement, gasket including making holes in wall and fitting mending good the damages etc. complete in all respect as per drawing and direction of the Engineer / Consultant. (See detail sanitary ware, Tapware & Bathroom Accessories schedule of code No. SW05)	5	No		
5.08	**Shower Assembly with Shower Tray, In closer** Supply, Fitting and fixing of C.P. Shower head, Square Shower Tray & shower in closer Complete with all standard accessories and fittings. Shower assembly shall be fitted to pipe end by using approved sealing compound to make the joint water tight as per drawing and direction of Consultant.				

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
5.08.1	Product shall be Model No. **TF-7330 Square Shower Tray, A-6070 Moving Shower with arm A-6022-974-845** of American Standard, Thailand.(See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. SW09)	4	Set		
5.09	**Glass Mirror** Supply, Fitting and fixing of Beveled edge plate glass mirror (OVALO Glass Mirror) fitted in wall with screws including plastic plug, damp protection on back etc. and shall be completed as per direction of the Consultant. (See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. SW10)	600	Sft		
5.10	**Towel Bar, Towel Rack & Other Toilet Accessories** Supply, Fitting and fixing of the following with all hardware and consumables complete in all respect as per drawing and direction of the Engineer/Consultant.				
a.	CP Towel Rail. Model No.TOTO YT406S6RC L"Towel Bar GB(L=600) Size: 650x55mm (See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. BH08)	15	No		
b.	CP Coat Hook Model No. FFAS1481 or K-2801-41-N of American Standard, Thailand or equivalent from Thailand .(See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. BH09)	56	No		
c.	Paper Dispenser & Waste Bin Supply, Fitting and fixing of ATGET TD-K83371 Paper Dispenser & Waste Bin (See detail sanitary ware, Tapware & Bathroom Accessories schedule of code No. BH01)	14	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
d.	Toilet Paper Holder Supply, Fitting and fixing of TOTO DSP70WToilet Paper Holder (See detail sanitary ware, Tapware & Bathroom Accessories schedule of code No. BH02)	56	No		
e.	Robe hook Supply, Fitting and fixing of TOTO TS 118 WSB Robe hook (See detail sanitary ware, Tapware & Bathroom Accessories schedule of code No. BH03)	56	No		
f.	Automatic Hand Dryer Supply, Fitting and fixing of TOTO TYC322M Automatic Hand Dryer (See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. BH04)	14	No		
g.	Automatic Soap Dispenser Supply, Fitting and fixing of JVD 844397 Automatic Soap Dispenser Material : ABS Colour : White Volume (L) : 1.1000 Warranty (in years) : 2 Type of soap : Gel Soap Water level indicator : Yes Height (mm) : 235Width (mm) : 140Depth (mm) : 107 (See detail sanitaryware, Tapware & Bathroom Accessories schedule of code No. BH05)	45	No		
h.	Floor Drain Supply, Fitting and fixing of TX 1DB Floor Drain (for 2" G.I. Pipe) (115 x 115 mm) (See detail sanitary ware, Tapware & Bathroom Accessories schedule of code No. BH07)	220	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
6.00	**AUTOMATIC WATER HEATER :** Supply, Installation of Electric or Gas fired water heater be made of stainless steel sheet inside container with seamless welding pressure tested to leaks. Outside jackets shall be sprayed with scratch and rust proof high gloss backed enamel paint. The heater shall be complete with adjustable Thermostat (30°C to 80°C) and automatic pressure release valve and all other required accessories. The Water Heater shall be of 'IEGA brand, Bangladesh or equivalent Bangladeshi made.				
a.	10 Gallon (Horizontal type)	10	No		
b.	15 Gallon (Horizontal type)	8	No		
c.	20 Gallon (Horizontal type)	5	No		
7.00	**CATCH PIT :**				
a.	Construction of masonry Catch pits, inside measurement (450 mm x 450 mm x 600 mm) with 250 mm thick brick work in cement mortar (4:1) 100 mm thick R.C.C. top (4:2:1) with the necessary reinforcement. 600mm x 600mm x 450mm	15	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
8.00	**INSPECTION PIT:**				
a.	Construction of masonry Inspection pits, inside measurement (600 mm x 600 mm x 450 mm) with 250 mm thick brick work in cement mortar (4:1) 100 mm thick R.C.C. top (4:2:1) with the necessary reinforcement.	22	No		
b.	Construction of masonry Inspection pits, inside measurement (1200 mm x 900 mm x 700 mm) with 250 mm thick brick work in cement mortar (4:1) 100 mm thick R.C.C. top (4:2:1) with the necessary reinforcement.	8	No		
c.	Construction of masonry Inspection pits, inside measurement (1500 mm x 800 mm x 1200 mm) with 250 mm thick brick work in cement mortar (4:1) 100 mm thick R.C.C. top (4:2:1) with the necessary reinforcement.	18	No		
d.	Construction of masonry Inspection pits, inside measurement (18000 mm x 1200 mm x 900 mm) with 250 mm thick brick work in cement mortar (4:1) 100 mm thick R.C.C. top (4:2:1) with the necessary reinforcement.	4	No		
9.01	**C.I. COVER:** Supply and installation of heavy duty C.I. manhole covers of 550mm/600mm Clear opening with frames (Havy type Minimum weight of Cover to be 22kg to 28Kg) lock type in top slab of inspection pits all complete as per drawing and direction of the Consultant. Product shall be Manco Brand.	76	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
9.02	***MS GRATING :*** Supply and installation of MS Gratings of MS Angle and MS rod of dia 6mm with frames in top slab of Catch pits all complete as per drawing and direction of the Client/Consultant.				
a)	300mmx1200mmx3mm	2272	No		
b)	100mmx1200mmx3mm	2040	No		
10.00	**Core Cutting**				
A	50 mm	30	No		
B	100 mm	40	No		
C	150 mm	50	No		
D	200 mm	20	No		
E	250 mm	25	No		
F	300 mm	20	No		
G	350 mm	25	No		
H	400 mm	15	No		
11.00	**PRESSURIZED WATER DISTRIBUTION SYSTEM**				
11.01	**PUMP SET** Supply, fitting, fixing of Pressurized Water System shall comprise of Four Pumps, Four Pressure Vessel, Controls, Valves etc. complete in all respect. The pumps shall have a capacity of 65 gpm against a head of 60M wg. each and shall be complete with pump motor, variable speed drive, motor starter of star-delta type, base plate, mechanical seal, SS shaft etc. complete in all respect. Power supply shall be 400V/50Hz/3 phase. Pump shall have an efficiency of not less that 50% and shall be suitable at 40°C ambient. Pump shall be auto operated with pressure sensor. Each Pressure Vessel shall be comprising of 50 litter vessel internally lined/painted with food grade materials. Vessel shall be pressure tested at 15 kg pressure. Vessel shall be complete with face piping, valves, compressed air inlet, level indicator, service port, foundation leg etc (04 nos Running & 04 nos standby with pressure tank)	8	Set		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
	Pump panel shall be suitable to Control Four Pumps and shall be complete with incoming MCCB, outgoing MCCB, bas bar, underground level indication, selector switch, auto-starting mechanism for the pumps etc. Three pumps shall be on duty. Variable flow of water in the system shall be maintained by variable speed drive mechanism. System pressure shall be maintained always at 30 meter of wg. Product shall be USA/ UK/ JAPAN/ Germany/ Australia.				
11.02	**SUMP PUMP** Supply, installation, testing and commissioning of single stage sump pump having a capacity to handle 40 Gpm of water against a head of 20 meter of wg. The pump shall be complete with coupled motor, coupling, motor guard etc. Pump shall not be less than 60% efficient. Pump motor shall be capable to handle 30% to 120% of rated flow. Supply shall be 400V/3 phase/50Hz. Pump should be auto sensor detector with automatic on off system. Pump shall be of USA/ UK/ JAPAN/ Germany/ Australia origin	8	Nos		
12.00	**VALVES & FITTINGS:** Supply, fittings and fixing of water line valves of screwed end type suitable to handle 10 Kg. pressure. Valves shall be Pressure Reducing valve, Gate valve, Globe valve, Check valve, Flange, Flexible Joint etc. **Valve shall be flange type 50mm dia to upper size.** Valve as per drawing and direction. Valves shall be of USA/UK/Japan origin.				

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
12.01	**GATE VALVE** Supply, fitting and fixing of Gate valve of 40mm dia shall be bronze body and valve of 150mm dia shall be iron body to withstand a water pressure of 200 PSIG. Valves shall be installed at location as shown on the drawing complete with consumable, materials etc. Valves shall be of USA/UK/Japan origin.				
a)	150mm dia	1	No		
b)	100mm dia	4	No		
c)	80mm dia	8	No		
d)	65mm dia	1	No		
e)	50mm dia	16	No		
f)	40mm dia	28	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
g)	25mm dia	22	No		
h)	20mm dia	12	No		
i)	15mm dia Ball Valve	5	No		
j)	20mm dia air relief valve	4	No		
12.02	**GLOBE VALVE :** Supply, fitting and fixing of Globe valve of 40mm dia shall be bronze body and 150mm dia shall be iron body to withstand a water pressure of 200 PSIG, valve shall be installed at location as shown on the drawing complete with consumable, accessories etc.Valves shall be of USA/UK/Japan origin.				
a)	100mm dia	2	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
b)	50mm dia	8	No		
c)	40mm dia	8	No		
12.03	**STRAINER :** Supply, fitting and fixing of Strainer shall be cast iron body flanged end type assembly complete with internal stainless steel net, companion flange, nut bolt, gasket, all consumable and materials. Strainer shall be of USA/UK/Japan origin.				
a)	100mm dia	4	No		
12.04	**CHECK VALVE :** Supply, fitting and fixing of Check valve of iron body shall flanged end lift check type complete companion flange, nut bolt, gasket, all consumable and materials. Valves shall be of USA/UK/Japan origin.				
a)	80mm dia	2	No		
12.05	**FOOT VALVE :** Supply, fitting and fixing of Foot valve shall be flanged end/screwed end type with non-return valve & strainer. Valves shall be of USA/UK/Japan origin.				
a)	100mm dia	2	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
12.06	**FLEXIBLE JOINT :**				
a)	Supply, fitting and fixing of Flexible joints shall be of moulded neoprene shall be capable and suitable to absorb shock and system hammering at the line water pressure of 200 psig complete with flanged end, companion flanges, adjustable screw etc. flexible joint shall be installed at suction and discharge side of pump or as shown on the & shall be tested upto satisfaction of the Consultant. Flexible Joint shall be of USA/UK/Japan origin. 100mm dia	1	No		
12.07	**FLOAT ASSEMBLY :**				
a)	Supply, fitting and fixing of float assembly suitable to install on 65 mm dia supply pipe. Float assembly shall be complete with float valve, float etc. complete.Float Assembly shall be of USA/UK/Japan 100mm dia	1	No		
12.08	NON RETURN VALVE				
	Supplying, fitting and fixing of Non-return valve with sealant etc. complete in all respects approved and accepted by the Owner/ Consultant. Brand: Grundfos X, Origin: Italy, Brand: Pedrollo, Origin: Italy or equivalent to approved by authority 50 mm-100 mm dia	6	No		
12.09	AUTO AIR VENT Providing fitting & Fixing of Auto Air Vent for cold water supply risers suitable for pressure not less than 15Kg/Sqm. Complete with required fitting, fixture & accessories. Complete as per satisfaction of Owner/ Consultant. Brand: Any European Brand.	10	No		

12.10	**PRESSURE REDUCING VALVE :**				
	Supply, fitting and fixing of pressure reducing valve on size 50 mm dia. Pressure reducing valve shall be suitable to deliver water at a pressure of 7.5 psig (minimum) irrespective of inlet pressure. (Inlet pressure shall be 80 to 60 psig) PRV Valves shall be of USA/UK/Japan origin.				
a)	50mm dia	10	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
b)	40mm dia	8	No		
12.11	**PRESSURE GAUGE** Providing fitting & Fixing of Pressure Gauge shall be in the range of 0 to 10 bar. The body shall be of metallic. Complete with required fitting, fixture & accessories. Complete as per satisfaction of Owner/ Consultant. Brand: Any European Brand.	15	No		
13.00	**PUMP PANEL** Supply, fitting, fixing of totally insulated (IP65) pump panel complete with MCCB for pump, ON/OFF push button, bus bar, run-stop lamp, dry operation protection, phase monitoring rules all complete. Power panel shall house all incoming and outgoing MCCB, MCB, bus- bar, insulator, internal wiring etc. complete. Panel shall be painted with two coats of epoxy paint of approved red colour over a coat of primer. All electrical components shall be from Siemens/Moellir.				
a)	Water Supply Pump Panel	2	No		
b)	Sump & Sludge Pump Panel	2	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
14.00	**WATER LEVEL CONTROLLER** Supply, installation, testing and commissioning of water level controller suitable to operate the pumps on demand of water in overhead tank. Level controller will also resist dry operation of the pump when there is no water in underground water reservoir. Water level control electric cabel standard quality supplied.	4	Set		
15.00	**ELECTRICAL CABLE WORKS** Electrical works shall be complete with supply and installation of all Cables, conduit, distribution board etc. as per direction and drawing by the consultant.	1	Job		
16.00	**COLLECTION CHAMBER** Construction of Collection Chamber of different sizes with RCC Work in cement mortar (1:6) as per approved drawings over a brick flat soling and 150mm thick cement concrete flooring (1:2:4) with 250mm thick walls in partition and 20mm thick cement plaster (1:4) to insides of walls with N.C.F. and 25mm thick patent stone(1:2:4) flooring with N.C.F. including supplying fitting and fixing of two R.C.C. Tees and providing 600mm dia water sealed heavy type C.I. manhole cover with locking arrangement and 100mm thick R.C.C. (1:2:4) Top slab with minimum 1% reinforcement including centering, shuttering, fabricating, casting and curing etc. complete, upto required depth including necessary earth work in excavation and shorting, bailing out water and ise filing including the cost of all materials, operations and incidental charges, etc. all complete as per drawing and direction of Engineer/Consultant.				
a)	500 Users Collection chamber	2	No		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
17.00 a)	**SOAK WELL** Construction of Soak Well of different sizes with 250mm thick solid brick work and 250mm honey comb brick work with cement mortar (1:6) as per design and drawings over RCC (1:2:4) well curb with 1.5% reinforcement including Supplying and fixing 600mm dia water sealed heavy type C.I. manhole cover with locking arrangement. Filling the well upto the required depth with graded khoa and sand including supplying and fabricating MS Rod casting curing including necessary earth work in excavation, side filling and bailing out water including cost of all materials etc. all complete as per drawing, design and direction of the Engineer/Consultant. 250 Users Soak Well	2	No		
18.00	**SOLVENT CEMENT** Supply of uPVC Solvent Cement shall be conforming to ASTM/BS standard as corresponding to the pipes and fittings manufacturers standard. Complete as per satisfaction of the Owner/ Consultant 500 gm	40	No		
19.00	**WASA CONNECTION** Arrangement of Wasa connection from the WASA Header to Building Premises complete with Water Meter with Inspection Pit or surface drain for rain water line and all other required accessories as per drawings and direction of the Client/Consultant and as per approval of the Wasa Authority. All required formalities to WASA shall be done by the Contractor.	2	Set		

21.00	**WATER PURIFICATION SYSTEM/RO** Reverse Osmosis System (RO) Supplying, fitting, fixing of foreign made best quality Reverse Osmosis Water Purifier (Kent / Unilever / Vapor water purifier or equivalent brand) for purification of water by reverse osmosis system to have potable water conforming WHO standard and Bangladesh concentration parameters including installation charge, carriage, sundries etc. complete approved and accepted by the Engineer- in- charge.	12	Set		
22.00	**FITTINGS ACCESSORIES, SIGNAGE & MISCELLANEOUS**	1	Job		
23.00	**TESTING & COMMISSIONING** After complete installation the system shall be tested and commissioned as per recommendation of the manufacturer and standard. Piping system shall be tested with pressure in presence of the Client/Consultant. All testing of electrical system shall be done as per direction. Test certification shall be taken from the Engineer.	1	Job		

Sl. No.	Description of Items	Quantity	Unit	Quoted rate in Tk. (Both in fig. & words)	Amount in Taka
24.00	**DOCUMENTATION** The contractor has to prepare working drawing before starting the job and get it approved by the engineer in charge. The contractor has to prepare as built drawing, work modification drawing etc. He has to compile all the document including maintenance manual, Asbuilt drawings and submit it to the Owner in three copies	1	Job		
				GRAND TOTAL TK =	

(In Word: Taka .....

..... only)

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AUW PHASE II

Sanitary ware, Tapware and Bathroom Accessories Schedule

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Sanitary ware, Tapware and Bathroom Accessories Schedule

Code	Item	Description
SANITARYWARE		
SW01	Wash Basin	TOTO L710CSRE Description: CONSOL LAVATORY Size: W500*D450*H7mm Sample to be approved
SW02	Basin	TOTO LW240CJ HALF PEDESTAL LAVATORY Width: 500 mm Depth: 350 mm Recommended for Regular Height Mixer Sample to be approved
SW11	Accessible restroom basin	TOTO LW103JT ACCESSIBLE RESTROOM Lavatory 1 Tap Hole Width Depth 580 mm X 550 mm Sample to be approved
SW02A	Toilet Type 1 (Public)	TOTO CW 822NJ Description: TOTO W C WALLHUNG Including Concealed Tank and Push Plate Seat & Cover: TC281SJ Sample to be approved.

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Code	Item	Description
SW02B	Conceal Tank	TOTO WH172A MB170P#WH Description: Water Use: 4.5L / 3L Water Pressure: 0.05MPa~0.75MPa Sample to be approved.
SW03	Toilet Type 2 (Private & Accessible restroom)	TOTO **C887RE#XW** Description: Flush system TORNADO FLUSH Water Use 4.8L Rough-in 305 mm Bowl Shape Elongated Size 428Wx727Dx657H mm Seat & Cover Model: TC600VS#W Sample to be approved.
SW08	Squat (Long pan)	ARZAIQ **Code-309** Description: Squat (Long pan) Sample to be approved.
SW04	Urinal	TOTO U-104 Description: Wall Hung Urinal Height: 540 mm, Width: 340 mm, Depth: 320 mm Sample to be approved.

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Code	Item	Description
SW05	Urinal Sensor Flash Valve	TOTO DUE110PBK Description: DC type Sensor Flush Valve Power: Dry Cell Water Volume: 1.9L Sensor Flush Valve Size: W50×D107×H150mm Sample to be approved.
SW06	Single Bowl Stainless steel	TOTO ES-RD5045 Description Color: Black Single Bowl Stainless steel > HAND MADE SINK > OVERALL SIZE (MM) : 500x450x230 R10 > BOWL SIZE (MM) : 460x410x230 > THICKNESS : 1.0-3MM > MATERIALS : 304G stainless steel > WASTE : 110 mm > WASTE POSITION : In Mid > OVERFLOW HOLE : 1 > ACCESSORIES : S1) Sample to be approved.
SW07	Flexible Connection	TOTO T025005 Description Flexible Connection Sample to be approved.

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Code	Item	Description
SW09	Square Shower Tray	American Standard TF-7330 Description Square Shower Tray Sample to be approved.
SW10	Glass Mirror Customized	Glass Mirror Customized Beveled edge plate glass mirror (OVALO Glass Mirror) Sample to be approved.
SW11	Grab Bar for Handicap Toilet	TOTO Sample to be approved.
TAPWARE		
TW01	AUTO SENSOR FAUCET	TOTO TEN12AWRV500 Description: AUTO SENSOR FAUCET Size: 50 x 161 x 169 Sample to be approved.
TW02	Pillar cock	TOTO TS 135HM Description PILLER COCK (SELF CLOSING) Sample to be approved.
TW03	Rinsing Spray/Hand shower	TOTO THX 20PIV (IVORY) Description: PUSH SHOWER Sample to be approved.

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Code	Item	Description
TW04	Angle stop Valve	TOTO TX277SV1 Description: ANGLE STOP VALVE Sample to be approved.
TW05	Sink Mixer	TOTO TTKC301FK Description: SINK MIXER Cres Series Sample to be approved.
TW06	Concealed Shower tap	American Standard FFAST605-7T9500BTO Description: WINSTON CONCEALED MONO SHOWER (I HANDLE) Sample to be approved.
TW07	Twin bib cock bib cock	TOTO TX131L Description TWIN BIB COCKBIB COCK Sample to be approved.
TW08	bib cock	American Standard FFAS4610-405500BC0 Description Bib cock Sample to be approved.
TW09	Single Lever Lavatory Faucet	TOTO TLS04301B Description LF Series Single Lever Lavatory Faucet (w/ pop-up waste) Sample to be approved.

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Code	Item	Description
BATHROOM ACCESSORIES		
BH01	Paper Dispenser & Waste Bin	ATGET TD-K83371 Description: Paper Dispenser & Waste Bin Sample to be approved.
BH02	Toilet paper holder	TOTO DSP70W Sample to be approved.
BH03	Robe hook	TOTO TS118WSB. Double Robe Hook. Sample to be approved.

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Code	Item	Description
BH05	Automatic Soap Dispenser	844397 Automatic Soap Dispenser Material: ABS Color: White Volume (L): 1.1000 Warranty (in years): 2 Type of soap: Gel Soap Water level indicator: Yes Height (mm): 235Width (mm): 140Depth (mm): 107 Sample to be approved.
BH06	P-Trap	TOTO THX1A-5N P-TRAP Sample to be approved.
BH07	Floor Drain	TOTO TX1DB. Description Floor Drain w/ Square Flange (for 2" G.I. Pipe) (115 x 115 mm) Sample to be approved.
BH08	"L" Towel Bar	TOTO YT406S6RC "L" Towel Bar GB(L=600) Size: 650x55mm Sample to be approved.
BH09	Coat Hook	American Standard FFAS1481 or K-2801-41-N American Standard, Thailand or equivalent from Thailand. Sample to be approved.

Note: a. Installation means installation, testing & commissioning of the respective ITEM as per drawing & specifications complete with all necessary accessories and fittings for commissioning of the equipment including all electrical & civil works. If any item description conflict with BOQ and Specification, then consider best selection for that item or follow the consultant instruction; b. Contractor bill should be adjusted as per actual site quantity of install item; c. Materials should be supplied at actual as per site requirements; d. For Fixture unit is not as per actual. Average tentative unit is shown here.

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External Electrical Works for Three Storied with a Semi-Basement Academic Building for Asian University for Women, AUW, Pahartoli, Chattogram.

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.0	CONDUIT WORK:				
1.1	Supply & installation of PVC pipe and accessories of "RFL/BRB/National Polymer" brand product of reputed manufacturers as per routing shown in the drawing, concealed /surface mounted in columns, ceiling, walls and other various places as required, complete with bend/elbow, PVC circular boxes, shaddles, rowel plugs, sockets, lock-nuts, male /female bushes, 18SWG G.I.pull/ wire, necessary thermo-cool, minimum 4-times taping of joints with plastic of thickness 0.2mm, width 19mm (Nitto brand), S-Ion solvent cement (Japan), fish wire, tying with the reinforcement steel bar at the rate of 600mm spacing using 2X20 SWG G.I. wire including tracing out the outlets after the shuttering are removed and clearing the outlets & mending good all damages as per drawings, specifications & direction of the Engineer-in-charge. This is an average rate with necessary number of 16SWG sheet steel make junction/pull boxes of appropriate sizes with 3mm approved colour (matching with all colour), all above mentioned material /accessories of this item. The cost shall include the necessary cleaning and necessary civil works like cutting/breaking of walls/columns/ceiling and mending the plastering /painting (approved colour) as per instruction of the Engineer-in-charge. All materials of this item will be of approved quality.				
1.1.1	75mm dia (C-Class)	20	/M		
1.1.2	50mm dia (C-Class)	15	/M		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.1.3	40mm dia (C-Class)	110	/M		
1.1.4	25mm dia Water grade	1000	/M		
1.1.5	25mm dia Flexible pipe	50	/M		
1.2	Providing & laying of the following PVC insulated & sheathed cable (NYY)/(XLPE) insulated FRLS & PVC Sheathed cable (2XY) with PVC insulated Green/Yellow bi-colour ECC wire (BYA) FRLS connecting at both ends. Through PVC pipe & accessories in the following manner. All electrical contacts shall be of bass copper connected through connector or soldering (no twisting shall be allowed) and cables shall be manufactured and tested according to IEC/BS/VDE standards along with relevant BDS standard as per detailed specification mentioned in Annexure-1. The work shall be carried out as per direction & approval of the Engineer in Charge. In kutcha ground by cutting 45.70 cm width x 91.40 cm depth trench with necessary brick or tile protection and mending the damages good by reffiling trench with proper compaction. In pucca floor tgrough Pvc pipe by cutting trench of necessary size and mending the damahes good by brick soiling , 75mm (1:2:4) CC work with neat cement finishing etc.				
1.2.1	1C-2x4 sqmm NYY FRLS with 4 sqmm (BYA) FRLS ECC wire through the PVC pipe of minimum inner dia 32 mm & wall thickness 1.7mm	3500	/M		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
2.0	CABLE WORK:				
2.1	Supply & installation of PVC insulated single core cable/PVC insulated & PVC sheathed single/multi core cables of Eastern/BBS /BRB/Supersign Cable having ISO9001 certificate of the following sizes in prelaid conduits /trench/tray and making good all damages and termination of connection at both ends as per drawing, specification and instruction of the Engineer-in-charge. The rate should be quoted inclusive of locally available best/approved quality PIB insulating tape (U.K./Japan), cable sockets, solderless connector, cutting/cleaning the prelaid PVC pipe, connection etc. This is an average rate and all material of this item will be of approved quality.				
2.1.1	1C-1.5mm2 BYA FRLS	1800	/M		
2.1.2	1C-2.5mm2 BYA FRLS	300	/M		
2.1.3	1C-4.0mm2 BYA FRLS	400	/M		
2.1.4	1C-4.0mm2 NYY FRLS	240	/M		
2.1.5	1C-6.0mm2 XLPE FRLS	200	/M		
2.1.6	1C-10mm2 NYY FRLS	180	/M		
2.1.7	1C-16mm2 NYY FRLS	50	/M		
2.1.8	1C-35mm2 XLPE FRLS	750	/M		
2.1.9	1C-70mm2 XLPE FRLS	40	/M		
2.1.10	1C-95mm2 XLPE FRLS	320	/M		
2.1.11	1C-300mm2 XLPE FRLS	2950	/M		
2.1.11	1C-400mm2 XLPE FRLS	3690	/M		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
3.0	EARTH CONTINUITY CONDUCTORS:				
3.1.	Supply & installation of insulated/electrolytic annealed copper earth continuity conductor of Eastern/BBS/ BRB/Supersign cable having ISO9001 certificate of following sizes in prelaid conduit along with cable including connection to various metallic parts as per specification, drawing and instruction of the Engineer-in-charge:				
3.1.1	1C-1.5mm2 re BYA(Green) FRLS	900	/M		
3.1.2	1C-2.5mm2 re BYA(Green) FRLS	150	/M		
3.1.3	1C-4.0mm2 BYA (Green) FRLS	260	/M		
3.1.4	1C-6.0mm2 BYA (Green) FRLS	50	/M		
3.1.5	1C-10mm2 BYA (Green) FRLS	45	/M		
3.1.6	1C-16mm2 BYA (Green) FRLS	190	/M		
3.1.8	1C-35mm2 BYA (Green) FRLS	10	/M		
3.1.9	1C-70mm2 BYA (Green) FRLS	20	/M		
3.1.10	1C-120mm2 BYA (Green) FRLS	150	/M		
3.1.11	1C-150mm2 BYA (Green) FRLS	140	/M		
3.1.12	1C-240mm2 BYA (Green) FRLS	650	/M		
3.1.13	1C-300mm2 BYA (Green) FRLS	420	/M		
4.0	SWITCH BOARD:				
4.1	Supply and installation of imported gang switches and wall boxes of approved model from M.K(UK)/ Legrand (France) /Schneider (France) complete with all other necessary accessories & connections everything complete as per drawing, specification and instruction of the Engineer-in-charge. The wall boxes may be locally made of 16SWG galvanized steel sheet including earthing block.				

4.1.1	1 Gang (10A)	2	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
4.1.2	2 Gang (10A)	10	/Set		
4.1.3	3 Gang (10A)	12	/Set		
4.2	Supply & installation of concealed/ surface type special switches in totally insulated made switch board of appropriate dimension with sufficient spacing suitable for mounting the required nos. of switches, contactors, impulse relay, push button, earthing block, etc. from reputed manufactures like Siemens (Germany) /Moeller (Germany) /ABB (Germany) as per following ratings with cover and all other accessories & connections as per specifications, drawing & comprising of :				
4.2.1	KSB-Type-1 :				
	1 to 3 Nos. Push button switch	5	/Set		
5.0	SOCKET OUTLET:				
5.1	Supply and installation of 5A, 2-pin, 250V, universal type combined single gang switched socket suitable for 2 pin plug of approved model from M.K(UK)/ Schneider(France) /Legrand (France) including the box, cover plate with necessary galvanized machine screws, earthing block complete with necessary connections as per drawings, specifications and direction of the Engineer-in-charge. The box may be locally made of 16SWG galvanized steel sheet conforming to BS4662.	12	/Set		

5.2	Supply and installation of 13A, 3-pin, 250V, universal type combined single gang switched socket suitable for 3 pin plug of approved model from M.K(UK)/Schneider(France) /Legrand (France) including the box, cover plate with necessary galvanized machine screws, earthing block complete with necessary connections as per drawings, specifications and direction of the Engineer-in-charge. The box may be locally made of 16SWG galvanized steel sheet conforming to BS4662.	10	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
6.0	TELEPHONE SYSTEM:				
6.1	Supply & installation of surface/concealed type totally insulated telephone junction box made of polystrol/polycarbonate of following sizes with connecting strip and all required accessories such as insulator, screw, rubber bushing, rowel plug etc. as per drawing, specification and instruction of the Engineer-in-charge.				
6.1.1	6 Pairs	1	/Set		
6.2	Supply and installation of jack type shuttered telephone outlet of M.K (UK)/ Schneider (France) / Legrand (France) with sheet steel box and all other accessories as per specifications, drawing & direction of the Engineer-in-charge.	4	/Set		
6.3	Supply & installation of telephone cable of Supersign/Telephone Cable Shilpa Sangstha Ltd. of the following sizes including 25mm dia PVC pipe and termination of connection as per drawing, specifications and instruction of the Engineer-in-charge.				
6.3.1	6 Pairs Cable (Under Ground Cable)	90	/M		
6.3.2	2 Pairs Cable	150	/M		

7.0	CALLING BELL :				
7.1	Supply & installation of electronic cordless calling bell with push button of approve quality complete with lamps and all other accessories as per drawing, specifications and direction of the Engineer in-charge.	2	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
8.0	DISTRIBUTION BOARD:				
8.1	Supply, installation, testing & commissioning of type tested sheet steel imported type distribution boards with insulated cover conforming to IEC439-1 from reputed manufacturers like Eaton/ Siemens/ /schneider/ABB having ISO9001 certificate housing the following rated MCB/ ELCB/MCCB/MPCB, ON-OFF disconnecting switches, contactors, rotary & busbars and all other accessories as per technical specification & drawings. The distribution board shall be of suitable dimensions so as to accommodate the circuit breakers and busbars with insulated shroud with sufficient spacing including internal connection cables in the board and other materials, shall have hinged type door locks, circuit directory shall be suitable for concealed /surface mounted type having PVC cable glands/grommets of appropriate sizes, shall have knockout for conduits entry & exist, a suitable size copper plate earthing block must be provided inside the box. The rate should be quoted inclusive of all required inclusive of all required material for this item & the cost shall include the necessary clearing and necessary civil works like cutting and breaking of walls/columns/ ceiling /floors and mending the same including the plastering & painting as per instruction of the Engineer-in-charge. The bidder must submit the catalouge of MCCB, MCB, SPD, totally insulated board along with the Offer.				

8.1.1	MDB-(Area Lighting)-Service Building : Incoming: 1X100A TP MCCB Outgoing: 6X20A TP MCB 3X20A SP MCB 5X20A TP Contactor with auxiliary contact 5nos. Timer Switch or Photocell Switch for closing the contactor & also by pass switch.200A TP+N+E Plug-in type insulated copper Busbar	1	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
8.1.2	MDB-SB(Service Building-LEVEL-00 : Incoming: 1X63A 4P MCB Outgoing: 18X16A SP MCB 80A TP+N+E Plug-in type insulated copper Busbar	1	/Set		
9.0	EXHAUST FAN:				
9.1	Supply & installation of 16" sweep 220V,50HZ, A.C wall mounted exhaust fan approved quality of National (japan) or others reputed company everything complete with fixing accessories, hard wares etc. as per drawing, specifications and direction of the Engineer-in-charge.	4	/Set		
10.0	CABLE TRAY/LADDER:				
10.1	Supply and installation of cable tray/ladder made of 18SWG galvanized sheet steel/angle bar, flat bar of approved quality of following sizes complete with necessary hangers, supports, cover, junction box, hangers, clamps, bends, nuts, bolts, washer & all other accessories as per drawing, specifications & direction of the Engineer-in-charge.				
10.1.1	600mm width x 100mm depth - Ladder	60	/M		
10.1.2	300mm width x 100mm depth - Ladder	160	/M		
11.0	CABLE TRENCH				
	Making following cable tench in pucca floor having 76.2mm (3") thick CC (4:2:1) base on one layer of flat brick soiling over 76.2mm (3") thick sand bedding at the bottom, 127mm (5") thick brick work(4:1) at the sides complete with 12.7mm (1/2") plaster & neat cement finishing duly covered with 4.8 mm (3/16") thick MS sheet having necessary lifting lugs:				

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	W (width) -610mm X D (depth)- 864 mm	75	/M		
				Total =	

Taka in word:

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Internal Electrical Works for Three Storied with a Semi-Basement Academic Building for Asian University for Women, AUW, Pahartoli, Chattogram.

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.0	**CONDUIT WORK:**				
1.1	Supply & installation of PVC pipe and accessories of "Aziz/National Polymer/RFL" brand product of reputed manufacturers as per routing shown in the drawing, concealed /surface mounted in columns, ceiling, walls and other various places as required, complete with bend/elbow, PVC circular boxes, shaddles, rowel plugs, sockets, lock- nuts, male /female bushes, 18SWG G.I.pull/ wire, necessary thermo-cool, minimum 4- times taping of joints with plastic of thickness 0.2mm, width 19mm (Nitto brand), S-Ion solvent cement (Japan), fish wire, tying with the reinforcement steel bar at the rate of 600mm spacing using 2X20 SWG G.I. wire including tracing out the outlets after the shuttering are removed and clearing the outlets & mending good all damages as per drawings, specifications & direction of the Engineer-in-charge.This is an average rate with necessary number of 16SWG sheet steel make junction/pull boxes of appropriate sizes with 3mm approved colour (matching with all colour), all above mentioned material /accessories of this item. The cost shall include the necessary cleaning and necessary civil works like cutting/breaking of walls/ columns/ceiling and mending the plastering /painting (approved colour) as per instruction of the Engineer-in-charge. All materials of this item will be of approved quality.				

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.1.1	50mm(2") dia (C-Class)	200	/M		

1.1.2	38mm(1.5") dia (D-Class)	1200	/M		
1.1.3	25mm(1") dia Water grade (E-Class)	45000	/M		
1.1.4	25mm(1") dia Flexible pipe	1800	/M		
1.1.5	38mm(1.6") dia Flexible pipe	500	/M		
2.0	**CABLE WORK:**				
2.1	Supply & installation of PVC insulated single core cable/PVC insulated & PVC sheathed single/multi core cables of Eastern/BRB/BBS Cable having ISO9001 certificate of the following sizes in prelaid conduits /trench/tray and making good all damages and termination of connection at both ends as per drawing, specification and instruction of the Engineer-in-charge. The rate should be quoted inclusive of locally available best/approved quality PIB insulating tape (U.K./Japan), cable sockets, solderless connector, cutting/ cleaning the prelaid PVC pipe, connection etc. This is an average rate and all material of this item will be of approved quality.				
2.1.1	1C-1.5mm2 rm BYA FRLS	66700	/M		
2.1.2	1C-2.5mm2 rm BYA FRLS	19000	/M		
2.1.3	1C-4.0mm2 rm BYA FRLS	37000	/M		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
2.1.4	1C-6.0mm2 BYA FRLS	600	/M		
2.1.5	1C-4.0mm2 NYY FRLS	60	/M		
2.1.6	1C-6.0mm2 NYY FRLS	400	/M		
2.1.7	1C-10mm2 NYY FRLS	4100	/M		
2.1.8	1C-16mm2 NYY FRLS	4000	/M		
2.1.9	1C-25mm2 NYY FRLS	3900	/M		
2.1.10	1C-35mm2 NYY FRLS	980	/M		
2.1.11	1C-50mm2 NYY FRLS	4860	/M		
2.1.12	1C-70mm2 NYY FRLS	1960	/M		
2.1.13	1C-240mm2 NYY FRLS	1900	/M		
2.1.14	1C-300mm2 NYY FRLS	144	/M		
3.0	**EARTH CONTINUITY CONDUCTORS:**				
3.1.	Supply & installation of insulated /electrolytic annealed copper earth continuity conductor of Eastern/BRB/BBS cable having ISO9001 certificate of following sizes in prelaid conduit along with cable including connection to various metallic parts as per specification, drawing and instruction of the Engineer-in- charge:				
3.1.1	1C-1.5mm2 re BYA(Green) FRLS	33350	/M		

3.1.2	1C-2.5mm2 re BYA(Green) FRLS	9500	/M		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
3.1.3	1C-4.0mm2 BYA (Green) FRLS	18500	/M		
3.1.4	1C-6.0mm2 BYA (Green) FRLS	225	/M		
3.1.5	1C-10mm2 BYA (Green) FRLS	925	/M		
3.1.6	1C-16mm2 BYA (Green) FRLS	2095	/M		
3.1.7	1C-25mm2 BYA (Green) FRLS	1215	/M		
3.1.8	1C-35mm2 BYA (Green) FRLS	490	/M		
3.1.9	1C-120mm2 BYA (Green) FRLS	950	/M		
3.1.10	1C-300mm2 BYA (Green) FRLS	20	/M		
4.0	**SWITCH BOARD:**				
	Supply and installation of imported gang switches and wall boxes of approved model from M.K(UK)/ MEM(UK) /Legrand (France) complete with all other necessary accessories & connections everything complete as per drawing, specification and instruction of the Engineer-in-charge. The wall boxes may be locally made of 16SWG galvanized steel sheet conforming to BS4662 including earthing block.				
4.1.1	1 Gang (10A)	46	/Set		

4.1.2	2 Gang (10A)	180	/Set		
4.1.3	3 Gang (10A)	110	/Set		
4.1.4	4 Gang (10A)	92	/Set		
4.1.5	1 Gang Dimmer (500W)	32	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
4.2	Supply & installation of concealed/ surface type special switches in totally insulated made switch board of appropriate dimension with sufficient spacing suitable for mounting the required nos. of switches, contactors, impulse relay, push button, earthing block, etc. from reputed manufactures like Siemens /Eaton/ABB/Schneider asper following ratings with cover and all other accessories & connections as per specifications, drawing & comprising of :				
4.2.1	KSB-Type-1 :				
	1 No. ON/OFF Push button switch	40	/Set		
5.0	SOCKET OUTLET:				
5.1	Supply and installation of wall type 5A, 2-pin, 250V, combined single gang switched socket suitable for 2 pin plug of approved from M.K(UK)/ MEM(UK) /Legrand (France) including the box, cover plate with necessary galvanized machine screws, earthing block complete with necessary connections as per drawings, specifications and direction of the Engineer-in-charge. The box may be locally made of 16SWG galvanized steel sheet conforming to BS4662. **(Type-P)**	340	/Set		

5.2	Supply and installation of floor type 16A, 3- pin ~~5A, 2-pin~~, 250V, Universal type combined single gang switched socket suitable for 2/3- pin ~~2-pin~~ plug of approved model from M.K(UK)/MEM(UK) /Legrand (France) including flush mounting box, cover plate with necessary galvanized machine screws, earthing block complete with necessary connections as per drawings, specifications and direction of the Engineer-in-charge. **(Type-PF)**	25	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
5.3	Supply and installation of wall type 15A, 3- pin, 250V, combined single gang switched socket suitable for 3 pin plug of approved model from M.K(UK)/ /MEM(UK) /Legrand (France) including the box, cover plate with necessary galvanized machine screws, earthing block complete with necessary connections as per drawings, specifications and direction of the Engineer-in-charge. The box may be locally made of 16SWG galvanized steel sheet conforming to BS4662. **(Type-Q)**	510	/Set		
5.4	Supply and installation of floor type 16A, 3-pin, 250V, **universal** type combined single gang switched socket suitable for 2/3 pin plug of approved model from M.K(UK) /MEM(UK) /Legrand (France) including flush mounting box, cover plate with necessary galvanized machine screws, earthing block complete with necessary connections as per drawings, specifications and direction of the Engineer-in-charge. **(Type-QF)**	30	/Set		

5.5	Supply and installation of wall type 16A, 3- pin, 250V, universal type combined double gang switched socket suitable for 2/3 pin plug of approved model from M.K(UK)/MEM(UK) /Legrand(France) including the box, cover plate with necessary galvanized machine screws, earthing block complete with necessary connections as per drawings, specifications and direction of the Engineer-in-charge. The box may be locally made of 16SWG galvanized steel sheet conforming to BS4662. **(Type-UPW)**	320	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
5.6	Supply and installation of floor type 16A, 3- pin, 250V, universal type combined double gang socket suitable for 3 pin plug of approved model from M.K(UK)/MEM(UK) /Legrand (France) including flush mounting box, cover plate with necessary galvanized machine screws, earthing block complete with necessary connections as per drawings, specifications and direction of the Engineer-in-charge. **(Type-UP)**	500	/Set		
6.0	**TELEPHONE SYSTEM:**				
6.1	Supply & installation of surface/ concealed type totally insulated/16SWG sheet steel telephone junction box made of polystrol/polycarbonate of following sizes with connecting strip and all required accessories such as insulator, screw, rubber bushing, rowel plug etc. as per drawing, specification and instruction of the Engineer- in-charge.				
6.1.1	160 Pairs	1	/Set		

6.1.2	50 Pairs	3	/Set		
6.1.3	20 Pairs	8	/Set		
6.2	Supply and installation of jack type shuttered telephone outlet of M.K (UK)/MEM(UK) /Legrand(France) with sheet steel box and all other accessories as per specifications, drawing & direction of the Engineer-in-charge.	170	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
6.3	Supply & installation of telephone cable of Supersign/BRB/BBS/Telephone Cable Shilpa Sangstha Ltd. of the following sizes in prelaid conduit and termination of connection as per drawing, specifications and instruction of the Engineer-in-charge.				
6.3.1	50 Pairs Cable	200	/M		
6.3.2	20 Pairs Cable	120	/M		
6.3.3	3 Pairs Cable	4000	/M		

7.0	**DISTRIBUTION BOARD:**				
7.1	Supply, installation, testing & commissioning of totally insulated distribution boards/Type tested imported type sheet steel board with insulated cover conforming to IEC439-1 from reputed manufacturers like Eaton / Siemens/ ABB having ISO9001 certificate housing the following rated MCB/ ELCB/ MCCB /MPCB, ON-OFF disconnecting switches, contactors, rotary & busbars and all other accessories as per technical specification & drawings. The distribution board shall be of suitable dimensions so as to accommodate the circuit breakers and busbars with insulated shroud with sufficient spacing including internal connection cables in the board and other materials, shall have hinged type door locks, circuit directory shall be suitable for concealed /surface mounted type having PVC cable glands/grommets of appropriate sizes, shall have knockout for conduits entry & exist, a suitable size copper plate earthing block must be provided inside the box.				

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	The rate should be quoted inclusive of all required inclusive of all required material for this item & the cost shall include the necessary clearing and necessary civil works like cutting and breaking of walls/columns/ ceiling /floors and mending the same including the plastering & painting as per instruction of the Engineer-in-charge. The bidder must submit the catalogue of MCCB, MCB, SPD, totally insulated board along with the Offer.				

7.1.1	**MDB-1-LEVEL-00 :** Incoming: 1X80A TP MCCB 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 1X32A TP MPCB 1X16A TP MPCB 13X16A SP MCB 6X10A SP MCB 1X16A SP FSS type Impulse Relay 160A TP+N+E copper Busbar	1	/Set		
7.1.2	**MDB-2-LEVEL-00 :** Incoming: 1X63A TP MCCB Outgoing: 3X20A TP MPCB 6X16A SP MCB 3X10A SP MCB 100A TP+N+E copper Busbar	1	/Set		
7.1.3	**MDB-3-LEVEL-00 :** Incoming: 1X80A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 15X16A SP MCB 9X10A SP MCB 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
7.1.4	**MDB-4-LEVEL-00 :** Incoming: 1X80A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 17X16A SP MCB 7X10A SP MCB 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		

7.1.5	**MDB-5-LEVEL-00 :** Incoming: 1X125A TP MCCB Outgoing: 1X80A TP MCCB 1X63A TP MCCB 1X40A TP MCB 200A TP+N+E copper Busbar	1	/Set		
7.1.6	**SDB-1 - LEVEL-00 :** Incoming: 1X63A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 10X16A SP MCB 5X10A SP MCB 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.7	**SDB-2 - LEVEL-00 :** Incoming: 1X80A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 18X16A SP MCB 15X10A SP MCB 3X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
7.1.8	**MDB-6 - LEVEL-00 :** Incoming: 1X63A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 9X16A SP MCB 9X10A SP MCB 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		

7.1.9	**SDB-SECURITY-LEVEL-00 :** Incoming: 1X100A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 21X20A SP MCB 7X16A SP MCB 6X20A TP Contactor with auxiliary contact 7X16A SP FSS type Impulse Relay 3X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.10	**UMDB-1-LEVEL-00 :** Incoming: 1X125A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 33X16A SP MCB 3X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
7.1.11	**UMDB-2- LEVEL-00 :** Incoming: 1X32A 4P MCB+ELCB (300mA) 1X32A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 9X16A SP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.12	**UMDB-3- LEVEL-00 :** Incoming: 1X80A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 24X16A SP MCB 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.13	**UMDB-4-LEVEL-00 :** Incoming: 1X125A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 30X16A SP MCB 3X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.14	**MDB-1-LEVEL-01 :** Incoming: 1X100A TP MCCB Outgoing: 1X80A TP MCB 1X63A TP MCB 1X40A TP MCB 200A TP+N+E copper Busbar	1	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
7.1.15	**SDB-1-LEVEL-01 :** Incoming: 1X80A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 22X16A SP MCB 11X10A SP MCB 5X16A SP FSS type Impulse Relay 3X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.16	**SDB-2-LEVEL-01 :** Incoming: 1X63A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 19X16A SP MCB 9X10A SP MCB 3X16A SP FSS type Impulse Relay 3X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.17	**MDB-2-LEVEL-01 :** Incoming: 1X100A TP MCCB Outgoing: 2X63A TP MCB 1X40A TP MCB 200A TP+N+E copper Busbar	1	/Set		
7.1.18	**SDB-3-LEVEL-01 :** Incoming: 1X63A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 22X16A SP MCB 6X10A SP MCB 5X16A SP FSS type Impulse Relay 3X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing Busbar	1	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
7.1.19	**SDB-4-LEVEL-01 :** Incoming: 1X63A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 14X16A SP MCB 6X10A SP MCB 5X16A SP FSS type Impulse Relay 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.20	**MDB-3-LEVEL-01 :** Incoming: 1X63A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 15X16A SP MCB 9X10A SP MCB 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.21	**MDB-4-LEVEL-01 :** Incoming: 1X63A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 16X16A SP MCB 8X10A SP MCB 2X16A SP FSS type Impulse Relay 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.22	**MDB-5-LEVEL-01 :** Incoming: 1X40A 4P MCB+ELCB (300mA) 1X40A 4P MCB 1X4Pole C-type surge protective device (40KA)	1	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
	Outgoing: 9X16A SP MCB 6X10A SP MCB 3X16A SP FSS type Impulse Relay 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar				
7.1.23	**UMDB-1-LEVEL-01 :** Incoming: 1X63A TP MCCB Outgoing: 2X40A TP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.24	**UPS-DB1-LEVEL-01 :** Incoming: 1X40A 4P MCB+ELCB (300mA) 1X40A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 9X16A SP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.25	**UMDB-2-LEVEL-01 :** Incoming: 1X63A TP MCCB Outgoing: 1X63A TP MCB 1X20A TP MCB 1X80A TP+N+E Plug-in type insulated copper Busbar	1	/Set		
7.1.26	**UPS-DB2-LEVEL-01 :** Incoming: 1X63A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 9X16A SP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		

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7.1.27	**UPS-DB3-LEVEL-01 :** Incoming: 1X20A 4P MCB+ELCB (300mA) 1X20A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 6X16A SP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.28	**UMDB-3 & 4-LEVEL-01 :** Incoming: 1X40A 4P MCB+ELCB (300mA) 1X40A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 9X16A SP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	2	/Set		
7.1.29	**UMDB-5-LEVEL-01 :** Incoming: 1X25A 4P MCB+ELCB (300mA) 1X25A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 6X16A SP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.30	**MDB-1-LEVEL-02 :** Incoming: 1X100A TP MCCB Outgoing: 2X63A TP MCB 1X40A TP MCB 200A TP+N+E copper Busbar	1	/Set		
7.1.31	**SDB-1-LEVEL-02 :** Incoming: 1X63A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA)	1	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
	Outgoing: 18X16A SP MCB 7X10A SP MCB 1X16A SP FSS type Impulse Relay 3X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar				
7.1.32	**SDB-2-LEVEL-02 :** Incoming: 1X63A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 18X16A SP MCB 6X10A SP MCB 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.33	**MDB-2-LEVEL-02 :** Incoming: 1X100A TP MCCB Outgoing: 2X63A TP MCB 1X40A TP MCB 200A TP+N+E copper Busbar	1	/Set		
7.1.34	**SDB-3-LEVEL-02 :** Incoming: 1X63A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 16X16A SP MCB 6X10A SP MCB 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.35	**SDB-4-LEVEL-02 :** Incoming: 1X40A 4P MCB+ELCB (300mA) 1X40A 4P MCB 1X4Pole C-type surge protective device (40KA)	1	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
	Outgoing: 11X16A SP MCB 6X10A SP MCB 2X16A SP FSS type Impulse Relay 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar				
7.1.36	**MDB-3-LEVEL-02 :** Incoming: 1X40A 4P MCB+ELCB (300mA) 1X40A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 6X16A SP MCB 6X10A SP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.37	**MDB-4-LEVEL-02 :** Incoming: 1X63A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 16X16A SP MCB 6X10A SP MCB 1X16A SP FSS type Impulse Relay 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.38	**UMDB-1-LEVEL-02 :** Incoming: 1X63A TP MCCB Outgoing: 2X40A TP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.39	**UPS-DB1 & UPS-DB-2-LEVEL-02 :** Incoming: 1X40A 4P MCB+ELCB (300mA) 1X40A 4P MCB 1X4Pole C-type surge protective device (40KA)	2	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
	Outgoing: 12X16A SP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar				
7.1.40	**UMDB-2-LEVEL-02 :** Incoming: 1X50A TP MCCB Outgoing: 1X40A TP MCB 1X25A TP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.41	**UPS-DB3-LEVEL-02 :** Incoming: 1X40A 4P MCB+ELCB (300mA) 1X40A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 9X16A SP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.42	**UPS-DB4-LEVEL-02 :** Incoming: 1X25A 4P MCB+ELCB (300mA) 1X25A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 6X16A SP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.43	**UMDB-3-LEVEL-02 :** Incoming: 1X125A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 28X16A SP MCB 3X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
7.1.44	**UMDB-4-LEVEL-02 :** Incoming: 1X32A 4P MCB+ELCB (300mA) 1X32A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 9X16A SP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.45	**MDB-1-LEVEL-03 :** Incoming: 1X100A TP MCCB Outgoing: 1X63A TP MCCB 1X63A TP MCB 200A TP+N+E copper Busbar	1	/Set		
7.1.46	**SDB-1-LEVEL-03 :** Incoming: 1X63A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 22X16A SP MCB 7X10A SP MCB 2X16A SP FSS type Impulse Relay 3X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.47	**DB-1-(LIFT-LEVEL-03) :** Incoming: 1X63A TP MCCB Outgoing: 1X50A TP MPCB 3X25A SP MCB 120A TP+N+E copper Busbar	1	/Set		
7.1.48	**MDB-2-LEVEL-03 :** Incoming: 1X63A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA)	1	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
	Outgoing: 14X16A SP MCB 7X10A SP MCB 3X16A SP FSS type Impulse Relay 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar				
7.1.49	**MDB-3-LEVEL-03 :** Incoming: 1X80A 4P MCB+ELCB (300mA) 1X63A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 16X16A SP MCB 9X10A SP MCB 1X16A SP FSS type Impulse Relay 2X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	1	/Set		
7.1.50	**DB-2(2nos. LIFT)-LEVEL-03 :** Incoming: 1X125A TP MCCB Outgoing: 3X32A SP MCB 2X63A TP MPCB 200A TP+N+E copper Busbar	1	/Set		
7.1.51	**UMDB-1 & 3 - LEVEL-03 :** Incoming: 1X32A 4P MCB+ELCB (300mA) 1X32A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 9X16A SP MCB 1X80A TP Plug-in type insulated copper Busbar with seperated Neutral & Earthing busbar	2	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
7.1.52	**UMDB-2- LEVEL-03 :** Incoming: 1X25A 4P MCB+ELCB (300mA) 1X25A 4P MCB 1X4Pole C-type surge protective device (40KA) Outgoing: 6X16A SP MCB 1X80A TP Plug-in type insulated copper Busbar with separated Neutral & Earthing busbar	1	/Set		
	HVAC MDB- LEVEL-00 : Incoming: 1X1600A 4P ACB (Adj.) Outgoing: 3X630A 4P MCCB (Adj.) 5X50A T P MCCB (Adj.) 1X100A TP MCCB (Adj.) 4X63A TP MCCB (Adj.) 1X40A TP MCCB (Adj.) 4X10A TP MCB 1X6A TP MCB 1X10A SP MCB 1X16A SP MCB 1600A TPN+800 A ECC tinned copper Busbar	1	/Set		

8.0	**SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF MDB, FDB & UFDB PANELS:**				
8.1	Supply, installation, testing & commissioning of Type tested imported type sheet steel floor mounting **3b Form** of FDB & UFDB according to IEC439-1 from reputed manufacturers like Eaton / Siemens/ ABB having ISO9001 certificate housing the following rated MCB/ ELCB/ MCCB /MPCB, contactors, rotary handle & busbars and all other accessories as per technical specification & drawings. The panel shall be of suitable dimensions so as to accommodate the circuit breakers and busbars with insulated shroud with sufficient spacing including internal connection cables in the board and other materials, shall have hinged type door for 415V, 3-Phase, 4-Wire, 50Hz operation complete with all wiring accessories, hard drawn electrolytic copper busbars of appropriate ratings & equipped with the followings : The major components of the LT switchgear shall be from Eaton /Siemens /ABB				

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
8.1.1	**FDB-L & S :** Incoming : 1X1250A, 65KA, TP motor operated ACB with micro processor based selectively operating built in adjustable overload & adjustable short circuit protection, ON-OFF & Trip indicating auxiliary contacts with 3 nos. 1250/5A CT & 1no. digital ammeter(0-1250A) Outgoing: 2X250A, 25KA, TP MCCB with built in adjustable overload & adjustable short circuit protection & rotary handle with pad locking facilities, ON-OFF-TRIP indicating auxiliary contacts & 3 nos. LED indicating lamps etc. 1X200A, 25KA, TP MCCB with built in adjustable overload & adjustable short circuit protection & rotary handle with pad locking facilities, ON-OFF-TRIP indicating auxiliary contacts & 3 nos. LED indicating lamps etc. 2X160A, 25KA, TP MCCB with built in adjustable overload & adjustable short circuit protection & rotary handle with pad locking facilities, ON-OFF-TRIP indicating auxiliary contacts & 3 nos. LED indicating lamps etc. 2X125A, 25KA, TP MCCB with built in adjustable overload & adjustable short circuit protection & rotary handle with pad locking facilities, ON-OFF-TRIP indicating auxiliary contacts & 3 nos. LED indicating lamps etc. 10X100A, 25KA, TP MCCB with built in adjustable overload & adjustable short circuit protection & rotary handle with pad locking facilities, ON-OFF-TRIP indicating auxiliary contacts & 3 nos. LED indicating lamps etc. 2X80A, 25KA, TP MCCB with built in adjustable overload & adjustable short circuit protection & rotary handle with pad locking facilities, ON-OFF-TRIP indicating auxiliary contacts & 3 nos. LED indicating lamps etc.	1	/Set		

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
	6X63A, 25KA, TP MCCB with built in adjustable overload & adjustable short circuit protection & rotary handle with pad locking facilities, ON-OFF-TRIP indicating auxiliary contacts & 3 nos. LED indicating lamps etc. 2X40A, 25KA, TP MCCB with built in adjustable overload & adjustable short circuit protection & rotary handle with pad locking facilities, ON-OFF-TRIP indicating auxiliary contacts & 3 nos. LED indicating lamps etc. 1600A TP+N+E BUSBAR				
8.1.2	**UFDB :** Incoming : 1X500A, 50KA, TP MCCB with built in adjustable overload & adjustable short circuit electronica releases & & rotary handle with pad locking facilities, ON-OFF-TRIP indicating auxiliary contacts & 3 nos. LED indicating lamps etc.& Trip indicating auxiliary contacts with 3 nos. 500/5A CT & 1no.digital ammeter(0-500A)	1	/Set		
	Outgoing: 3X125A, 25KA, TP MCCB with built in adjustable overload & adjustable short circuit protection & rotary handle with pad locking facilities, ON-OFF-TRIP indicating auxiliary contacts & 3 nos. LED indicating lamps etc. 2X80A, 25KA, TP MCCB with built in adjustable overload & adjustable short circuit protection & rotary handle with pad locking facilities, ON-OFF-TRIP indicating auxiliary contacts & 3 nos. LED indicating lamps etc. 4X63A, 25KA, TP MCCB with built in adjustable overload & adjustable short circuit protection & rotary handle with pad locking facilities, ON-OFF-TRIP indicating auxiliary contacts & 3 nos. LED indicating lamps etc.				

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
	8X40A, 25KA, TP MCCB with built in adjustable overload & adjustable short circuit protection & rotary handle with pad locking facilities, ON-OFF-TRIP indicating auxiliary contacts & 3 nos. LED indicating lamps etc. 3X32A, 25KA, TP MCCB with built in adjustable overload & adjustable short circuit protection & rotary handle with pad locking facilities, ON-OFF-TRIP indicating auxiliary contacts & 3 nos. LED indicating lamps etc. 800A TP+N+E BUSBAR				
9.0	**CABLE TRAY/LADDER:**				
9.1	Supply and installation of capsule type cable tray/ladder made of 18SWG hot deep galvanized sheet steel of approved quality of following sizes complete with necessary horizontal & vertical bends, reducers, Tee's, Cross over, supports, brackets and other accessories as required confirming to IS/IEC-61537 & all other accessories as per drawing, specifications & direction of the Engineer-in-charge.				
9.1.1	600mm width, 100mm-depth- Ladder	100	/M		
9.1.2	400mm width, 100mm-depth-Ladder	75	/M		
9.1.3	600mm width, 100mm-depth-Cable Tray with cover	380	/M		
9.1.4	400mm width, 100mm-depth-Cable Tray with cover	130	/M		
9.1.5	200mm width, 100mm-depth-Cable Tray with cover	120	/M		
9.1.6	150mm width, 75mm-depth-Cable Tray with cover	1200	/M		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
11.0	EARTHING SYSTEM FOR Solar, LIFTS, TELECOMMUNICATION & NET WORK :				
11.1	Supply & installation of solid copper wire earthing lead 2X2 SWG in 38mm dia G.I. pipe and termination of connections at both ends as per drawing & specifications. (for lifts, Tele/Data, network etc.)	350	/M		
11.2	Supply and installation of 38mm dia, 12m long G.I. pipe earth electrode sunk up to a depth of 12m below ground level to be used as earth electrode as per drawing and specifications.	6	/Set		
11.3	Construction of 600X600X600mm earth inspection pit with R.C.C cover as per drawing & instruction of the Engineer-in- charge.	6	/Set		
				TOTAL TK =	

ASIAN UNIVERSITY FOR WOMEN

Lighting Works for Three Storied with a Semi-Basement Academic Building for Asian University for Women, AUW, Pahartoli, Chattogram.

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.0	**LIGHT FITTINGS:**				
	Supply & installation of following Luminaries with all accessories as stated. The bidder shall submit the catalogue with the tender.				
1.1	**Pole Top Light** Wattage: 57W , 4690lm Reflector is easily adjustable from symmetric to asymmetric distribution CRI: 80 CCT:3000k, SDCM: 3, IP 65 ,Class I, IK 08/06 Brand : Unilamp, Thailand or approved equivalent Pole Height 6m Powder Coated Heat Print Thickness 3mm Dia 3-4inch Base Plate = 12" x 12" Local Made **(TYPE-G1)** 	3	/Set		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.2	**Step Light** Wattage: 7.9W , Luminaire Lumen : 120 lm CRI: 80 CCT:3000k, , IP 65 ,Class I, IK 08/06 Brand : Unilamp, Thailand Courtyard, Stair **(TYPE-G2)** 	40	/Set		
1.3	**LED Strip Light** Wattage: 8.6W , 1000 lm Beam : 120deg CRI: ≥80, CCT:3000k, IP 67 , Lifetime = 50000 Hr Supply Voltage = 24V Brand : LEDVANCE Consider 1 driver for 3m strip And Local U shape channel Informal Collaboration Sitting **(TYPE-G4)** 	300	Rm		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.4	**Step Light (Customized available)** Wattage: 3W , 80 lm/W Beam : 120deg CRI: ≥80, CCT:3000k, IP 65 , Lifetime = 50000 Hr Supply Voltage = 24V Brand : PRC Driver Meanwell Integrated into Railing **(TYPE-G5)** 	200	/Set		
1.5	**Pole-mounted LED Light** Wattage : 60W, CRI : 75 , IP 65 , IK08 Power 100-277V COO : UNilamp With 4meter 4inch Dia GI Pole South side of road & Courtyard **(TYPE-G6)** 	47	/Set		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.6	**Pole-mounted STAGE** Model : S.7120W Colour temperature: 3000K Module luminous flux: 5440 lm Luminaire luminous flux: 4000 lm Module power: 40.6W Rated luminaire power : 44.1 W Luminaire efficacy : 91 lm/W Color Rendering Index: CRI 80 MacAdam step 3 Power Supply :220-240Vac Lifetime 50,000 hrs @ L70 B50 35℃ Brand : SIMES With 4meter 4inch Dia GI local Pole Service Building & Road **(TYPE-G7)** 	11	/Set		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.7	**Pole-mounted MEGASTAGE** Model : S.7142W Colour temperature: 3000K Module luminous flux: 9792 lm Luminaire luminous flux: 6568 lm Module power: 73.1W Rated luminaire power : 77.9W Luminaire efficacy : 8lm/W Color Rendering Index: CRI 80 MacAdam step 3 Power Supply :220-240Vac Lifetime 50,000 hrs @ L70 B50 35℃ COO : SIMES With 6 meter 4inch Dia GI Pole Parking **(TYPE-G7A)** 	3	/Set		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.8	**MINIZIP ROUND COMFORT** Colour temperature: 3000K Rated luminaire luminous flux: 300lm Rated module power: 6.W Luminaire efficacy: 50lm/W Color Rendering Index: CRI 90 MacAdam step 3 Brand : Unilamp. Thailand Courtyard, Stair **(TYPE-G8)** 	34	/Set		
1.9	**LINEAR 1200mm** Wattage: 40W , 4400 lm CRI: 80 CCT:3000k, SDCM : 3 IP 20 ,Class I, IK 06 (Direct 70%,/Indirect 30%) Voltage: 220-240Vac 50Hz COO : LEDVANCE Library, Physician Room, Admin, Faculty Office, Director Office **(TYPE-L1)** 	215	/Set		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.10	**LINEAR 1200mm** Wattage: 40W , 4400 lm CRI: 80 CCT:3000k, SDCM : 3 IP 20 ,Class I, IK 06 (Direct 30%,/Indirect 70%) Voltage: 220-240Vac 50Hz COO : LEDVANCE Library, Physician Room, Admin, Faculty Office, Director Office **(TYPE-L2)** 	204	/Set		
1.11	**Flexible wall washer** Wattage: 18W/m , 2160 lm CRI: 80 CCT:3000k, SDCM : 5 IP 65 , IK 08, Beam 120deg Voltage: 220-240Vac 50Hz Brand : ADLED Consider Meanwell driver Under Shading **(TYPE-L3)** 	118	/Set		

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FOR WOMEN

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.12	**Linear LED Light** Wattage : 30W , Lumen 2760 lm, Lumen O/P : 2000lm x 2 ,3000K CRI : 80 , IP20 , Power AC220V BRAND : LEDVANCE Computer Lab, Café, Tech Service **(TYPE-L4)** 	27	/Set		
1.13	**LED Strip Light with Profile** Wattage: 15.6W , 1870 lm Beam : 120deg CRI: ≥80, CCT:3000k, IP 67 , Lifetime = 50000 Hr Supply Voltage = 24V Brand : LEDVANCE Consider Meanwell 150W Power supply for 5m strip Upper Floor Library, Circulation Help desk **(TYPE-L7)** 	31	Rm		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.14	**LINEAR Wall light** Wattage: 18W , 1950 lm Lumen Effi : 108lm/W Length L-1014mm x W-79mm CRI: 80 CCT:3000k, SDCM : 5 IP 20 , IK 08, Beam 110deg Voltage: 220-240Vac 50Hz Body color black white available Brand : ESSYSTEM (Glamox) Library **(TYPE-L8)** 	18	/Set		
1.15	**Linear LED Pendent Light** Wattage : 25W , 80lm/W CRI : 80 , IP20 , Power AC220V Life 50,000Hrs @L70 COO : PRC Discussion, General Projection Room **(TYPE-L16)** 	16	/Set		

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FOR WOMEN

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.16	**LED Strip Light** Wattage : 5.5W/m , 600lm CRI : 80 , IP20 , Power AC220V /DC 24V COO : LEDVANCE _ OSRAM Café, Lab Seminar (VC Office) **(TYPE-L17)** 	217	Rm		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.17	**Linear LED Surface Light with Mini Box** Wattage: 15.6W , 1870 lm Beam : 120deg CRI: ≥80, CCT:3000k, IP 67 , Lifetime = 50000 Hr Supply Voltage = 24V Brand : LEDVANCE Consider Meanwell 150W Power supply for 5m strip Profile Box Local Customization Tiered Class Room, Toilet, Physician Office **(TYPE-L18)** 	117	Rm		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.18	**Flexible wall washer** Wattage: 18W/m , 2160 lm CRI: 80 CCT:3000k, SDCM : 5 IP 65, IK 08, Beam 120deg Voltage: 220-240Vac 50Hz Brand : ADLED Projection Room **(TYPE-L20)** 	14	/Set		
1.19	**LED Strip Light with profile** Wattage : 5.5W/m , 600lm CRI : 80 , IP20 , Power AC220V /DC 24V COO : LEDVANCE _ OSRAM Consider 1 driver for 5m strip Tiered Class Room **(TYPE-L21)** 	250	Rm		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.20	**COB Linear pendent** Wattage: 40W , 4000 lm CRI: 80 , CCT: 3000k, SDCM : 5 IP 20 , IK 03, Beam 140 deg Voltage: 220-240Vac 50Hz COO : PRC VC Office **(TYPE-L22)** 	8	/Set		
1.21	**Up-Down COB Linear pendent** Wattage: 40W , 4000 lm CRI: 80 , CCT: 3000k, SDCM : 5 IP 20 , IK 03, Beam 140 deg Voltage: 220-240Vac 50Hz COO : PRC VC Office **(TYPE-L22B)** 	12	/Set		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.22	**LED Strip Light** Wattage: 15.6W , 1870 lm Beam : 120deg CRI: ≥80, CCT:3000k, IP 67 , Lifetime = 50000 Hr Supply Voltage = 24V Brand : LEDVANCE Consider Meanwell 150W Power supply for 5m strip VC Office **(TYPE-L23)** 	31	RM		
1.23	**Surface Mounted Damp proof light** Wattage : 32W, 4000lm, CRI : 80 , IP 65 , Single CCT 4000K Power AC220V Lifetime 50000 Hrs @L70 BRAND : LEDVANCE OSRAM /ADLED Service Corridor, Class Room Store, AC Plant Room, Admin, Electric, TEL/DATA, Lab Support **(TYPE-L24)** 	112	Pcs		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.24	**Modern Pendant Light** Wattage : 10-15W Dia : 480mm /600mm CRI : 80 , IP20 , Power AC220V COO : PRC VC Room, Conference (VC) **(TYPE-P3D)** 	8	/Set		
1.25	**Recessed Downlight** CANOS G2-175 WH Wattage: 18W , 2500lmCRI: >80, CCT:3000k, SDCM: 5,UGR<19 IP 20 , IK 08, Beam 120 deg Voltage: 220-240Vac 50Hz, Brand : Glamox _ ESSYSTEM Tiered Class Room, Entry, Lobby (Proj. Room, Faculty Office) **(TYPE-R1)** 	300	/Set		

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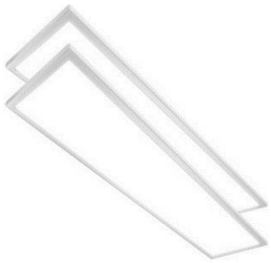
Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.26	**Recessed Downlight** Wattage: 20W , 2190 lm, CRI: >80, CCT:3000k, SDCM: 5,UGR<19 IP 50 , Beam asymmetric Voltage: 220-240Vac 50Hz, Brand : Glamox _ ESSYSTEM Tiered Class Room, Entry, (Proj. Room), Faculty Office) **(TYPE-R2)** 	100	/Set		
1.27	**1x4ft Pendent Light with String** Wattage : 36W,4000lm, CRI : 80 , IP 20 , Single CCT Power AC220V Lifetime 50000 Hrs @L70 BRAND : LEDVANCE OSRAM Document Processing **(TYPE-R3)** 	2	/Set		

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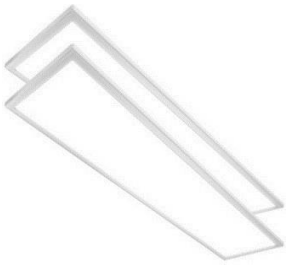
FOR WOMEN

Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.28	**1x4ft Pendent Light with String** Wattage : 36W,4000lm, CRI : 80 , IP 20 , Single CCT Power AC220V Lifetime 50000 Hrs @L70 BRAND : LEDVANCE OSRAM Physician Office **(TYPE-R4)** 	12	/Set		
1.29	**Surface Spot Light** Wattage : 15W, 1200lm CRI : 80 , IP 66 , 3000K , CRI 80 Lifetime 50,000Hrs Power AC220V COO : PRC All corridor Ceiling **(TYPE-S1)** 	174	/Set		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.30	**LEDVALUE CEILING GEN 4** Wattage : 20W,1600lm, CRI : 80 , IP 20 , Power AC220V BRAND : LEDVANCE _ OSRAM Toilet **(TYPE-S2)** 	10	/Set		
1.31	**Updown Wall Light** Wattage: 20W , 1600 lm CRI: 80 CCT:3000k, SDCM : 5 IP 65 , IK 08, Beam 110deg Voltage: 220-240Vac 50Hz Brand : PRC Corridor Wall Washer **(TYPE-S3)** 	145	/Set		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.32	**Surface Down Light/Wall Light** Wattage : 16W, 1280lm CRI : 80 , IP 65 , Single CCT, Power AC220V COO : PRC Beside Dinning Area **(TYPE-S5)** 	8	/Set		
1.33	**Surface Mounted Damp proof light** Wattage : 32W, 4000lm, CRI : 80 , IP 65 , Single CCT 4000K Power AC220V Lifetime 50000 Hrs @L70 BRAND : LEDVANCE OSRAM /ADLED Kitchen Area **(TYPE-S6)** 	15	/Set		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.35	**Surface Spot Light** Wattage : 15W, 1400lm CRI : 80 , IP 20 , Power AC220V COO : PRC Circulation Desk, Help Desk **(TYPE-S8)** 	3	/Set		
1.36	**Surface Spot Light** Wattage : 15W, 1400lm CRI : 80 , IP 20 , Power AC220V COO : PRC Faculty Dinning **(TYPE-S8D)** 	2	/Set		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.37	**LEDCOMFO LED Batten Light** Wattage: 20W , 2000 lm CRI: 80 , CCT: 3000k, SDCM : 5 IP 20 , IK 03, Beam 140 deg Voltage: 220-240Vac 50Hz Brand : LEDVANCE _OSRAM Cafeteria Above ceiling **(TYPE-T5)** 	108	/Set		
1.38	**Surface Wall-mounted** Wattage : 20W,1600lm, CRI : 80 , IP44 , Power AC220V COO :PRC Toilet **(TYPE-W4)** 	55	/Set		

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Sl. No.	Description of Items	Quantity	Unit	Unit Rate in Taka	Amount in Taka
1.39	**Surface Down Light/Wall Light** Wattage : 8W, 640lm CRI : 80 , IP 65 , Single CCT, Power AC220V COO : PRC Conference room (VC) **(TYPE-W11D)** 	10	/Set		
				TOTAL TK =	

Note: a. Installation means installation, testing & commissioning of the respective ITEM as per drawing & specifications complete with all necessary accessories and fittings for commissioning of the equipment including all electrical & civil works. If any item description conflict with BOQ and Specification, then consider best selection for that item or follow the consultant instruction; b. Contractor bill should be adjusted as per actual site quantity of install item; c. Materials should be supplied at actual as per site requirements; d. For Fixture unit is not as per actual. Average tentative unit is shown here.

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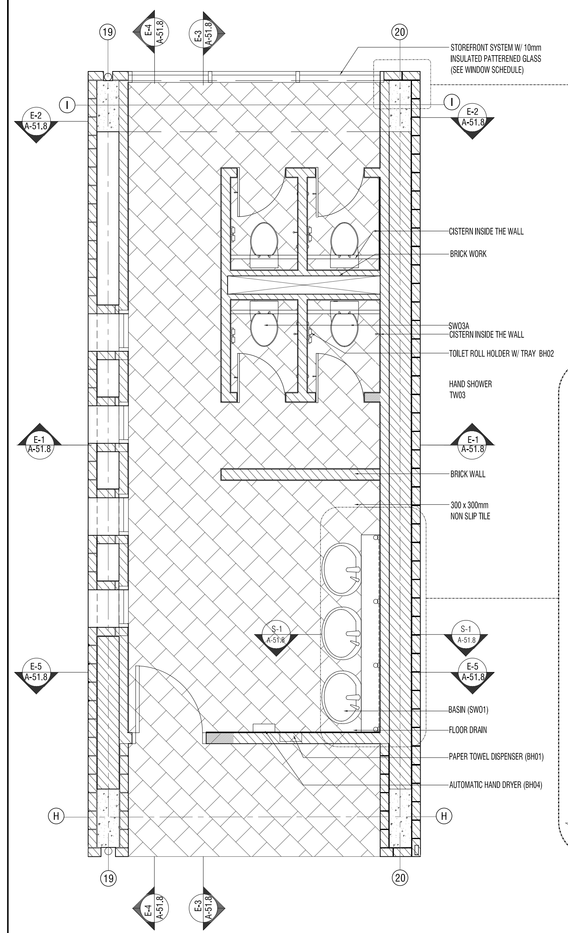
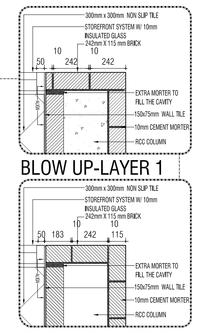
FOR WOMEN

Annexure 1

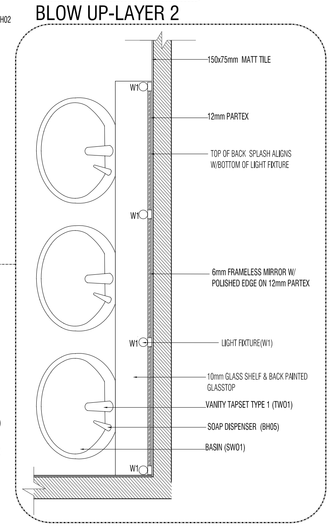


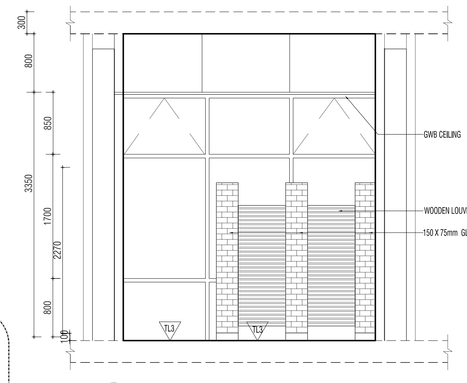
P-1 PLAN - TOILET -LEVEL-1
A-51.8 SCALE :1:40



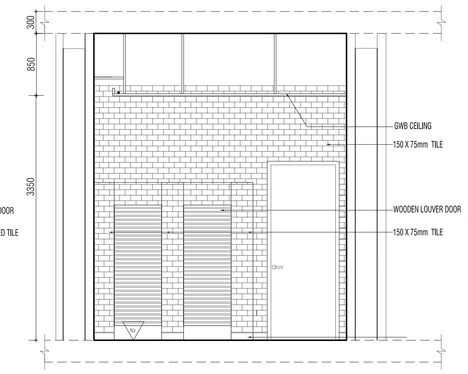
BLOW UP-LAYER 1

BLOW UP-LAYER 2

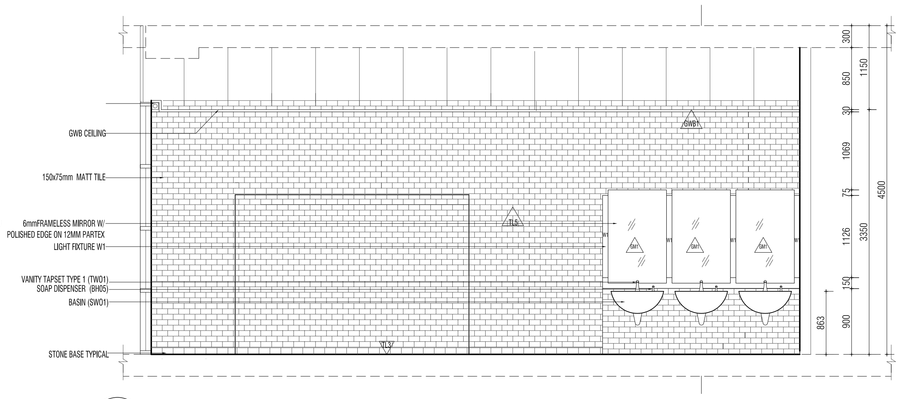




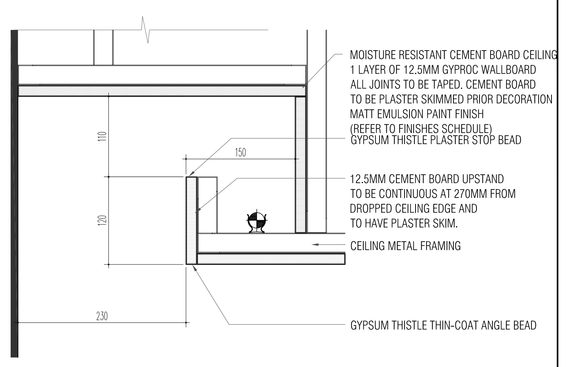
E-1 INTERIOR ELEVATION -E1
A-51.8 SCALE :1:40



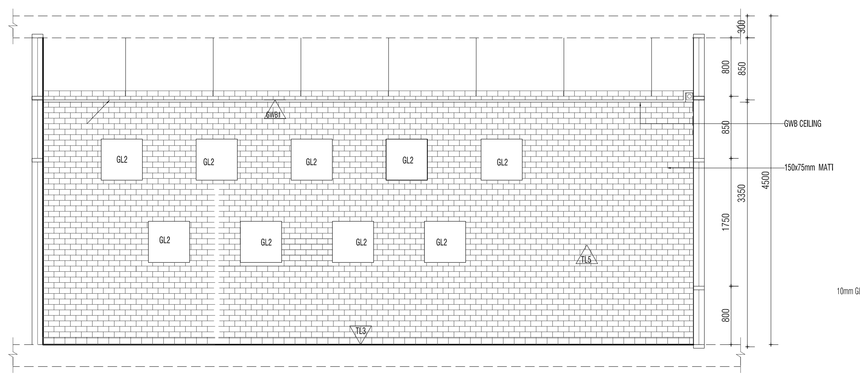
E-2 INTERIOR ELEVATION -E2
A-51.8 SCALE :1:40



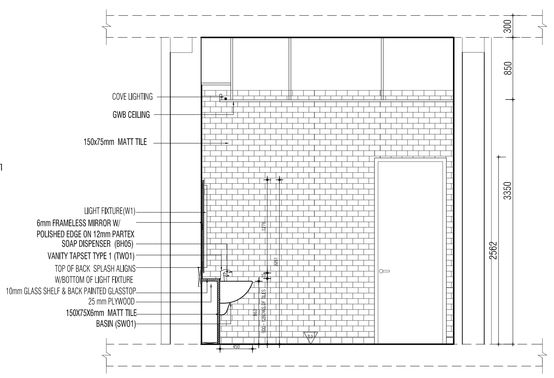
E-3 INTERIOR ELEVATION -E3
A-51.8 SCALE :1:40



D-2 DETAIL- 2
A-51.8 SCALE :1:8



E-4 INTERIOR ELEVATION -E4
A-51.8 SCALE :1:40



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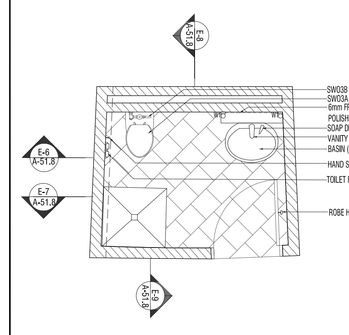
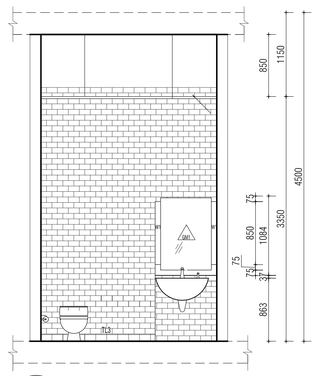
A-51.8 SCALE :1:40



P-2 PLAN - TOILET -LEVEL-1
SCALE :1:40



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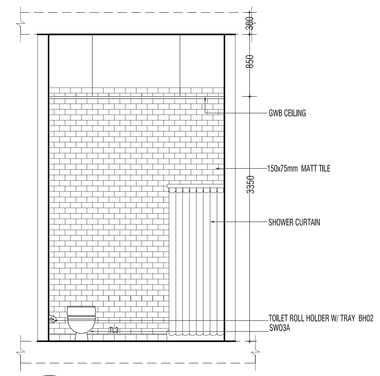
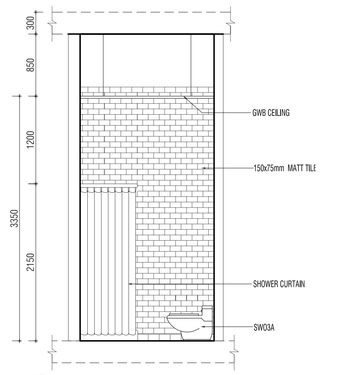
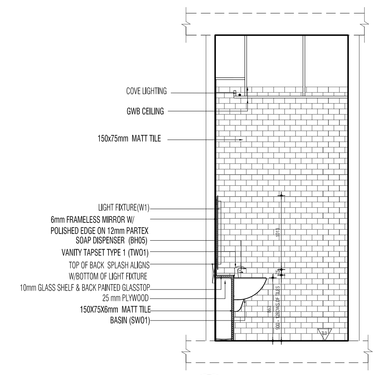
A-51.8 SCALE :1:40



E-7 INTERIOR ELEVATION -E7
A-51.8 SCALE :1:40



E-8 INTERIOR ELEVATION -E8
A-51.8 SCALE :1:40



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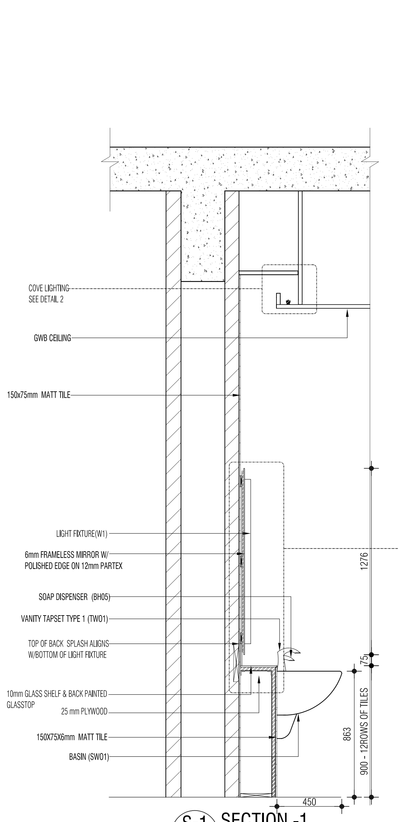
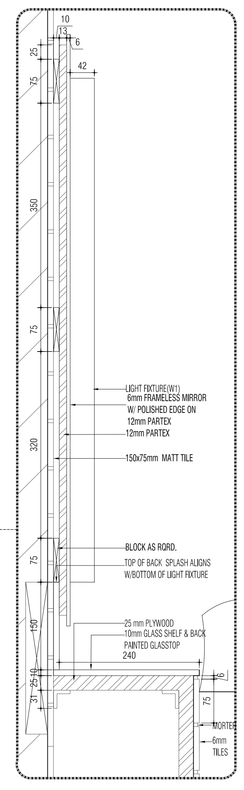
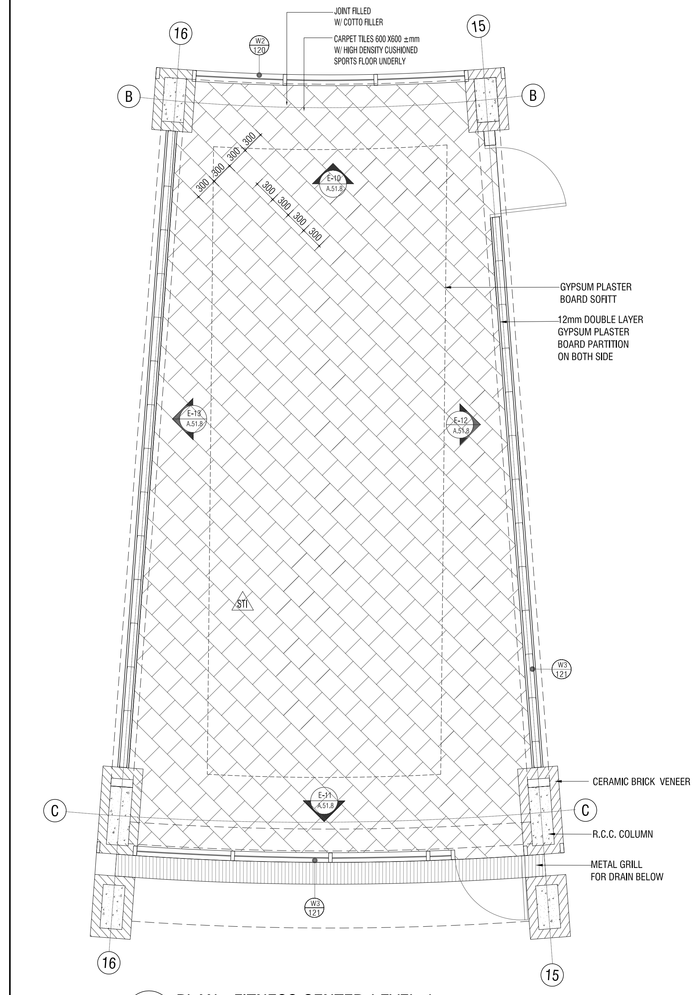
A-51.8 SCALE :1:40



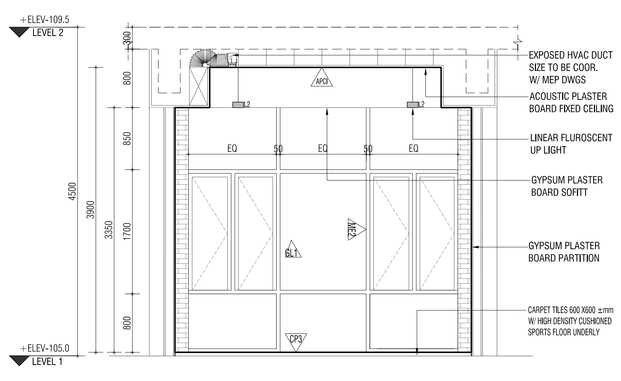
S-1 SECTION -1
A-51.8 SCALE :1:20



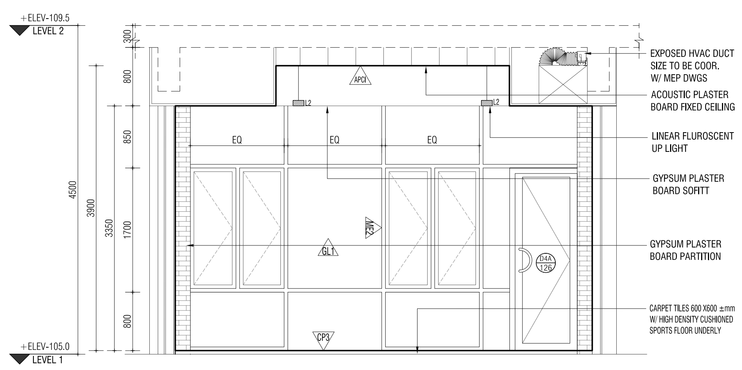
BLOW UP



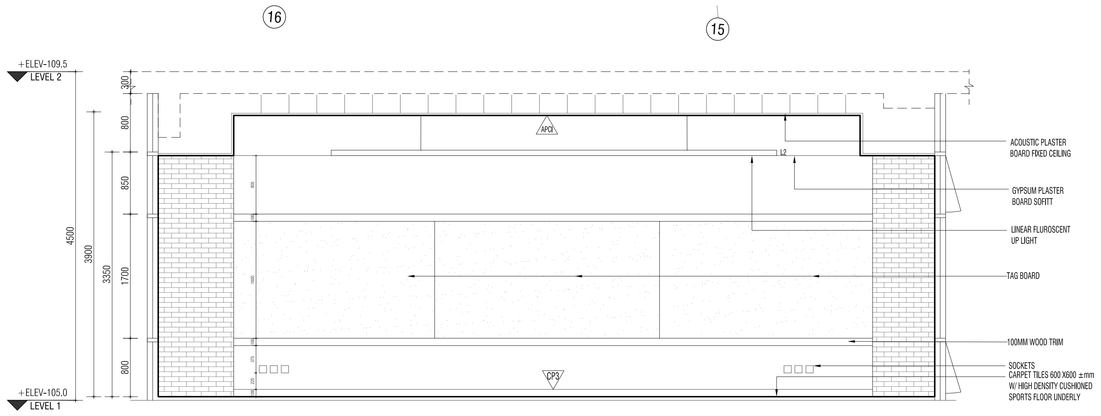
P-3 PLAN - FITNESS CENTER-LEVEL-1
A-51.8 SCALE :1:40



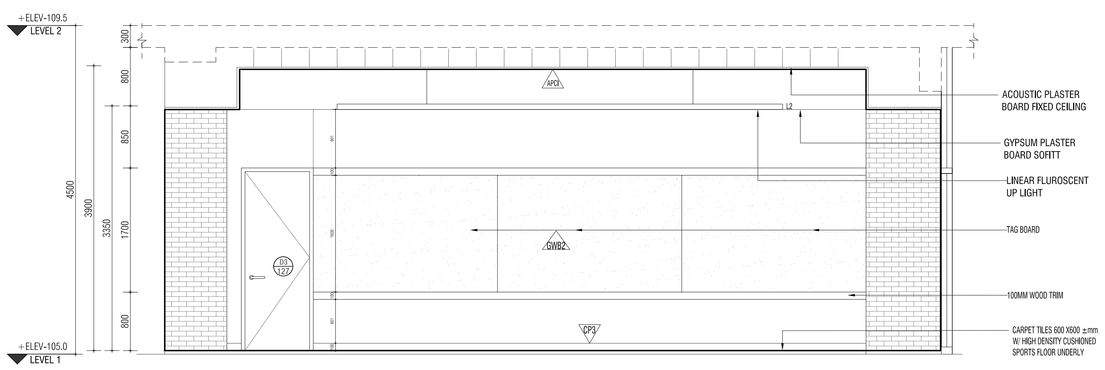
E-10 INTERIOR ELEVATION -E10
A-51.8 SCALE :1:40



E-11 INTERIOR ELEVATION -E11
A-51.8 SCALE :1:40



E-12 INTERIOR ELEVATION -E12
A-51.8 SCALE :1:40



E-13 INTERIOR ELEVATION -E13
A-51.8 SCALE :1:40

Asian University For Women
Chittagong, Bangladesh
www.asian-university.org
Phase One, Building 1a

Client
Asian University for Women
Support Foundation
1100 Massachusetts Ave.
Suite 300
Cambridge MA 02138, USA

Architect
Moshe Safdie and Associates
100 Properzi Way
Somerville MA 02143, USA

Associate Architects
VITTI-SHS Consortium
2, Shangshad Avenue, 3rd Level,
Munipuripara, Dhaka 1215,
Bangladesh

ASSOCIATE CONSULTANTS:
STRUCTURAL & CIVIL :
DESIGN PLANING AND MANAGEMENT CONSULTANT LTD. (DPM)
House no:4/1(2nd floor). Road no-4
Dhanmondi,Dhaka-1205,
Bangladesh
Phone : 8610116-7.

BRTC
Bangladesh University of Engineering & Technology ,
BUET.Polashi, Dhaka-1000,
Bangladesh
Phone : 8614640 , 9665650.PABX.

MECHANICAL AND PLUMBING :
AVE ENGINEERS & CONSULTANT LTD.
House no:5/3(1st floor), Block-A
Lalmatia,Dhaka-1205,
Bangladesh
Phone : 8610116-7.

ELECTRICAL:
TECHNO CONSULTANTS
House no:86(1st floor).Road no-9/A Dhanmondi, Dhaka-1209,
Bangladesh
Phone : 8610116-7.

Key Plan

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ISSUE - A

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REVISED CD 100%	11/30/2012	FOR REVIEW

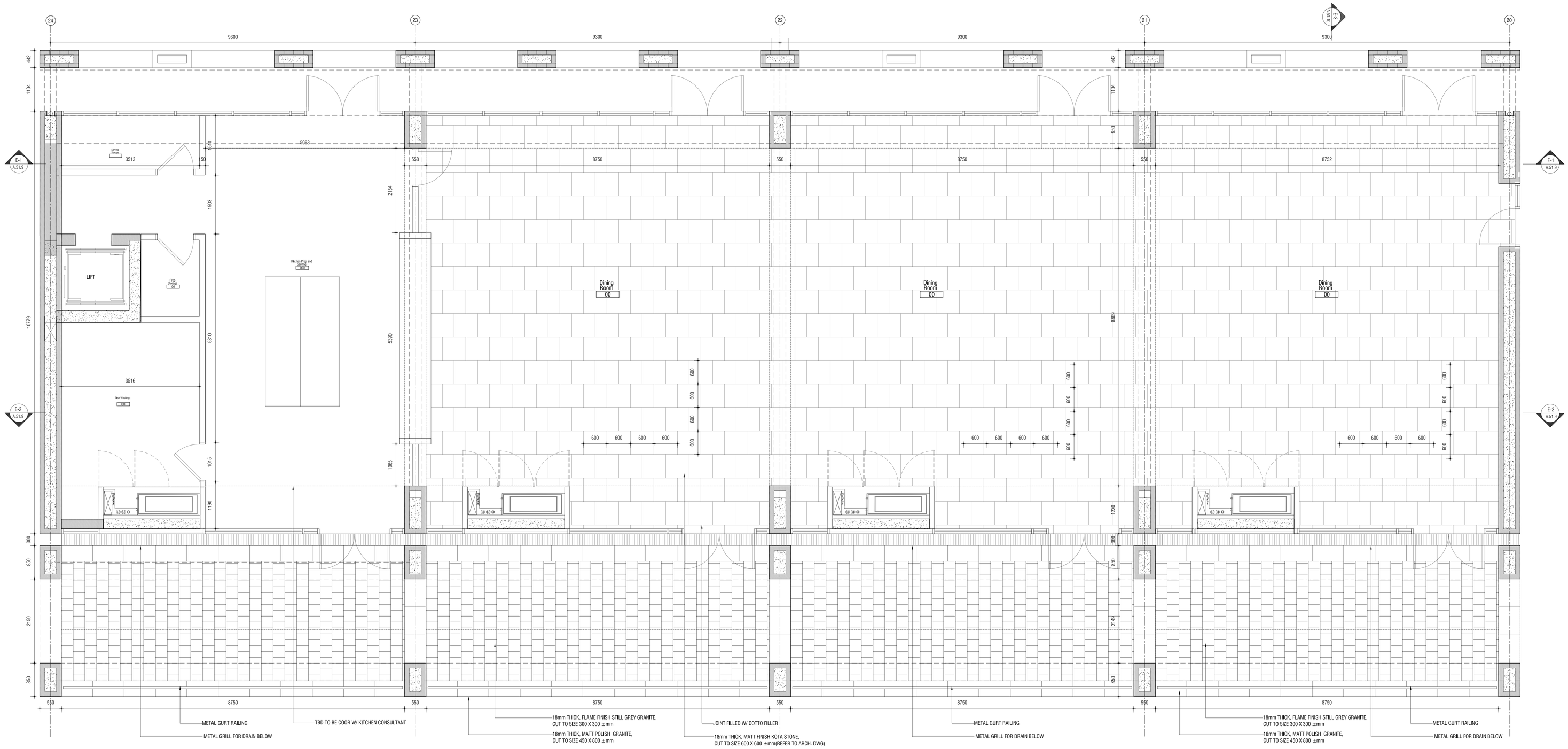
Seal Of Approval :

Drawn By :	NK
Checked By :	NI IZ
Scale :	AS NOTED

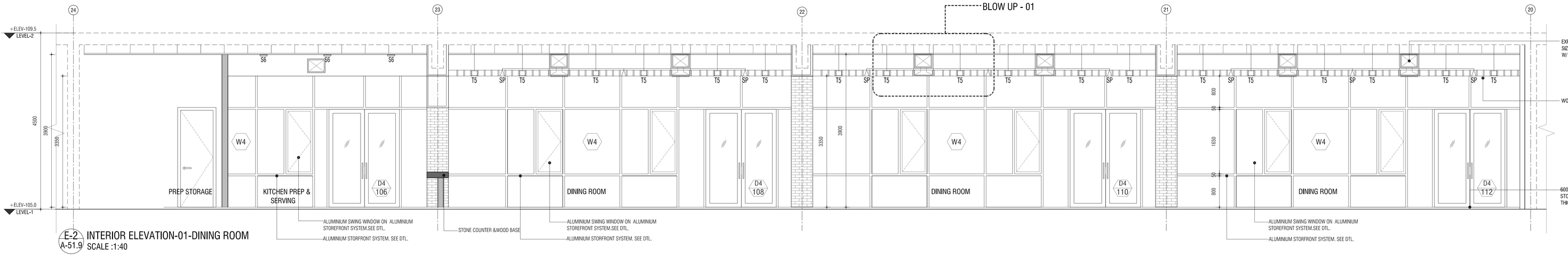
Drawing Title :

INTERIOR ELEVATION
TOILET & FITNESS CENTER

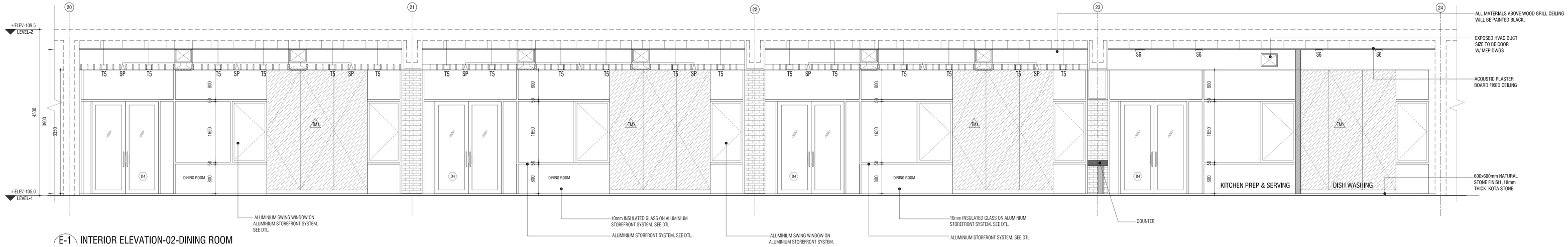
A-51.8



P-1 / A-51.9 PLAN - DINING ROOM
SCALE :1:40



E-2 / A-51.9 INTERIOR ELEVATION-01-DINING ROOM
SCALE :1:40



E-1 INTERIOR ELEVATION-02-DINING ROOM

Asian University For Women
Chittagong, Bangladesh
www.asian-university.org
Phase One, Building 1a

Client
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House no:4/1(2nd floor). Road no-4
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Phone : 8614640 , 9665650.PABX.

MECHANICAL AND PLUMBING :

AVE ENGINEERS & CONSULTANT LTD.
House no:5/3(1st floor). Block-A
Lalmatia,Dhaka-1205,
Bangladesh
Phone : 8610116-7.

ELECTRICAL:
TECHNO CONSULTANTS
House no:86(1st floor),Road no-9/A Dhanmondi, Dhaka-1209,
Bangladesh
Phone : 8610116-7.

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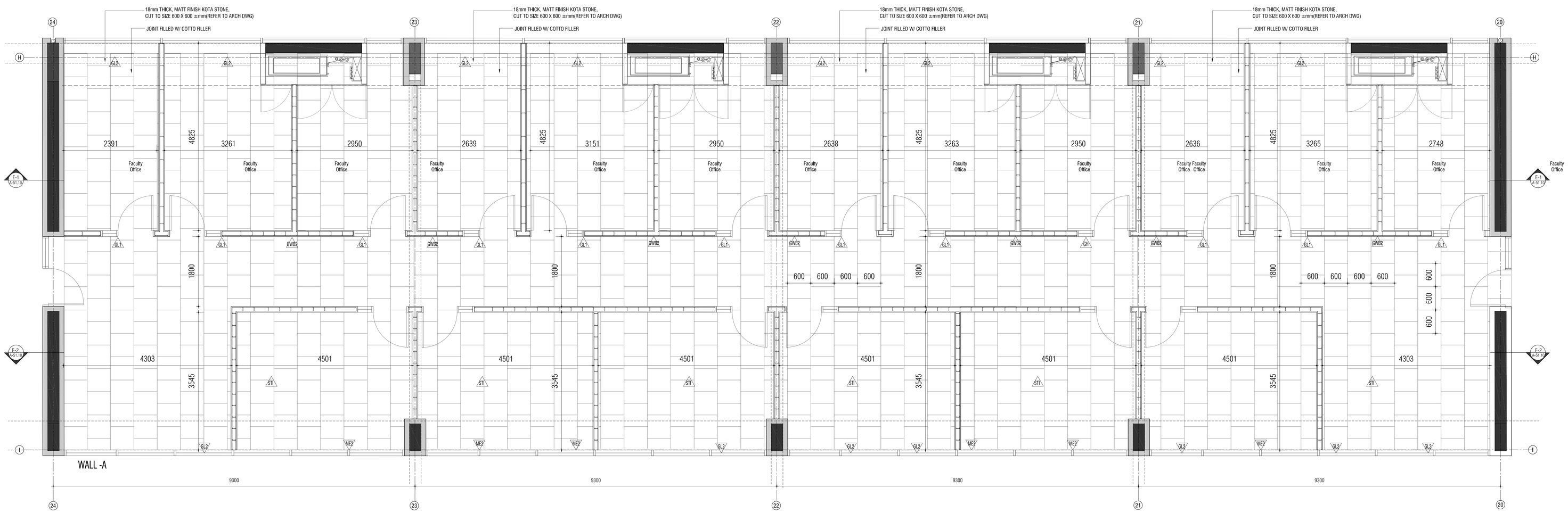
Seal Of Approval :

Drawn By :	NK
Checked By :	NI IZ
Scale :	AS NOTED

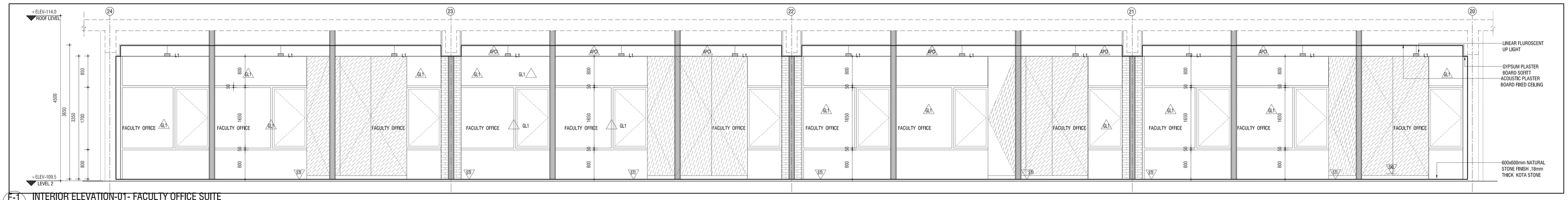
Drawing Title :

INTERIOR ELEVATION DINING

A-51.9



P-1 / A-51.10 PLAN - FACULTY OFFICE SUITE
SCALE :1:40



E-1 / A-51.10 INTERIOR ELEVATION-01- FACULTY OFFICE SUITE
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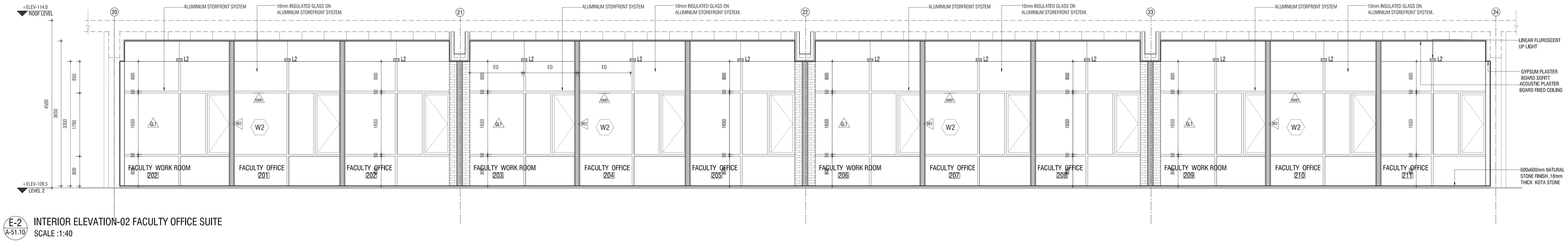

E-2 / A-51.10 INTERIOR ELEVATION-02 FACULTY OFFICE SUITE
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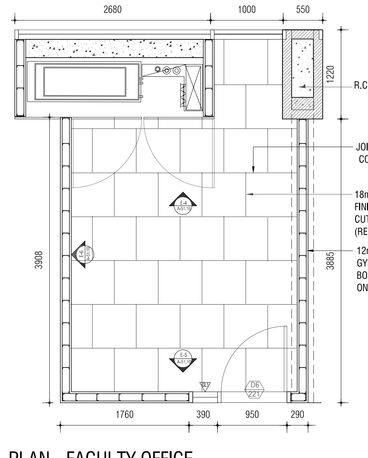
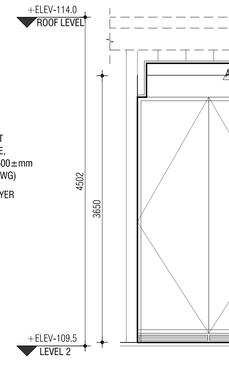
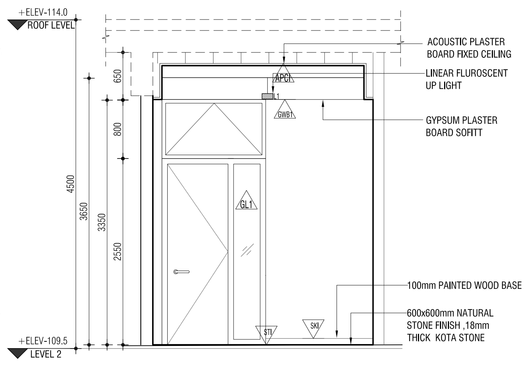


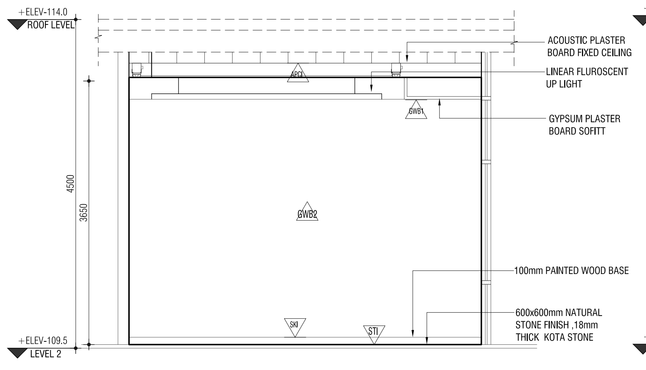
P-2 / A-51.10 PLAN - FACULTY OFFICE
SCALE :1:40



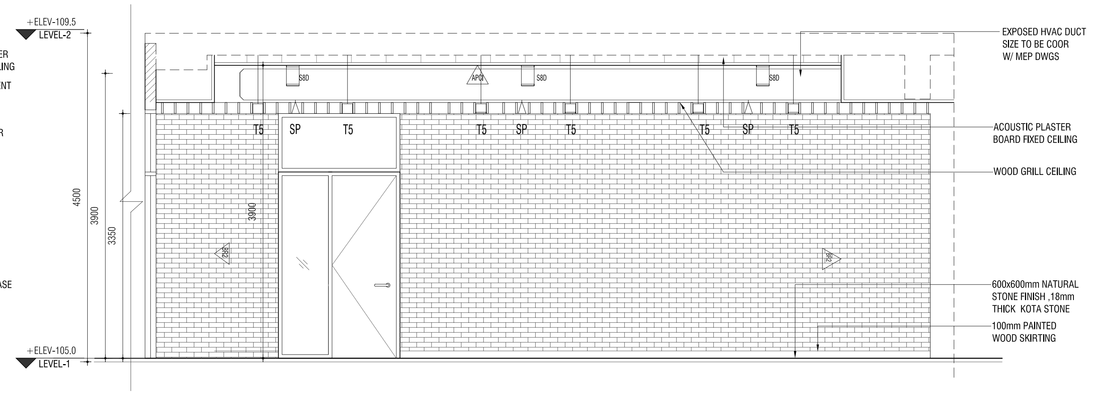
E-4 / A-51.10 INTERIOR ELEVATION- 04 - FACULTY OFFICE
SCALE :1:40



E-5 / A-51.10 INTERIOR ELEVATION- 05 - FACULTY OFFICE
SCALE :1:40



E-6 / A-51.10 INTERIOR ELEVATION- 06 -FACULTY OFFICE
SCALE :1:40



E-3 / A-51.10 INTERIOR ELEVATION- 03 -DINING ROOM
SCALE :1:40

Asian University For Women
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www.asian-university.org
Phase One, Building 1a

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MECHANICAL AND PLUMBING :

AVE ENGINEERS & CONSULTANT LTD.
House no:5/3(1st floor). Block-A
Lalmatia,Dhaka-1205,
Bangladesh
Phone : 8610116-7.

ELECTRICAL:
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House no:86(1st floor),Road no-9/A Dhanmondi, Dhaka-1209,
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REVISED CD 100%	11/30/2012	FOR REVIEW

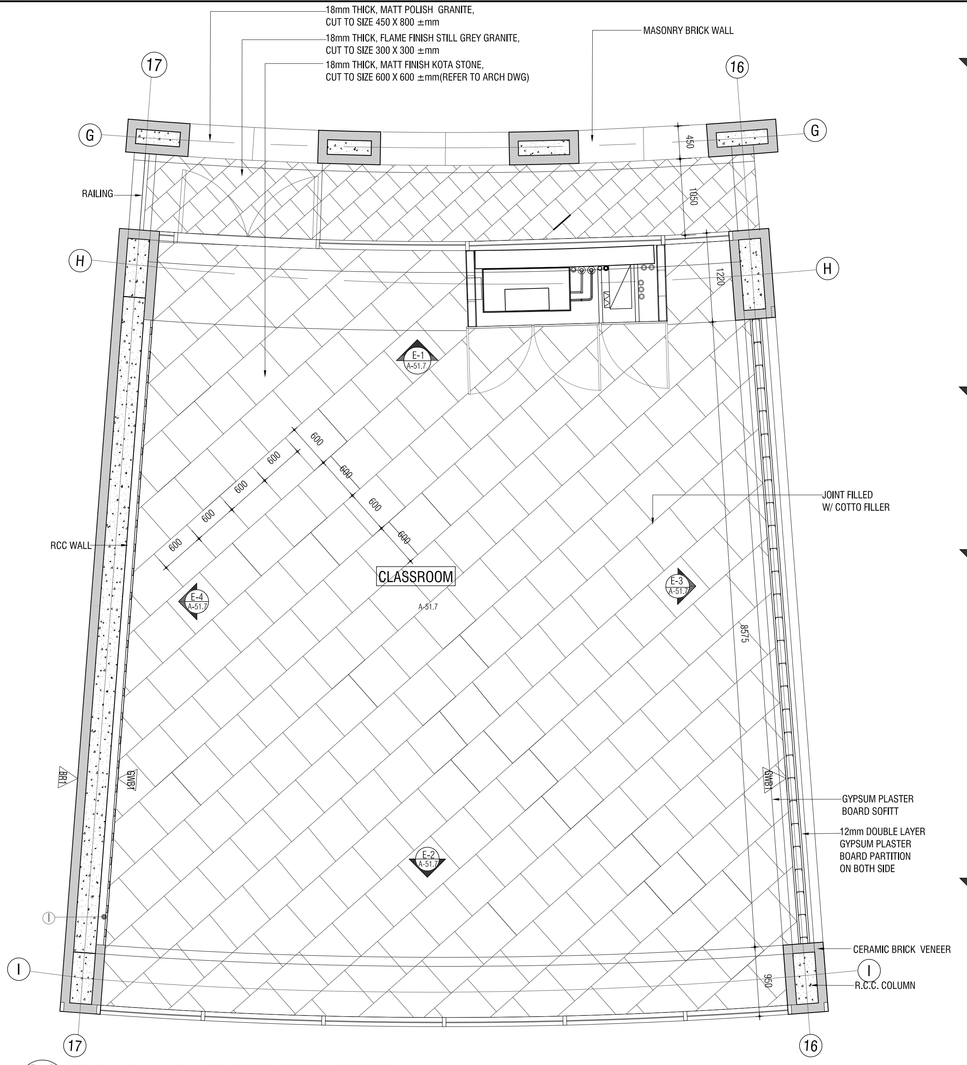
Seal Of Approval :

Drawn By :	NK
Checked By :	NI IZ
Scale :	AS NOTED

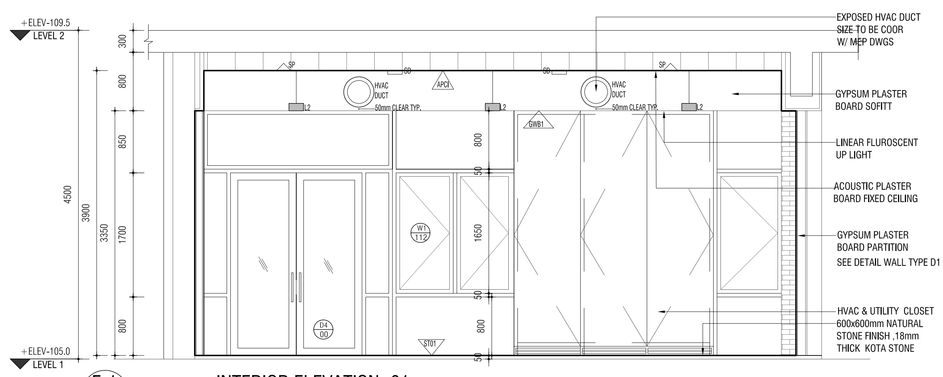
Drawing Title :

INTERIOR ELEVATION FACULTY OFFICE & DINING

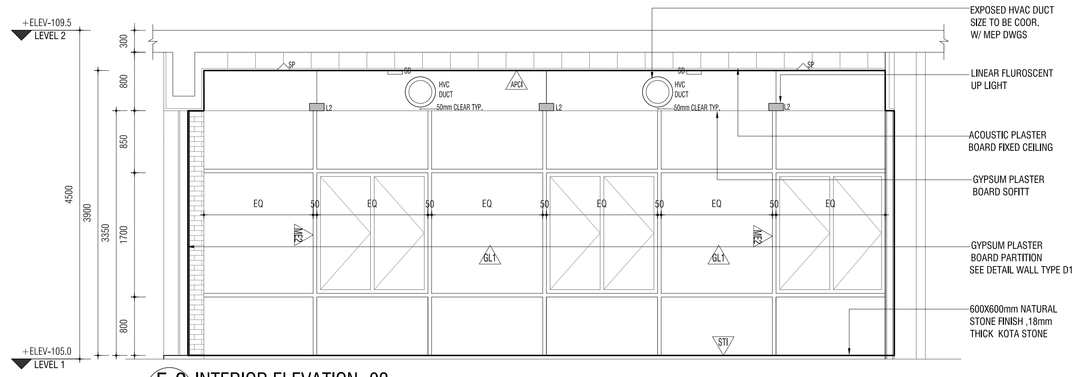
A-51.10



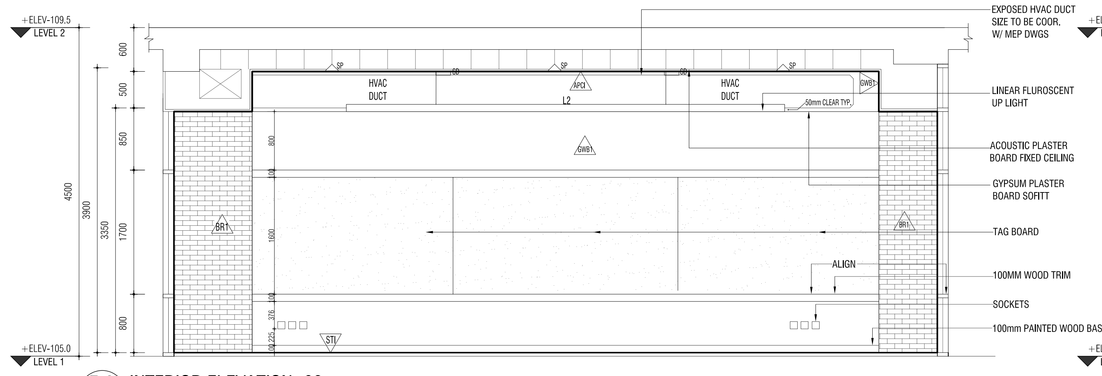
P-1 / A-51.7 PLAN -01- LEVEL-01(DISCUSSION ROOM)
SCALE:1:40



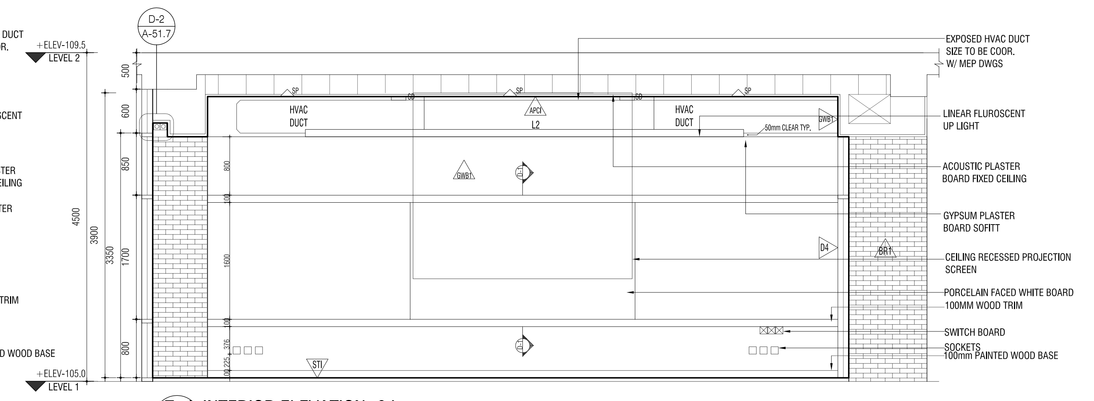
E-1 / A-51.7 INTERIOR ELEVATION- 01
SCALE:1:40



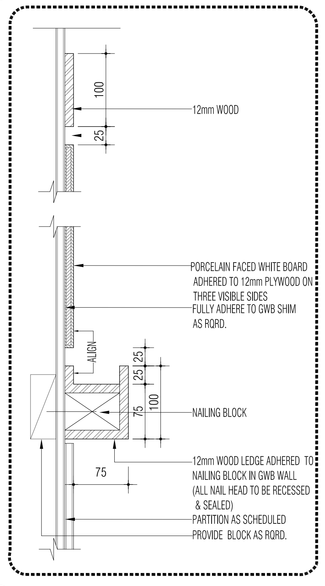
E-2 / A-51.7 INTERIOR ELEVATION- 02
SCALE:1:40



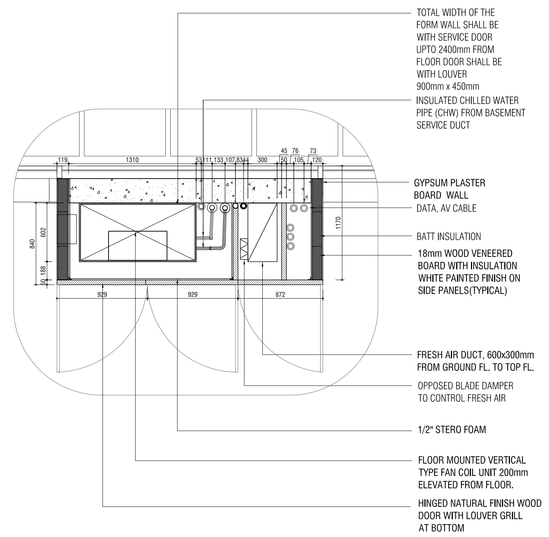
E-3 / A-51.7 INTERIOR ELEVATION- 03
SCALE:1:40



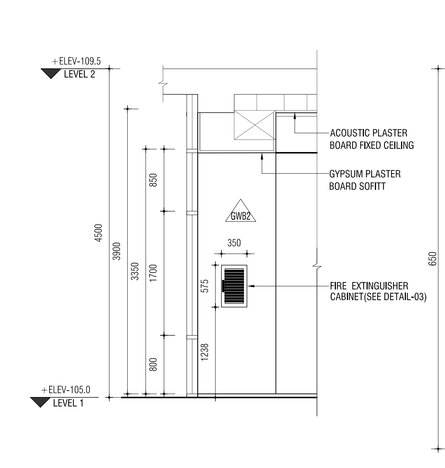
E-4 / A-51.7 INTERIOR ELEVATION- 04
SCALE:1:40



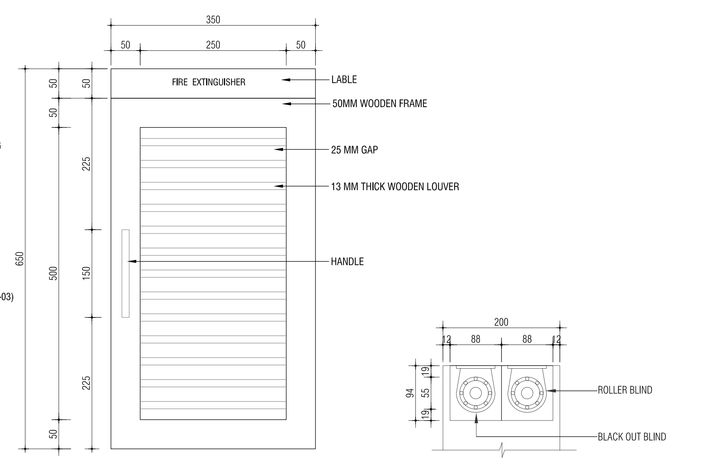
D-1 / A-51.7 DETAIL- 01
SCALE:1:20



D-2 / A-51.7 DETAIL- 02
SCALE:1:30

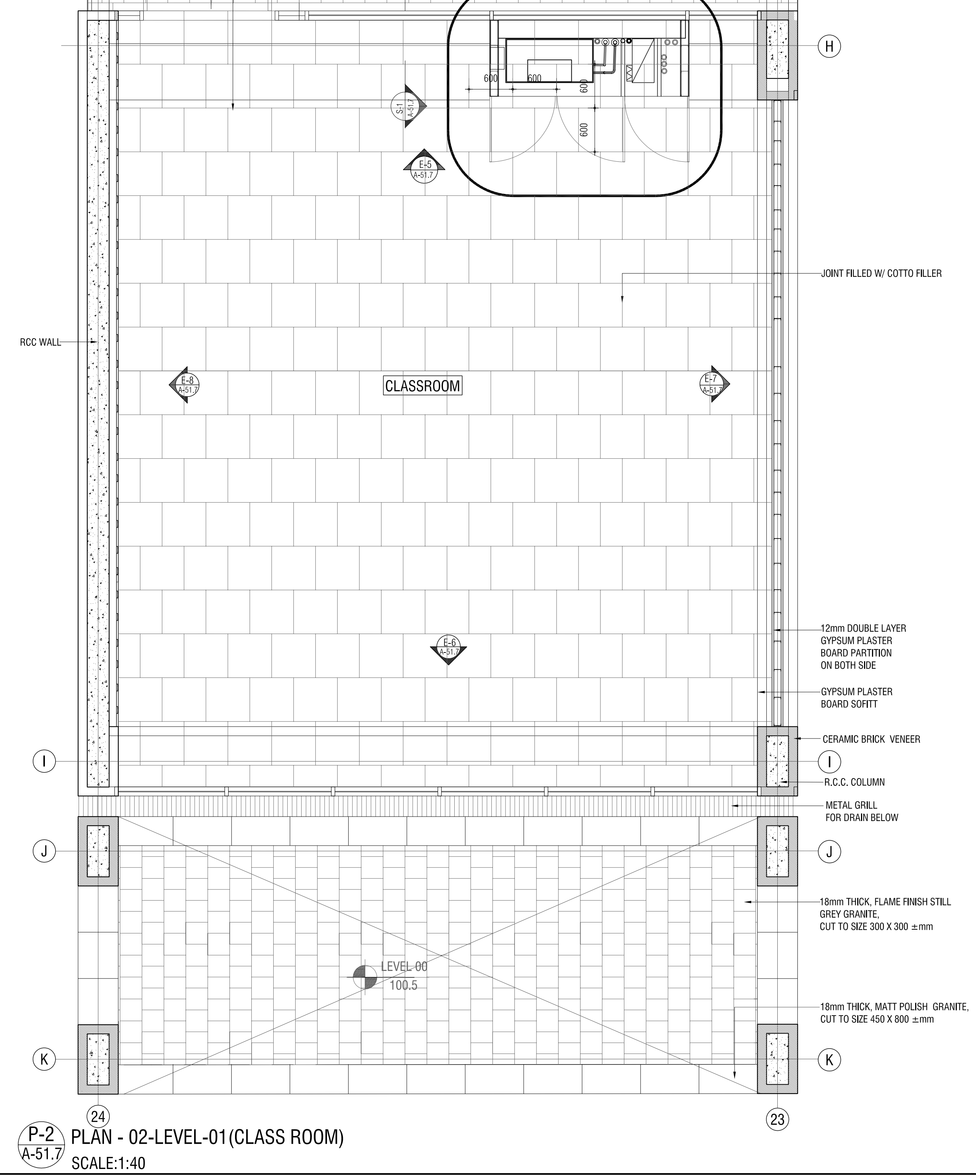


S-1 / A-51.7 SECTION- 01
SCALE:1:40

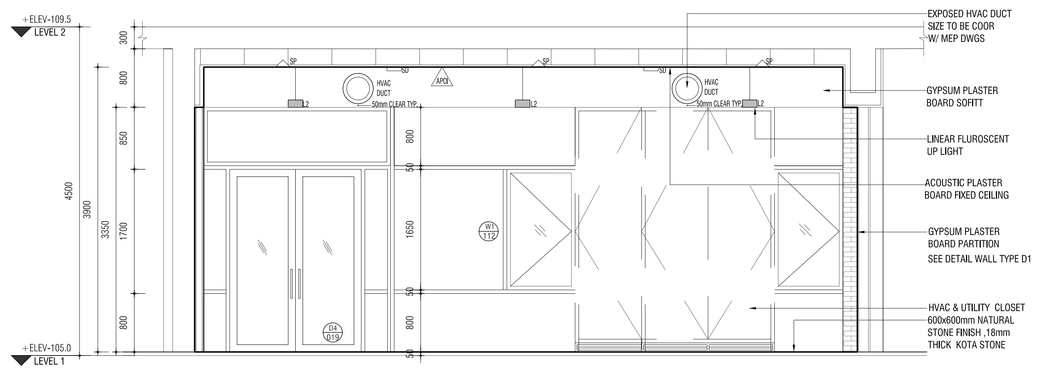


D-3 / A-51.7 DETAIL- 03
SCALE:1:30

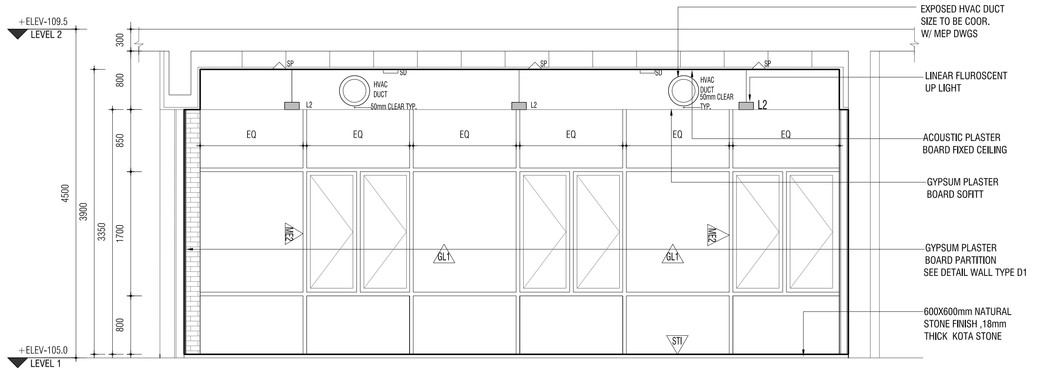
D-4 / A-51.7 DETAIL- 04
SCALE:1:20



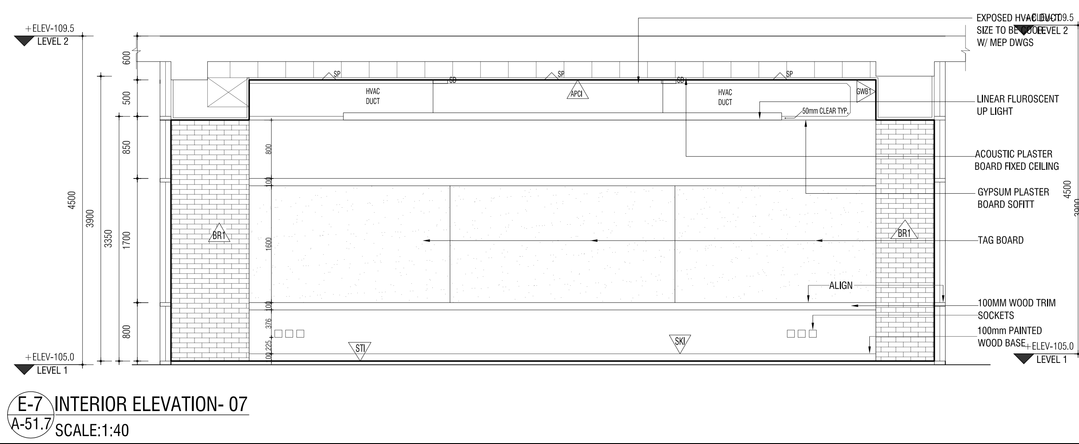
P-2 / A-51.7 PLAN - 02-LEVEL-01(CLASS ROOM)
SCALE:1:40



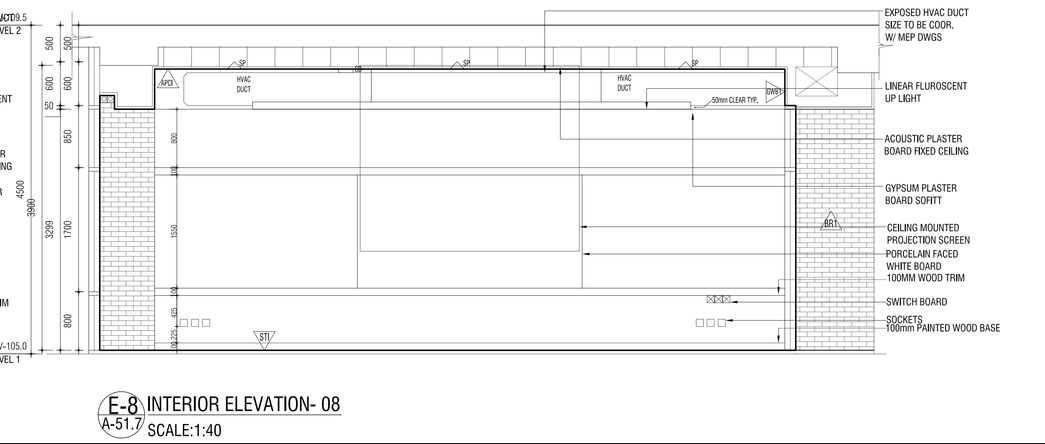
E-5 / A-51.7 INTERIOR ELEVATION- 05
SCALE:1:40



E-6 / A-51.7 INTERIOR ELEVATION- 06
SCALE:1:40



E-7 / A-51.7 INTERIOR ELEVATION- 07
SCALE:1:40



E-8 / A-51.7 INTERIOR ELEVATION- 08
SCALE:1:40

Asian University For Women
Chittagong, Bangladesh
www.asian-university.org
Phase One, Building 1a

Client
Asian University for Women
Support Foundation 100
Massachusetts Ave.
Suite 300
Cambridge MA 02138, USA

Architect
Moshe Safdie and Associates
100 Properzi Way
Somerville MA 02143, USA

Associate Architects
VITTI-SHS Consortium
2, Shangshad Avenue, 3rd Level,
Munipuripara, Dhaka 1215, Bangladesh

ASSOCIATE CONSULTANTS:
STRUCTURAL & CIVIL :
DESIGN PLANING AND MANAGEMENT CONSULTANT LTD. (DPM)
House no:4/1(2nd floor). Road no-4
Dhanmondi,Dhaka-1205,
Bangladesh
Phone : 8610116-7.

BRTC
Bangladesh University of Engineering & Technology ,
BUET.Polashi, Dhaka-1000,
Bangladesh
Phone : 8614640 , 9665650.PABX.

MECHANICAL AND PLUMBING :
AVE ENGINEERS & CONSULTANT LTD.
House no:5/3(1st floor). Block-A
Lalmatia,Dhaka-1205,
Bangladesh
Phone : 8610116-7.

ELECTRICAL:
TECHNO CONSULTANTS
House no:86(1st floor).Road no-9/A Dhanmondi, Dhaka-1209,
Bangladesh
Phone : 8610116-7.

Key Plan

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ISSUE - A

Phase One, Building 1a
Construction Document Phase.
(ARCHITECTURAL DRAWINGS)

CD 50%	08/22/2010	FOR REVIEW
CD 100%	09/30/2010	FOR REVIEW
REVISED CD 100%	04/21/2012	FOR REVIEW
REVISED CD 100%	11/30/2012	FOR REVIEW

Seal Of Approval :

Drawn By :	NK
Checked By :	NI IZ
Scale :	AS NOTED

Drawing Title :

INTERIOR ELEVATION
CLASS ROOM

A-51.7

PASSENGER LIFT-01

SERVICE LIFT-01

PASSENGER LIFT-02, 03

D4A
00

1000

D4A
00

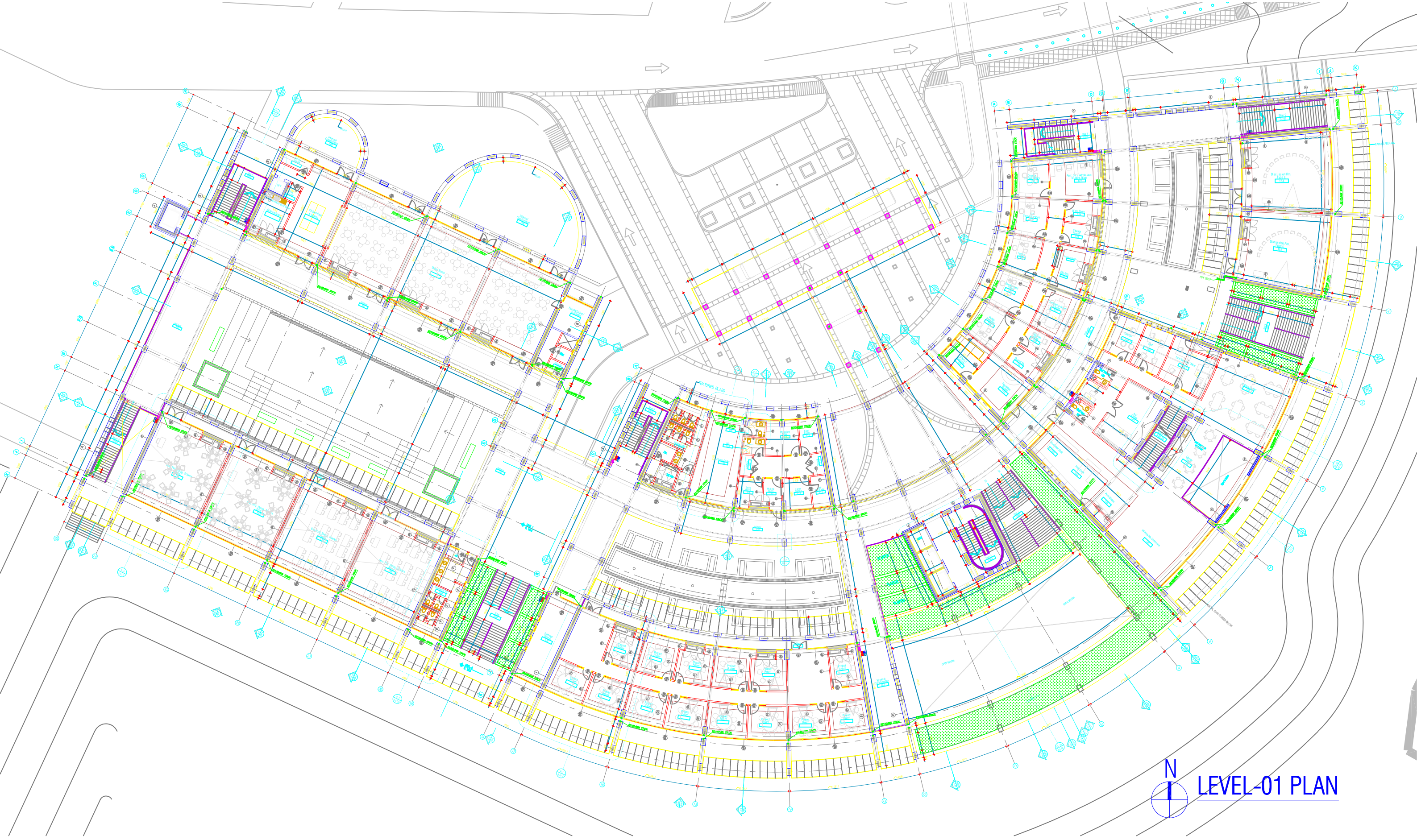
1000

1000

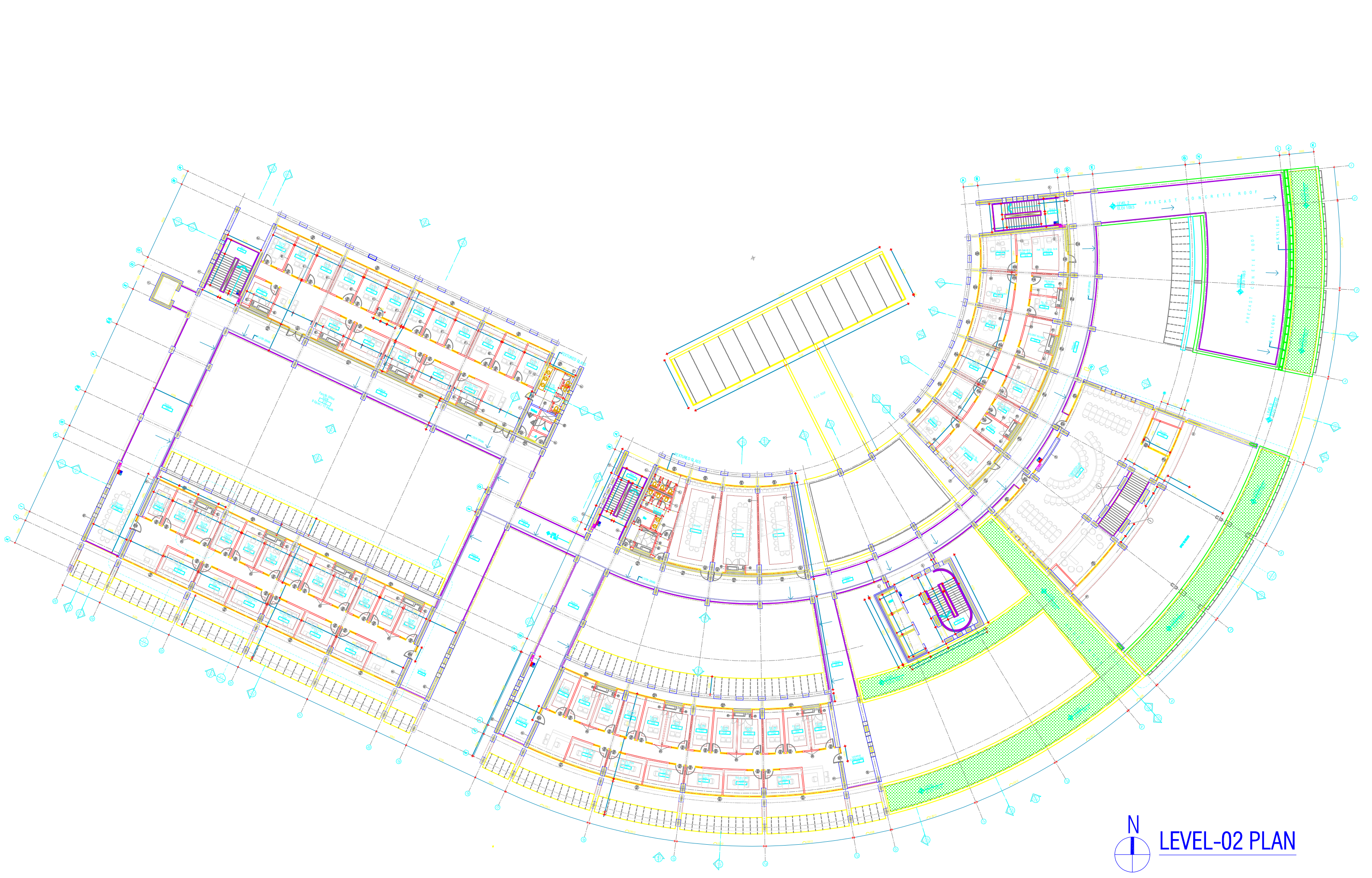
D1
00

N

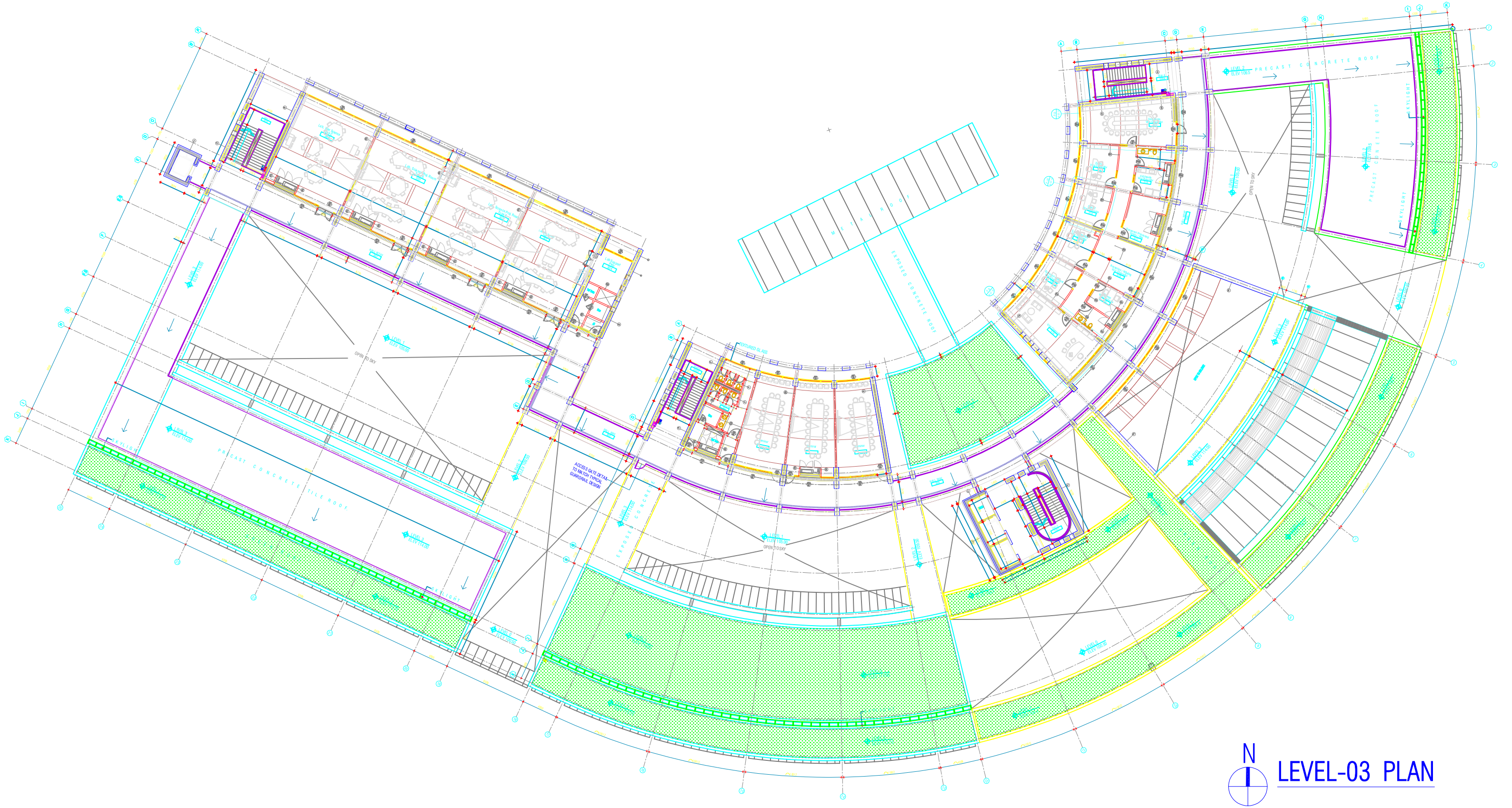
LEVEL-00 PLAN



LEVEL-01 PLAN



LEVEL-02 PLAN



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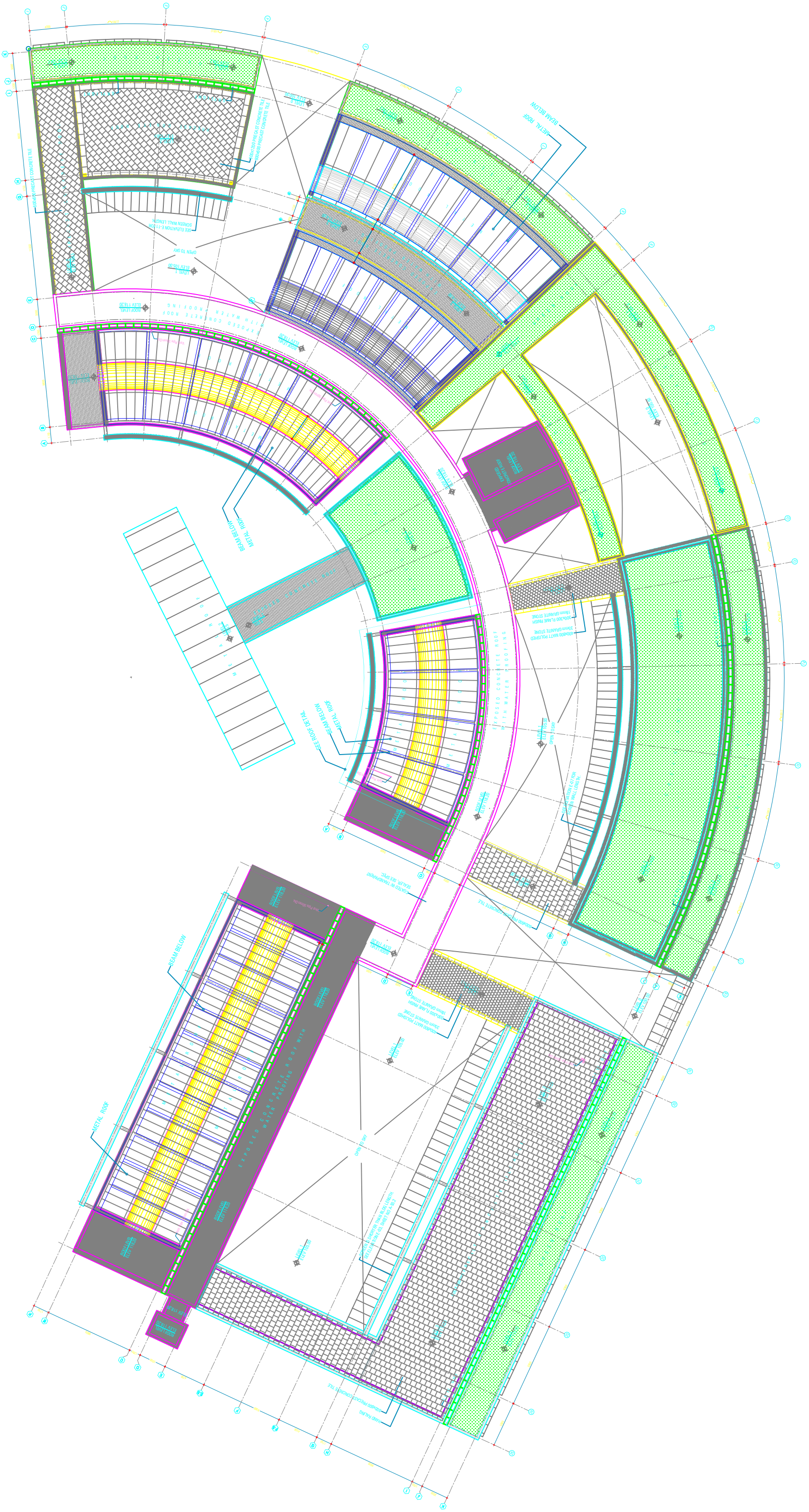
LEVEL-03 PLAN


METAL ROOF
BEAM BELOW
EXPOSED CONCRETE ROOF WITH WATER PROOFING
OPEN TO SKY
SEE ELEVATION E-1 FOR SCREEN WALL LENGTH
600x600 PRECAST CONCRETE TILE
600x600 MATT POLISHED 30mm GRANITE STONE
300x300 FLAME FINISH 15mm GRANITE STONE
SEE ROOF DETAIL
GLAZING
SKYLIGHT
LEVEL 1
ELEV 105.00
ROOF LEVEL
ELEV 118.20
LEVEL 4
ELEV 109.00
ELEV 113.20
ELEV 116.20

Cable Tray-600mm X 100mm -4nos
44X1C-50mm² NYY
ECC-11X1C-25mm² BYA
20X1C-25mm² NYY
ECC-5X1C-16mm² BYA
18X1C-16mm² NYY
ECC-4X1C-10mm² BYA
16X1C-10mm² NYY
ECC-4X1C-6.0mm² BYA
8X1C-6.0mm² NYY
ECC-2X1C-6.0mm² BYA

Cable Trench
12X1C-50mm² NYY
ECC-3X1C-25mm² BYA
8X1C-25mm² NYY
ECC-2X1C-16mm² BYA
4X1C-16mm² NYY
ECC-1C-16mm² BYA

600mm Ladder
MDB-1,UMDB-1 (L-3)
MDB-1,UMDB-1 (L-2)
MDB-1,UMDB-1 (L-1)

MDB-2(L-0)

CABLE TRAY

Trench to MDB/UMDB
Vertical connected
By ladder

Cable Tray-200mm X 100mm
4X1C-25mm² NYY
ECC-1C-16mm² BYA

Cable Tray-200mm X 100mm
4X1C-50mm² NYY
ECC-1C-25mm² BYA

600mm Ladder
MDB-2,UMDB-2 (L-3)
MDB-2,UMDB-2 (L-2)
MDB-2,UMDB-2 (L-1)

Trench to MDB/UMDB
Vertical connected
By ladder

Cable Tray-600mm X 100mm
4X1C-50mm² NYY
ECC-1X1C-25mm² BYA
4X1C-25mm² NYY
ECC-1X1C-16mm² BYA

Cable Tray-600mm X 100mm -400mm X 100mm &
16X1C-50mm2 NYY
4X1C-25mm2 NYY
ECC-1X1C-16mm2 BYA
8X1C-6.0mm2 NYY
ECC-4X1C-6.0mm2 BYA

Cable Tray-200mm X 100mm
4X1C-70mm2 NYY
ECC-1C-35mm2 BYA

CABLE TRAY

Cable Trench
20X1C-50mm² NYY
ECC-5X1C-25mm² BYA
12X1C-25mm² NYY
ECC-3X1C-16mm² BYA
12X1C-16mm² NYY
ECC-3X1C-16mm² BYA
4X1C-10mm² NYY
ECC-1C-10mm² BYA

Cable Tray-200mm X 100mm
8X1C-50mm² NYY
ECC-2X1C-25mm² BYA
8X1C-6.0mm² NYY
ECC-2X1C-6.0mm² BYA

Cable Tray 200mm X 100mm
4X1C-50mm² NYY
ECC-1X1C-25mm² BYA
4X1C-6.0mm² NYY
ECC-1X1C-6.0mm² BYA

Cable Tray 600mm X 100mm
4X1C-50mm² NYY
ECC-1X1C-25mm² BYA
4X1C-25mm² NYY
ECC-1X1C-16mm² BYA

Cable Tray-600mm X 100mm -3nos.
36X1C-50mm² NYY
ECC-9X1C-25mm² BYA
16X1C-25mm² NYY
ECC-4X1C-16mm² BYA
12X1C-16mm² NYY
ECC-3X1C-16mm² BYA
4X1C-10mm² NYY
ECC-1C-10mm² BYA
8X1C-6.0mm² NYY
ECC-2X1C-6.0mm² BYA

Cable Tray-600mm X 100mm -3nos. &
-200mm X 100mm- 1no.
40X1C-50mm² NYY
ECC-10X1C-25mm² BYA
16X1C-25mm² NYY
ECC-4X1C-16mm² BYA
12X1C-16mm² NYY
ECC-3X1C-16mm² BYA
4X1C-10mm² NYY
ECC-1C-10mm² BYA
8X1C-6.0mm² NYY
ECC-2X1C-6.0mm² BYA

Cable Tray-400mm X 100mm
4X1C-16mm² NYY
ECC-1X1C-16mm² BYA
4X1C-10mm² NYY
ECC-1C-10mm² BYA
8X1C-6.0mm² NYY
ECC-2X1C-6.0mm² BYA

CABLE TRAY

FDB & EFDB for MDB-5(L-1),UMDB-5 (L-1)
5-40mm(1.5")Ø from

from FDB & 12-40mm(1.5")Ø
UFDB for MDB-4,UMDB-4 (L-1)
MDB-4,UMDB-4 (L-2)
MDB-3,UMDB-3 (L-3)

Cable Trench
4X1C-25mm² NYY
ECC-1C-16mm² BYA
12X1C-16mm² NYY
ECC-3X1C-16mm² BYA
4X1C-10mm² NYY
ECC-1X1C-10mm² BYA
4X1C-6.0mm² NYY
ECC-1X1C-6.0mm² BYA

MDB-6(L-0)

UMDB-3(L-0)

CableTrench

5-40mm(1.5")Ø
going up for
MDB-3 UMDB-3 (L-2)
MDB-3 UMDB-3 (L-1)
MDB-6,UMDB-2 (L-0)

PANELS MOVE
TO INTERIOR SIDE OF WALL

UMDB-2(L-0)
SDB-2(L-0)
SDB-1(L-0)
MDB-5(L-0)

4-40mm(1.5")Ø
from FDB & EFDB TO LIFT
MR

UPDB-(L-0)
FDB-(L-0)

MDB-1(L-0)

CABLE TRAY

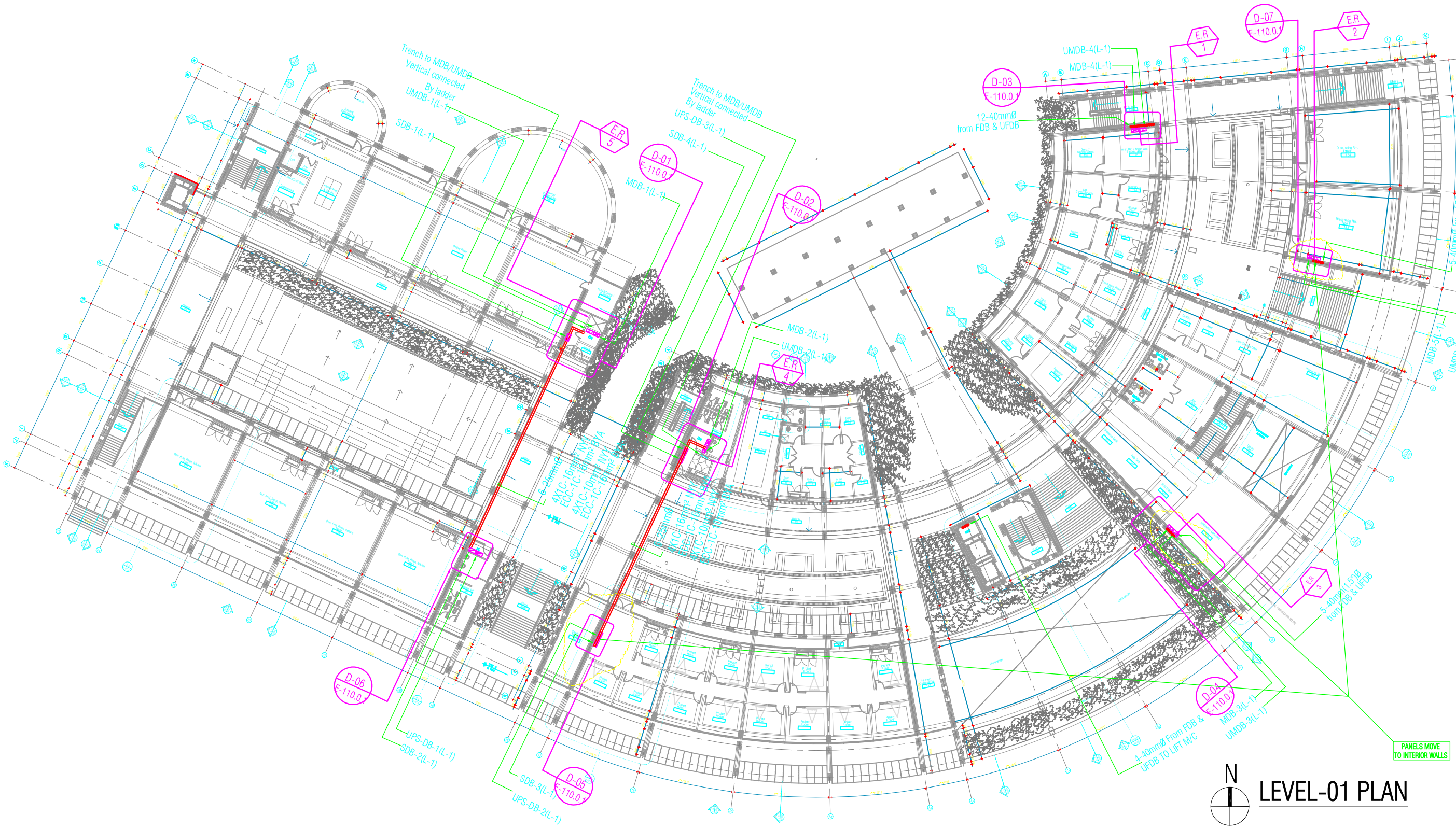
MDB-3(L-0)
UMDB-4(L-0)
SDB-3(L-0)
SDB-4(L-0)

SDB-5(L-0)
SDB-6(L-0)
SDB-SECURITY(L-0)
MDB-4(L-0)
UMDB-1(L-0)

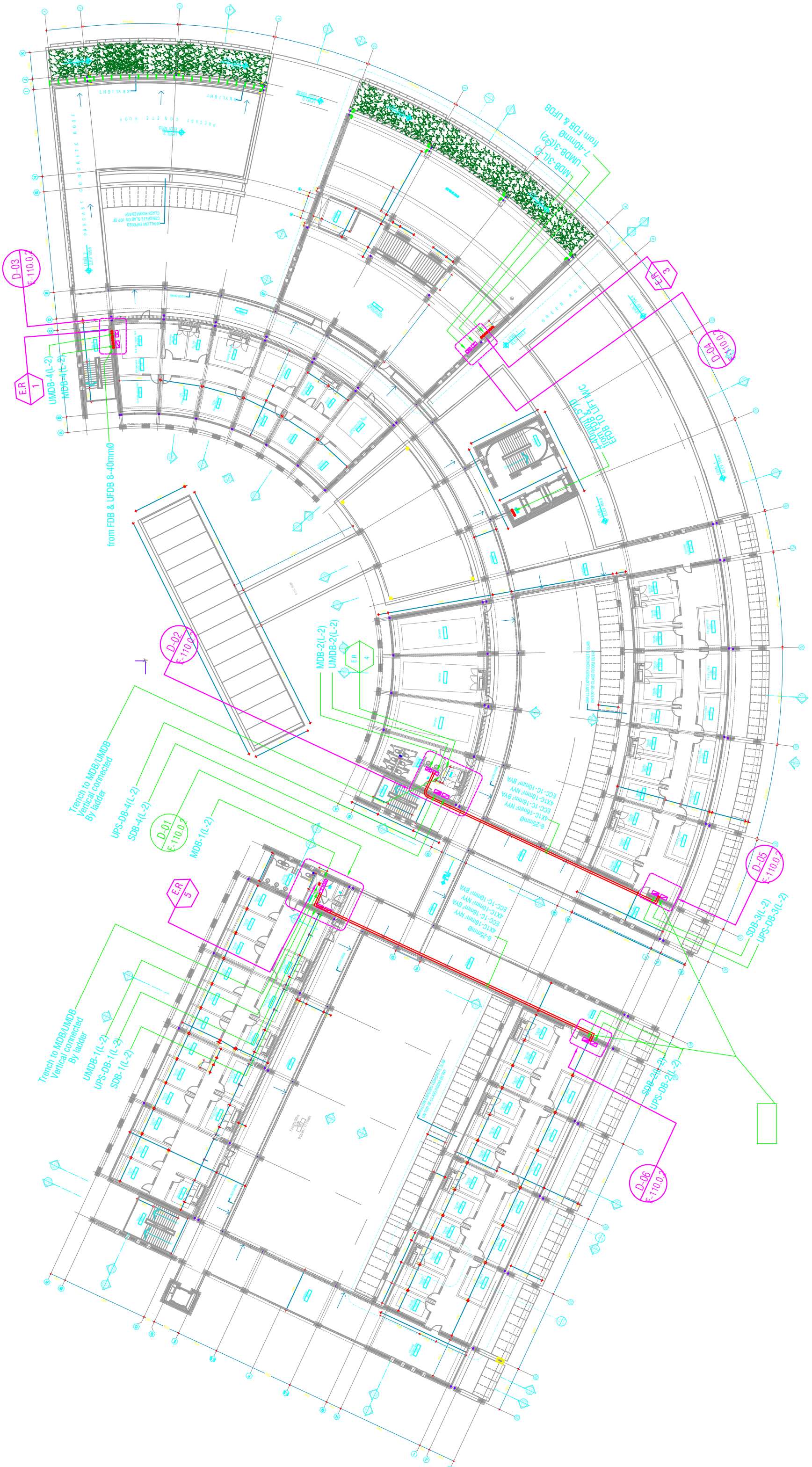
CABLE TRAY

N

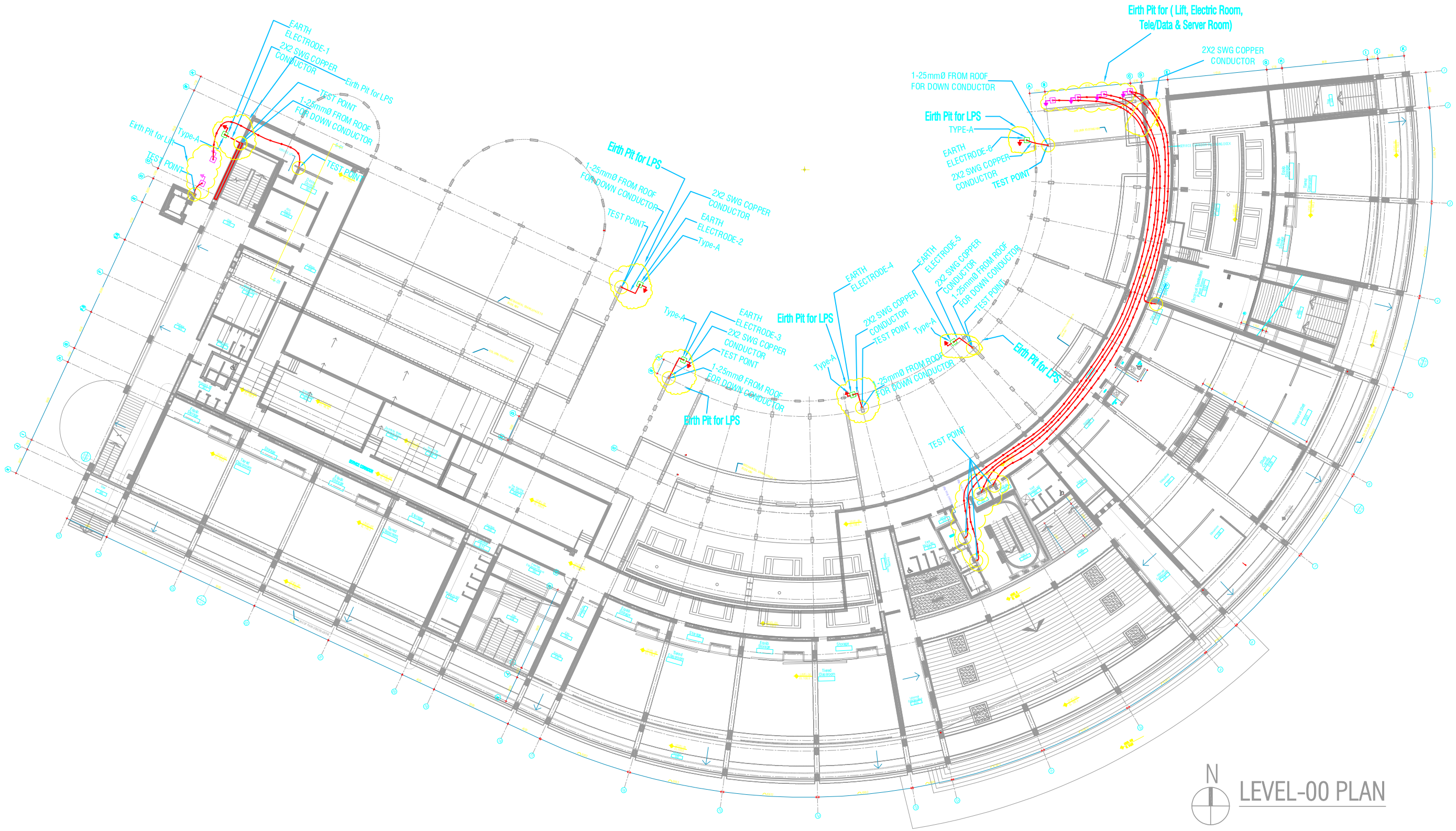
LEVEL-00 PLAN



LEVEL-01 PLAN


PRECAST CONCRETE ROOF
SKYLIGHT
GREEN ROOF
SHALLOW EXPOSED CONCRETE SLAB ON TOP OF CLASS ROOM ENTRY
E.R 1
E.R 3
E.R 4
E.R 5
UMDB-4(L-2)
MDB-4(L-2)
from FDB & UFDB 8-40mmØ
UMDB-3(L-2)
7-40mmØ
from FDB & UFDB
4-40mmØ
FDB TO LIFT M/C
MDB-2(L-2)
UMDB-2(L-2)
6-25mmØ
4XTC-16mm² BYA
ECC-1C-10mm² BYA
4XTC-16mm² NYY
ECC-1C-10mm² NYY
Trench to MDB/UMDB
Vertical connected
By ladder
UPS-DB-4(L-2)
SDB-4(L-2)
MDB-1(L-2)
UMDB-1(L-2)
UPS-DB-1(L-2)
SDB-1(L-2)
SDB-3(L-2)
UPS-DB-3(L-2)
SDB-2(L-2)
UPS-DB-2(L-2)
D-01
E-110.0
D-02
E-110.0
D-03
E-110.0
D-04
E-110.0
D-05
E-110.0
D-06
E-110.0

UMDB-3(L-3)
E.R 1
MDB-3(L-3)
D-03
E-110.02
4-40mmØ
from FDB & UFDB
FDB TO LFT W/C
4-40mm1.5/8
EXPOSED CONCRETE ROOF
GREEN ROOF
SKYLIGHT
OPEN TO SKY
MDB-2(L-3)
UMDB-2(L-3)
E.R 4
D-02
E-110.02
Trench to MDB/UMDB
Vertical connected
By ladder
D-01
E-110.02
SDB-1(L-3)
MDB-1(L-3)
E.R 5
Trench to MDB/UMDB
Vertical connected
By ladder
UMDB-1(L-3)
5-25mmØ
1XLC-35mm² XLPE
ECC-1C-16mm² BYA
3-25mmØ going up
for DB-1(Lift)


Eirth Pit for (Lift, Electric Room, Tele/Data & Server Room)
2X2 SWG COPPER CONDUCTOR
1-25mmØ FROM ROOF FOR DOWN CONDUCTOR
Eirth Pit for LPS
TYPE-A
EARTH ELECTRODE-6
2X2 SWG COPPER CONDUCTOR
TEST POINT
EARTH ELECTRODE-1
2X2 SWG COPPER CONDUCTOR
Eirth Pit for LPS
TEST POINT
1-25mmØ FROM ROOF FOR DOWN CONDUCTOR
Eirth Pit for Lift
Type-A
TEST POINT
Eirth Pit for LPS
1-25mmØ FROM ROOF FOR DOWN CONDUCTOR
TEST POINT
2X2 SWG COPPER CONDUCTOR
EARTH ELECTRODE-2
Type-A
Type-A
EARTH ELECTRODE-3
2X2 SWG COPPER CONDUCTOR
TEST POINT
1-25mmØ FROM ROOF FOR DOWN CONDUCTOR
Birth Pit for LPS
Eirth Pit for LPS
EARTH ELECTRODE-4
2X2 SWG COPPER CONDUCTOR
TEST POINT
Type-A
1-25mmØ FROM ROOF FOR DOWN CONDUCTOR
EARTH ELECTRODE-5
2X2 SWG COPPER CONDUCTOR
1-25mmØ FROM ROOF FOR DOWN CONDUCTOR
TEST POINT
Type-A
Eirth Pit for LPS
TEST POINT
N
LEVEL-00 PLAN

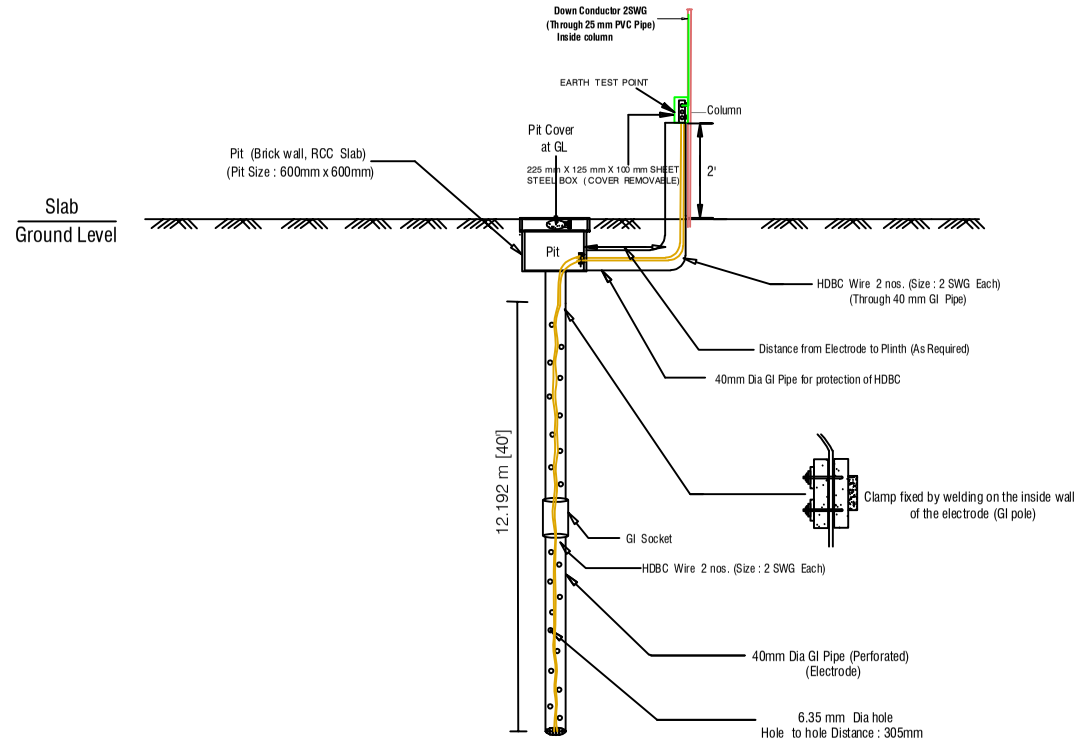
ELECTRICAL LEGEND

EARTHING PIT

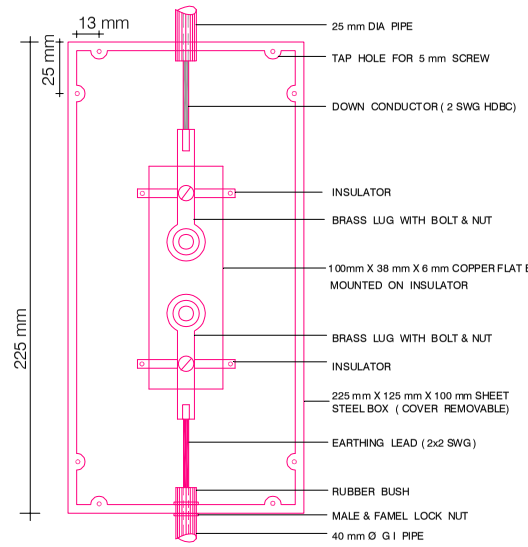
TEST POINT

1-25mmØ FOR DOWN CONDUCTOR

2X2SWG COPPER CONDUCTOR



Earthing Type- A



EARTH TEST POINT DETAIL

1-25mmØ FROM ROOF FOR DOWN CONDUCTOR

E.R 1

E.R 2

E.R 3

E.R 4

E.R 5

SB-53

SB-54

SB-55

SB-57,57A

SB-58

SB-59

SB-60

SB-52

SB-51

SB-50

SB-49

SB-48

SB-47

SB-46

SB-45

SB-44

SB-43

SB-42

SB-41

SB-40

SB-39

SB-38

SB-37

SB-36,36A

SB-35

SB-34

SB-33

SB-32

SB-31

SB-30

SB-29

SB-28

SB-27

SB-27A

SB-26

SB-25

SB-24

SB-23

SB-22

SB-22A

SB-21

SB-21A

SB-21B

SB-20

SB-19

SB-18

SB-17

SB-16

SB-15

SB-14

SB-13

SB-12

SB-11

SB-10

SB-9

SB-8

SB-7

SB-6

SB-5

SB-4

SB-3

SB-2

SB-1

KSB-1

KSB-2

KSB-3

KSB-4 to 10

SDB-6 (L-0)

SDB-5 (L-0)

SDB-SECURITY(L-0)

MDB-4(L-0)

UMDB-3(L-0)

MDB-3(L-0)

SDB-3(L-0)

MDB-2(L-0)

MDB-1(L-0)

UMDB-2(L-0)

MDB-5(L-0)

SDB-2(L-0)

SDB-1(L-0)

UFDB-1(L-0)

FDB-1(L-0)

W1 AT SINK SIDE

STEP LIGHTS IN RAILINGS

G5 STEP LIGHTS IN RAILINGS

PANELS MOVE TO INTERIOR SIDE

G6 POLE LIGHTS AT STAIRS

N

LEVEL-00 PLAN

ELECTRICAL DEVICES LOCATED ON FACE OF PIERS

1-25mmØ FROM ROOF FOR DOWN CONDUCTOR

SWITCHES LOCATED ON THE BACK OF PIERS

S1 FIXTURES SHOULD BE CENTERED IN EACH BAY

W4 OK

SWITCHES OFF FACED OF PIERS

PANELS MOVE TO INSIDE BUILDING

PANELS LOCATED INSIDE OFFICE SUITE

KSB SWITCHES MOVE TO INSIDE OF STAIRWELL

ELECTRICAL LEGEND

- SB-SWITCH BOARD (1GANG)
- SB-SWITCH BOARD (2GANG)
- SB-SWITCH BOARD (3GANG)
- SB-SWITCH BOARD (4GANG)
- KSB-KEYED SWITCH BOARD
- DSB-DIMMER SWITCH BOARD

N

LEVEL-01 PLAN

ELECTRICAL LEGEND

- SB-SWITCH BOARD (1GANG)
- SB-SWITCH BOARD (2GANG)
- SB-SWITCH BOARD (3GANG)
- SB-SWITCH BOARD (4GANG)
- KSB-KEYED SWITCH BOARD
- DSB-DIMMER SWITCH BOARD

ELECTRICAL LEGEND

- SB-SWITCH BOARD (1GANG)
- SB-SWITCH BOARD (2GANG)
- SB-SWITCH BOARD (3GANG)
- SB-SWITCH BOARD (4GANG)
- KSB-KEYED SWITCH BOARD
- DSB-DIMMER SWITCH BOARD

LEVEL 00

P WALL TYPE 5A,2PIN,250V, COMBINED SINGLE GANG SWITCHED SOCKET

PF FLOOR TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

Q WALL TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

QF FLOOR TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

UPW WALL TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

UP FLOOR TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

N 16A SP MCB OUTLET(16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

M 63A TP MCCB OUTLET

POWER REQUIREMENTS CONFIRM FOR FOUNTAIN EQUIPMENT

PANELS MOVE TO INTERIOR

E.R 1

E.R 2

E.R 3

E.R 4

E.R 5

MDB-1(L-0)

MDB-2(L-0)

MDB-3(L-0)

UMDB-4(L-0)

SDB-3(L-0)

SDB-4(L-0)

SDB-5

SDB-6

SDB-SECURITY(L-0)

MDB-4(L-0)

UMDB-1(L-0)

UMDB-2(L-0)

MDB-5(L-0)

SDB-2(L-0)

SDB-1(L-0)

UMDB-3(L-0)

MDB-6(L-0)

FDB-(L-0)

UFDB-(L-0)

EARTHING

P WALL TYPE 5A,2PIN,250V, COMBINED SINGLE GANG SWITCHED SOCKET

PF FLOOR TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

Q WALL TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

QF FLOOR TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

UPW WALL TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

UP FLOOR TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

POWER REQUIREMENTS CONFIRM FOR KITCHEN

POWER REQUIREMENTS CONFIRM AT OUTDOOR STAGE AREA

PANELS MOVE TO OFFICE SUITE

PANELS MOVE TO INTERIOR

PANELS MOVE TO INTERIOR

MDB-4(L-1)

UMDB-4(L-1)

UMDB-1(L-1)

MDB-1(L-1)

SDB-1(L-1)

UPS-DB-3(L-1)

SDB-4(L-1)

UMDB-2(L-1)

MDB-2(L-1)

To UPS-DB-1(L-1)

SDB-2(L-1)

UPS-DB-1(L-1)

SDB-3(L-1)

UPS-DB-2(L-1)

MDB-3(L-1)

UMDB-3(L-1)

MDB-5(L-1)

UMDB-5(L-1)

E.R 1

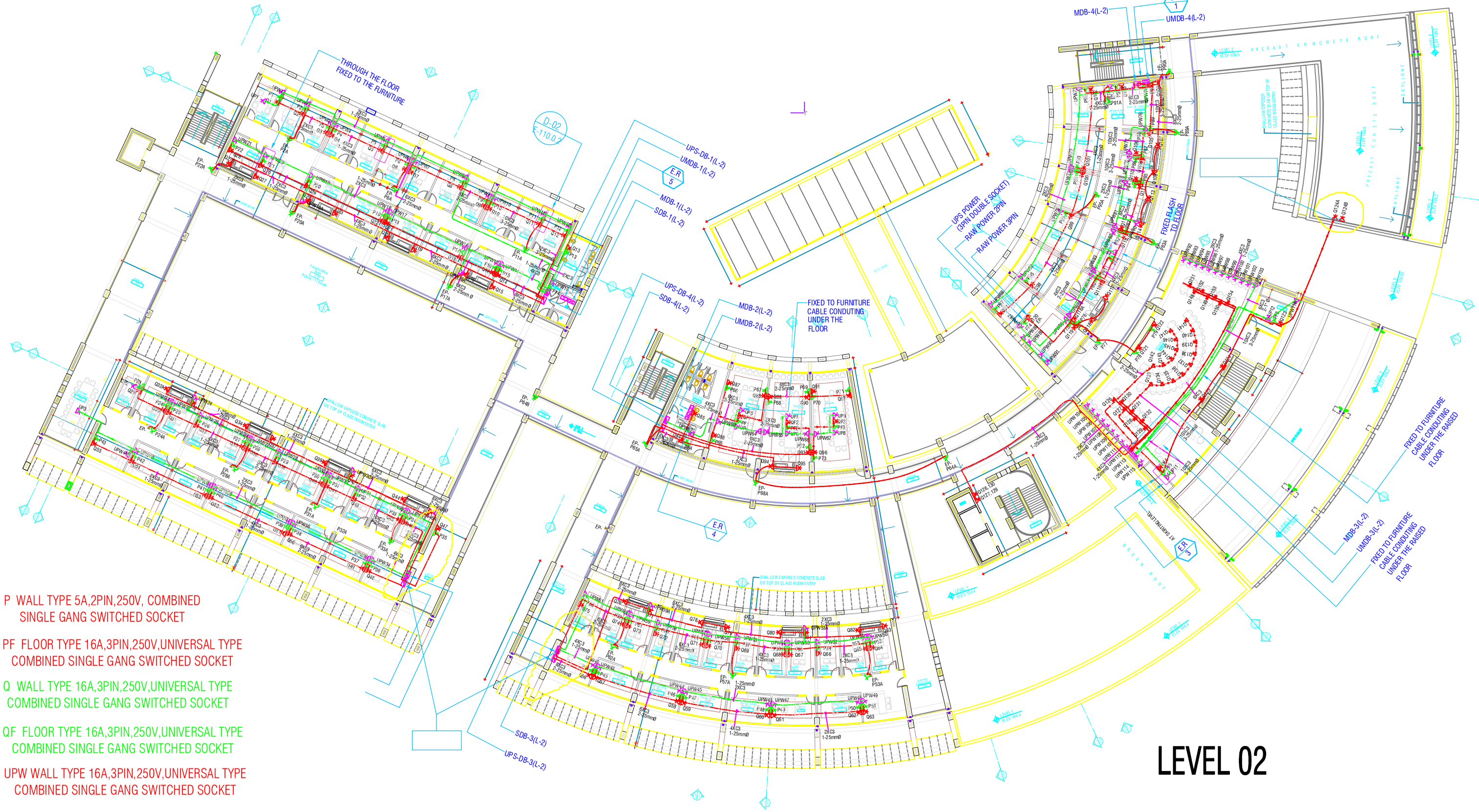
E.R 2

E.R 3

E.R 4

E.R 5

LEVEL 01



P WALL TYPE 5A,2PIN,250V, COMBINED SINGLE GANG SWITCHED SOCKET

PF FLOOR TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

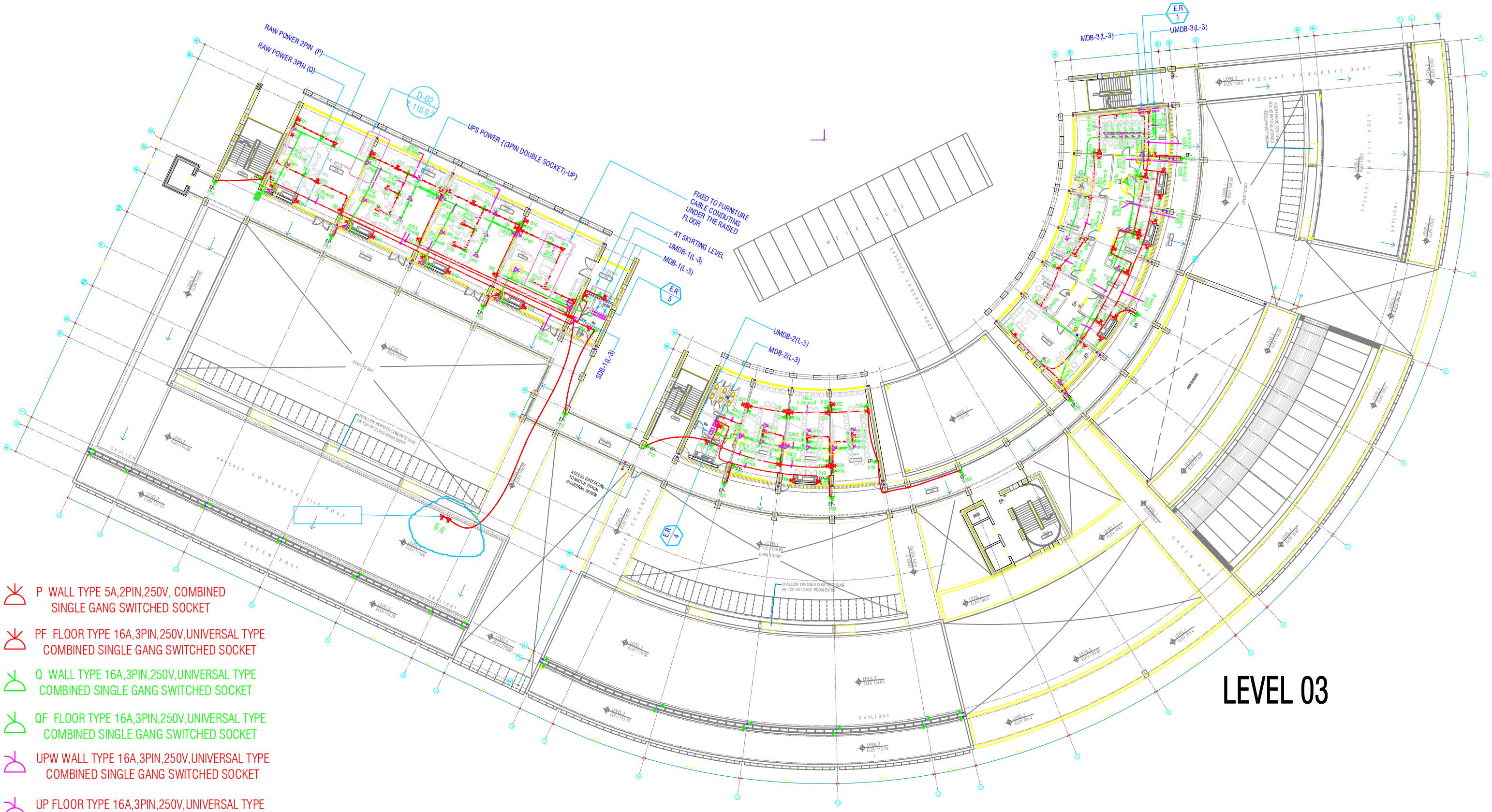
Q WALL TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

QF FLOOR TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

UPW WALL TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

UP FLOOR TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

LEVEL 02



P WALL TYPE 5A,2PIN,250V, COMBINED SINGLE GANG SWITCHED SOCKET

PF FLOOR TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

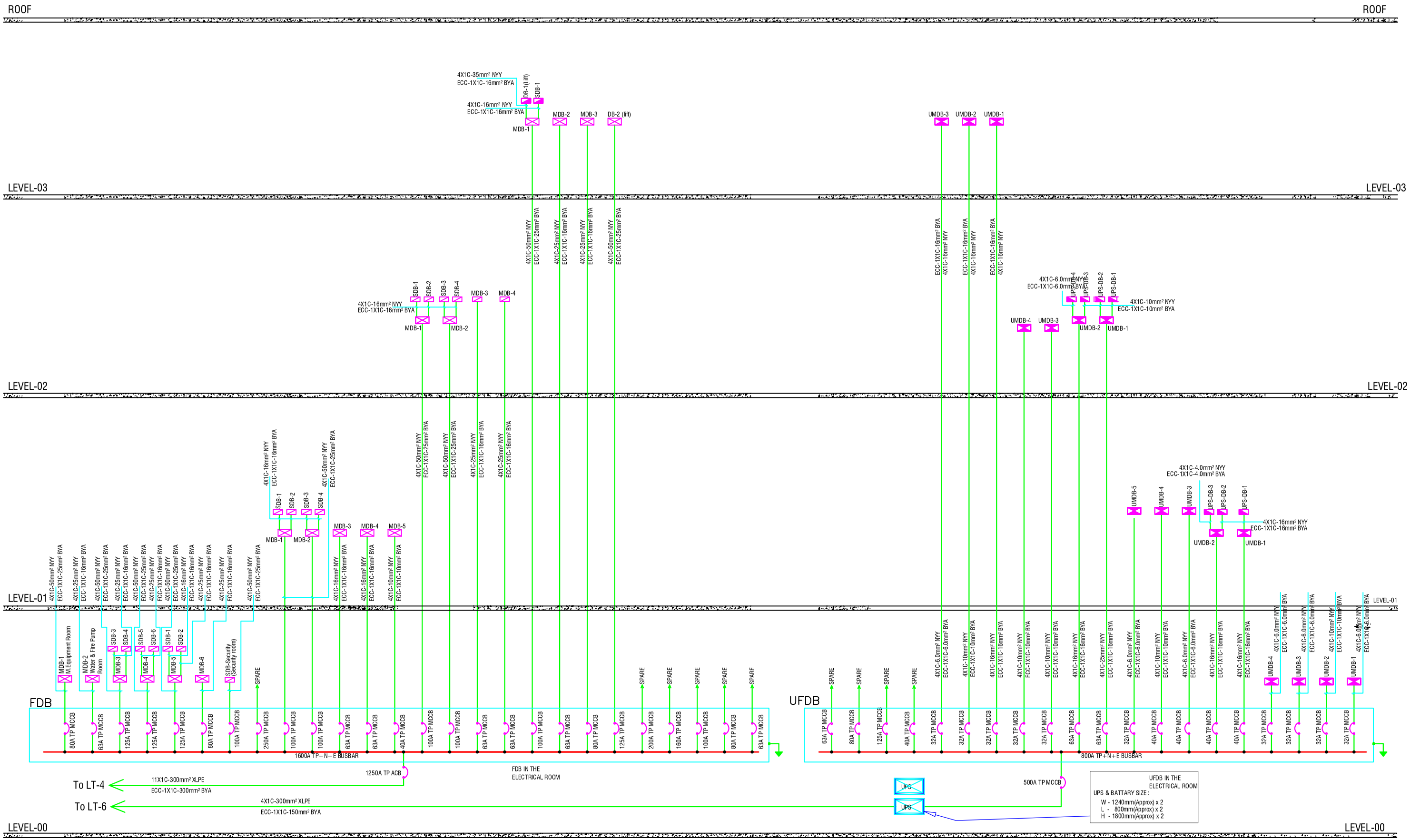
Q WALL TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

QF FLOOR TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

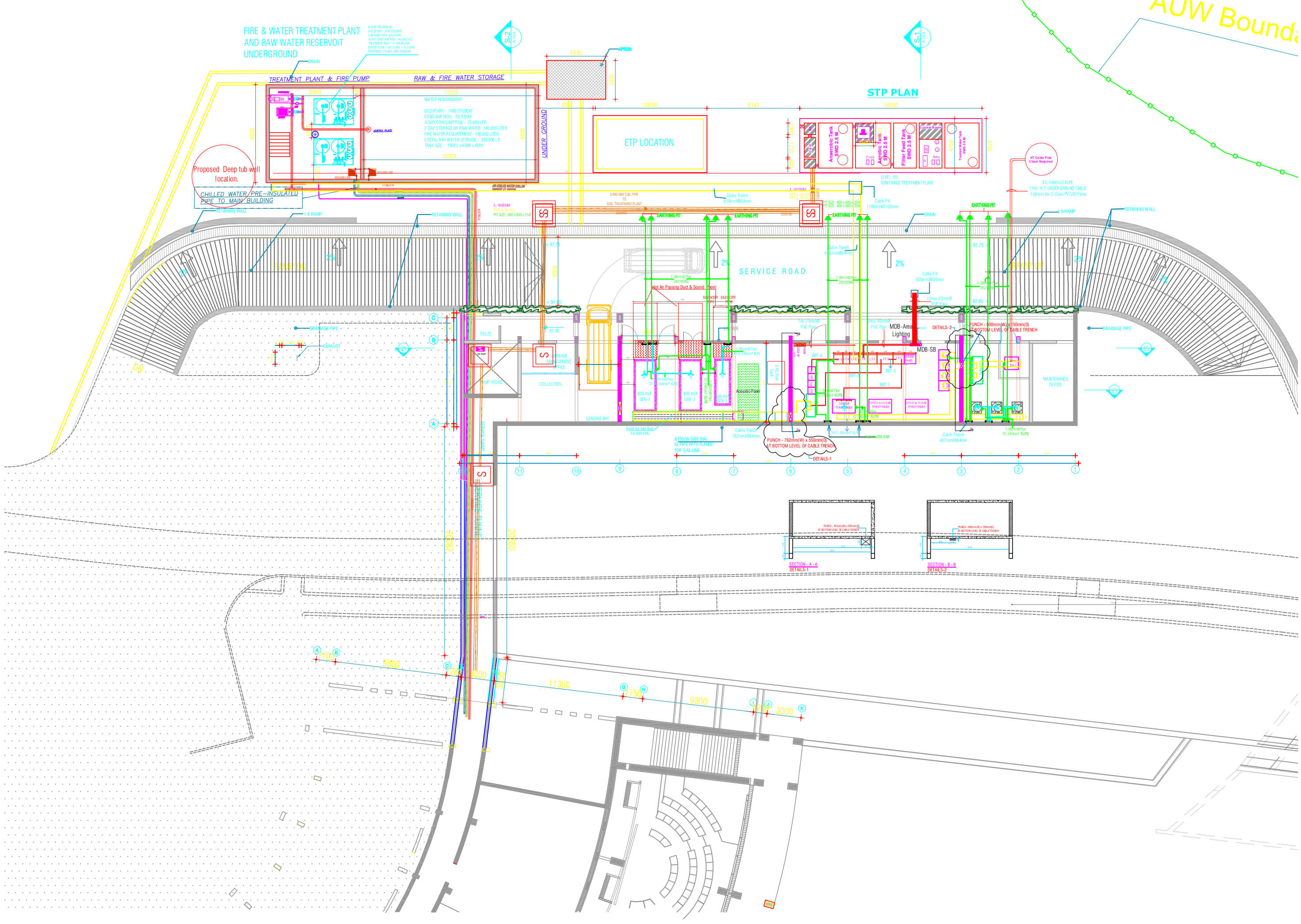
UPW WALL TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

UP FLOOR TYPE 16A,3PIN,250V,UNIVERSAL TYPE COMBINED SINGLE GANG SWITCHED SOCKET

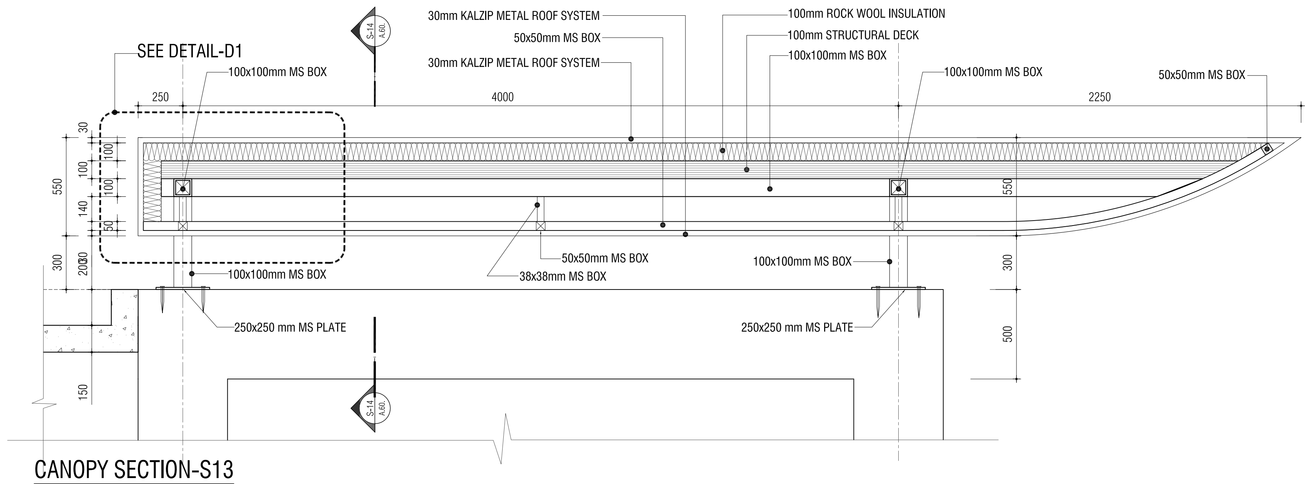
LEVEL 03



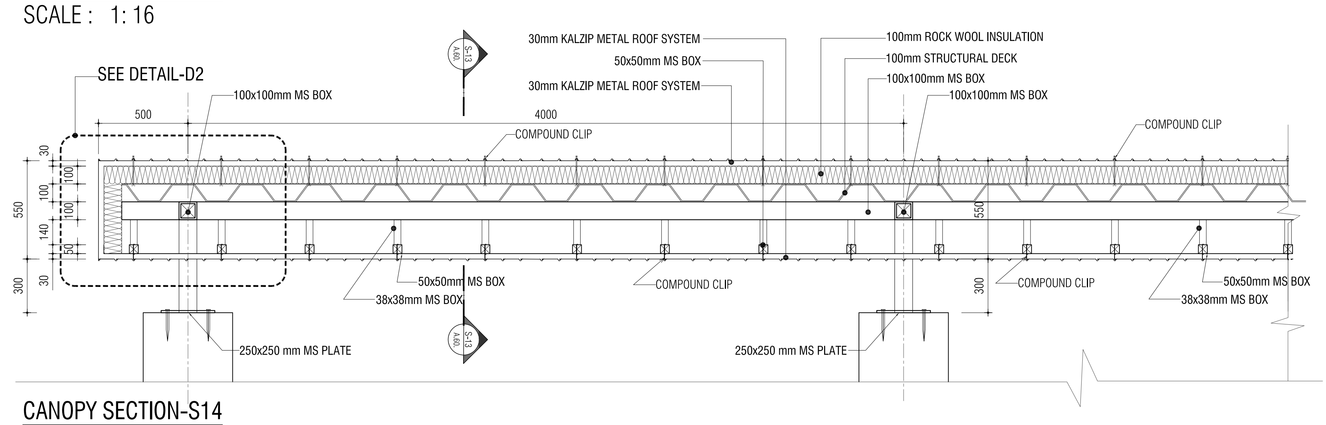
ELECTRICAL RISER DIAGRAM



LEVEL- 00 SERVICE BUILDING CABLE TRANCH & PIPE LAYOUT PLAN



CANOPY SECTION-S13
SCALE : 1: 16



CANOPY SECTION-S14
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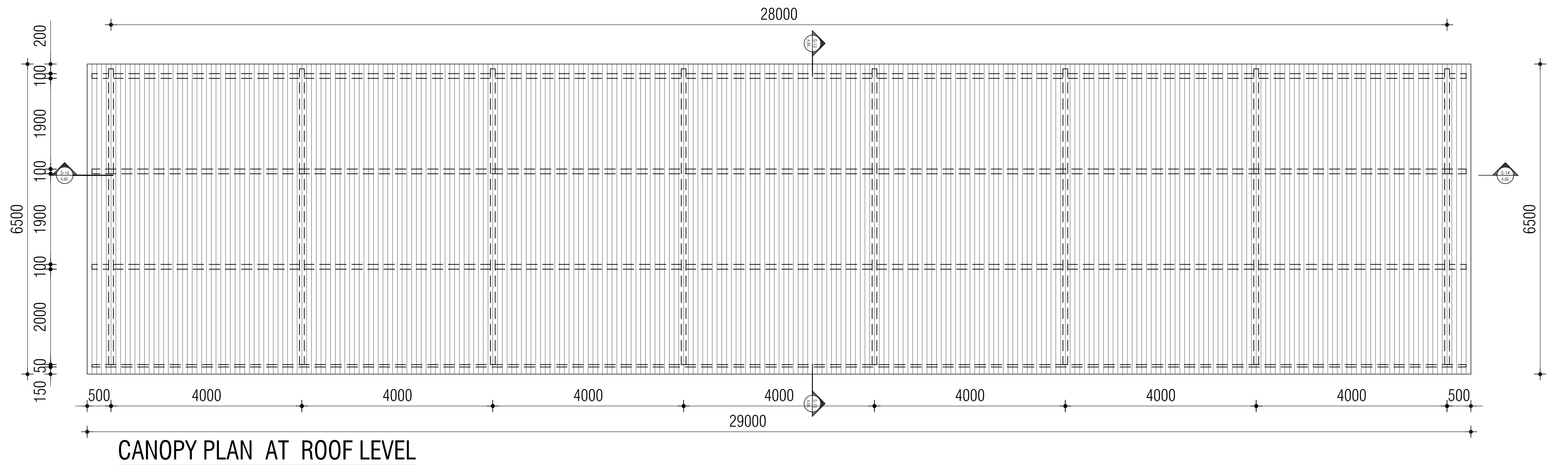
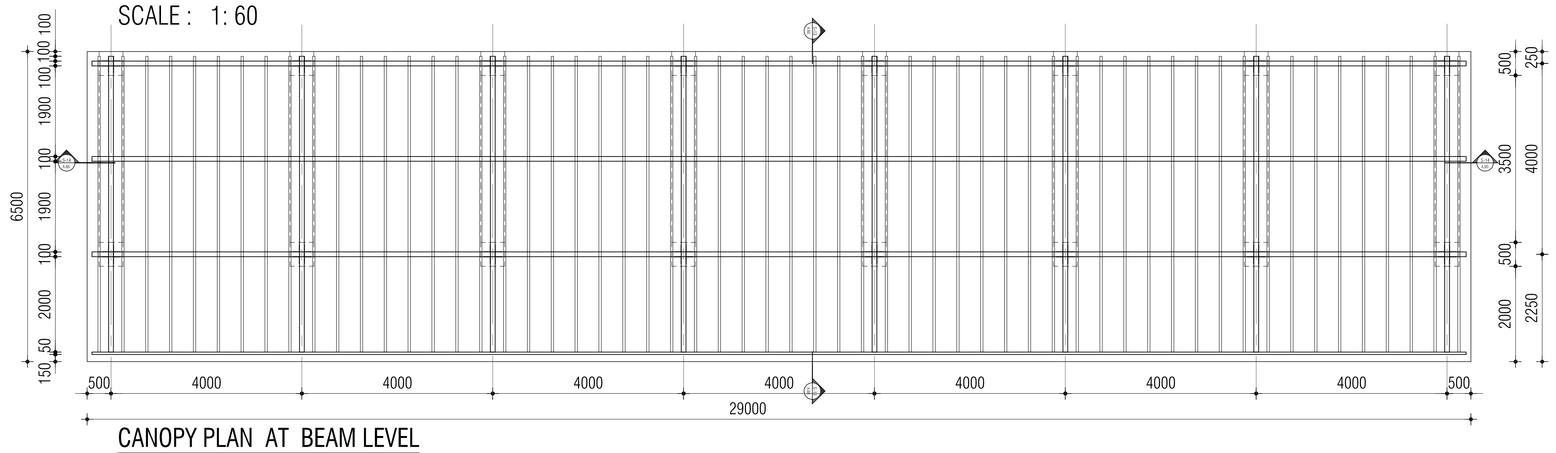
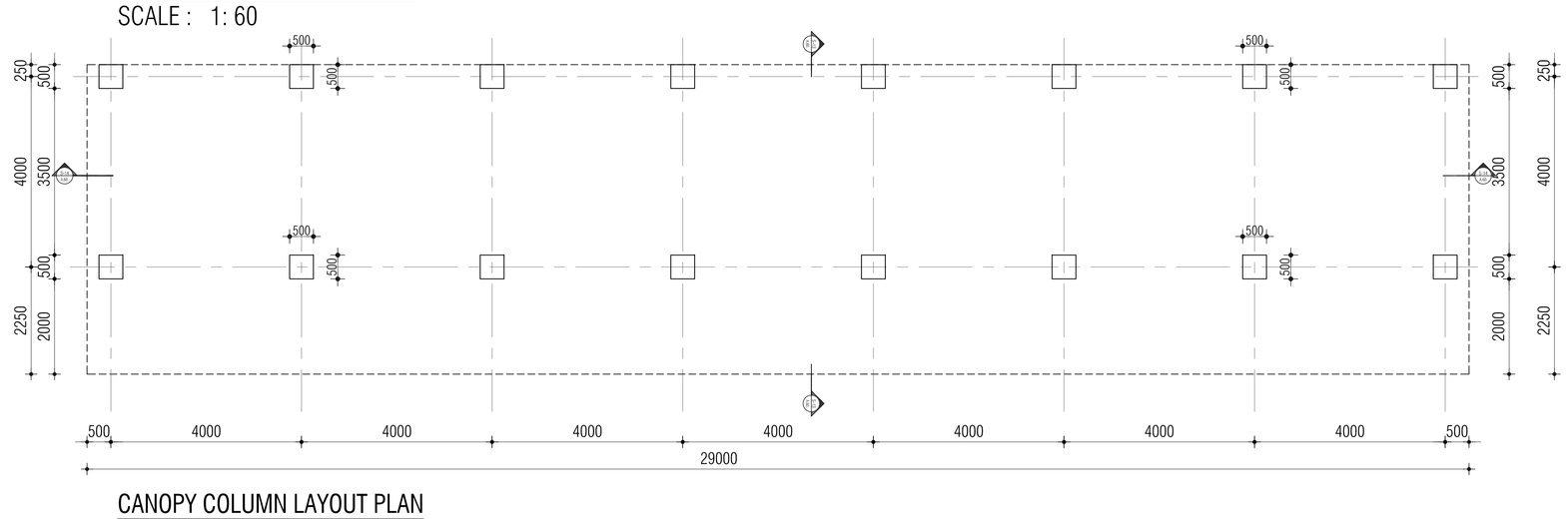


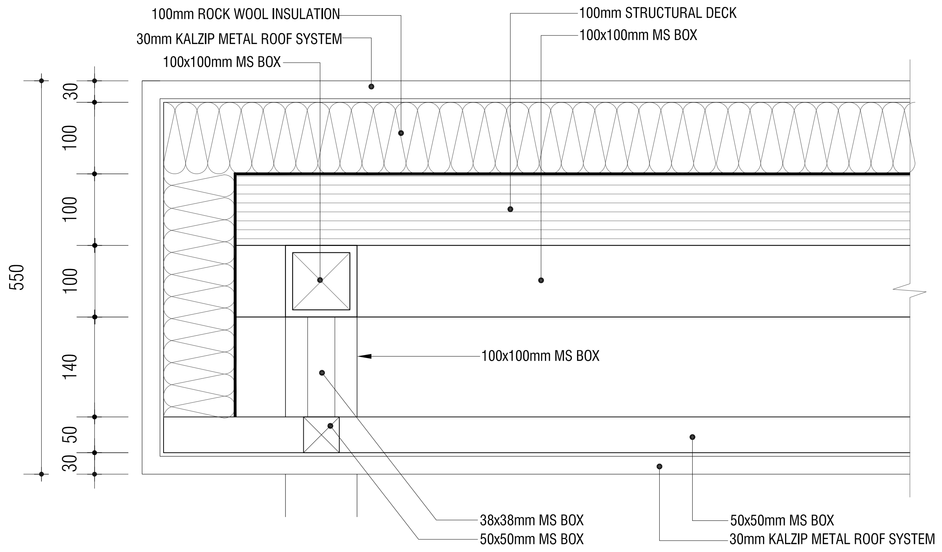
CANOPY PLAN AT ROOF LEVEL
SCALE : 1: 60



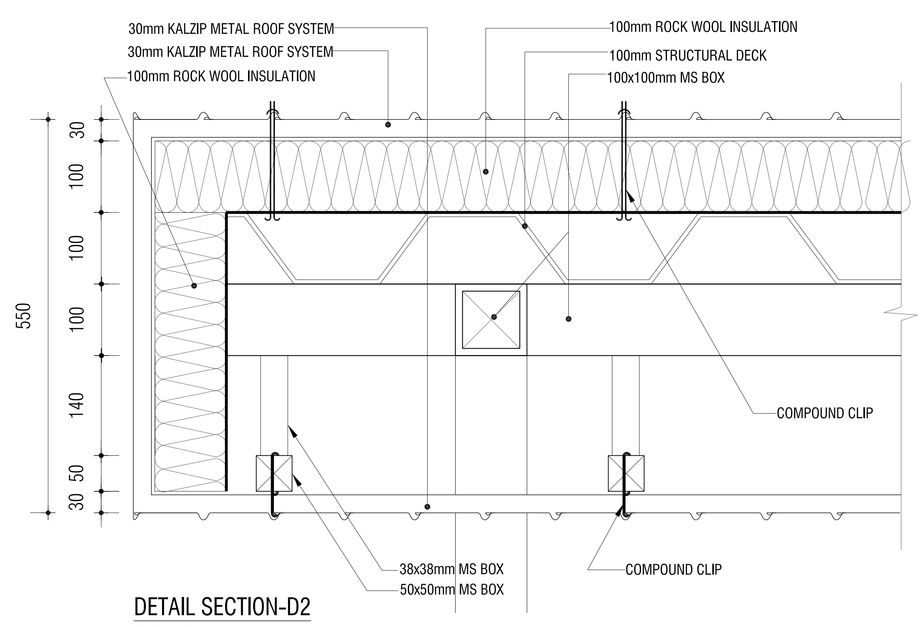
CANOPY PLAN AT BEAM LEVEL
SCALE : 1: 60



CANOPY COLUMN LAYOUT PLAN
SCALE : 1: 60



DETAIL SECTION-D1
SCALE : 1: 4



DETAIL SECTION-D2
SCALE : 1: 4

Asian University
For Women
Chittagong, Bangladesh
www.asian-university.org
Phase One, Building 1a

Client
Asian University for Women
Support Foundation
1100 Massachusetts Ave.
Suite 300
Cambridge MA 02138, USA

Architect
Moshe Safdie and Associates
100 Properzi Way
Somerville MA 02143, USA

Associate Architects
VITTI-SHS Consortium
2, Shangshad Avenue, 3rd Level,
Munipuripara, Dhaka 1215,
Bangladesh

ASSOCIATE CONSULTANTS:
STRUCTURAL & CIVIL :
DESIGN PLANING AND MANAGEMENT CONSULTANT LTD. (DPM)
House no:4/1(2nd floor). Road no-4
Dhanmondi,Dhaka-1205,
Bangladesh
Phone : 8610116-7.

BRTC
Bangladesh University of Engineering & Technology ,
BUET,Polashi, Dhaka-1000,
Bangladesh
Phone : 8614640 , 9665650.PABX.

MECHANICAL AND PLUMBING :
AVE ENGINEERS & CONSULTANT LTD.
House no:5/3(1st floor). Block-A
Lalmatia,Dhaka-1205,
Bangladesh
Phone : 8610116-7.

ELECTRICAL:
TECHNO CONSULTANTS
House no:86(1st floor).Road no-9/A Dhanmondi, Dhaka-1209,
Bangladesh
Phone : 8610116-7.

Key Plan

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ISSUE - A
Phase One, Building 1a
Construction Document Phase.
(ARCHITECTURAL DRAWINGS)

CD 50%	08/22/2010	FOR REVIEW
CD 100%	09/30/2010	FOR REVIEW
REVISED CD100%	04/21/2012	FOR REVIEW
CD 100%	11/30/2012	FOR CONSTRUCTION

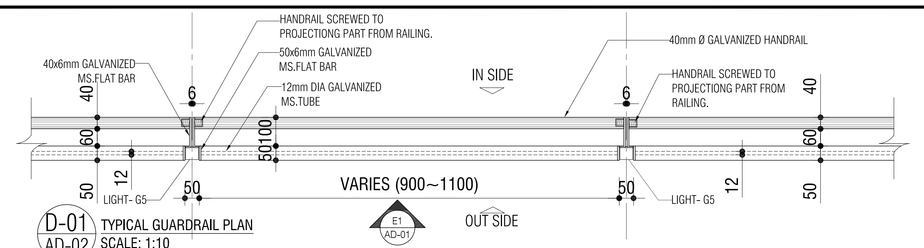
Seal Of Approval :

Drawn By :	KP MM
Checked By :	NI IZ
Scale :	AS NOTED

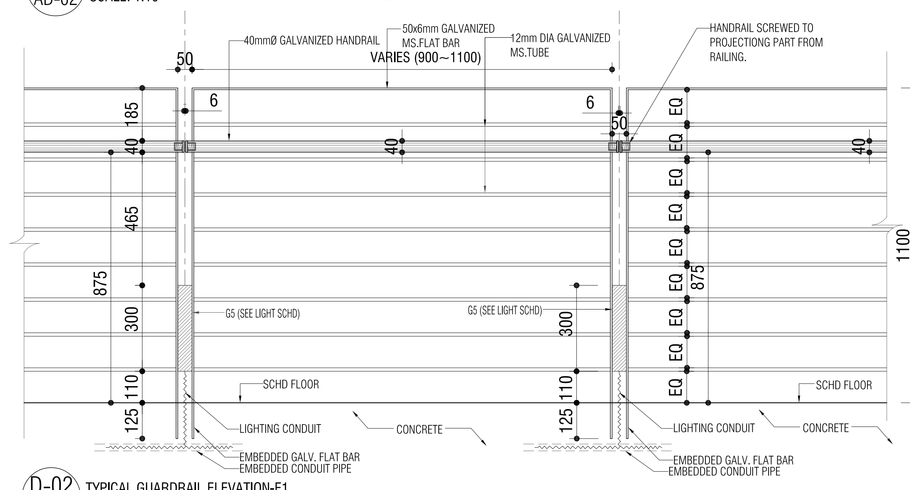
Drawing Title :

CANOPY DETAIL
PLAN & SECTION.

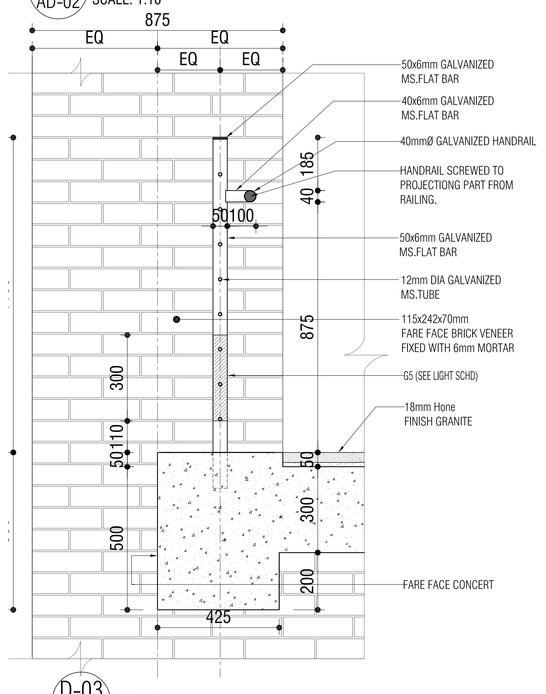
AD-10



D-01 AD-02 TYPICAL GUARDRAIL PLAN
SCALE: 1:10



D-02 AD-02 TYPICAL GUARDRAIL ELEVATION-E1
SCALE: 1:10



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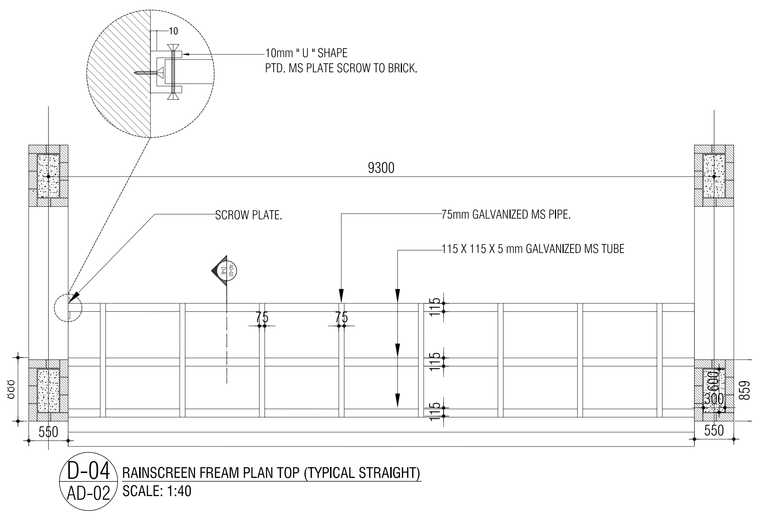
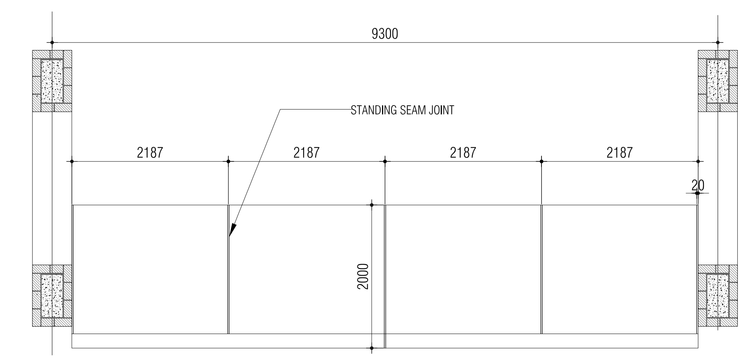


D-04 AD-02 RAINSCREEN FREAM PLAN TOP (TYPICAL STRAIGHT)
SCALE: 1:40



D-05 AD-02 RAINSCREEN PLAN TOP (TYPICAL STRAIGHT)
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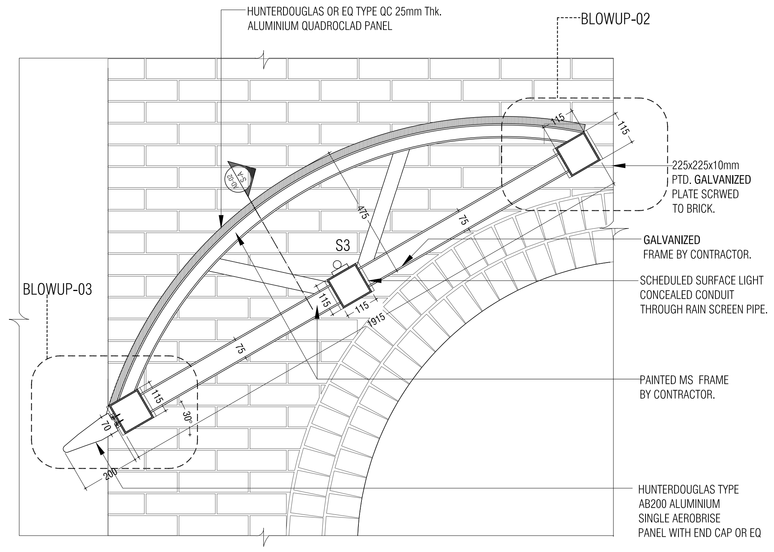

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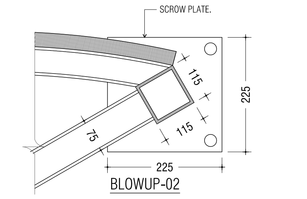
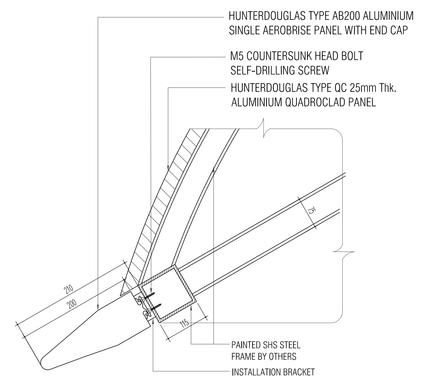
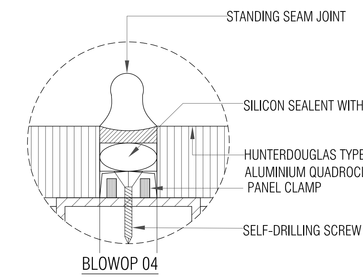


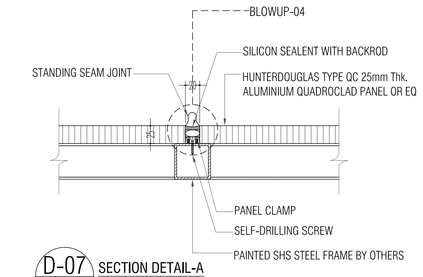
BLOWUP-02



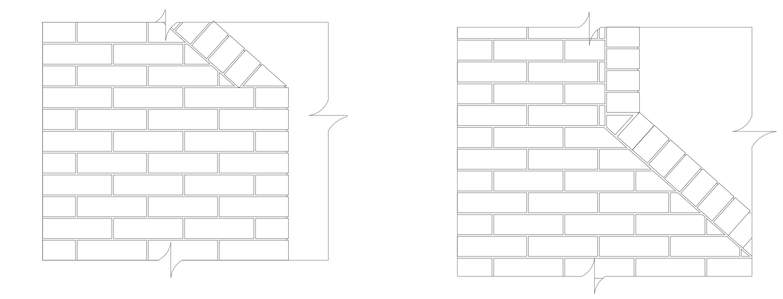
BLOWUP-03



BLOWOP 04

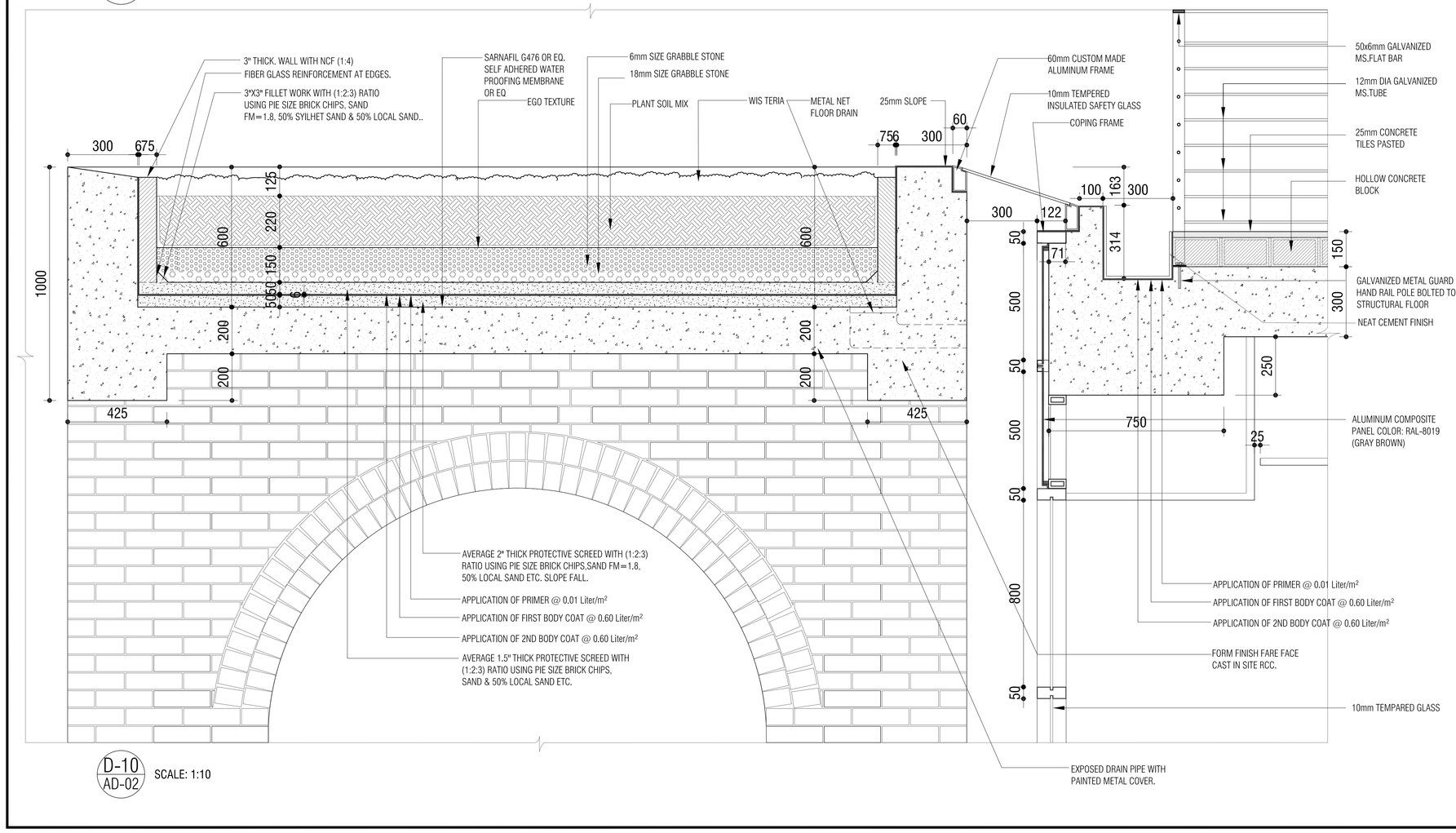


D-07 AD-02 SECTION DETAIL-A
SCALE: 1:4



D-08 AD-02 SCALE: 1:10

D-09 AD-02 SCALE: 1:10



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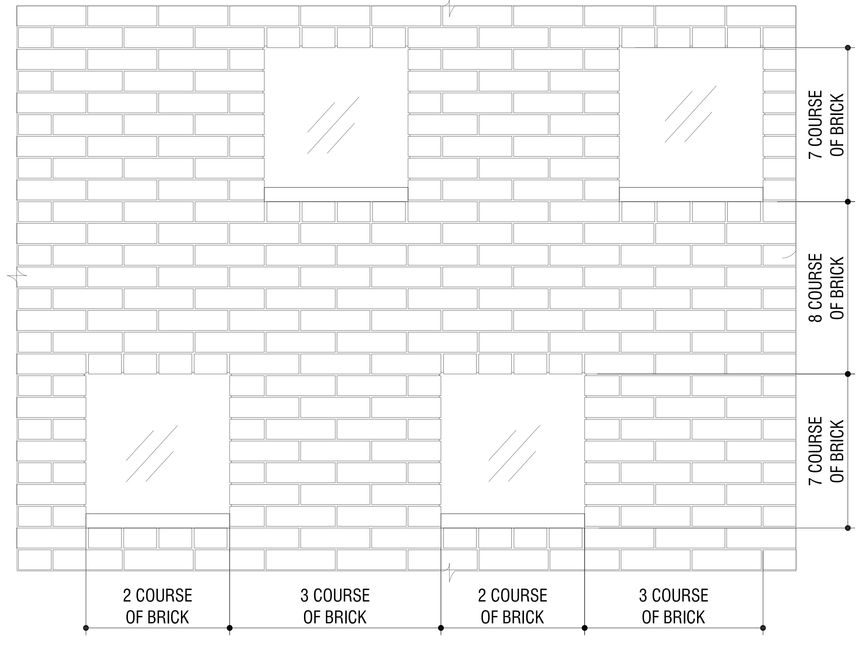

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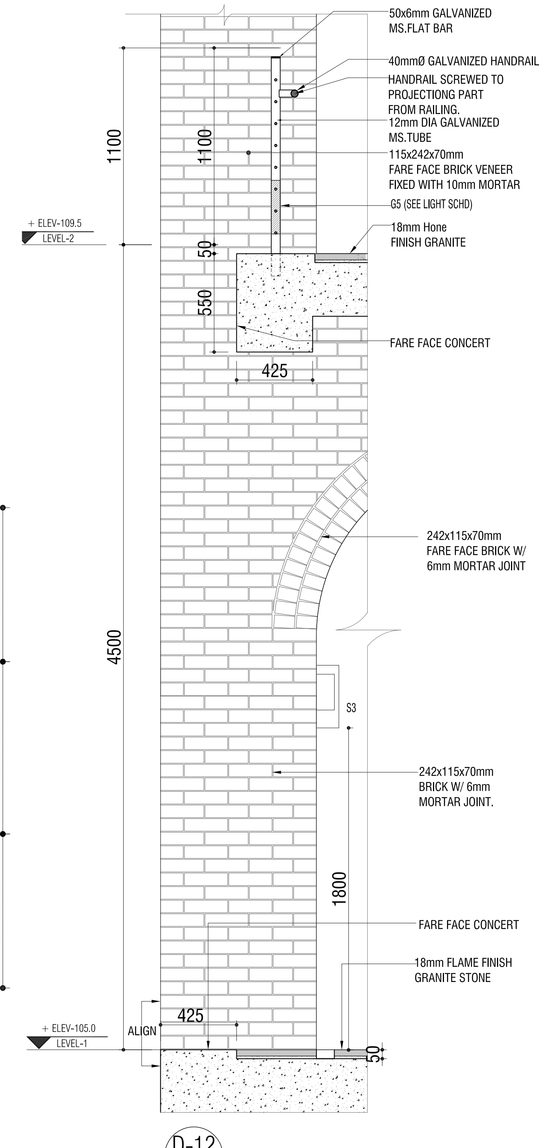

D-12 AD-02 SCALE: 1:16

Asian University For Women
Chittagong, Bangladesh
www.asian-uniwersity.org
Phase One, Building 1a

Client
Asian University for Women Support Foundation
1100 Massachusetts Ave. Suite 300
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Architect
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Somerville MA 02143, USA

Associate Architects
VITTI-SHS Consortium
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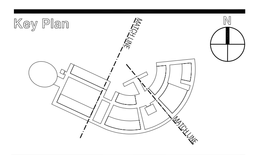
TECHNO CONSULTANTS
House no:86(1st floor).Road no-9/A Dhanmondi, Dhaka-1209, Bangladesh
Phone : 8610116-7.

Key Plan



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ISSUE - A

Phase One, Building 1a
Construction Document Phase.
(ARCHITECTURAL DRAWINGS)

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CD 100%	09/30/2010	FOR REVIEW
REVISED CD 100%	04/21/2012	FOR REVIEW
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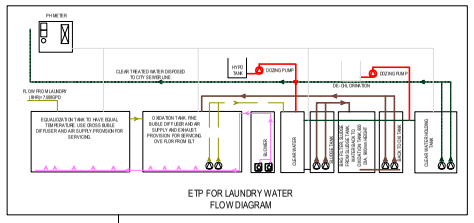
Seal Of Approval :

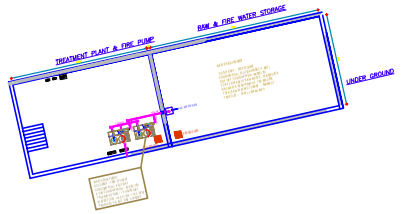
Drawn By : MN
Checked By : NI IZ
Scale : AS NOTED

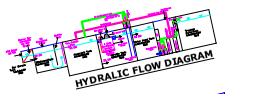
Drawing Title :

DETAIL

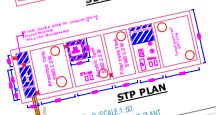
AD-02

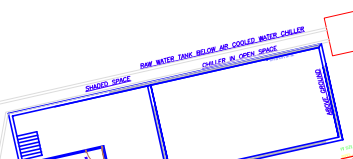

ETP FOR LAUNDRY WATER
FLOW DIAGRAM

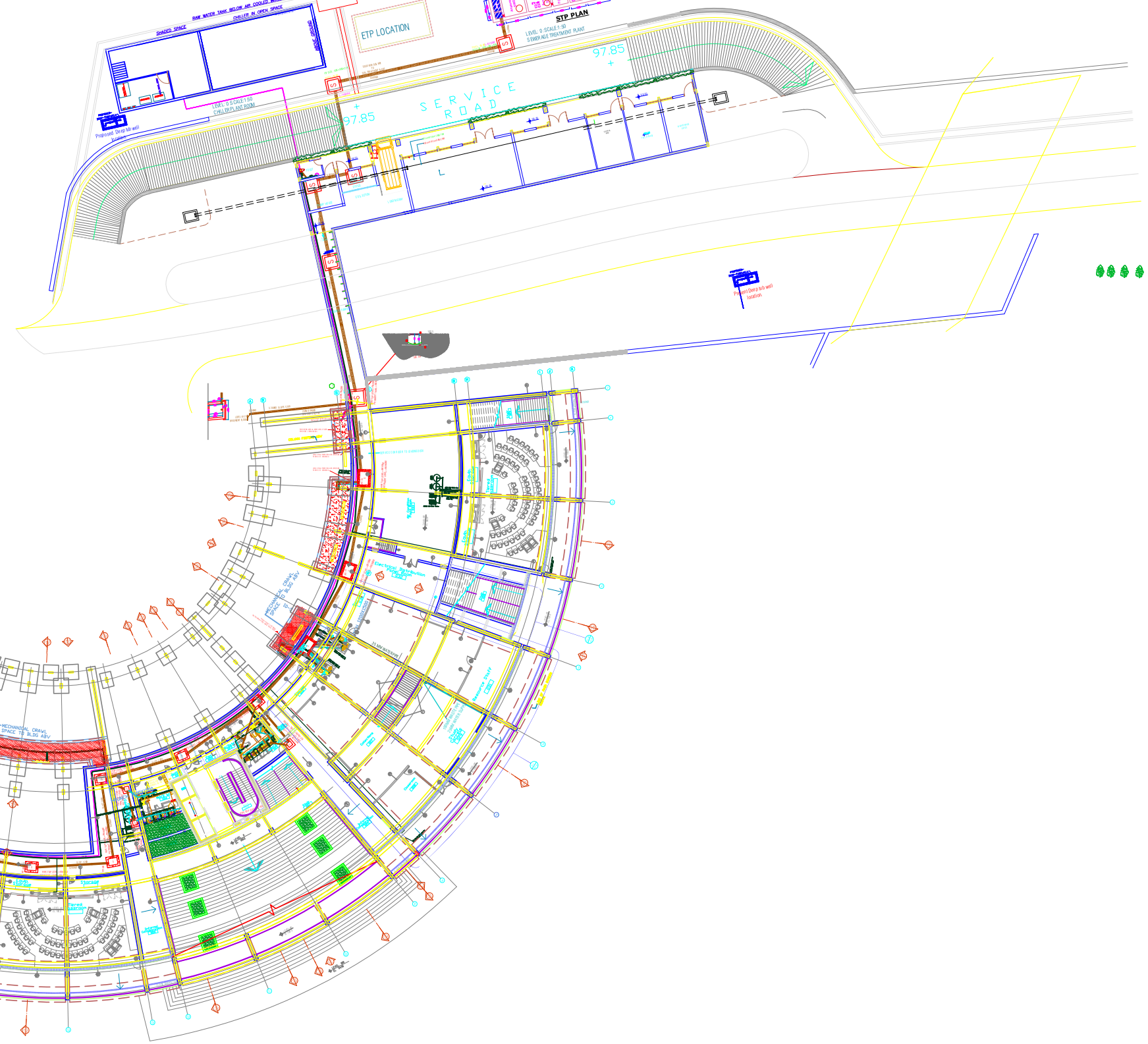

TREATMENT PLANT & FIRE PUMP
RAW & FIRE WATER STORAGE
UNDER GROUND

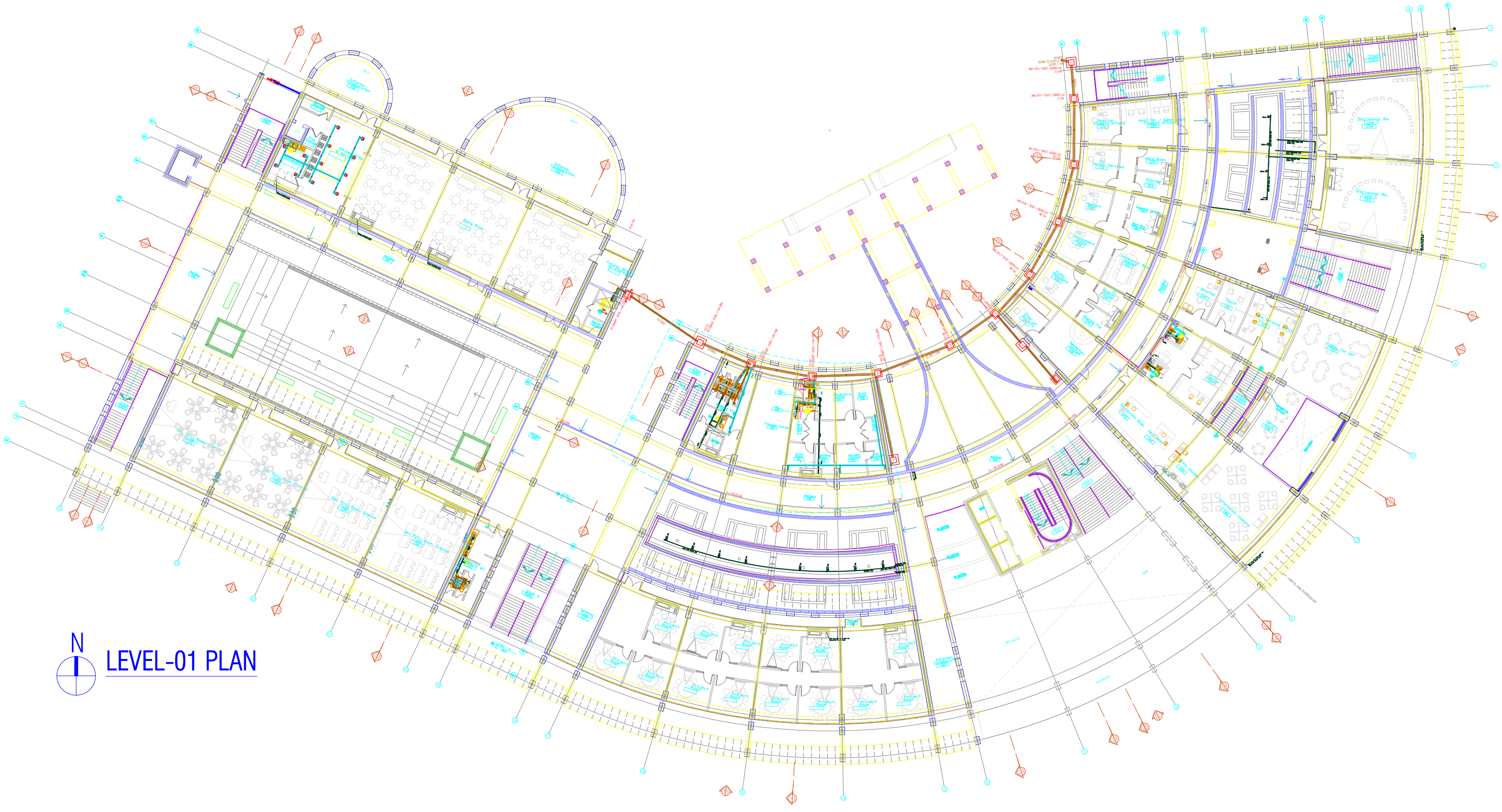

HYDRALIC FLOW DIAGRAM

SECTION

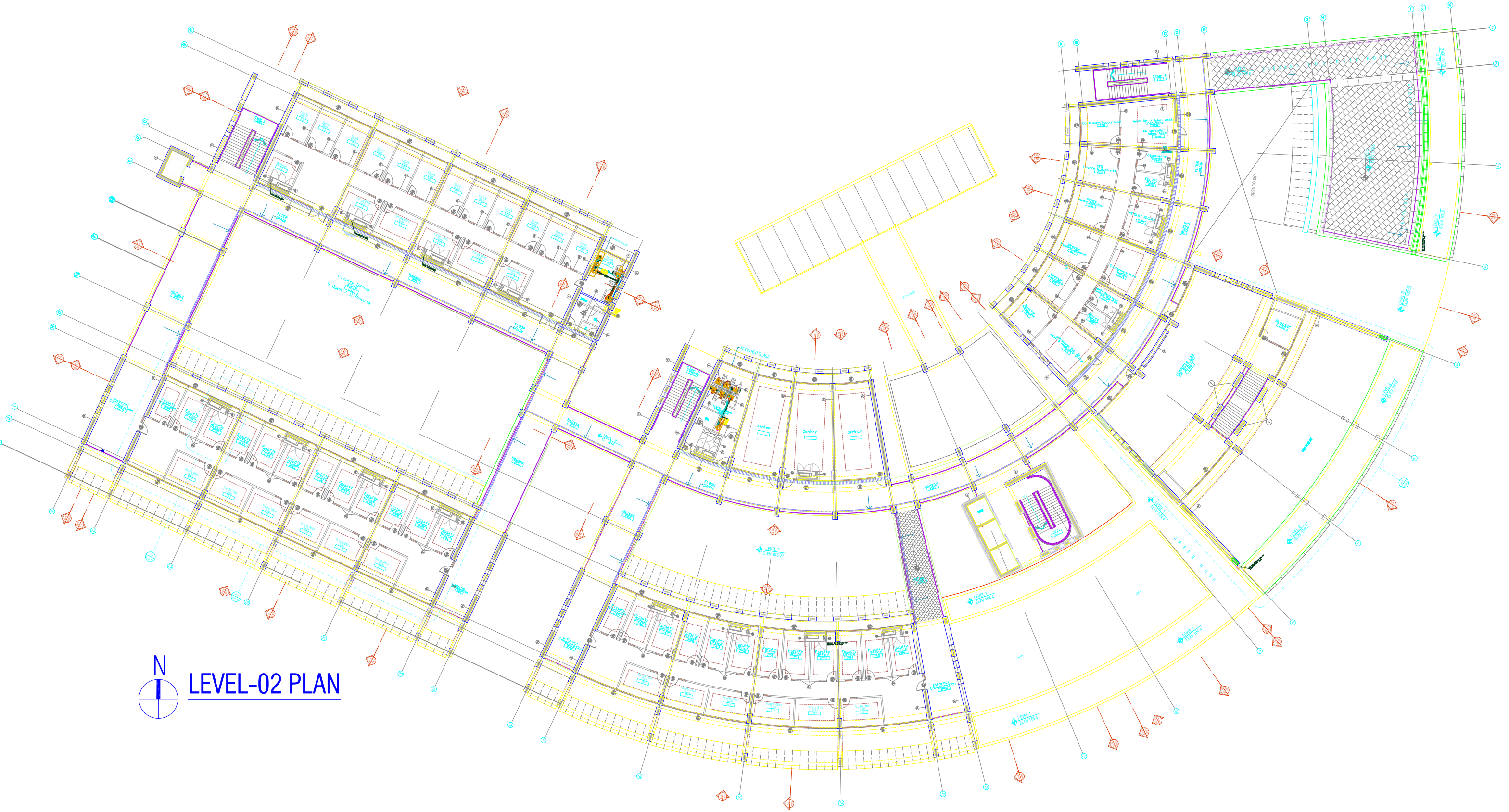

STP PLAN


RAW WATER TANK BELOW AIR COOLED WATER CHILLER
PACKED SPACE
CHILLER IN OPEN SPACE
ETP LOCATION

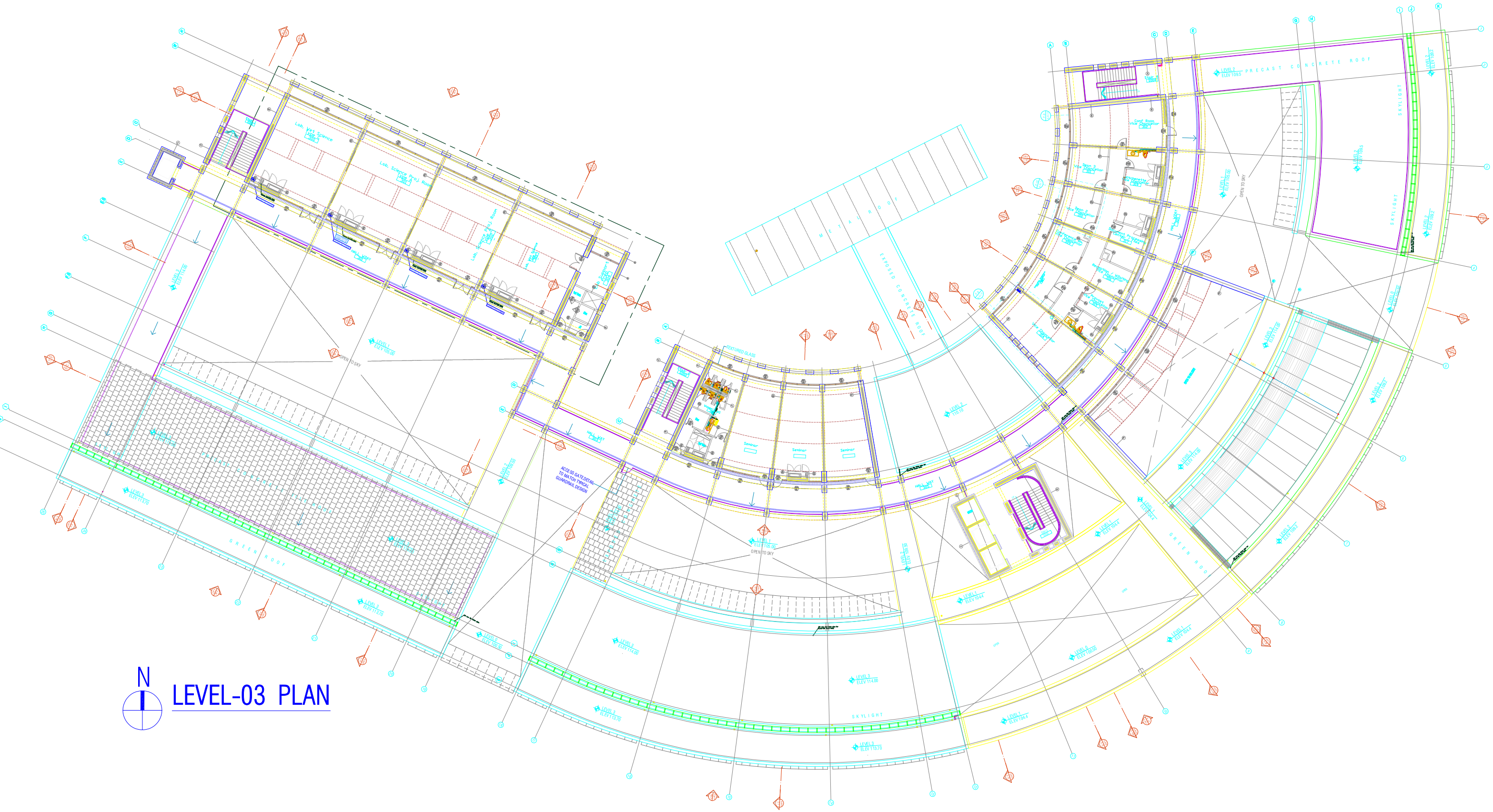

SERVICE ROAD
97.85
97.85
LEVEL-00 PLAN



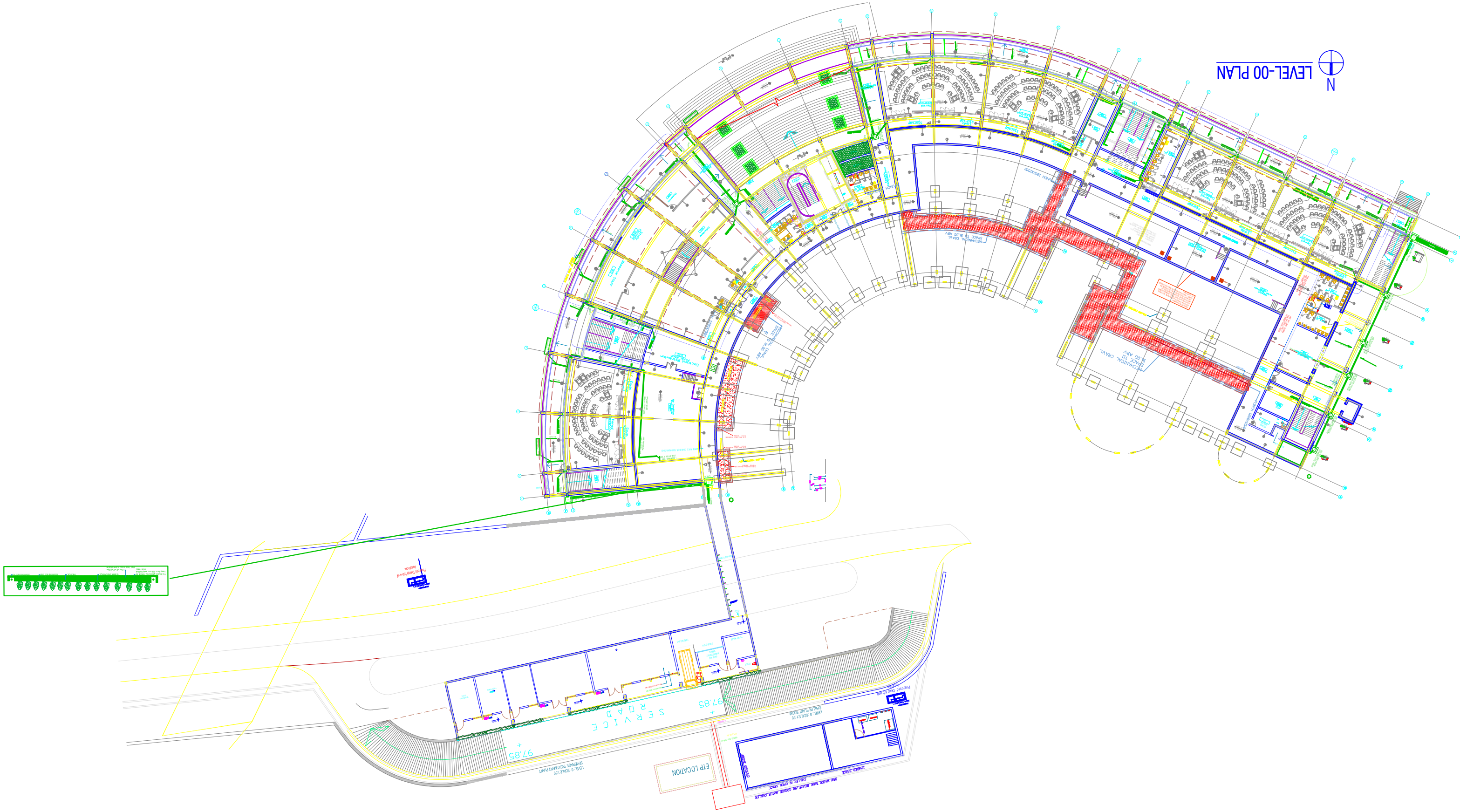
LEVEL-01 PLAN

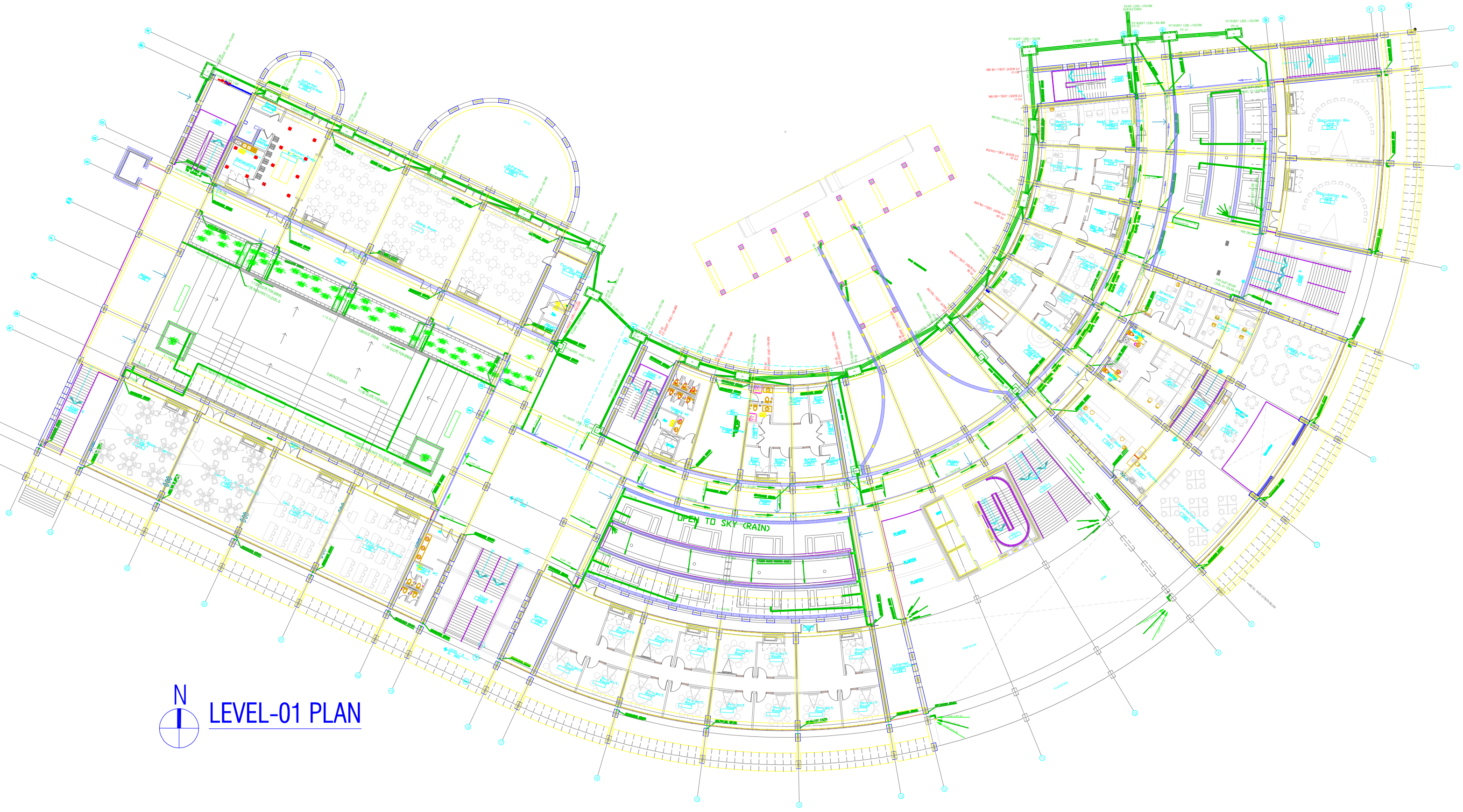


LEVEL-02 PLAN


N
LEVEL-03 PLAN

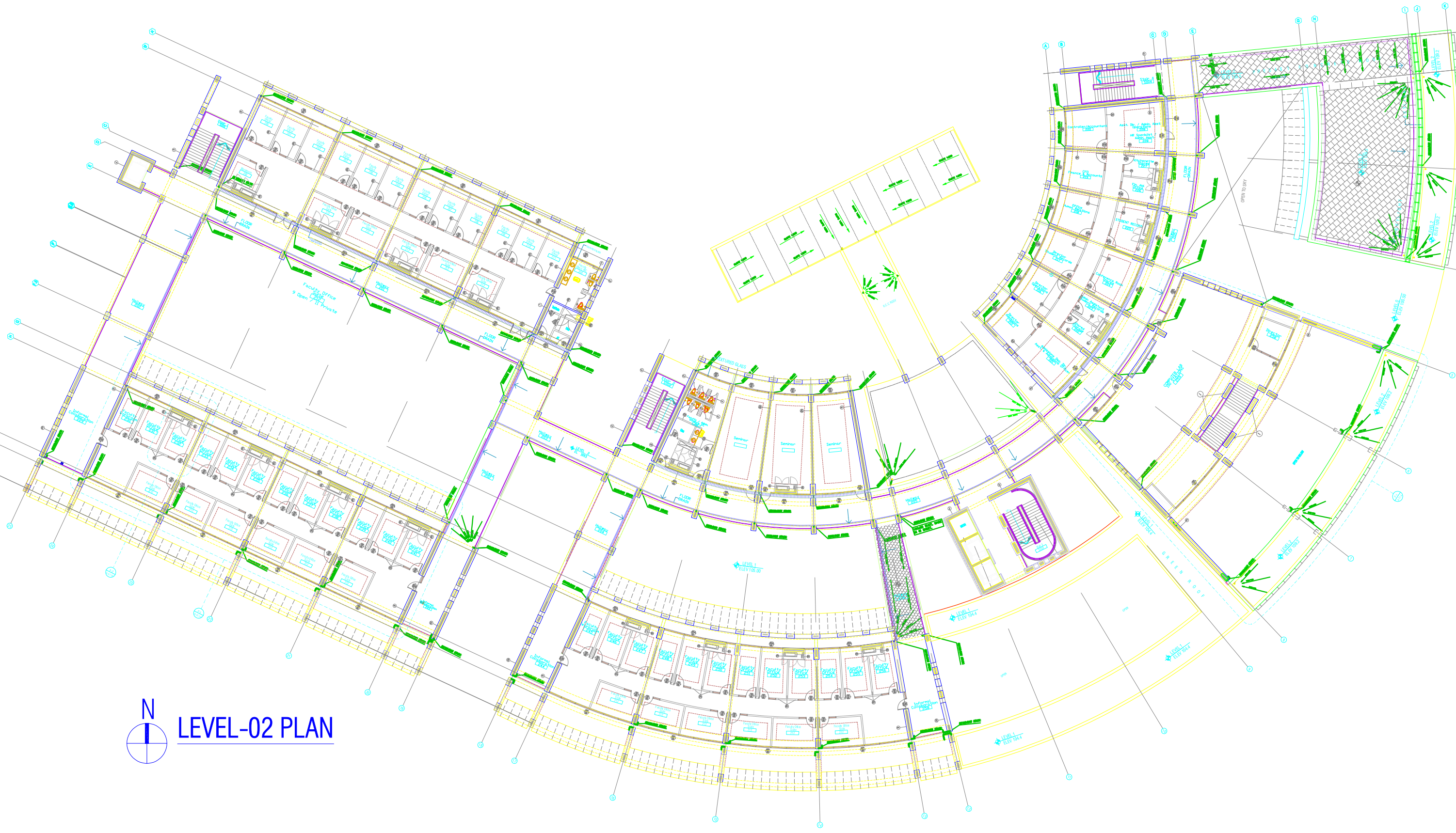
SKYLIGHT
SKYLIGHT
PRECAST CONCRETE ROOF
600X600 PRECAST CONCRETE TILE
600X600 PRECAST CONCRETE TILE
600X600 PRECAST CONCRETE TILE
SCREEN WALL LENGTH
SEE ELEVATION FOR
OPEN TO SKY
LEVEL 2
ELEV 109.50
LEVEL 2
ELEV 108.20
LEVEL 2
ELEV 108.20
LEVEL 2
ELEV 108.20


LEVEL-00 PLAN
N
SERVICE ROAD
97.85
ETP LOCATION

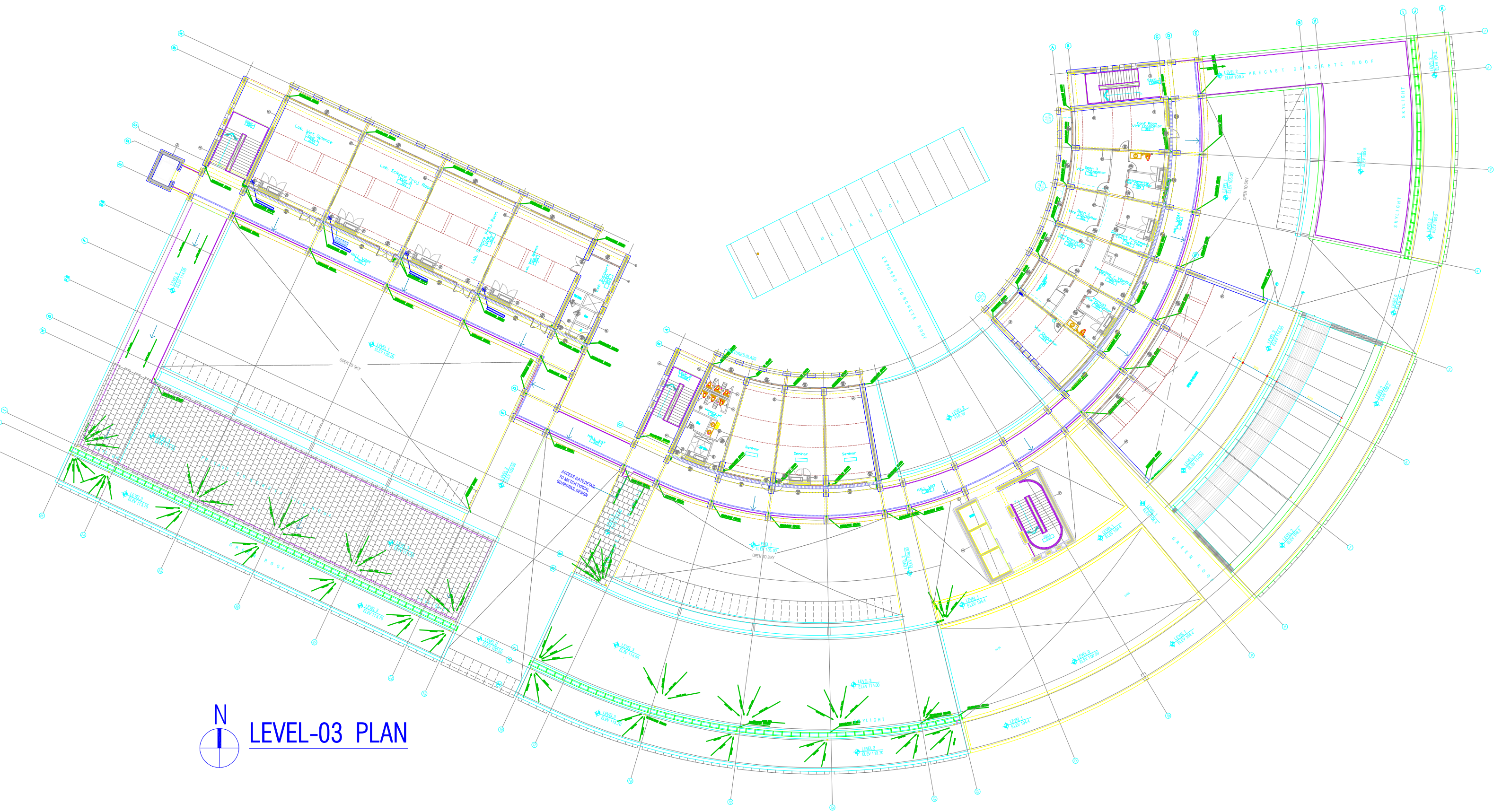


N

LEVEL-01 PLAN



LEVEL-02 PLAN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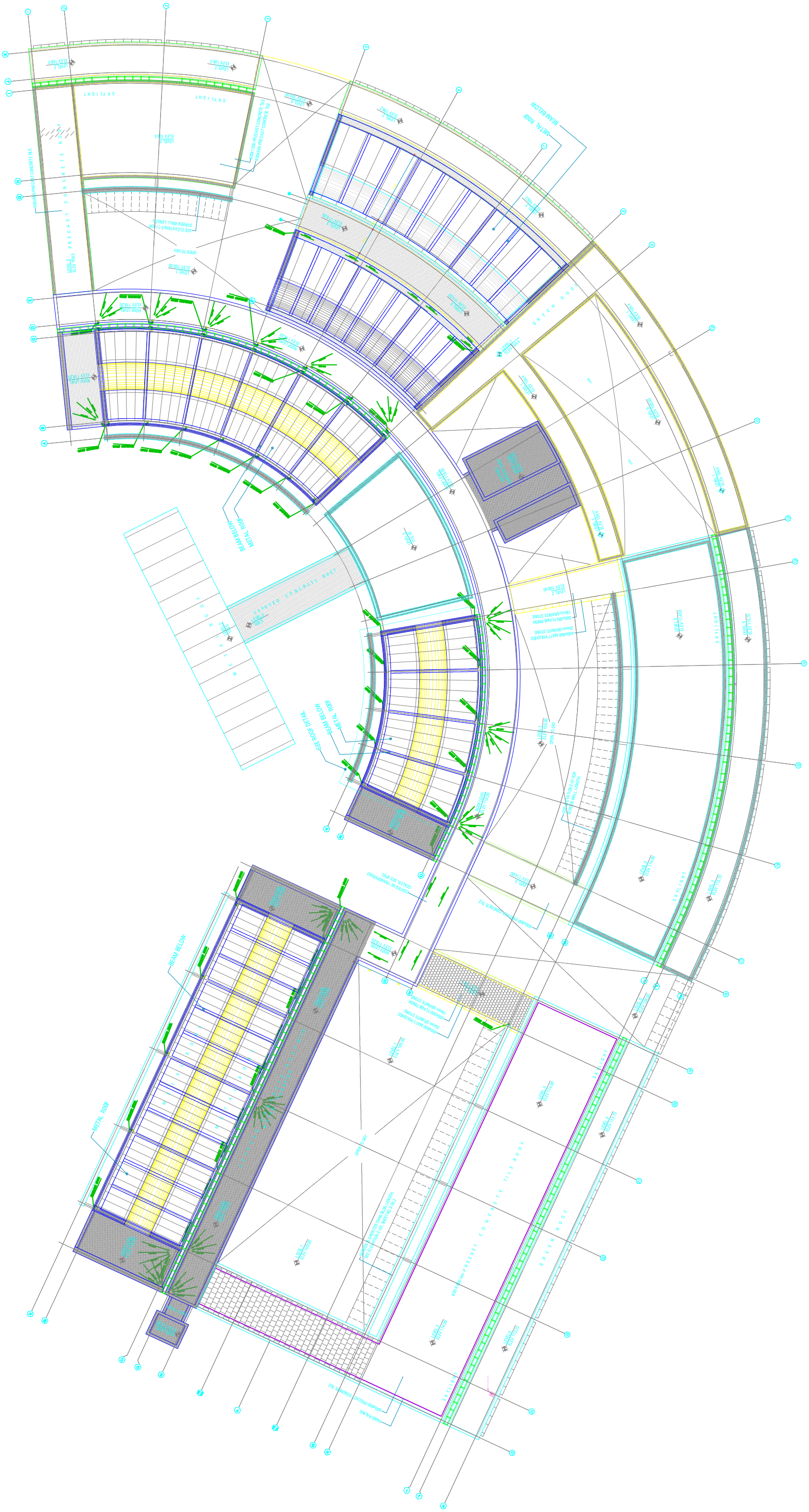
LEVEL-03 PLAN


SKYLIGHT
PRECAST CONCRETE ROOF
600X1200 PRECAST CONCRETE TILE
600X600 PRECAST CONCRETE TILE
METAL ROOF
BEAM BELOW
OPEN TO SKY
SEE ELEVATION E-1 FOR SCREEN WALL LENGTH
GREEN ROOF
SEE ROOF DETAIL
BEAM BELOW
METAL ROOF
PRECAST CONCRETE TILE ROOF
SKYLIGHT
METAL ROOF
BEAM BELOW
SEE ROOF DETAIL
METAL ROOF
SKYLIGHT
PRECAST CONCRETE TILE ROOF
GREEN ROOF