



BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS ENGINEERING MANAGEMENT
TNASMISSION BUSINESS GROUP
SEC – 142, NOIDA

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SECTION-1

INTENT, SYSTEM REQUIREMENT AND SCOPE

1.0.0 INTENT OF SPECIFICATION

- 1.1.0 This specification covers the manufacturing, inspection/testing, dispatch and erection, testing & commissioning at site of **Ventilation System** as mentioned in different sections of this specification for **400/220/132 KV Sub-station at Shamli** of Uttar Pradesh Power Transmission Corporation Limited (UPPTCL).
- 1.2.0 The requirements specified under **SECTION 3, SECTION 4 & SECTION 5'** of the specification shall be considered as part of this section. In case of variance between various sections, the requirements of **SECTION 1 & 2** shall prevail.
- 1.3.0 The Bidder shall be deemed to have understood completely all the tender drawings and documents and quoted accordingly.
- 1.4.0 The contract shall be on lump sum basis for the package. Within the scope of the contract no variation shall be admissible to the contractor so far the inputs remain unchanged. The Contractor shall be responsible for providing all material, equipment and services, specified or otherwise which are required to fulfill the intent of ensuring operability, maintainability and the reliability of the complete work covered under this specification. In case of change in the input after placement of order the additions / deletions to the scope shall be settled on the basis of mutually agreed rates.
- 1.5.0 It is recommended that Bidders have no deviation on technical requirement & scope. Bidder shall submit signed and stamped copy of "Certificate of No deviation" (Schedule 1 of Section 5) for 'NIL DEVIATION'.
- 1.6.0 The term **Customer** shall refer to **UPPTCL**, '**Purchaser**' shall refer to **BHEL** and the term '**Contractor**' shall refer to the **successful Bidder**
- 1.7.0 The system / equipment shall be capable of performing the required duties as per the specification requirements.

2.0.0 VENTILATION REQUIREMENT FOR VARIOUS AREAS

Ventilation System for GIS Building

The building shall have arrangement to maintain pressurised air in order to prevent the ingress of dust in the GIS Hall.

The GIS hall shall have an independent ventilation system. Each ventilation system shall consist of **two 100% capacity systems, one operating and one standby.**

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To ensure that the air being supplied to the GIS hall is free from dust particles, a minimum **two stage dust filtration process** shall be supplied. This shall consist of at least the following:

1. Pre Filters: To remove dust particles down to **10 microns in size** with at least 95% efficiency.
2. Fine Filters: To remove dust particles down to **5 microns in size** with at least 99% efficiency.

All the filters shall be panel type. Easy access should be available to the filters for replacement/cleaning.

The ventilation of the GIS hall shall be of a positive pressure type with minimum **4 air changes per hour**. **The pressure inside the GIS hall shall be maintained 5 mm of Water above the atmospheric pressure**. Fresh outdoor air shall be filtered as per requirement before being blown into the GIS hall by the centrifugal air fans to avoid dust accumulation on components present in the GIS hall. **Each GIS hall shall be provided with motorized exhaust dampers with local control.**

Ventilation shall be provided in the following areas:

Sl. No.	Area
i)	400 kV GIS Hall
ii)	220 kV GIS Hall
iii)	132 kV GIS Hall

Note:

The layout for 400kV, 220kV and 132kV GIS building is enclosed for reference and tender purpose only. Bidder may refer dimensions of GIS Hall building from the architecture drawing attached to this specification. However final drawing shall be provided with exact dimensions during detailed engineering. Dimensions may vary +/-10% hence, bidder may choose the capacity of equipment with sufficient margin.

3.0.0 ELECTRICAL SYSTEM REQUIREMENTS

One (1) no. dedicated MCC panel in ventilation room of each GIS Hall shall be provided. This MCC shall extend power supplies to centrifugal fan in this room. Two nos. incomers of adequate capacity shall be provided from the main ACDB (in control room building) and the same will be terminated in ventilation system MCC (in AHU room of their respective GIS Hall) with a mechanical changeover switch. Lamps shall be provided for indicating the status of each fan etc. in the panel. All annunciations related to failure of equipment, tripping of equipment, source of failure/reason due to which the equipment is stopped/tripped, low & high limits of parameters such as level, temp., pressure drop etc. as applicable shall be provided for each fan in the panel. Fully wired, 20% spare annunciation windows shall be provided in the panel.

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4.0.0 SCOPE OF SUPPLY & SERVICES

The scope of equipment to be furnished and services to be provided under the contract are outlined hereinafter and the same is to be read in conjunction with the provisions contained in other sections/ clauses. The scope of work under the contract shall be deemed to include all such items, which although are not specifically mentioned in the bid documents and / or in Bidder's proposal, but are required to make the equipment/ system complete for its safe, efficient, reliable and trouble free operation. **NO EXTRA COST** implication to BHEL shall be considered during contract stage on account of supply & installation of these unaccounted items.

4.1.0 SCOPE OF SUPPLY

Exact requirements shall be worked out during detailed engineering after award of contract. The scope of the work under the contract shall be deemed to include all such items, which although not specifically mentioned in the bid documents and/or in the bidder's proposal, but are required to make the equipment/system complete for its safe, efficient, reliable and trouble free operation, unless the same is specifically excluded from the Bidder's scope of work under clause 5.0 of this section.

4.1.1 Bidder shall also consider the following while quoting for the system:

- i) Power & Control cables will be supplied on free issue basis to contractor. Contractor shall have to choose their cables from the available sizes only and necessary modifications in their equipment for termination of these cables shall be made by contractor.
- ii) Since laying & termination of all cables is in contractor's scope, supply of cable accessories such as lugs, glands, cable tags & markers etc. shall be included by the bidders in their offers.
- iii) Necessary cable trays will be supplied on free issue basis to the contractor, however necessary hardware for fixing the same on walls or elsewhere shall be included by the bidders in their offers.
- iv) Earthing material viz. GS flat & wire will also be supplied on free issue basis to contractor; however, requirement shall be given by the bidders in their respective bids.
- v) Bidder shall ensure that sufficient quantities of commissioning spares are made available for timely completion of commissioning of the system. The bidder shall furnish a list of Commissioning spares that will be brought by him. The unused commissioning spares shall be returnable to the bidder.
- vi) Conducting performance guarantee tests as per approved procedure to the satisfaction of Owner / Purchaser and handing over an operational system to the owner. Procedure for performance guarantee test shall be submitted by contractor for customer review and approval.
- vii) Contractor shall submit valid Type test report for approval by owner. Fresh type test of equipment is not envisaged. It is presumed that equipment offered is duly type tested.

In case the type test reports are found un-satisfactory, tests shall be carried out afresh by contractor without any additional cost implication to BHEL.

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Bidder may read all clauses of technical specification and quote accordingly.

Final applicable make is subject to ultimate customer approval without any cost implication to BHEL. Ultimate client may ask for any make and the same shall be binding on the contractor without any commercial implication.

4.2.0 SCOPE OF SERVICES

A. Erection, Testing & Commissioning (ETC) requirements

- i) The scope of ETC shall include receipt of material at site, unloading, safe storage of material, handling of equipment/ material at site, erection of equipment /material at site including fabrication, equipment and system testing, commissioning of the entire system, conducting performance guarantee tests to the satisfaction of Owner / Purchaser and final handing over to the owner of the entire system.
- ii) Furnishing technical calculations in support of equipment selection or sizing as and when required.

B. Electrical System

- i) Preparations of cable interconnection diagram for equipment supplied under this contract and accordingly offer guidance to the purchaser for laying necessary cables. Termination details shall also be furnished in the said interconnection table.
- ii) Cables laying for incomers to the MCC panel shall be done by the purchaser while termination of the same to the MCC panel end supplied under this contract is in bidder's scope of works. The contractor has to lay and terminate all the other power and control cables supplied under the present scope.
- iii) Laying & Termination of Power/ Control cables for the equipment under the scope of this specification. Bidders shall include all cable accessories like lugs, glands, cable tags, markers etc. in their respective bids.
- iv) Earthing of all installations (to the nearest earth mat/ earthing pad) supplied under the scope of this specification wherever applicable shall be done by contractor. However earthing material shall be supplied by BHEL.

C. All machinery tools & tackles and consumables required for erection/testing/commissioning of the system shall be arranged by the Bidder.

D. Minor modifications, alterations in system installation as per customer's specific requirements shall be done without any extra cost to purchaser.

E. Painting of all the equipment shall be done to match the inside wall of GIS hall from aesthetic point of view.

F. After completion of erection and commissioning of the system, the bidder shall provide training

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to site engineers of Purchaser/Owner so that they are fully conversant with both electrical and mechanical part of this package. G. Bidders to ensure that sufficient quantity of spares are made available for timely completion of commissioning of the system. The bidder shall furnish a list of commissioning spares that will be brought by him. The unused commissioning spares shall be returnable to the bidder. H. <u>Obtaining approval on documents & installations.</u> i) Obtaining, "As Built" certification from purchaser or owner on applicable drawings. Completing documentation as per specification requirement. ii) Obtaining customer's written acceptance of satisfactory completion of job. (Acceptance of PG + handing over of system and mandatory spares (if any)). iii) Any other service not explicitly illustrated herein but which may be required to complete the system with its desired functionality or in the spirit of contract shall also deemed to be under the scope of bidder. I. <u>Civil Works</u> Major civil works such as room & foundations for various equipment shall be in purchaser's scope. However, following shall be in contractor scope of services: a. <u>Wall openings at suitable locations for ducts and fresh air etc., shall be made by the contractor. Associated civil works such as grouting, filling up crevices/cut outs etc. during installations of equipments shall also be in contractor's scope.</u> Any other damage caused to civil works during ETC work of the equipment/system shall be made good to the original finish by the contractor at no extra cost to the purchaser. b. Support Structure for all equipments of ventilation system including ducting etc. are in contractor's scope. c. Providing necessary guidance to / coordination with civil contractor so that appropriate sized / correctly located cut outs are made (by civil contractor) in areas like AHU room and GIS hall pertaining to ventilation system for installation/erection of grilles/diffusers/ducts etc. Suitable wall openings for fresh air and supply & installation of grills shall be done by contractor. <i>However, in case wall openings / cut outs have not been provided for either duct laying, louver fixing, ventilation fan(s) the same shall have to be made by the Contractor.</i> Minor modifications, alterations in system installation as per customer's specific requirements shall be done without any extra cost to purchaser. The Bidder shall however supply foundation bolts & hardware and undertake minor civil works such as grouting, filling up of crevices/ cut outs etc. Any damage caused to civil works during ETC work of the equipment/system shall have to be made good to the original finish by the Contractor at no extra cost to the Purchaser.			

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5.0.0 EXCLUSIONS

- Supply of power & control cables are excluded. However, laying and termination of these cables shall be in contractor's scope.** The bidder shall furnish quantity and type of cables required for complete system in their respective bids. Laying & termination is in contractor scope.
- Supply of necessary cable trays for laying cables, however hardware for fixing the same on wall trenches or elsewhere shall be included by the bidder in his bid.**
- Supply of GI flat or any other for earthing of equipment.**
- Major civil works such as AHU rooms & foundations for various ventilation equipment.**

6.0.0 ENGINEERING DRAWINGS / DOCUMENTS

Engineering shall start immediately after the award of the contract.

Submission & approval of all drawings / Data sheet /documents– as per tender requirement. Bidder shall also submit 3 sets of each drawing documents in hard copy for approval

7.0.0 OPERATION & MAINTENANCE (O&M) MANUAL

Operation and Maintenance manuals shall be specifically compiled for the project by the bidders. The draft O&M manual shall be submitted along with the supply of the items. The O&M manual shall contain the following information:

- Description of the system and equipment with design particulars.
- Instruction for erection.
- Instruction for operation, maintenance and repair.
- Recommended inspection practices and inspection schedule.
- Ordering information for all replaceable parts.
- Recommendation for type of lubricants and frequency of lubrication.

8.0.0 HANDING & TAKING OVER

It is the responsibility of the contractor to maintain the Ventilation system for switchyard till PG test conducted successfully and it is handed over to customer. Any defect noted during the period shall be rectified by the contractor without any price implication to BHEL. Also suitable PG tests shall be conducted by the contractor to show the achievement of guaranteed parameters in line with the requirements of specification/ standards/ codes and to the satisfaction of Purchaser/ Owner.

9.0.0 INSPECTION & TESTING

All the equipment shall be inspected prior to dispatch in line with relevant IS, approved GTP/ drawing and technical specification, BHEL/ customer approved QAP. Being standard equipment, no shop tests have been envisaged for ventilation fans. Test certificates for all major equipment of ventilation system will be submitted to customer for verification and release of dispatch instruction.

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After the installation is over, the system will be subjected to performance guaranteed test in the presence of customer.

"Performance Guarantee Test Procedure" will be submitted during detailed engineering for approval of customer.

10.0.0 VARIOUS HEADS TO BE QUOTED FOR

Based on the above input it is recommended that the bidders shall submit their LUMPSUM offers in the prescribed format only.

Sl. No.	Item Description	Unit	Qty.	Ex-works Rate	Total Ex-works	ETC rate	Total ETC price
1.0	Ventilation System (positive pressure type) with pre filters and fine filters for 100% capacity of GIS Hall (one operating + one standby for each Hall) alongwith all accessories and panel as per technical specification.						
1.1	400 kV GIS Hall	Lot	1				
1.2	220 kV GIS Hall	Lot	1				
1.3	132 kV GIS Hall	Lot	1				

It may be noted that BOQ furnished by the bidder against main heads as per above Table in Cl. 10.0.0 shall not be considered as limits to scope of supply and ETC. Being a lumpsum offer, any other item, which is not specifically mentioned in this specification 'OR' any item not considered by the bidder in his BOQ 'OR' additional quantity of any given item in Bidder's BOQ, which is required for satisfactory operation of the system shall be supplied and erected without any additional cost implication to BHEL.

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IS:2062 - Steel for general structural purposes
IS:655 - Specification for Metal Air Duct
IS:277 - Specification for Galvanised Steel Sheets
IS-737 - Specification for Wrought Aluminium and Aluminium Sheet & Strip
IS-1079 - Hot rolled cast steel sheet & strip
BS-6540 Part-I - Air Filters used in Air Conditioning and General Ventilation
BS-3928 - Sodium Flame Test for Air Filters (Other than for Air Supply to I.C. Engines and Compressors)
US-PED-2098 - Method of cold DOP & hot DOP test
MIL-STD-282 - DOP smoke penetration method
ASHRAE-52 - Air cleaning device used in general ventilation for removing particle matter
IS:3069 - Glossary of Terms, Symbols and Units Relating to Thermal Insulation Materials.
IS:4671 - Expanded Polystyrene for Thermal Insulation Purposes
IS:8183 - Bonded Mineral Wool
IS:3346 - Evaluation of Thermal Conductivity properties by means of guarded hot plate method
ASTM-C-591-69 - Standard specification for rigid preformed cellular urethane thermal insulation
IS:4894 - Centrifugal Fans
BS:848 - Method of Performance Test for Centrifugal Fans
IS:325 - Induction motors, three-phase
IS:4722 - Rotating electrical machines
IS:1231 - Three phase foot mounted Induction motors
IS:2233 - Designations of types of construction and mounting arrangements of rotating electrical machines
IS:2254 - Vertical shaft motors for pumps
IS:7816 - Guide for testing insulation resistance of rotating machines
IS:4029 - Guide for testing three phase induction motors
IS:4729 - Rotating electrical machines, vibration of, Measurement and evaluation of
IS:4691 - Degree of protection provided by enclosures for rotating electrical machinery
IS:7572 - Guide for testing single-phase a.c. motors
IS:2148 - Flame proof enclosure for electrical apparatus
BS:4999 - Noise levels (Part-51)

2.0. Ventilation system for 400, 220 & 132 kV GIS Hall

Ventilation system shall be provided to maintain positive pressure inside GIS building.

The system shall comprise of supply air fan assemblies with Pre & Fine filters, motorized exhaust dampers, along with necessary ducting, grilles etc. This dry mechanical ventilation system shall be designed according to four air changes per hour.

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Ventilation system for GIS hall shall operate on 100% fresh air and no recirculation is envisaged.

A) Plant shall mainly consist Supply air fans of DIDW type with pre and fine filters, Supply air ducting and grills. Two (2) nos. DIDW supply air centrifugal fans on 2x100 % (One working and one standby) basis shall be provided for the collective requirement of GIS Hall. Fans and accessories for this ventilation system shall be placed in separate ventilation room (AHU room) provided adjacent to the GIS Hall.

B) Air Handling Unit (A complete factory made package enclosed unit consist of all fans, filters and other accessories)

The air handling units shall be Double skin, draw through/ blow through type, modular construction and shall include filter section, fan section and mixing box (wherever required). The AHU shall be made of Double skin design with main structure made of suitable thickness powder coated/ extruded Aluminium frame work as per manufacturer standard. The panels shall be double skin sandwich type with minimum 24G GI powder coated external sheet and 24G GI powder coated internal sheet with 25mm thick insulation material in between. All sections shall be bolted to each other with neoprene rubber or its equivalent gasket. The fan shall be double inlet, double width type. The wheel & housing shall be fabricated from heavy gauge galvanised steel. The impeller & fan shaft shall be statically and dynamically balanced. Fan housing with motor shall be mounted on a common steel base mounted inside the air handling housing on anti- vibration springs mounts. The fan outlet shall be connected to casing with the help of fire retardant flexible canvass. The fan shall be complete with multi V belt drive, belt guard and adjustable motor mounting base. The inspection doors shall have double synthetic rubber seals doors and locking arrangements.

One of the above options (A or B) from these AHU units of suitable capacity (shall be finalised during detailed engineering) shall be installed inside a separate dedicated room called AHU/ventilation room adjacent to GIS Hall.

For fresh air suitable size of intake louvers with wire mesh, frame and bird protection screen shall be provided. Each system shall have washable pre-filter of 90% efficiency down to 10 microns at the inlet of AHU and a micro-vee filter of 99% efficiency down to 5 microns at the inlet of AHU. These filters shall be arranged in a panel formation with filter module mounting frame on the downstream side. Easy access should be available to the filters for replacement/cleaning.

The vibration level of fans shall be within limits and vibration isolation shall be achieved by providing suitable spring type or pad type (or combination) vibration isolators for ventilation system equipment (centrifugal fans). Wall cut outs for mounting of intake louvers shall be made available in ventilation room.

There shall be 18 gauge G.I. common plenum chamber after centrifugal fans outlet provided with necessary maintenance windows, water tube manometer across air filter, one pressure switch and pilot light on panel to indicate dirty condition of filter.

Two Supply air duct shall be taken from plenum chamber which shall run on the both walls along the length of the GIS Hall with necessary grilles/ diffusers to make proper ventilation arrangement inside

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the hall to facilitate proper mixing and avoid any hot spot. Fusible link / solenoid operated & CBRI certified Fire damper of fire rating 90 minutes shall be installed in supply air path. No exhaust duct or return air ducting is envisaged in this area.

There shall be a proper arrangement/provisions for supply and accommodation of NRD/URD in the supply air circuit near AHU duct to avoid any cross/reverse flow of air and inturn AHU fan of standby unit. The purpose of providing these damper is to isolate standby unit when working unit is under operation

Motorized Pressure Relief Dampers with frame & bird screen shall be provided of suitable size and quantities on both walls of GIS hall above supply air ducts to release hot air & excessive pressure inside the hall beyond design over pressure.

Ventilation duct running inside GIS Hall shall be suitably placed to avoid any fouling with GIS incoming/outgoing ducts and LCC panels, if any.

For fans and blowers, continuous motor rating (at 50 deg. C ambient) shall be at fifteen percent (15%) above the demand of the equipment at duty point or ten percent (10%) above maximum load demand of the equipment whichever is higher. For Belt drives, the belts shall be sized for 150% of the rated power and there shall be minimum of two belts per drive.

The pressure inside the GIS hall shall be maintained 5 mm of Water above the atmospheric pressure.

All ducts shall be made of galvanized steel sheets confirming to IS 277 with minimum grade of 180 GSM. Duct sizing and fabrication shall comply with requirements of IS 655.

Duct design criteria- Velocity shall be 12m/s (max.) for main duct, 9m/s (max.) for branch duct and 3.75m/s for the grills.

All the equipment of Ventilation system shall be designed for continuous duty for continuous operation of 24 hours a day.

✓ **Notes:**

Ventilation fan with suitable capacity driving motor calculation sheet for GIS Hall shall be submitted for customer/ Purchaser approval during detailed engineering stage. Pressure loss in ducting and accordingly static of fans and power capacity of motor shall be finalised during detailed engineering.

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This section stipulates the General Technical Requirements (GTR) under the Contract and will form an integral part of the Technical Specification.

The provisions under this section are intended to supplement general requirements for the materials, equipments and services covered under respective equipment sections and are not exclusive. However in case of conflict between the requirement specified in this section and requirements specified under respective equipment sections, the requirements specified under respective sections shall hold good.

Every effort will be made to supply all equipment as per the technical details furnished in the specification. However, due to the standard manufacturing practice of various equipment suppliers and depending on the selected vendor, there may be slight variations from indicated values at the contract stage. Such variations should not affect the quality and performance of the equipment.

It is not the intent to specify completely in technical specifications of equipments/ materials all details of the design and construction of equipment. However, the equipment shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation. The Purchaser will interpret the meaning of drawing and specification and shall have the power to reject any work or material which in his judgement is not in accordance therewith. The equipment offered shall be complete with all components necessary for its effective and trouble free operation. Such components shall be deemed to be within the scope of Bidder's supply, irrespective of whether these are specifically brought out in this specification and/or commercial order or not.

2.0 COMPLETENESS OF EQUIPMENTS

2.1 Equipments furnished shall be complete in every respect with all mountings, fittings, fixtures and standard accessories specified &/or normally provided with such equipment and/ or needed for erection, completion and safe operation of the equipment as required by applicable codes though they may not have been specifically detailed in the Technical Specifications. Materials and components not specifically stated in the specification but which are necessary for commissioning and satisfactory operation of the substation unless specifically excluded shall be deemed to be included in the scope of the specification and shall be supplied without any extra cost All similar standard components/ parts of similar standard equipment provided, shall be inter-changeable with one another.

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- 2.2** The Bidder shall supply type tested (including special test as per technical specification) equipments and materials. The test reports/details shall be furnished by the Bidder in the bid. In the event of any discrepancy in the test reports i.e. any test report not acceptable due to any design/manufacturing changes or due to non-compliance with the requirement stipulated in the Technical Specification and/or IEC/ IS, same, shall be carried out without any additional cost implication to the Purchaser. The Purchaser reserves the right to get any or all type tests conducted/ repeated.

The reports for all type tests and additional type tests as per technical specification furnished by the Bidder shall be of the tests conducted within last 05(five) years prior to the date of bid opening. The type tests conducted should have either been conducted in accredited laboratory (accredited based on ISO/ IEC Guide 25/ 17025 or EN 45001 by the national accreditation body of the country where laboratory is located) or witnessed by UPPTCL or representative authorized by UPPTCL or Utility or representative of accredited test lab or reputed consultant.

3.0 STANDARDS

- 3.1** Except as modified by this Bid specification, all material and equipment shall conform to the requirement of the latest editions of relevant ISS/ IEC and other applicable standards. The equipments/ works shall be designed, engineered, manufactured, built, tested and commissioned shall be carried out in accordance with the Acts, Rules, Laws and Regulations in force in India.
- 3.2** In addition to meeting the specific requirements called for in the respective sections of the Technical Specification, the equipment shall also conform to the general requirement of the relevant standards which shall form an integral part of the specification. When the specific requirements stipulated in the specifications exceed or differ than those required by the applicable standards, the stipulation of the specification shall take precedence.
- 3.3** In the event of the Bidder offering equipment conforming to standards other than ISS/IES standards, which ensure equivalent or better performance than that specified in the standards, the salient point of comparison between the standards adopted and relevant ISS/ IEC standards shall be indicated clearly in the proposal, along with English language version of such standard or relevant extract of the same. The equipment conforming to standards other than IS/IEC shall be subject to Purchaser's approval.
- 3.4** The standards mentioned in the respective equipment specifications are not mutually exclusive or complete in themselves. The equipment &/or work shall also conform to any other applicable standard, even if not specifically mentioned in these specifications.
- 3.5** Should the Bidder wish to depart from the provisions of the specifications, either on accounts of manufacturing practices or for any other reason, he shall clearly mention the departure and submit complete justification supported by information, drawings etc. as will enable to assess the suitability of equipment(s) offered. In the event of the Bidder's specifications, drawings, forms and tables etc. being found to disagree with the requirement of the Bid specifications at

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any stage, Bid specifications shall be binding, unless the departures have been duly approved in writing by the Purchaser.

3.6**REFERENCE OF STANDARDS**

Reference	Abbreviation	Name and Address
IEC/ CISPR	International Electro technical Commission	Bureau Central de la Commission, Electro Technique International, 1 Rue de verembe Geneva, Switzerland
IS	Indian Standards,	Bureau of Indian Standard, Manak Bhavan, 9, Bahadur Shah Zafar Marg, New Delhi-110 002, INDIA

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BS	British Standards,	British Standards Institution, 101, Pentonville Road, N-19-ND UK
ISO	International Organization For Standardization,	Danish Board of Standardization Danish Standardising Sraat, Aurehoegvej-12, DK-2900, Heelstrup, DENMARK
NEMA	National Electric Manufacture Associate	115, East 44th Street, New York NY 10017 U.S.A

4.0 PROJECT DATA

- | | | |
|------|--|---------------------------|
| i. | Location | UTTAR PRADESH |
| ii. | Altitude | not exceeding 1000 Meters |
| iii. | Climatic Conditions | |
| (a) | Design maximum ambient Air Temperature | 50 ⁰ C |
| (b) | Minimum ambient air temperature in shade | 0 ⁰ C |
| (c) | Relative Humidity | 100%Max. |
| (d) | Wind Load | 195 Kg./ Sq.m. |
| (e) | Seismic Level | 0.3 g |
| (f) | Isoceraunic Level | 50days/ year |
| (g) | Average annual rain fall | 1200 mm |
| (h) | Hot and humid tropical Climate conducive to rust and fungus growth | |

5.0 SYSTEM PARTICULARS

- | | | |
|-------|--------------------------|-----------------------------------|
| (i) | Rated System voltage | 420 kV, 245kV, 145kV, 36kV |
| (ii) | System frequency | 50 Hz, This may vary by $\pm 5\%$ |
| (iii) | Number of phases | Three |
| (iv) | Neutral | Effectively Earthed |
| (v) | Auxiliary power supply:- | |

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Auxiliary electrical equipment shall be suitable for operation on the following supply system:

- | | | |
|-----|--|---|
| (a) | Power device (Like drive motors) | 400V, 3Phase, 4Wire 50Hz
Effectively earthed AC system. |
| (b) | Lighting fixtures, space heaters,
fractional Horse Power motors and
control devices. | 250V, 2wire, 50Hz,
AC supply with one
point grounded. |
| (c) | DC alarm, Control and Protective
Devices from sub station batteries as under | 2wire ungrounded DC supplies |
- (i) 400 kV S/S : 220V DC (ii)
220/132kV S/S : 110V DC (iii)
Communication : 48 V DC
equipment

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The above supply voltage is subject to variation as follows:

All devices must be suitable for a continuous operation over the entire range of voltage variations :

- (i) AC
- Voltage may vary by $\pm 10\%$.
Frequency by $\pm 5\%$
Combined Voltage & frequency by $\pm 10\%$.
- (ii) DC
- a) 220 V may vary between 187 & 242 V
b) 110 V may vary between 93 & 121 V
c) 48 V may vary between 41 & 53 V

6.0 SYSTEM PARAMETERS

The following system parameters shall prevail:

Sl. No.	Description of Parameters	400 kV System	220 kV System	132 kV System	33 kV System
1.	Nominal system voltage	400kV	220kV	132kV	33kV
2.	Maximum operating voltage of the system(rms)	420kV	245kV	145kV	36kV
3.	Rated frequency	50Hz	50Hz	50Hz	50Hz
4.	No. of phase	3	3	3	3
5.	Rated short time current	50 kA for 3 Sec.	40 kA for 3 sec	31.5 kA for 3 sec	25 kA for 3 sec
6.	Dry and wet one minute power frequency withstand voltage	680 kV	460 kV	275 kV	95 kV
7.	Dry and wet impulse withstand voltage positive and negative	1550 kVp	1050 kVp	650 kVp	250 kVp
8.	Corona extinction voltage	320 kV	156 kV	105 kV	-
9.	Max. Radio interference voltage for frequency between 0.5 MHz and 2 MHz at 508 kV rms for 765kV, 320kV rms for 400kV system and 156kV rms for 220kV system & 92kV rms for 132kV system	1000 microvolt	1000 microvolt	500 microvolt	-
10.	Minimum total creepage	25mm/ kV (10500 mm)	25mm/ kV (6125 mm)	25mm /kV (3625 mm)	25mm/kV (1300 mm)
11.	Min. clearances				

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i. Phase to phase

4000mm (for
Conductor-
conductor)
4200mm
(for rod -
Conductor)

2100 mm

1300 mm

320 mm

ii. Phase to earth

3500 mm

2100 mm

1300 mm

320 mm

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	iii) Sectional clearances	6500 mm	5000 mm	4000 mm	3000 mm
12.	System neutral earthing	Effectively Earthed	Effectively Earthed	Effectively Earthed	Effectively Earthed

Major technical parameters of bushings/ hollow column/ support insulators are given below:

Sl. No	Parameters	400 kV System	220 kV System	132 kV System	33 kV System
(a)	Max. System voltage Um (kV)	420	245	145	36
(b)	Impulse withstand voltage (dry & wet) (kVp)	± 1425	± 1050	± 650	±170
(c)	Switching surge withstand voltage (dry & wet) (kVp)	1050	-	-	-
(d)	Power frequency withstand voltage (dry and wet) (kV rms)	650	460	275	75
(e)	Total creepage distance(min) (mm)	10500	6125	3625	900

Insulator shall also meet requirement of IEC- 815 for 420kV, 245kV, 145kV and 36kV systems, as applicable having alternate long and short sheds.

7.0 SERVICES TO BE PERFORMED BY THE EQUIPMENT

All equipments shall perform satisfactorily under various electrical, electromechanical and meteorological conditions of the installation site.

All equipment shall be able to withstand all external and internal mechanical thermal and electromechanical forces due to various factors like wind load temperature variation, ice & snow (wherever applicable) short circuit etc for the equipment.

The Bidder shall design the various forces which the terminal connectors of the equipment are required to withstand.

All outdoor EHV equipments except marshalling kiosks shall be suitable for hot line washing.

To facilitate erection of equipment, all items to be assembled at site shall be "match marked".

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Where the specification does not contain references to workmanship, equipment, materials and components of the covered equipment, it is understood that the same must be new, of highest grade of the best quality of their kind, conforming to best engineering practice and suitable for the purpose for which they are intended.

The design of the works shall be such that installation, future expansions, replacements and general maintenance may be undertaken with a minimum of time and expenses. Each component shall be designed to be consistent with its duty and suitable factors of safety, subject to mutual agreements. All joints and fastenings shall be devised, constructed and documented so that the component parts shall be accurately positioned and restrained to fulfill their required function. In general screw threads shall be standard metric threads. The use of other thread forms will only be permitted when prior approval has been obtained from the Purchaser.

Whenever possible, all similar part of the Works shall be made to gauge and shall also be made interchangeable with similar parts. All spare parts shall also be interchangeable and shall be made of the same materials and workmanship as the corresponding parts of the Equipment supplied under the Specification. Where feasible, common component units shall be employed in different pieces of equipment in order to minimize spare parts stocking requirements. All equipment of the same type and rating shall be physically and electrically interchangeable.

All materials and equipment shall be installed in strict accordance with the manufacturer's recommendation(s). Only first-class work in accordance with the best modern practices will be accepted. Installation shall be considered as being the erection of equipment at its permanent location. This, unless otherwise specified, shall include unpacking, cleaning and lifting into position, grouting, leveling, aligning, coupling of or bolting down to previously installed equipment bases/foundations, performing the alignment check and final adjustment prior to initial operation, testing and commissioning in accordance with the manufacturer's tolerances, instructions and the Specification. All factory assembled rotating machinery shall be checked for alignment and adjustments made as necessary to re-establish the manufacturer's limits. Suitable guards shall be provided for the protection of personnel on all exposed rotating and/or moving machine parts and shall be designed for easy installation and removal for maintenance purposes. The spare equipment(s) shall be installed at designated locations and tested for healthiness.

The Bidder shall apply oil and grease of the proper specification to suit the machinery, as is

necessary for the installation of the equipment. Lubricants used for installation purposes shall be drained out and the system flushed through where necessary for

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applying the lubricant required for operation. The Bidder shall apply all operational lubricants to the equipment installed by him.

All oil, grease and other consumables used in the Works/ Equipment shall be purchased in India unless the Bidder has any special requirement for the specific application of a type of oil or grease not available in India. In such is the case he shall declare in the proposal, where such oil or grease is available. He shall help Purchaser in establishing equivalent Indian make and Indian Contractor. The same shall be applicable to other consumables too.

A cast iron or welded steel base plate shall be provided for all rotating equipment which are to be installed on a concrete base unless otherwise agreed to by the Purchaser. Each base plate shall support the unit and its drive assembly, shall be of design with pads for anchoring the units and shall have a raised up all around and shall have threaded in air connections, if so required.

8.2 PROVISIONS FOR EXPOSURE TO HOT AND HUMID CLIMATE

Outdoor equipment supplied under the specification shall be suitable for service and storage under tropical conditions of high temperature, high humidity, heavy rainfall and environment favourable to the growth of fungi and mildew. The indoor equipments located in non-air conditioned areas shall also be of same type.

9.0 SPACE HEATERS

The heaters shall be suitable for continuous operation at 240V AC supply. On-off switch and fuse shall be provided for the heater.

One or more adequately rated thermostatically connected heaters shall be supplied to prevent condensation in any compartment. The heaters shall be installed in the lower portion of the compartment and electrical connections shall be made sufficiently away from below the heaters to minimize deterioration of supply wire insulation. The heaters shall be suitable to maintain the compartment temperature to prevent condensation.

The heaters shall be suitably designed to prevent any contact between the heater wire and the air and shall consist of coiled resistance wire centered in a metal sheath and completely encased in a highly compacted powder of magnesium oxide or other material having equal heat conduction and electrical insulation properties, or they shall consist of resistance wire wound on a ceramic and completely covered with a ceramic material to prevent any contact between the wire and the air. Alternatively, they shall consist of a resistance wire mounted into a tubular ceramic body built into an envelope of stainless steel or the resistance wire is wound on a tubular ceramic body and embedded in glaze. The surface temperature of the heaters shall be restricted to a value which will not shorten the life of the heater sheaths or that of insulator wire or other component in the compartments.

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Besides the space heaters, special moisture and fungus resistant varnish shall be applied on parts which may be subjected or predisposed to the formation of fungi due to the presence or deposit of nutrient substances. The varnish shall not be applied to any surface of part where

the treatment will interface with the operation or performance of the equipment. Such surfaces or parts shall be protected against the application of the varnish.

11.0 VENTILATION OPENING

In order to ensure adequate ventilation, compartments shall have ventilation openings provided with fine wire mesh of brass to prevent the entry of insects and to reduce to a minimum the entry of dirt and dust. Outdoor compartment openings shall be provided with shutter type blinds and suitable provision shall be made so as to avoid any communication of air/ dust with any part in the enclosures of the Control Cabinets, Junction boxes and Marshalling Boxes, panels etc.

12.0 DEGREE OF PROTECTION

The enclosures of the Control Cabinets, junction boxes and Marshalling Boxes, panels etc. to be installed shall be provided with degree of protection as detailed here under:

- a) Installed out door : IP-55
- b) Installed indoor in air conditioned area : IP-31
- c) Installed in covered area : IP -52
- d) Installed indoor in non air-conditioned area where possibility of entry of water is limited: IP-41
- e) For LT Switchgear (AC & DC distribution Boards): IP-52

The degree of protection shall be in accordance with :13947 (Part-I)/ IEC-60947 (Part-I)/ IS

12063 / IEC-60529. Type test report for degree of protection test, on each type of the box shall be submitted for approval.

13.0 RATING PLATES, NAME PLATES AND LABELS

Each main and auxiliary item of substation is to have permanently attached to it in a conspicuous position a rating plate of non-corrosive material upon which is to be engraved manufacturer's name, year of manufacture, equipment name, type or serial number together with details of the loading conditions under which the item of

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substation in question has been designed to operate, and such diagram plates as may be required by the Purchaser. The rating plate of each equipment shall be according to IEC requirement.

All such nameplates, instructions plates, rating plates CB, CT, VT, SA, Isolators and Relay & Protection panels equipments shall be bilingual with Hindi inscription first followed by English. Alternatively two separate plates one with Hindi and the other with English inscriptions may be provided.

14.0 FIRST FILL OF CONSUMABLES, OIL AND LUBRICANTS

All the first fill of consumables such as oils, lubricants, filling compounds, touch up paints, soldering/brazing material for all copper piping of circuit breakers and essential chemicals etc. which will be required to put the equipment, covered under the scope of the specifications, into successful operation, shall be furnished by the Bidder unless specifically excluded under the exclusions in these specifications and documents.

15.0 PACKAGING AND PROTECTION

All the equipments shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at site till the time of erection. The Bidder shall also submit packing details/associated drawing for any equipment/material, to facilitate the Purchaser to repack any equipment/material at a later date. The Bidder shall be responsible for any loss or damage during transportation, handling and storage due to improper packing. Any demurrage, wharfage and other such charges claimed by the transporters, railways etc. shall be to the account of the Bidder.

All coated surfaces shall be protected against abrasion, impact, discolouration and any other damages. All exposed threaded portions shall be suitably protected with either a metallic or a non-metallic protectin device. All ends of all valves and pipings and conduit equipment connections shall be properly sealed with suitable devices to protect them from damage. The parts which are likely to get rusted, due to exposure to weather should also be properly treated and protected in a suitable manner.

16.0 SURFACE FINISH

All interiors and exteriors of tanks, control cubicles and other metal parts shall be thoroughly cleaned to remove all rust, scales, corrosion, greases or other adhering foreign matter. All steel surfaces in contact with insulating oil as far as accessible shall be painted with not less than two coats of heat resistant, oil insoluble, insulating paints.

All metal surfaces exposed to atmosphere shall be given two primer coats of zinc chromate and two coats of epoxy paint with epoxy base thinner. All metal parts not accessible for painting shall be made of corrosion resisting material. All machine finished

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or bright surfaces shall be coated with a suitable preventive compound and suitably wrapped or otherwise protected. All paints shall be carefully selected to withstand tropical heat and extremes of weather within the limit specified. The paint shall not scale off or wrinkle or be removed by abrasion due to normal handling.

All external painting shall be as per shade No. 631 of IS: 5.

17.0 HOT DIP GALVANISING

All ferrous parts including all sizes of nuts, bolts, plain and spring washers, support channels, structures, shall be hot dip galvanized conforming to latest version of IS: 2629 or any other equivalent authoritative standard. However, hardware less than M12 size shall be electro- galvanized. Minimum weight of zinc coating shall be 610 gm/ sq.mm and minimum thickness of coating shall be 85 microns for all items thicker than 6 mm. For items lower than 6mm thickness, requirement of coating shall be as per relevant ASTM. For surface which shall be embedded in concrete, the zinc coating shall be 610 gm/sq. m minimum.

The galvanized surfaces shall have a continuous and uniform thick coating of zinc, firmly adhering to the surface of steel. The finished surface shall be clean and smooth and shall be free from defects like discoloured patches, bare spots, unevenness of coating, spelter which is loosely attached to the steel globules, spiky deposits, blistered surface, flaking or peeling off,

etc. The presence of any of these defects noticed on visual or microscopic inspection shall render the material liable to rejection.

After galvanizing, no drilling or welding shall be performed on the galvanized parts of the equipment excepting that nuts may be threaded after galvanizing. Sodium dichromate treatment shall be provided to avoid formation of white rust after hot dip galvanization.

Galvanised material must be transported properly to ensure that galvanised surfaces are not damaged during transit. Application of zinc rich paint at site shall not be allowed.

18.0 PROTECTIVE GUARDS

Suitable guards shall be provided for protection of personnel on all exposed rotation and/of moving machine parts. All such guards with necessary spares and accessories shall be designed for easy installation and removal for maintenance purpose.

19.0 TOOLS AND TACKLES

The Bidder shall supply with the equipment one complete set of all special tools and tackles for the erection, assembly, dis-assembly and maintenance of the equipment.

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However, these tools and tackles shall be separately packed and brought on to site.

**20.0 CONTROL CABINETS, JUNCTION BOXES, TERMINAL BOXES AND MARSHALLING
BOXES FOR OUTDOOR EQUIPMENT**

- 20.1 All types of boxes, cabinets etc. shall generally conform to and be tested in accordance with IS-5039/ IS-8623, IEC-60439, as applicable, and the clauses given below.
- 20.2 Control cabinets, junction boxes, marshalling boxes and terminal boxes shall be made of sheet steel or aluminum enclosure and shall be dust, water and vermin proof. Sheet steel used shall be at least 2.0 mm thick cold rolled or 2.5 mm hot rolled. The box shall be properly braced to prevent wobbling. There shall be sufficient reinforcement to provide level surfaces, resistance to vibrations and rigidity during transportation and installation. In case of aluminum enclosed box, the thickness of aluminum shall be such that it provides adequate rigidity and long life as comparable with sheet steel of specified thickness.
- 20.3 Cabinet/boxes shall be free standing floor mounting type, wall mounting type or pedestal mounting type as per requirements. A canopy and sealing arrangements for operating rods shall be provided in marshalling boxes/ Control cabinets to prevent ingress of rain water.
- 20.4 Cabinet/boxes shall be provided with double hinged doors with padlocking arrangements. The distance between two hinges shall be adequate to ensure uniform sealing pressure against atmosphere. The quality of the gasket shall be such that it does not get damaged/cracked during the operation of the equipment.
- 20.5 All doors, removable covers and plates shall be provided gasket all around with suitably profiled EPDM/Neoprene gaskets. The gasket shall be tested in accordance with approved quality plan, IS:11149 and IS:3400. The quality of gasket shall be such that it does not get damaged/cracked during 10(ten) years of operation of the equipment or its major overhaul whichever is earlier. All gasketed surfaces shall be smooth straight and reinforced if necessary to minimize distortion and to make a tight seal. Ventilating Louvers, if provided, shall have screen and filters, the screen shall be fine wire mesh made of brass.
- 20.6 All boxes/ cabinets shall be designed for the entry of cables from bottom by means of weather proof and dust-proof connections. Boxes and cabinets shall be designed with generous clearances to avoid interference between the wiring entering from below and any terminal blocks or accessories mounted within the box or cabinet. Suitable cable gland plate projecting at least 150 mm above the base of the marshalling kiosk/box shall be provided for this purpose along with the proper blanking plates. Necessary number of cable glands shall be supplied and fitted on this gland plate. Gland plate shall have provision for some future glands to be provided later, if required.
- 20.7 A 240V, single phase, 50 Hz, 15 amp AC plug and socket shall be provided in the

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cabinet with ON-OFF switch for connection of hand lamps. Plug and socket shall be of industrial grade.

- 20.8** For illumination, a 20 Watts fluorescent tube or 15 watts CFL/LED bulb shall be provided. The switching of the fittings shall be controlled by the door switch.

For junction boxes of smaller sizes such as lighting junction box, manual operated earth switch mechanism box etc., plug socket, heater and illumination is not required to be provided.

- 20.9** All control switches shall be of rotary type. Toggle piano switches shall not be accepted.

- 20.10** Positive earthing of the cabinet shall be ensured by providing two separate earthing pads. The earth wire/ strip shall be terminated on to the earthing pad and secured by the use of self etching washer. Earthing of hinged door shall be done by using a separate earth wire.

- 20.11** The bay marshalling kiosks shall be provided with danger plate and a diagram showing the numbering/connection/feruling by pasting the same on the inside of the door.

- 20.12** a) The following routine tests alongwith the routine tests as per IS: 5039 shall also be conducted.

Check for wiring
Visual and dimension check

- b) The enclosure of bay marshalling kiosk, junction box, terminal box shall be type tested for IP-55 as per IS: 13947. After IP-55 test, 2.5 kVrms for 1 (one) minute, insulation resistance and functional test should be conducted.

20.13 Auxiliary Switches

All the auxiliary switches shall be fully type tested as per relevant IS.

The following type test reports on auxiliary switches shall be submitted:

- (a) Electrical endurance test - A minimum of 2000 operation for 2A D. C. with a time constant greater than or equal to 20 millisecond with a subsequent examination of mV drop/visual defects/temperature rise test.
- (b) Mechanical endurance test. A minimum of 1, 00,000 operations with a subsequent checking of contact pressure test/visual examination.
- (c) Heat run test

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Bidder shall submit the drawings & data sheets as per the following list:

DRAWING NOS.	DRAWING NAME
TB-DG-406-553-001	Ventilation equipment & Ducting layout for GIS hall building (400, 220 & 132 kV)
TB-DG-406-553-002	Schematic, GA & SLD of PDB/MCC for Ventilation fan in GIS hall building (400, 220 & 132 kV)
DATA SHEETS	DATA SHEETS NAME
TB-DS-406-553-01	TDS For GI Sheet for Ducts
TB-DS-406-553-02	TDS For Insulation
TB-DS-406-553-03	TDS For Fire Damper
TB-DS-406-553-04	TDS For Pre-filter & Fine filter
TB-DS-406-553-05	TDS For Instruments
TB-DS-406-553-06	TDS for Centrifugal fans and motor
TB-DS-406-553-07	Ventilation Fans Calculation
TB-DS-406-553-08	BOQ - VENTILATION SYSTEM

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SECTION -5**SHEET 2 OF 4****SCHEDULE-1****CERTIFICATE OF NO DEVIATION**

We confirm that there are no deviations whatsoever and our offer is in full compliance with the specification. We also confirm that there are no deviations in any other form such as comments, variations/ GTP and/ or exceptions.

Signature of the authorized representative of Bidder

Name : _____

Designation : _____

Place : _____

Date : _____

Company Seal

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SECTION -5**SHEET 3 OF 4****SCHEDULE-2****DETAILS OF CONTACT PERSON (TECHNICAL AND COMMERCIAL)**

Name

Address for correspondence

Phone No.

Fax No.

Email

Place

Date

Signature of the authorized representative of Bidder

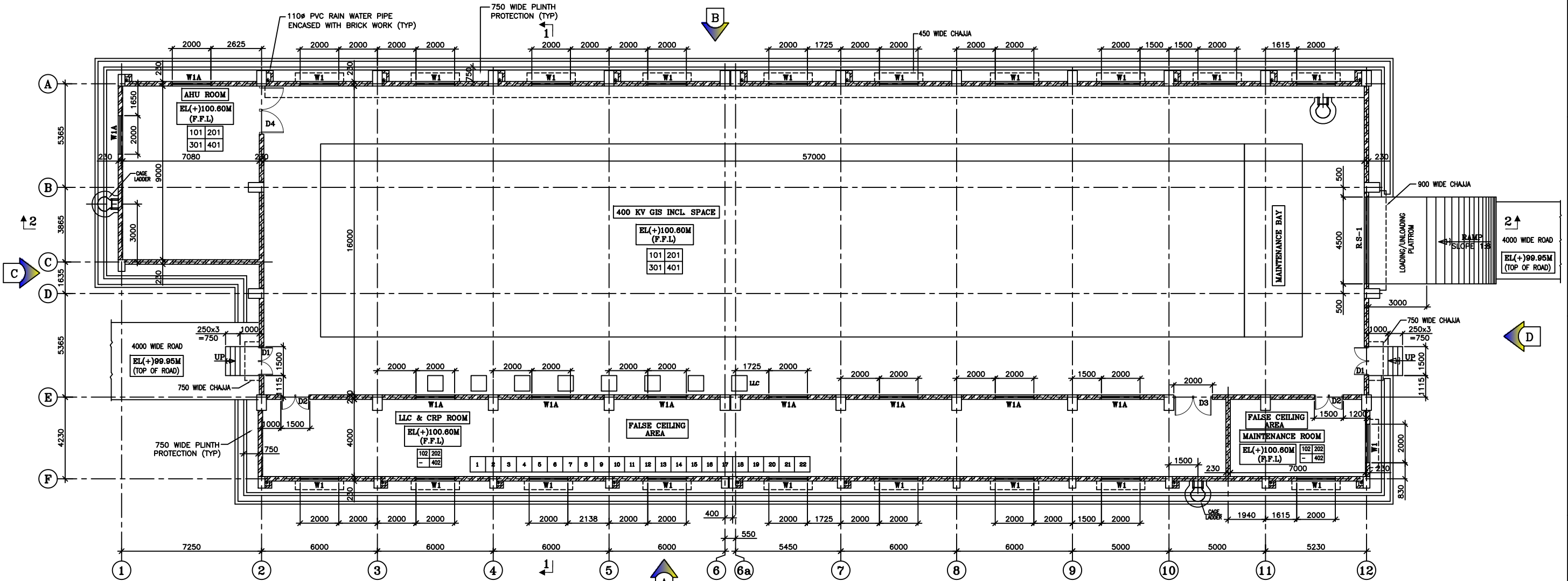
Name-----

Designation-----

Company seal -----

Note: Continuation sheets of like size and format may be used as per the Bidder's Requirement and shall be annexed to this schedule.

	BHARAT HEAVY ELECTRICALS LIMITED TRANSMISSION BUSINESS ENGINEERING MANAGEMENT	Doc. No.	TB-406-553-02 Rev. 00
	400/220/132 kV GIS SUBSTATION UPPTCL SHAMLI	Part No.	SECTION -5
	VENTILATION SYSTEM		SHEET 4 OF 4
SCHEDULE-3 DRAWINGS 1. Architecture drawing-400 kV GIS Building DRG. NO. TB-1-406-607-640-1 REV.00 2. Architecture drawing-220 kV GIS Building DRG. NO. TB-1-406-607-651-1 REV.00 3. Architecture drawing-132 kV GIS Building DRG. NO. TB-1-406-607-661-1 REV.00			

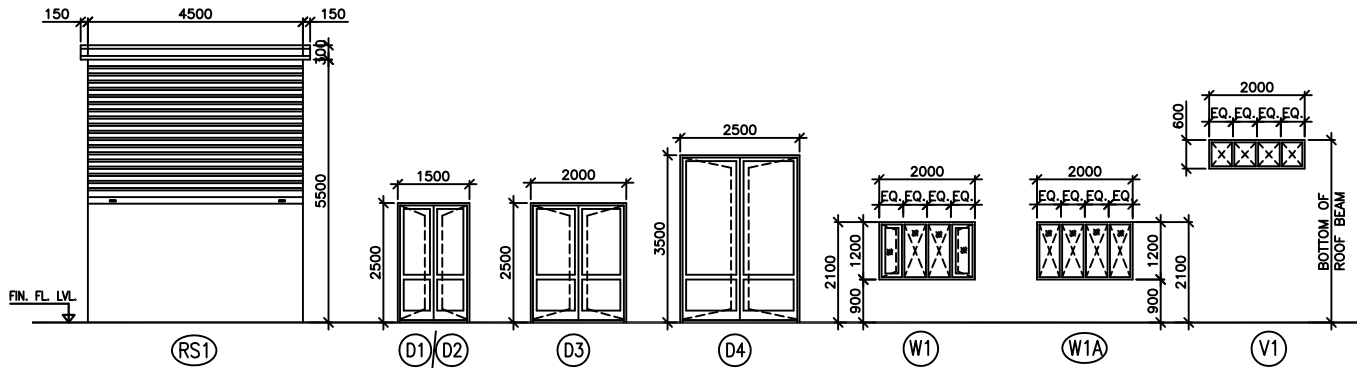


PLAN AT EL(+100.60M (F.F.L.)
(SCALE- 1:100)

ILLUSTRATION OF FINISHES.			FINISHES OF SCHEDULE						
<table border="1"><tr><td>WALL SERIES 100</td><td>FLOORING SERIES 200</td></tr><tr><td>CEILING SERIES 300</td><td>SKIRTING/ DADO SERIES 400</td></tr></table>			WALL SERIES 100	FLOORING SERIES 200	CEILING SERIES 300	SKIRTING/ DADO SERIES 400	WALL FINISHES--		
WALL SERIES 100	FLOORING SERIES 200								
CEILING SERIES 300	SKIRTING/ DADO SERIES 400								
			SR.NO.	CODE NO.	DESCRIPTION				
			1.	101	ACRYLIC DISTEMPER EXTERNAL FINISHED OF WALL--WATER PROOF EXTERIOR EMULSION PAINT OF APEX ULTIMATE (ASIAN) / WEATHER SHIELD MAX (ICI) OR EQUIVALENT				
			2.	102	ACRYLIC EMULSION PAINT				
SKIRTING/DADO FINISHES			FLOORING FINISHES						
1.	401	20mm THK. (1:2) CEMENT PLASTER SKIRTING 150 MM HIGH	1.	201	CEMENT CONCRETE FLOORING(1:2:4) 40mm THK. WITH GLASS STRIP PANEL				
2.	402	VITRIFIED TILES	2.	202	VITRIFIED TILES				
CEILING FINISHES									
1.	301	ACRYLIC DISTEMPER							
2.	302	ARYLIC EMULSION PAINT							

PLASTER:
INTERNAL:
12mm THK. PLASTER (1:4 CEMENT : SAND)
EXTERNAL:
12mm THK. PLASTER (1:4 CEMENT : SAND)
CEILING EXCEPT FOR WHERE FALSE CEILING WILL BE PROVIDED.
6mm THK. PLAIN PLASTER (1:4 CEMENT : SAND)

REFERENCE DRAWING:-
1 OVERALL GENERAL ARRANGEMENT DRAWING -
1 CONCEPTUAL DRAWING FOR 400KV GIS BUILDING - TB-1-406-316-005



LEGEND:-
[Symbol] SIDE HUNG OPENABLE PANEL
[Symbol] FIXED GLASS PANEL
F.F.L. = FINISH FLOOR LEVEL
F.G.L. = FINISH GRADE LEVEL
H.P. = HIGH POINT
L.P. = LOWER POINT
T.O.C. = TOP OF CONCRETE
F.F.L. = FINISH FLOOR LEVEL
F.G.L. = FINISH GRADE LEVEL

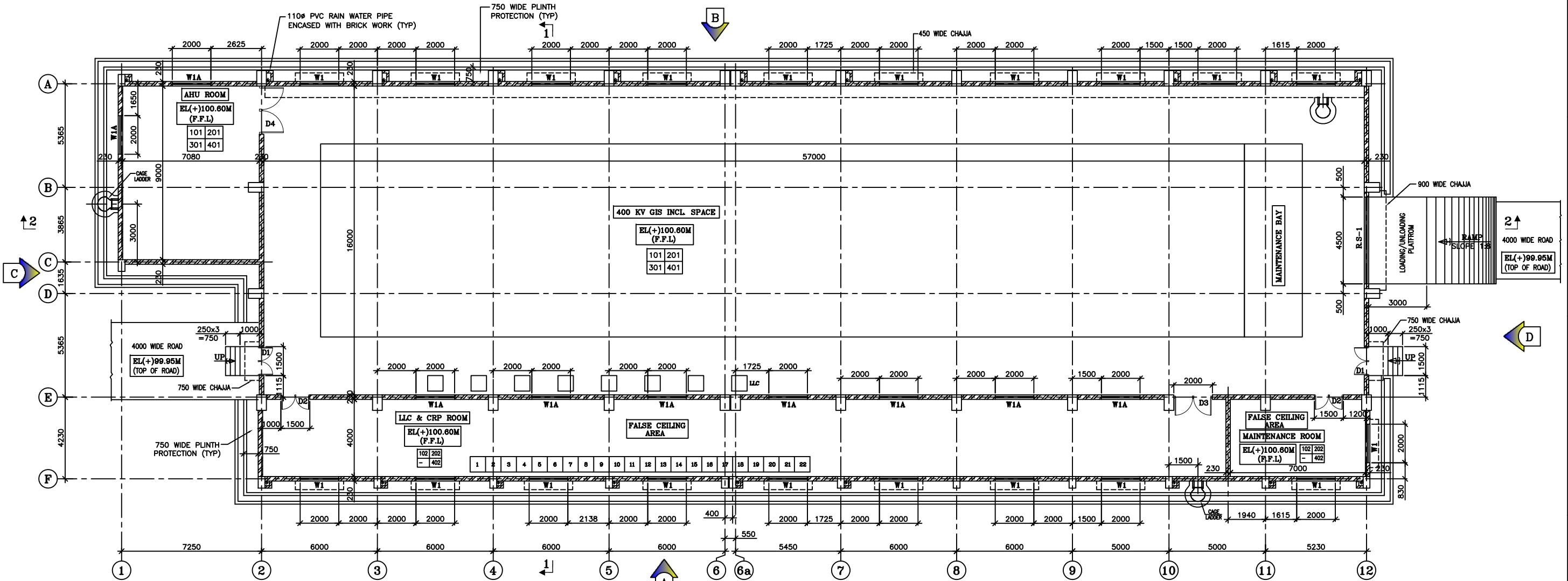
WATER PROOFING ON ROOF
PROVIDING AND APPLYING FOUR COURSES OF WATER PROOFING TREATMENT AT ROOFS CONSISTING FIRST COURSE OF STRAIGHT RUN 85/25 GRADE BITUMEN CONFIRMING TO I.S. 73-1961@0.7 KG/SQM, SECOND COURSE OF ROOF GUARD CONSISTING OF POLYTHENE SHEETS WEIGHTING 0.12 KG/ SQM, WITH 75MM OVER LAPS, ALONG ROOF SLOPE, THIRD COURSE OF COLD CUT BACK BITUMEN B.S. GRADE @ 1.0 KG/ SQM AS PER I.S. 7290 AND THE FOURTH AND FINAL COURSE OF 1:1.5:3 CEMENT CONCRETE, 25MM THICK WITH WATER PROOFING COMPOUND (RECRO-3S) AS PER SPECIFICATIONS, INCLUDING ALL MATERIALS, LABOUR AND T & P ETC. REQUIRED FOR PROPER COMPLETION OF WORK.

NOTES:-

- 1 ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
- 2 ALL WINDOWS AND VENTILATORS ON GROUND FLOOR OF ALL BUILDINGS SHALL BE PROVIDED WITH SUITABLE MS GRILL.
3. ALL DOOR-WINDOW, ETC. HEIGHT SHALL BE CONSIDERED FROM FINISH FLOOR LEVEL.
4. EL(+100.00M) CORRESPONDS TO TOP LEVEL OF ROAD (T.B.M.) WHICH IS (+)100.00M ABSOLUTE ELEVATION.
5. EL. (+)99.95 M CORRESPONDS TO TOP OF SWITCHYARD ROAD.
6. FOR GIS ROOM FLOORING REFER DETAIL DRAWING.

REV.	DATE	ALTERED CHD/APPD	REV.	DATE	ALTERED CHD/APPD	REV.	DATE	ALTERED CHD/APPD	REV.	DATE	ALTERED CHD/APPD
ZONE			ZONE			ZONE			ZONE		

PROJECT: 400/220/132KV GIS SUBSTATION AT SHAMLI (U.P.)			
CUSTOMER: UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED			
BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA			
STRUCTURAL CONSULTANTS:- STRUC MECH ENGINEERS PVT. LTD. 87, OLD A.G. COLONY, KADRU, RANCHI. ☎ PH. 0651 2340631, FAX 0651 2340631		NAME	SIGN.
		DRN.	Subrata
		CHD.	Madhuk
		APPD.	Madhuk
		DATE	27.03.19
		DATE	27.03.19
		DATE	27.03.19
DEPT. TBG CODE	UNTOL. DIMS. GR. G/M/F	SCALE N.T.S	WEIGHT (KG) N.A.
TITLE 400KV GIS BUILDING ARCHITECTURAL GROUND FLOOR PLAN & FINISHES SCHEDULE		CARD CODE NA	REF. TO ASSY. DRG. N.A.
		DRG.NO. TB-1-406-607-640-1	ITEM NO. N.A.
		SHT. No 01	NO. OF SHT. 03
		NO. OF ITEMS N.A.	REV. 00

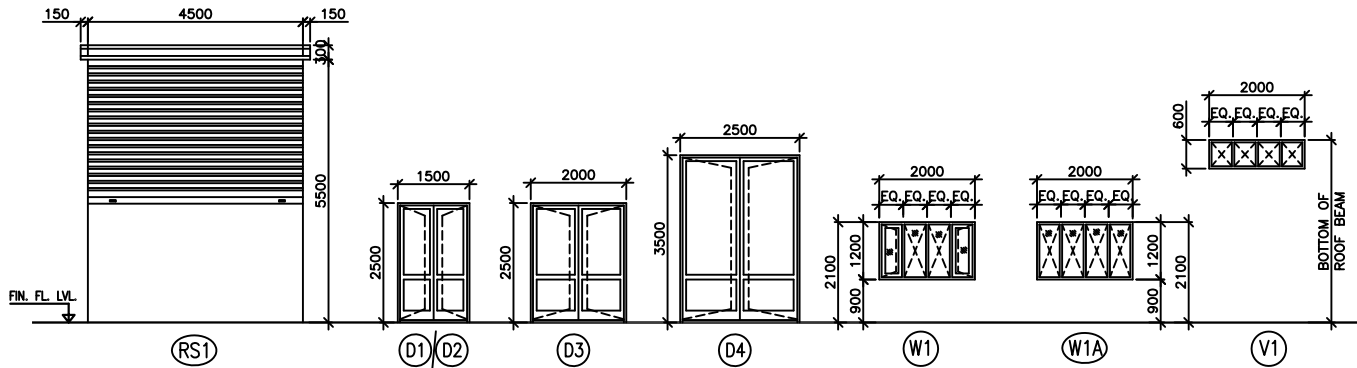


PLAN AT EL(+100.60M (F.F.L.)
(SCALE- 1:100)

ILLUSTRATION OF FINISHES.			FINISHES OF SCHEDULE						
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 - L.P. = LOWER POINT
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 - F.F.L. = FINISH FLOOR LEVEL
 - F.G.L. = FINISH GROUND LEVEL

WATER PROOFING ON ROOF

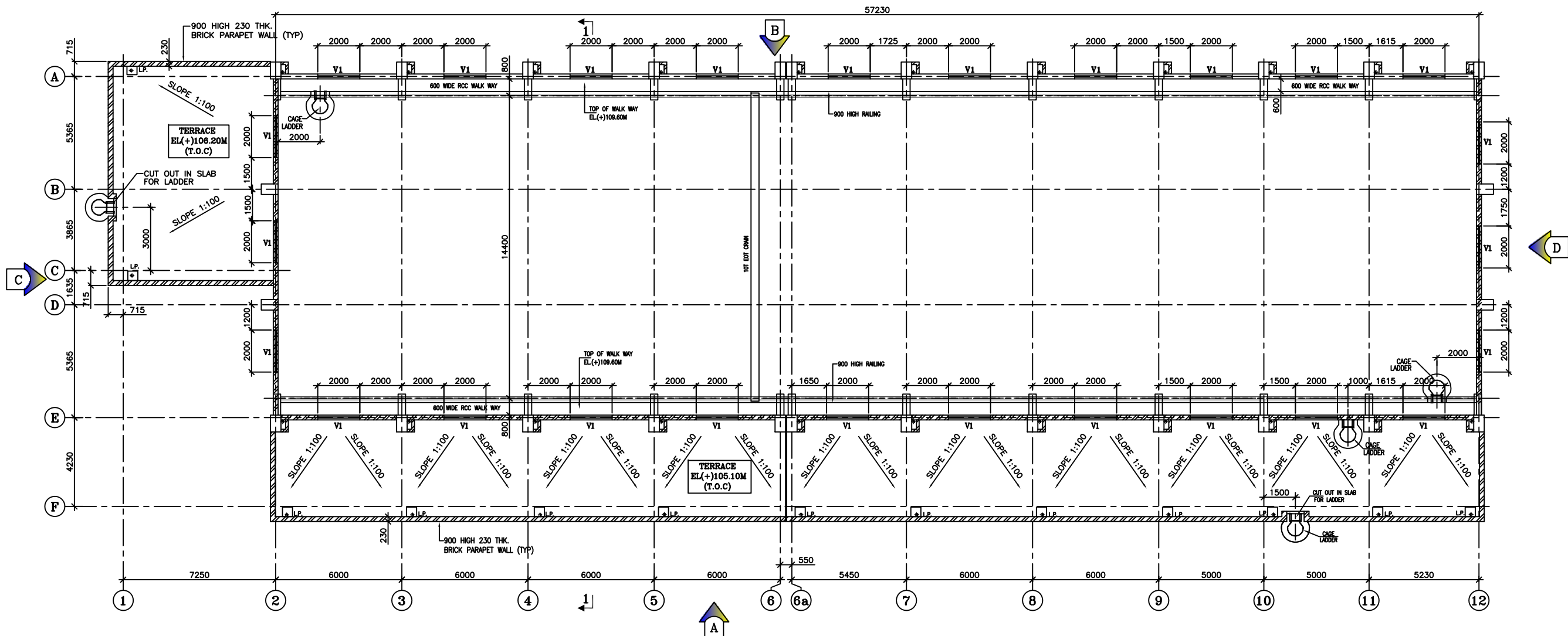
PROVIDING AND APPLYING FOUR COURSES OF WATER PROOFING TREATMENT AT ROOFS CONSISTING FIRST COURSE OF STRAIGHT RUN 85/25 GRADE BITUMEN CONFIRMING TO I.S. 73-1961@0.7 KG/SQM, SECOND COURSE OF ROOF GUARD CONSISTING OF POLYTHENE SHEETS WEIGHTING 0.12 KG/ SQM, WITH 75MM OVER LAPS, ALONG ROOF SLOPE, THIRD COURSE OF COLD CUT BACK BITUMEN B.S. GRADE @ 1.0 KG/ SQM AS PER I.S. 7290 AND THE FOURTH AND FINAL COURSE OF 1:1.5:3 CEMENT CONCRETE, 25MM THICK WITH WATER PROOFING COMPOUND (RECRO.N.3S) AS PER SPECIFICATIONS, INCLUDING ALL MATERIALS, LABOUR AND T & P ETC. REQUIRED FOR PROPER COMPLETION OF WORK.

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- FOR GIS ROOM FLOORING REFER DETAIL DRAWING.

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE			ZONE		

PROJECT: 400/220/132kV GIS SUBSTATION AT SHAMLI (U.P.)			
CUSTOMER: UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED			
BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA			
STRUCTURAL CONSULTANTS:- STRUC MECH ENGINEERS PVT. LTD. 87, OLD A.G. COLONY, KADRU, RANCHI. ☎ PH. 0651 2340631, FAX 0651 2340631		NAME	SIGN.
		DRN.	Subrata
		CHD.	Madhuk
		APPD.	Madhuk
		DATE	27.03.19
		DATE	27.03.19
		DATE	27.03.19
DEPT. TBG CODE	UNTOL. DIMS. GR. 2/M/F	SCALE	WEIGHT (KG)
		N.T.S	N.A.
TITLE 400KV GIS BUILDING ARCHITECTURAL GROUND FLOOR PLAN & FINISHES SCHEDULE		CARD CODE	DRG.NO.
		NA	TB-1-406-607-640-1
		SHT. No 01	NO. OF SHT. 03
		REF. TO ASSY. DRG.	ITEM NO.
		N.A.	N.A.
		NO. OF ITEMS	REV.
		N.A.	00



PLAN AT CRAIN GIRDER LEVEL @ EL(+109.60M
(SCALE- 1:100)

LEGEND:-

- ☐ SIDE HUNG OPENABLE PANEL
☒ FIXED GLASS PANEL
FFL = FINISH FLOOR LEVEL
FGL = FINISH GRADE LEVEL
H.P. = HIGH POINT
L.P. = LOWER POINT
TOC = TOP OF CONCRETE
FFL = FINISH FLOOR LEVEL
FGL = FINISH GRADE LEVEL

PROJECT:

400/220/132kV GIS SUBSTATION AT SHAMLI (U.P.)

CUSTOMER:

UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED



BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP
NOIDA



STRUCTURAL CONSULTANTS:-
STRUC MECH ENGINEERS PVT. LTD.
87, OLD A.G. COLONY, KADRU, RANCHI.
☎ PH. 0651 2340631, FAX 0651 2340631

NAME	SIGN.	DATE	NO.OF VAR.
DRN. Subrata		27.03.19	
CHD. Madhush		27.03.19	N.A.
APPD. Madhush		27.03.19	

DEPT. TBG CODE	UNTOL. DIMS. GR. ℓ/M/F	SCALE N.T.S	WEIGHT (KG) N.A.	REF. TO ASSY. DRG. N.A.	ITEM NO. N.A.	NO.OF ITEMS N.A.
TITLE 400KV GIS BUILDING ARCHITECTURAL PLAN AT CRAIN GIRDER LEVEL @ EL(+109.60M				CARD CODE NA	DRG.NO. TB-1-406-607-640-1	REV. 00
				SHT. No 02	NO. OF SHT. 03	

NOTES:-

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ZONE			ZONE			ZONE			ZONE		

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. TB-1-406-607-640-1

6

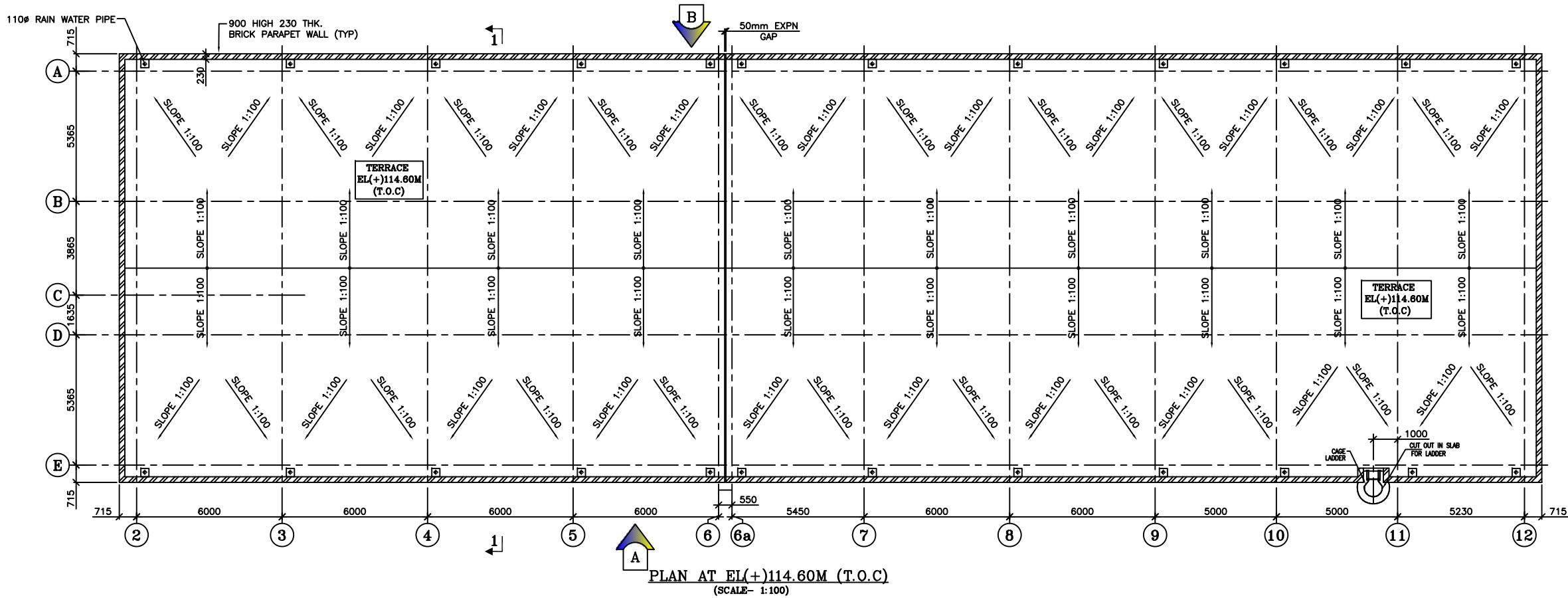
5

4

3

2

1



LEGEND:-

- SIDE HUNG OPENABLE PANEL
- FIXED GLASS PANEL
- F.F.L. = FINISH FLOOR LEVEL
- F.G.L. = FINISH GRADE LEVEL
- H.P. = HIGH POINT
- L.P. = LOWER POINT
- T.O.C. = TOP OF CONCRETE
- F.F.L. = FINISH FLOOR LEVEL
- F.G.L. = FINISH GRADE LEVEL

SCHEDULE OF DOORS & WINDOWS							REMARK
TYPE	OPENING SIZE	FRAME SIZE	CILL LEVEL	LINTEL LEVEL	NOS.	DESCRIPTION	AS PER SPECIFICATION
RS1	4500x5500	4480x5490	-	EL(+105.60M	1	STEEL ROLLING SHUTTER	
D1	1500x2500	1480x2490	-	EL(+103.10M	2	DOUBLE SHUTTER STEEL DOOR	
D2	1500x2500	1480x2490	-	EL(+103.10M	2	DOUBLE SHUTTER ALUMINIUM DOOR	
D3	2000x2500	1980x2490	-	EL(+103.10M	1	DOUBLE SHUTTER ALUMINIUM DOOR	
D4	2500x3500	2480x3490	-	EL(+104.10M	1	DOUBLE SHUTTER STEEL DOOR	
W1	2000x1200	1980x1180	900	EL(+102.70M	20	ALUMINIUM WINDOW FULLY GLAZED	
W1A	2000x1200	1980x1180	900	EL(+102.70M	9	ALUMINIUM FIXED WINDOW FULLY GLAZED	
V1	2000x600	1980x580	-	SOFFIT OF ROOF BEAM	20	FIXED ALUMINIUM VENTILATOR	

NOTES:-

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REV.

DATE

ALTERED
CHD/APPD

REV.

DATE

ALTERED
CHD/APPD

REV.

DATE

ALTERED
CHD/APPD

REV.

DATE

ALTERED
CHD/APPD

PROJECT:

400/220/132kV GIS SUBSTATION AT SHAMLI (U.P.)

CUSTOMER:

UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED



BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP
NOIDA



STRUCTURAL CONSULTANTS:-
STRUC MECH ENGINEERS PVT. LTD.
87, OLD A.G. COLONY, KADRU, RANCHI.
☎ PH. 0661 2340631, FAX 0661 2340631

NAME

DRN.

CHD.

APPD.

SIGN.

DATE

DATE

DATE

NO.OF
VAR.

N.A.

27.03.19

NO.OF
ITEMS

N.A.

27.03.19

REV.

00

DEPT.
TBG
CODE

UNTOL DIMS.
GR
Ø/M/Y



SCALE
N.T.S

WEIGHT (KG)
N.A.

REF. TO ASSY. DRG.

ITEM NO.

N.A.

TITLE
400KV GIS BUILDING
ARCHITECTURAL TERRACE PLAN

CARD
CODE
NA

DRG.NO.

TB-1-406-607-640-1

SHT. No 03

NO. OF SHT. 03

F

E

D

C

B

A

F

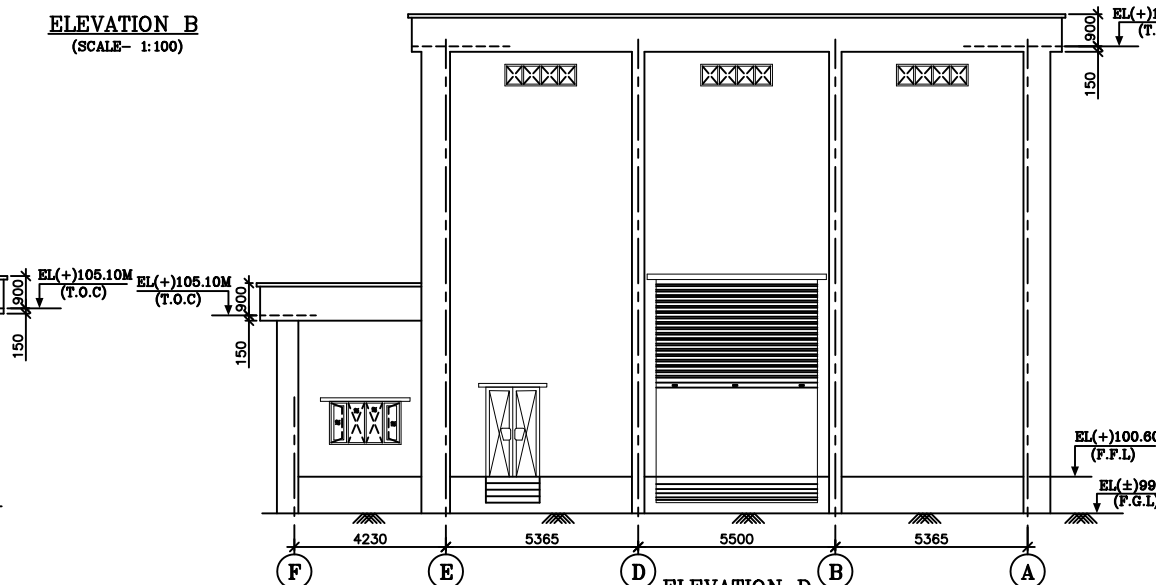
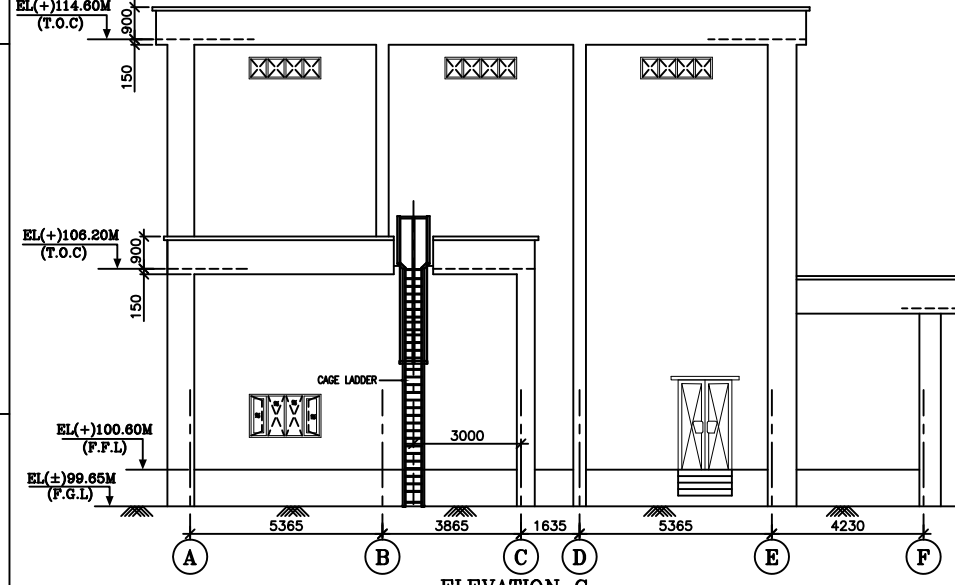
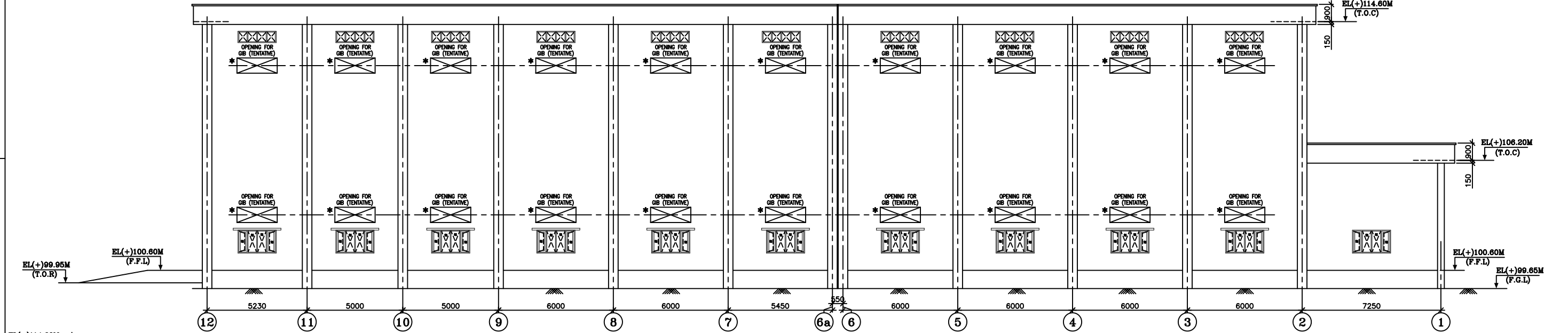
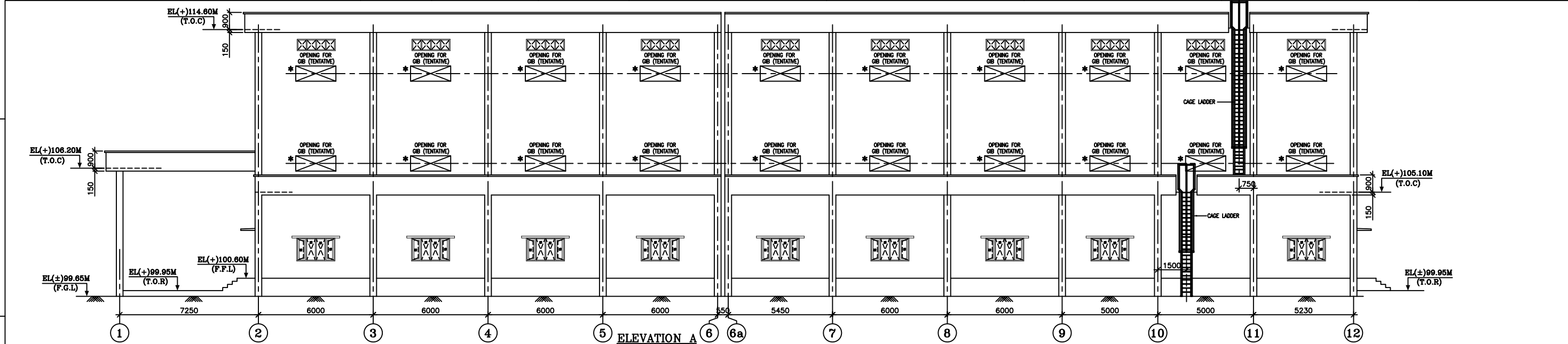
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REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD
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* RECTANGULAR CUTOUT TO BE PROVIDED CUTOUT DIMENSION & LOCATION SHALL BE PROVIDED AS PER GIS MANUFACTURE

PROJECT:

400/220/132kV GIS SUBSTATION AT SHAMLI (U.P.)

CUSTOMER:

UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED



BHARAT HEAVY ELECTRICALS LTD.
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		NAME	SIGN.	DATE	NO.OF VAR.
	DRN.	Subrata		27.03.19	N.A.
	CHD.	Madhush		27.03.19	
	APPD.	Madhush		27.03.19	

DEPT. TBG CODE	UNTOL DIMS. GR. 2/M/F		SCALE N.T.S	WEIGHT (KG) N.A.	REF. TO ASSY. DRG. N.A.	ITEM NO. N.A.	NO.OF ITEMS N.A.
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TITLE 400KV GIS BUILDING ARCHITECTURAL ELEVATIONS	CARD CODE NA	DRG.NO. TB-1-406-607-640-2	REV. 00
	SHT. No 01		NO. OF SHT. 01

F

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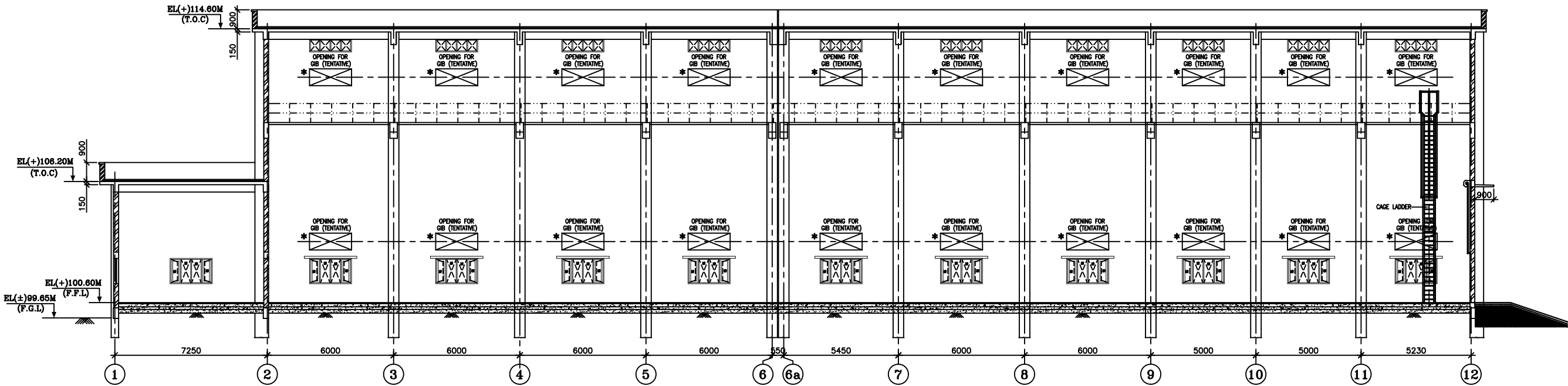
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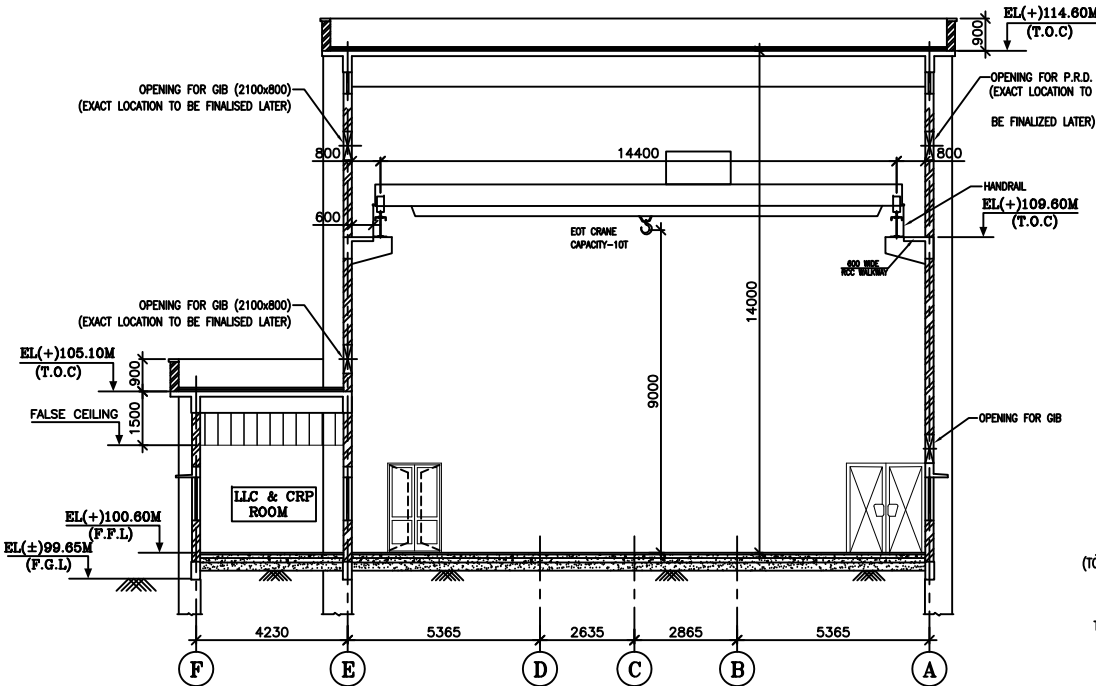
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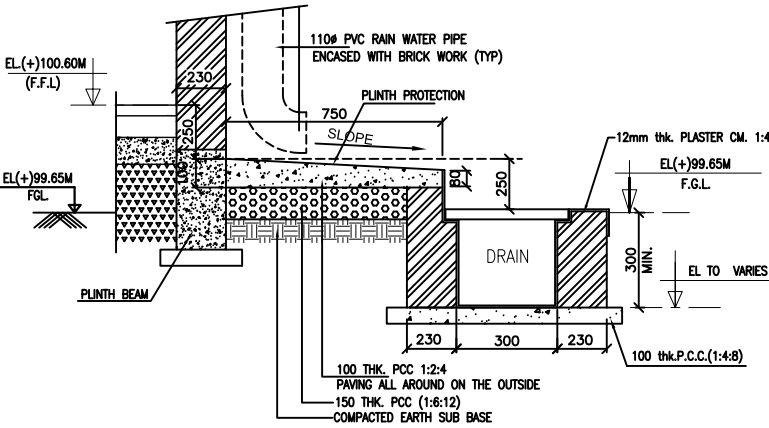
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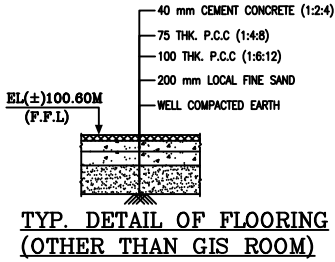
SECTION 2-2
(SCALE- 1:100)



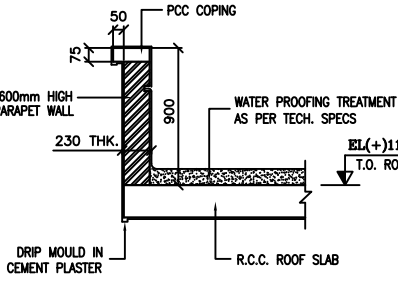
SECTION 1-1



PLINTH PROTECTION ALONG BUILDING
WITH DRAIN-TYPICAL

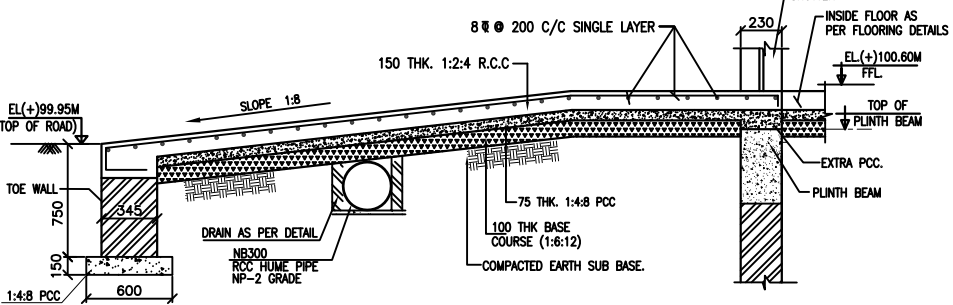


TYP. DETAIL OF FLOORING
(OTHER THAN GIS ROOM)



TYP. DETAIL OF PARAPET

* RECTANGULAR CUTOUT TO BE PROVIDED CUTOUT DIMENSION & LOCATION SHALL BE PROVIDED AS PER GIS MANUFACTURE



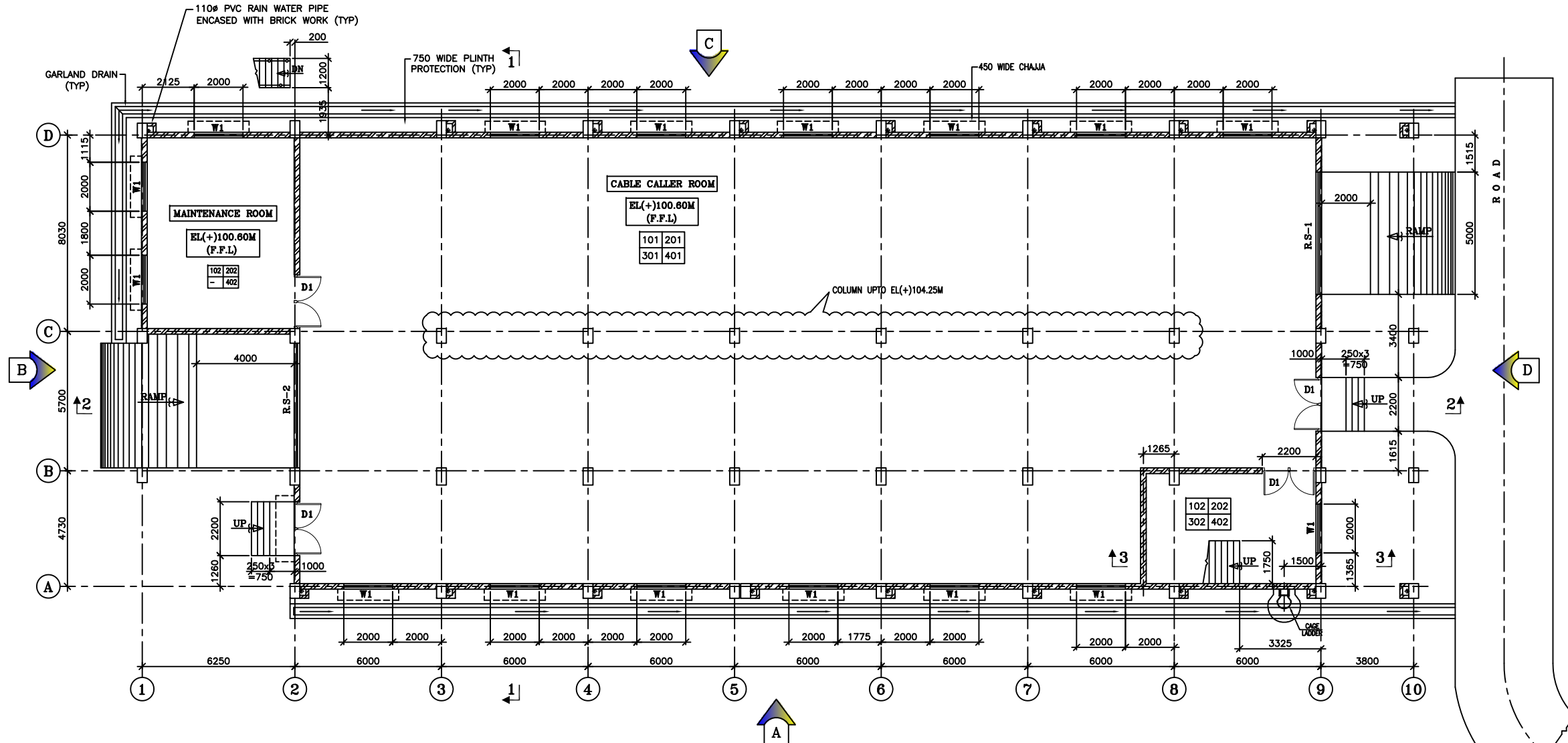
DETAIL OF RAMP

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		CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE			ZONE		

PROJECT: 400/220/132kV GIS SUBSTATION AT SHAMLI (U.P.)											
CUSTOMER: UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED											
Bharat Heavy Electricals Ltd. TRANSMISSION BUSINESS GROUP NOIDA											
STRUCTURAL CONSULTANTS:- STRUC MECH ENGINEERS PVT. LTD. 87, OLD A.G. COLONY, KADRU, RANCHI. PH. 0651 2340631, FAX 0651 2340631											
NAME				SIGN.				DATE			
DRN.				Subrata				27.03.19			
CHD.				Mishra				27.03.19			
APPD.				Mishra				27.03.19			
DEPT. TBG CODE				UNTOL. DIMS. GR. 2/M/F				SCALE N.T.S			
TITLE				400KV GIS BUILDING ARCHITECTURAL SECTIONS				WEIGHT (KG) N.A.			
CARD CODE NA				REF. TO ASSY. DRG. N.A.				ITEM NO. N.A.			
				DRG. NO. TB-1-406-607-640-3				NO. OF ITEMS N.A.			
				SHT. No 01				NO. OF SHT. 01			



LEGEND:-

- SIDE HUNG OPENABLE PANEL
✕ FIXED GLASS PANEL
F.F.L. = FINISH FLOOR LEVEL
F.G.L. = FINISH GRADE LEVEL
H.P. = HIGH POINT
L.P. = LOWER POINT
T.O.C. = TOP OF CONCRETE
F.F.L. = FINISH FLOOR LEVEL
F.G.L. = FINISH GRADE LEVEL

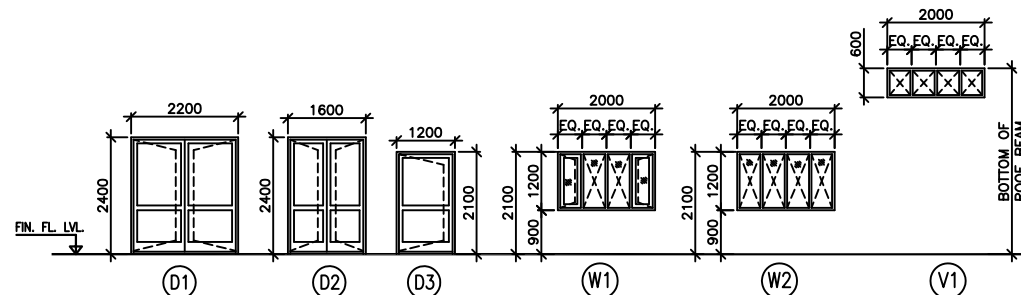
ILLUSTRATION OF FINISHES.		FINISHES OF SCHEDULE					
<table border="1"><tr><td>WALL SERIES 100</td><td>FLOORING SERIES 200</td></tr><tr><td>CEILING SERIES 300</td><td>SKIRTING/ DADO SERIES 400</td></tr></table>	WALL SERIES 100	FLOORING SERIES 200	CEILING SERIES 300	SKIRTING/ DADO SERIES 400		WALL FINISHES-	
	WALL SERIES 100	FLOORING SERIES 200					
	CEILING SERIES 300	SKIRTING/ DADO SERIES 400					
		SR.NO.	CODE NO.	DESCRIPTION			
	1.	101	ACRYLIC DISTEMPER EXTERNAL FINISHED OF WALL-WATER PROOF EXTERIOR EMULSION PAINT OF APEX ULTIMATE (ASIAN) / WEATHER SHIELD MAX (ICI) OR EQUIVALENT				
	2.	102	ACRYLIC EMULSION PAINT				
SKIRTING/DADO FINISHES		FLOORING FINISHES					
1.	401	20mm THK. (1:2) CEMENT PLASTER SKIRTING 150 MM HIGH					
2.	402	VITRIFIED TILES					
CEILING FINISHES							
1.	301	ACRYLIC DISTEMPER					
2.	302	ARYLIC EMULSION PAINT					

PLASTER:

INTERNAL:
12mm THK. PLASTER (1:4 CEMENT : SAND)
EXTERNAL:
12mm THK. PLASTER (1:4 CEMENT : SAND)
CEILING EXCEPT FOR WHERE FALSE CEILING WILL BE PROVIDED.
6mm THK. PLAIN PLASTER (1:4 CEMENT : SAND)

WATER PROOFING ON ROOF

PROVIDING AND APPLYING FOUR COURSES OF WATER PROOFING TREATMENT AT ROOFS CONSISTING FIRST COURSE OF STRAIGHT RUN 85/25 GRADE BITUMEN CONFORMING TO I.S. 73-1961@0.7 KG/SQM, SECOND COURSE OF ROOF GUARD CONSISTING OF POLYTHENE SHEETS WEIGHTING 0.12 KG/ SQM, WITH 75MM OVER LAPS, ALONG ROOF SLOPE, THIRD COURSE OF COLD CUT BACK BITUMEN B.S. GRADE @ 1.0 KG/ SQM AS PER I.S. 7290 AND THE FOURTH AND FINAL COURSE OF 1:1.5:3 CEMENT CONCRETE, 25MM THICK WITH WATER PROOFING COMPOUND (RECRO-35) AS PER SPECIFICATIONS, INCLUDING ALL MATERIALS, LABOUR AND T & P ETC. REQUIRED FOR PROPER COMPLETION OF WORK.



PROJECT:

400/220/132kV GIS SUBSTATION AT SHAMLI (U.P.)

CUSTOMER:

UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED



BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP
NOIDA



STRUCTURAL CONSULTANTS:-
STRUC MECH ENGINEERS PVT. LTD.
87, OLD A.G. COLONY, KADRU, RANCHI.
PH. 0661 2340631, FAX 0661 2340631

NAME	SIGN.	DATE	NO. OF VAR.
DRN. Subrata		01.05.19	
CHD. Madhus		01.05.19	N.A.
APPD. Madhus		01.05.19	

DEPT. TBG CODE

UNTOL. DIMS. GR. ϕ/M/Y



SCALE N.T.S.

WEIGHT (KG) N.A.

REF. TO ASSY. DRG. N.A.

ITEM NO. N.A.

TITLE
220KV GIS BUILDING
ARCHITECTURAL GROUND FLOOR PLAN &
FINISHING SCHEDULE

CARD CODE NA

DRG. NO. TB-1-406-607-651-1

REV. 00

NOTES:-

- ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
- ALL WINDOWS AND VENTILATORS ON GROUND FLOOR OF ALL BUILDINGS SHALL BE PROVIDED WITH SUITABLE MS GRILL.
- ALL DOOR-WINDOW, ETC. HEIGHT SHALL BE CONSIDERED FROM FINISH FLOOR LEVEL.
- EL.(±)0.00M CORRESPONDS TO TOP LEVEL OF ROAD (T.B.M.) WHICH IS +100.0M ABSOLUTE ELEVATION.
- EL. (+)99.95 M CORRESPONDS TO TOP OF SWITCHYARD ROAD.

REV. DATE

ALTERED CHD/APPD

ZONE

REV. DATE

ALTERED CHD/APPD

ZONE

REV. DATE

ALTERED CHD/APPD

ZONE

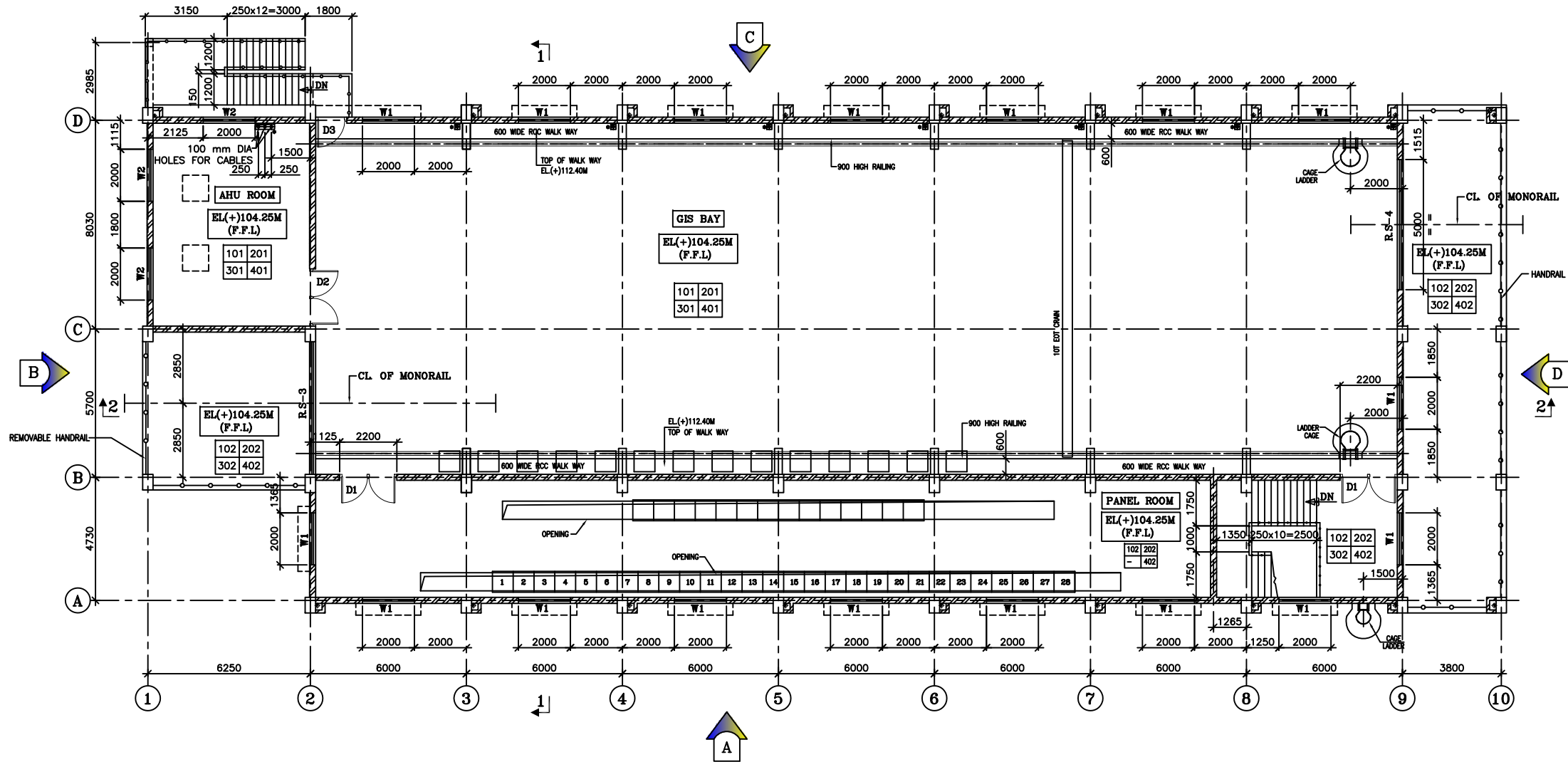
REV. DATE

ALTERED CHD/APPD

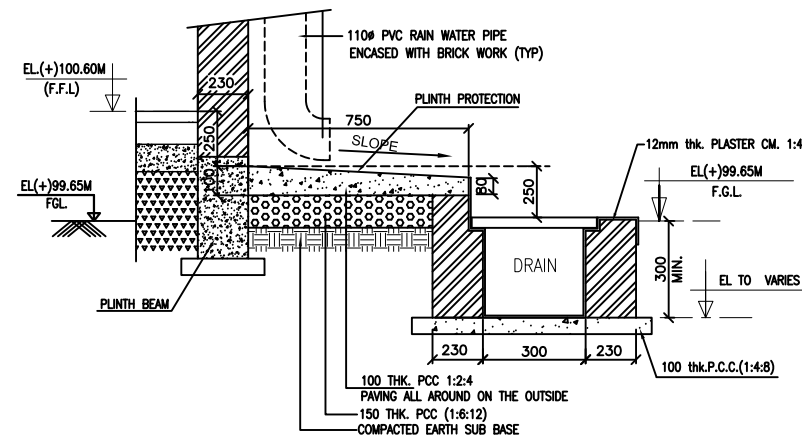
ZONE

SHT. No 01

NO. OF SHT. 03

PLAN AT EL(+104.25M (F.F.L))
(SCALE- 1:100)

SCHEDULE OF DOORS & WINDOWS							REMARK
TYPE	OPENING SIZE	FRAME SIZE	CILL LEVEL	LINTEL LEVEL	NOS.	DESCRIPTION	AS PER SPECIFICATION
RS-1	5000x3000	4980x2990	-	EL(+103.60M	1	STEEL ROLLING SHUTTER	
RS-2	5000x3000	4980x2990	-	EL(+103.60M	1	STEEL ROLLING SHUTTER	
RS-3	5000x5000	4980x4990	-	EL(+108.25M	1	STEEL ROLLING SHUTTER	
RS-4	5000x5000	4980x4990	-	EL(+108.25M	1	STEEL ROLLING SHUTTER	
D1	2200x2400	2180x2390	-	EL(+103.00M	6	DOUBLE SHUTTER STEEL DOOR	
D2	1600x2400	1580x2390	-	EL(+103.00M	1	DOUBLE SHUTTER STEEL DOOR	
D3	1200x2100	1180x2090	-	EL(+102.70M	1	SINGLE SHUTTER ALUMINIUM DOOR	
W1	2000x1200	1980x1180	900	EL(+102.70M	37	ALUMINIUM WINDOW FULLY GLAZED	
W2	2000x1200	1980x1180	900	EL(+102.70M	3	ALUMINIUM FIXED WINDOW FULLY GLAZED	
V1	2000x600	1980x580	-	SOFFIT OF ROOF BEAM		FIXED ALUMINIUM VENTILATOR	

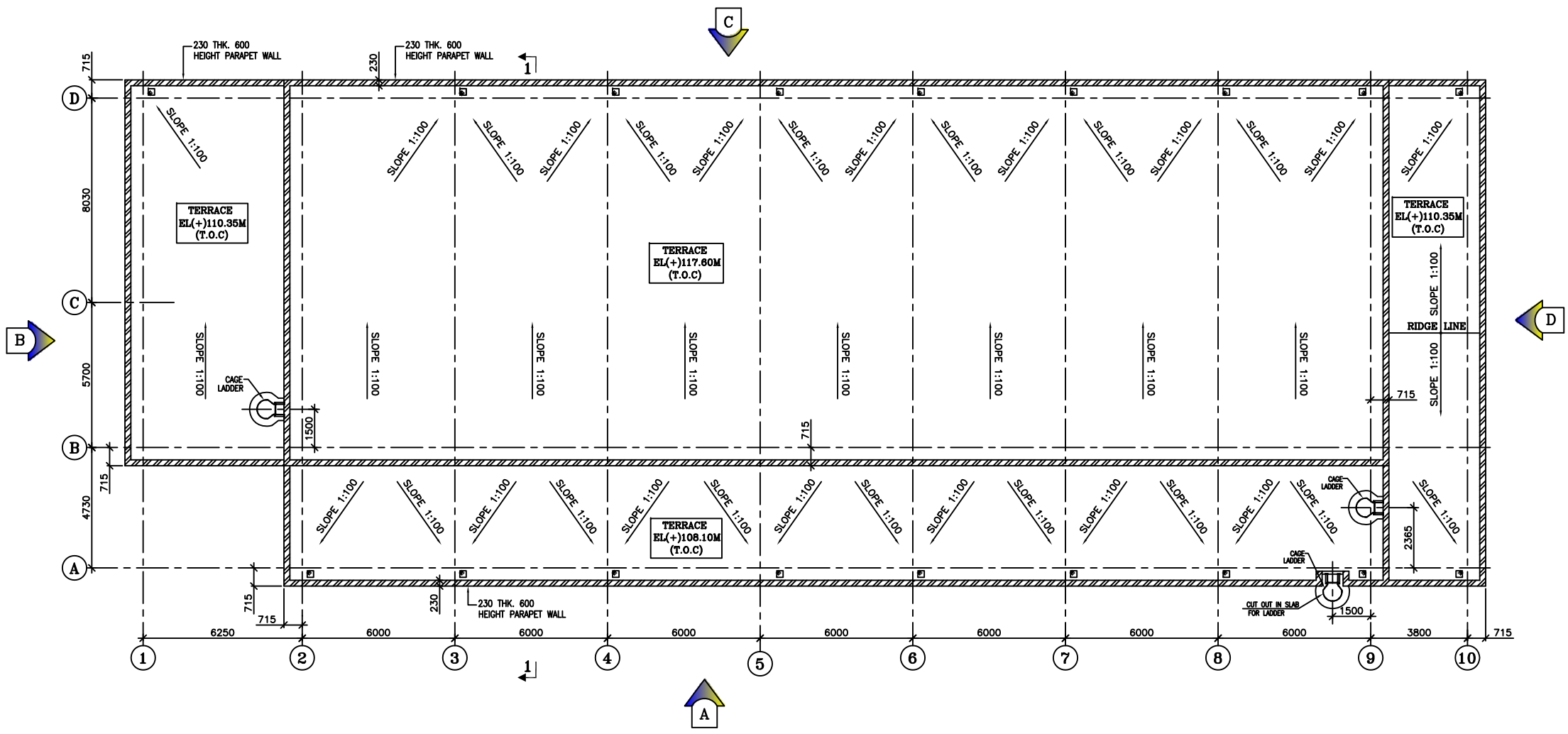
PLINTH PROTECTION ALONG BUILDING
WITH DRAIN-TYPICAL* RECTANGULAR CUTOUT TO BE PROVIDED CUTOUT DIMENSION & LOCATION
SHALL BE PROVIDED AS PER GIS MANUFACTURE

PROJECT: 400/220/132kV GIS SUBSTATION AT SHAMLI (U.P.)			
CUSTOMER: UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED			
BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA			
STRUCTURAL CONSULTANTS:- STRUC MECH ENGINEERS PVT. LTD. 87, OLD A.G. COLONY, KADRU, RANCHI. PH. 0661 2340631, FAX 0661 2340631		NAME	SIGN.
DRN.		Subrata	01.05.19
CHD.		Mishra	01.05.19
APPD.		Mishra	01.05.19
DEPT. TBG CODE	UNTOL DIMS. GR. 1/2/3/4	SCALE N.T.S	WEIGHT (KG) N.A.
TITLE 220KV GIS BUILDING ARCHITECTURAL 1st FLOOR PLAN & CRAIN GIRDER LEVEL		CARD CODE NA	DRG. NO. TB-1-406-607-651-1
SHT. No 02		NO. OF SHT. 03	

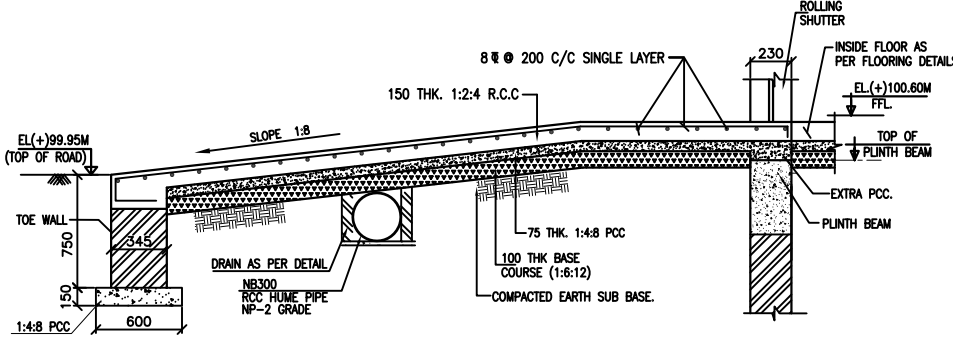
NOTES:-

- ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
- ALL WINDOWS AND VENTILATORS ON GROUND FLOOR OF ALL BUILDINGS SHALL BE PROVIDED WITH SUITABLE MS GRILL.
- ALL DOOR-WINDOW, ETC. HEIGHT SHALL BE CONSIDERED FROM FINISH FLOOR LEVEL.
- EL(±)0.00M CORRESPONDS TO TOP LEVEL OF ROAD (T.B.M.) WHICH IS +100.0M ABSOLUTE ELEVATION.
- EL. (+)99.95 M CORRESPONDS TO TOP OF SWITCHYARD ROAD.

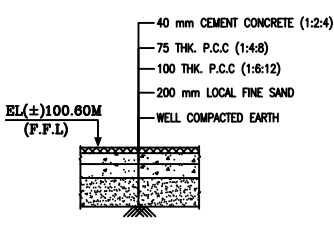
REV.	DATE	ALTERED CHD/APPD	REV.	DATE	ALTERED CHD/APPD	REV.	DATE	ALTERED CHD/APPD	REV.	DATE	ALTERED CHD/APPD
ZONE			ZONE			ZONE			ZONE		



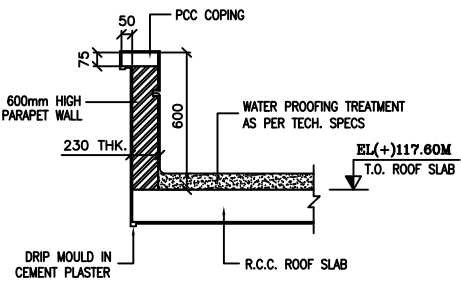
PLAN AT EL(+117.60M (T.O.C)
(SCALE- 1:100)



DETAIL OF RAMP



TYP. DETAIL OF FLOORING



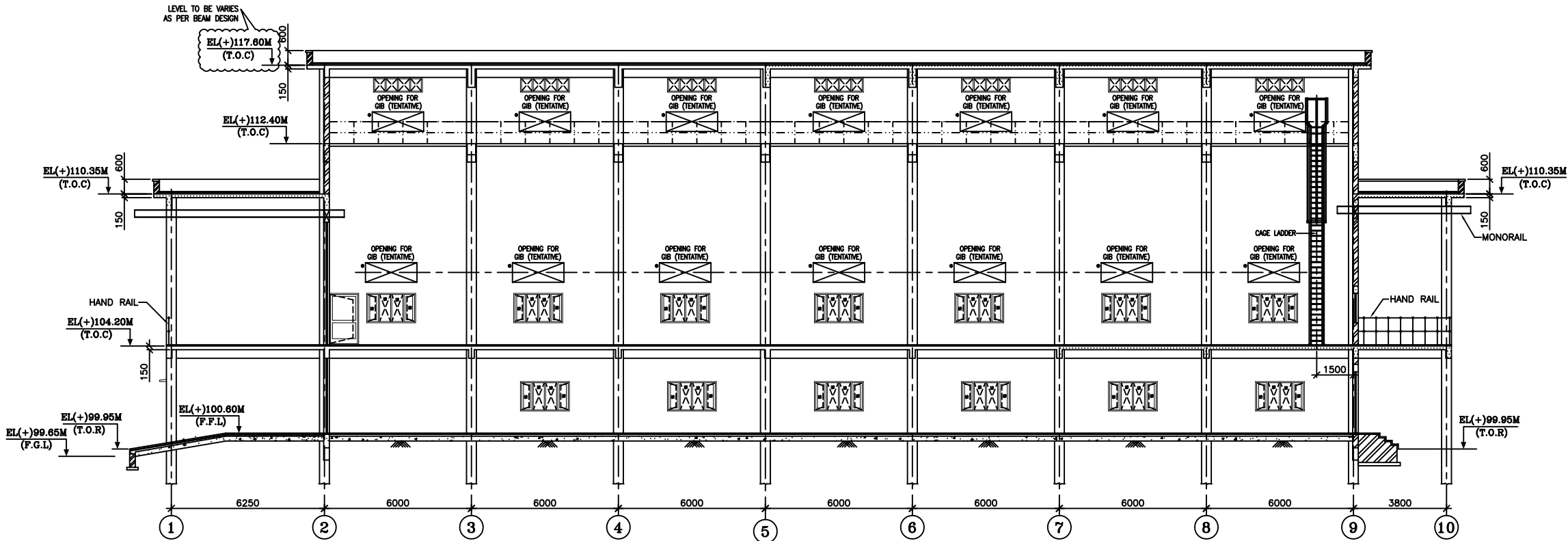
TYP. DETAIL OF PARAPET

NOTES:-

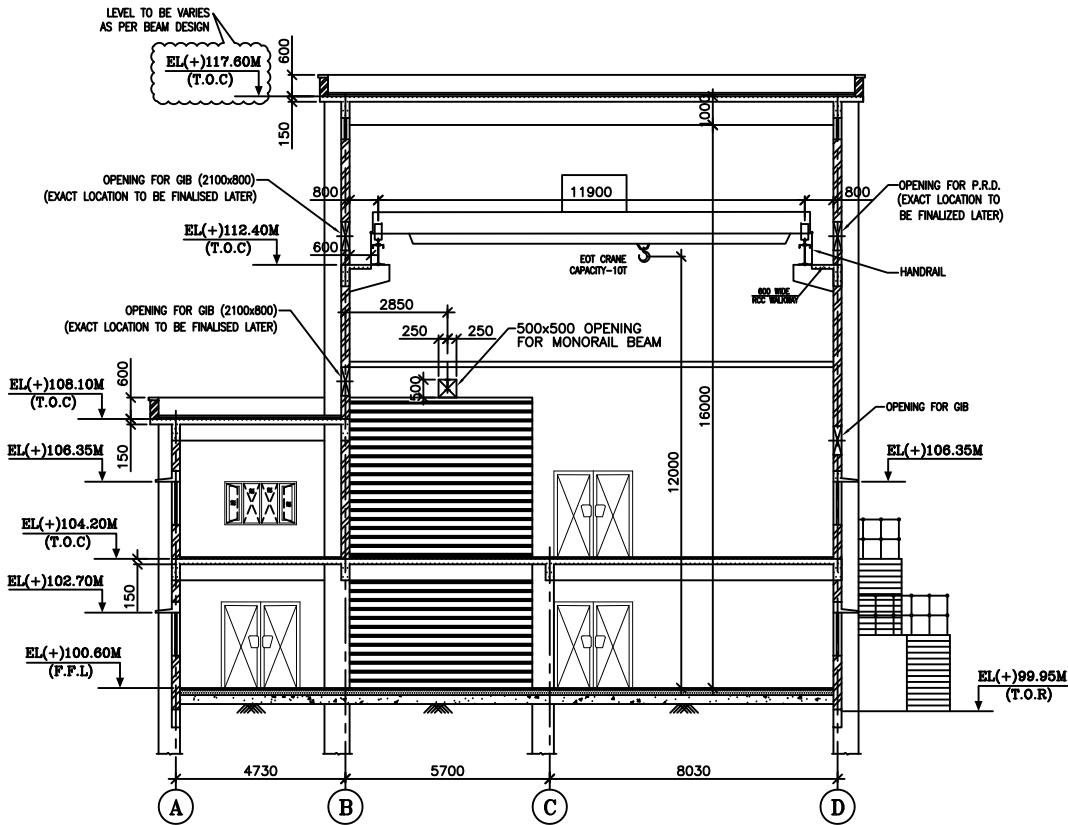
1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
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3. ALL DOOR-WINDOW, ETC. HEIGHT SHALL BE CONSIDERED FROM FINISH FLOOR LEVEL.
4. EL(+100.00M) CORRESPONDS TO TOP LEVEL OF ROAD (T.B.M.) WHICH IS +100.0M ABSOLUTE ELEVATION.
5. EL. (+)99.95 M CORRESPONDS TO TOP OF SWITCHYARD ROAD.

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE			ZONE		

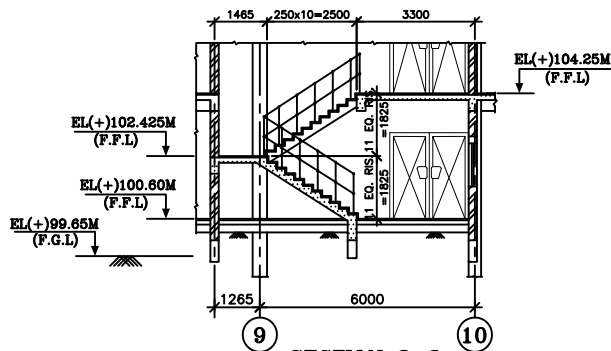
PROJECT: 400/220/132kV GIS SUBSTATION AT SHAMLI (U.P.)											
CUSTOMER: UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED											
BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA											
STRUCTURAL CONSULTANTS:- STRUC MECH ENGINEERS PVT. LTD. 87, OLD A.G. COLONY, KADRU, RANCHI. PH. 0651 2340631, FAX 0651 2340631								NAME	SIGN.	DATE	NO.OF VAR.
SME								DRN.	Subrata	01.05.19	
								CHD.	Madhush	01.05.19	N.A.
								APPD.	Madhush	01.05.19	
DEPT. TBG CODE	UNTOL. DIMS. GR. 1/4"/F	SCALE N.T.S.	WEIGHT (KG) N.A.	REF. TO ASSY. DRG. N.A.	ITEM NO. N.A.	NO.OF ITEMS N.A.					
TITLE 220KV GIS BUILDING ARCHITECTURAL TERRACE FLOOR PLAN								CARD CODE NA	DRG.NO. TB-1-406-607-651-1	REV. 00	
								SHT. No 03	NO. OF SHT. 03		



SECTION 2-2
(SCALE- 1:100)



SECTION 1-1
(SCALE- 1:100)



SECTION 3-3
(SCALE- 1:100)

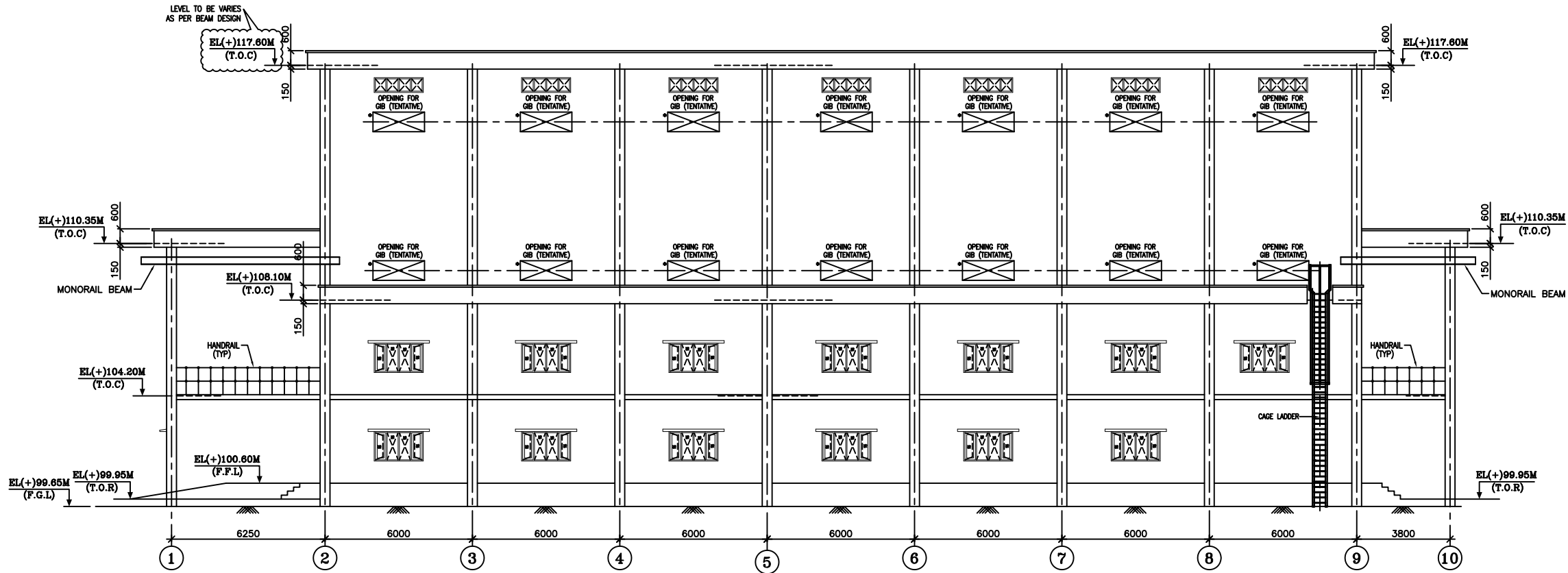
* RECTANGULAR CUTOUT TO BE PROVIDED CUTOUT DIMENSION & LOCATION SHALL BE PROVIDED AS PER GIS MANUFACTURE

NOTES:-

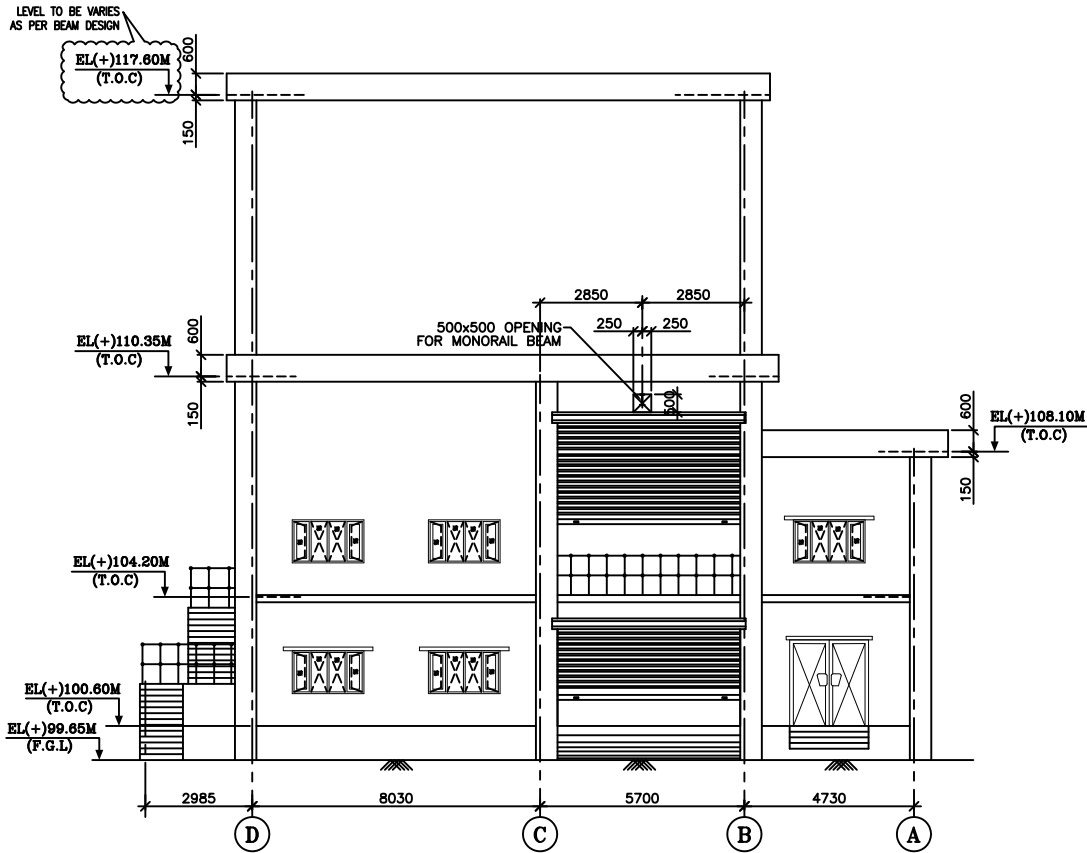
1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. ALL WINDOWS AND VENTILATORS ON GROUND FLOOR OF ALL BUILDINGS SHALL BE PROVIDED WITH SUITABLE MS GRILL.
3. ALL DOOR-WINDOW, ETC. HEIGHT SHALL BE CONSIDERED FROM FINISH FLOOR LEVEL.
4. EL(+99.65M) CORRESPONDS TO TOP LEVEL OF ROAD (T.B.M.) WHICH IS +100.0M ABSOLUTE ELEVATION.
5. EL. (+99.95 M) CORRESPONDS TO TOP OF SWITCHYARD ROAD.

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE			ZONE		

PROJECT: 400/220/132kV GIS SUBSTATION AT SHAMLI (U.P.)											
CUSTOMER: UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED											
BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA											
STRUCTURAL CONSULTANTS:- STRUC MECH ENGINEERS PVT. LTD. 87, OLD A.G. COLONY, KADRU, RANCHI. ☎ PH. 0651 2340631, FAX 0651 2340631								NAME	SIGN.	DATE	NO.OF VAR.
SME								DRN.	Subrata	01.05.19	N.A.
								CHD.	Madush	01.05.19	N.A.
								APPD.	Madush	01.05.19	N.A.
DEPT. TBG CODE	UNTOL. DIMS. GR. 2/M/F	SCALE N.T.S	WEIGHT (KG) N.A.	REF. TO ASSY. DRG. N.A.	ITEM NO. N.A.	NO.OF ITEMS N.A.					
TITLE 220KV GIS BUILDING ARCHITECTURAL SECTIONS								CARD CODE NA	DRG.NO. TB-1-406-607-651-3	REV. 00	
								SHT. No 01	NO. OF SHT. 01		



ELEVATION-A



ELEVATION-B

* RECTANGULAR CUTOUT TO BE PROVIDED CUTOUT DIMENSION & LOCATION SHALL BE PROVIDED AS PER GIS MANUFACTURE

NOTES:-

- 1 ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
- 2 ALL WINDOWS AND VENTILATORS ON GROUND FLOOR OF ALL BUILDINGS SHALL BE PROVIDED WITH SUITABLE MS GRILL.
3. ALL DOOR-WINDOW, ETC. HEIGHT SHALL BE CONSIDERED FROM FINISH FLOOR LEVEL.
4. EL(+100.00M) CORRESPONDS TO TOP LEVEL OF ROAD (T.B.M.) WHICH IS +100.0M ABSOLUTE ELEVATION.
5. EL. (+)99.95 M CORRESPONDS TO TOP OF SWITCHYARD ROAD.

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE			ZONE		

PROJECT:

400/220/132kV GIS SUBSTATION AT SHAMLI (U.P.)

CUSTOMER:

UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED



BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP
NOIDA



STRUCTURAL CONSULTANTS:-
STRUC MECH ENGINEERS PVT. LTD.
87, OLD A.G. COLONY, KADRU, RANCHI.
☎ PH. 0651 2340631, FAX 0651 2340631

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	Subrata		01.05.19	N.A.
CHD.	Mishra		01.05.19	
APPD.	Mishra		01.05.19	

DEPT. TBG CODE	UNTOL DIMS. GR. 2/M/F		SCALE N.T.S	WEIGHT (KG) N.A.	REF. TO ASSY. DRG. N.A.	ITEM NO. N.A.	NO.OF ITEMS N.A.
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TITLE

220KV GIS BUILDING
ARCHITECTURAL ELEVATION

CARD CODE NA	DRG.NO. TB-1-406-607-651-2	REV. 00
SHT. No 01		NO. OF SHT. 02

F

E

D

C

B

A

F

E

D

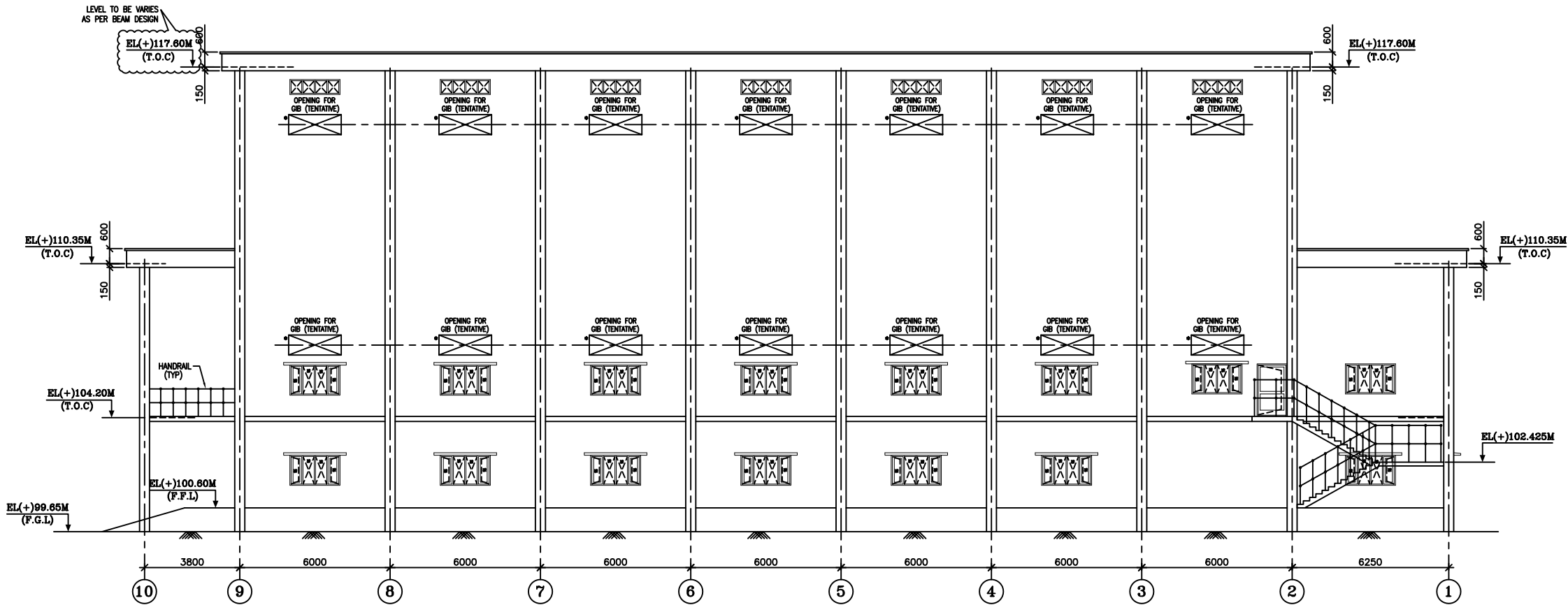
C

B

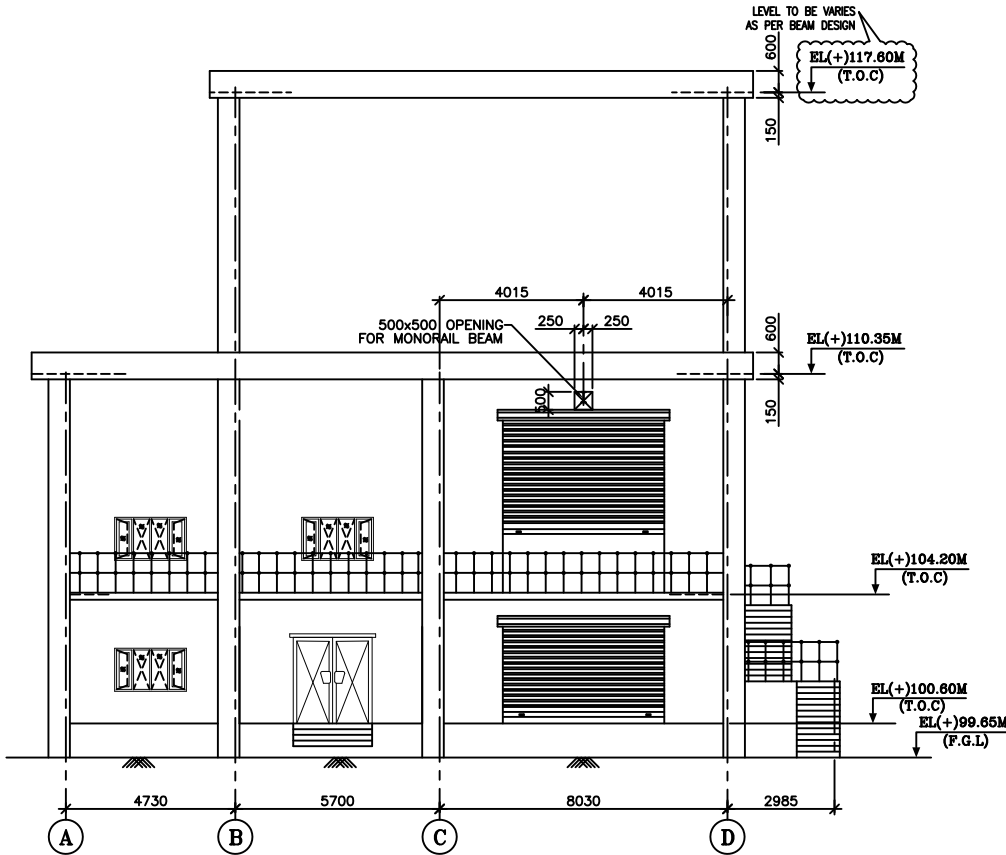
A

LEGEND:-

- ☐ SIDE HUNG OPENABLE PANEL
☒ FIXED GLASS PANEL
F.F.L. = FINISH FLOOR LEVEL
F.G.L. = FINISH GRADE LEVEL
H.P. = HIGH POINT
L.P. = LOWER POINT
T.O.C. = TOP OF CONCRETE
F.F.L. = FINISH FLOOR LEVEL
F.G.L. = FINISH GROUND LEVEL



ELEVATION-C



ELEVATION-D

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. ALL WINDOWS AND VENTILATORS ON GROUND FLOOR OF ALL BUILDINGS SHALL BE PROVIDED WITH SUITABLE MS GRILL.
3. ALL DOOR-WINDOW, ETC. HEIGHT SHALL BE CONSIDERED FROM FINISH FLOOR LEVEL.
4. EL(+100.00M) CORRESPONDS TO TOP LEVEL OF ROAD (T.B.M.) WHICH IS +100.0M ABSOLUTE ELEVATION.
5. EL. (+)99.95 M CORRESPONDS TO TOP OF SWITCHYARD ROAD.

REV.	DATE	ALTERED
		CHD/APPD
ZONE		

REV.	DATE	ALTERED
		CHD/APPD
ZONE		

REV.	DATE	ALTERED
		CHD/APPD
ZONE		

REV.	DATE	ALTERED
		CHD/APPD
ZONE		

PROJECT:

400/220/132kV GIS SUBSTATION AT SHAMLI (U.P.)

CUSTOMER:

UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED



BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP
NOIDA



STRUCTURAL CONSULTANTS:-
STRUC MECH ENGINEERS PVT. LTD.
87, OLD A.G. COLONY, KADRU, RANCHI.
☎ PH. 0651 2340631, FAX 0651 2340631

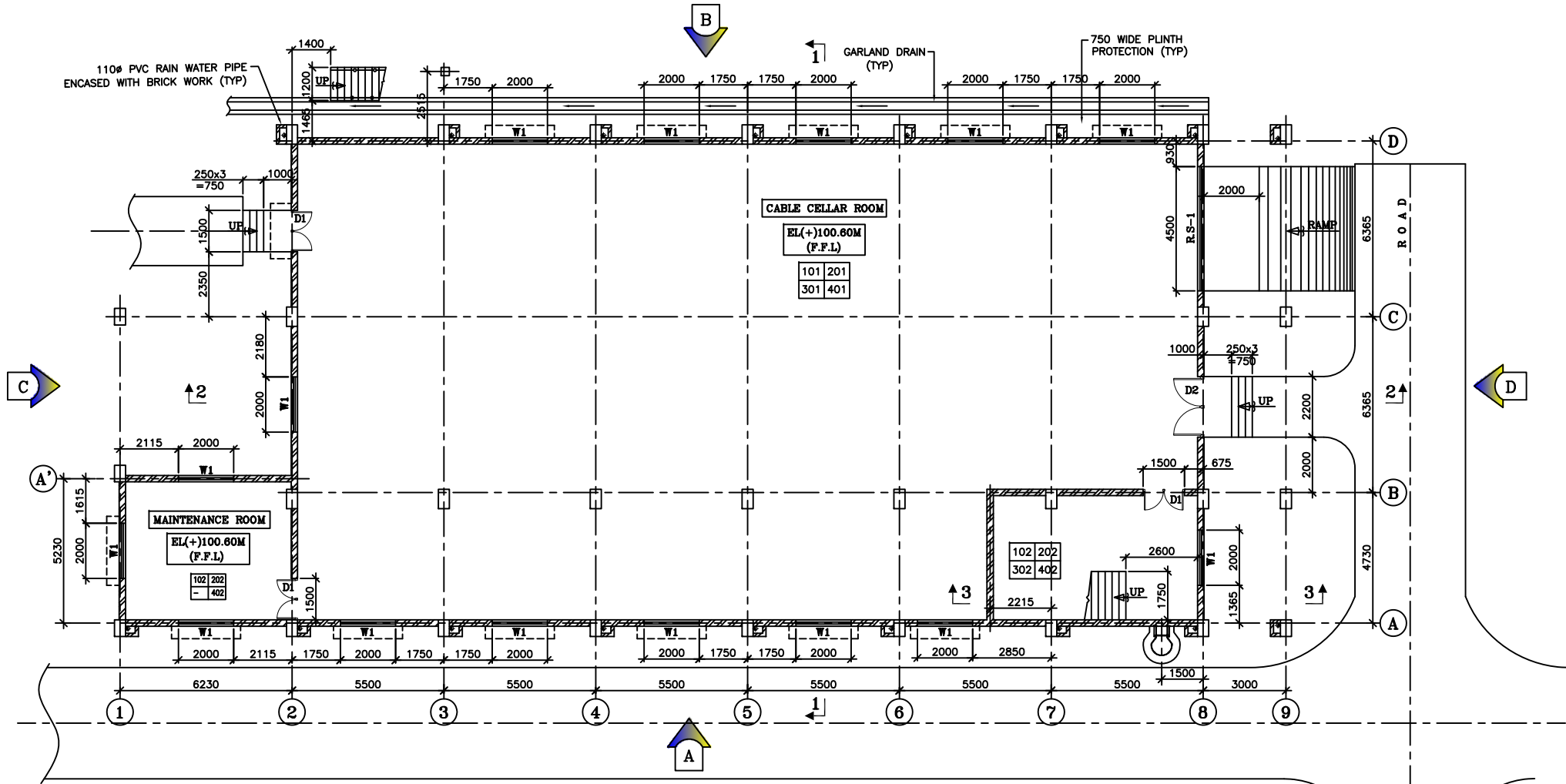
	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	Subrata		01.05.19	
CHD.	Madush		01.05.19	N.A.
APPD.	Madush		01.05.19	

DEPT. TBG CODE	UNTOL DIMS. GR. 2/M/F		SCALE N.T.S	WEIGHT (KG) N.A.	REF. TO ASSY. DRG. N.A.	ITEM NO. N.A.	NO.OF ITEMS N.A.
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TITLE

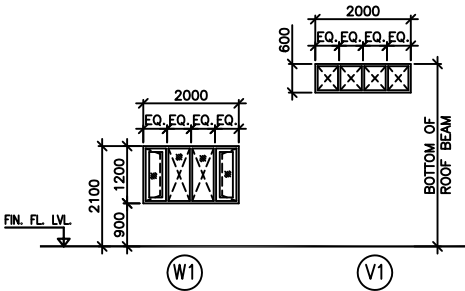
220KV GIS BUILDING
ARCHITECTURAL ELEVATION

CARD CODE NA	DRG.NO. TB-1-406-607-651-2	REV. 00
SHT. No 02		NO. OF SHT. 02



LEGEND:-

- SIDE HUNG OPENABLE PANEL
- FIXED GLASS PANEL
- F.F.L. = FINISH FLOOR LEVEL
- F.G.L. = FINISH GRADE LEVEL
- H.P. = HIGH POINT
- L.P. = LOWER POINT
- TOC = TOP OF CONCRETE
- F.F.L. = FINISH FLOOR LEVEL
- F.G.L. = FINISH GRADE LEVEL

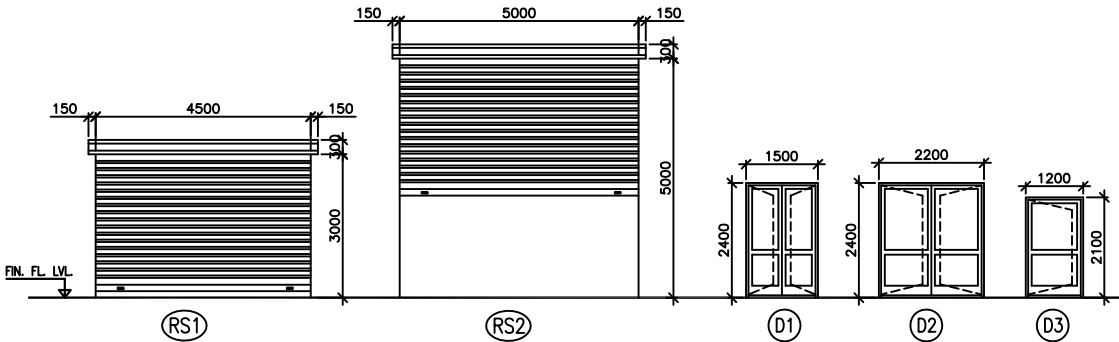


PLAN AT EL(+100.60M (F.F.L.)
(SCALE- 1:100)

ILLUSTRATION OF FINISHES.			FINISHES OF SCHEDULE																		
<table border="1"><tr><td>WALL SERIES 100</td><td>FLOORING SERIES 200</td></tr><tr><td>CEILING SERIES 300</td><td>SKIRTING/ DADO SERIES 400</td></tr></table>	WALL SERIES 100	FLOORING SERIES 200	CEILING SERIES 300	SKIRTING/ DADO SERIES 400	<table><tr><th colspan="3">WALL FINISHES—</th></tr><tr><th>SR.NO.</th><th>CODE NO.</th><th>DESCRIPTION</th></tr><tr><td>1.</td><td>101</td><td>ACRYLIC DISTEMPER EXTERNAL FINISHED OF WALL—WATER PROOF EXTERIOR EMULSION PAINT OF APEX ULTIMATE (ASIAN) / WEATHER SHIELD MAX (ICI) OR EQUIVALENT</td></tr><tr><td>2.</td><td>102</td><td>ACRYLIC EMULSION PAINT</td></tr></table>					WALL FINISHES—			SR.NO.	CODE NO.	DESCRIPTION	1.	101	ACRYLIC DISTEMPER EXTERNAL FINISHED OF WALL—WATER PROOF EXTERIOR EMULSION PAINT OF APEX ULTIMATE (ASIAN) / WEATHER SHIELD MAX (ICI) OR EQUIVALENT	2.	102	ACRYLIC EMULSION PAINT
	WALL SERIES 100	FLOORING SERIES 200																			
	CEILING SERIES 300	SKIRTING/ DADO SERIES 400																			
	WALL FINISHES—																				
SR.NO.	CODE NO.	DESCRIPTION																			
1.	101	ACRYLIC DISTEMPER EXTERNAL FINISHED OF WALL—WATER PROOF EXTERIOR EMULSION PAINT OF APEX ULTIMATE (ASIAN) / WEATHER SHIELD MAX (ICI) OR EQUIVALENT																			
2.	102	ACRYLIC EMULSION PAINT																			
SKIRTING/DADO FINISHES			FLOORING FINISHES																		
1.	401	20mm THK. (1:2) CEMENT PLASTER SKIRTING 150 MM HIGH	1.	201	CEMENT CONCRETE FLOORING(1:2:4) 40mm THK. WITH GLASS STRIP PANEL																
2.	402	VITRIFIED TILES	2.	202	VITRIFIED TILES																
CEILING FINISHES																					
1.	301	ACRYLIC DISTEMPER																			
2.	302	ARYLIC EMULSION PAINT																			

PLASTER:

INTERNAL:
12mm THK. PLASTER (1:4 CEMENT : SAND)
EXTERNAL:
12mm THK. PLASTER (1:4 CEMENT : SAND)
CEILING EXCEPT FOR WHERE FALSE CEILING WILL BE PROVIDED.
6mm THK. PLAIN PLASTER (1:4 CEMENT : SAND)



WATER PROOFING ON ROOF

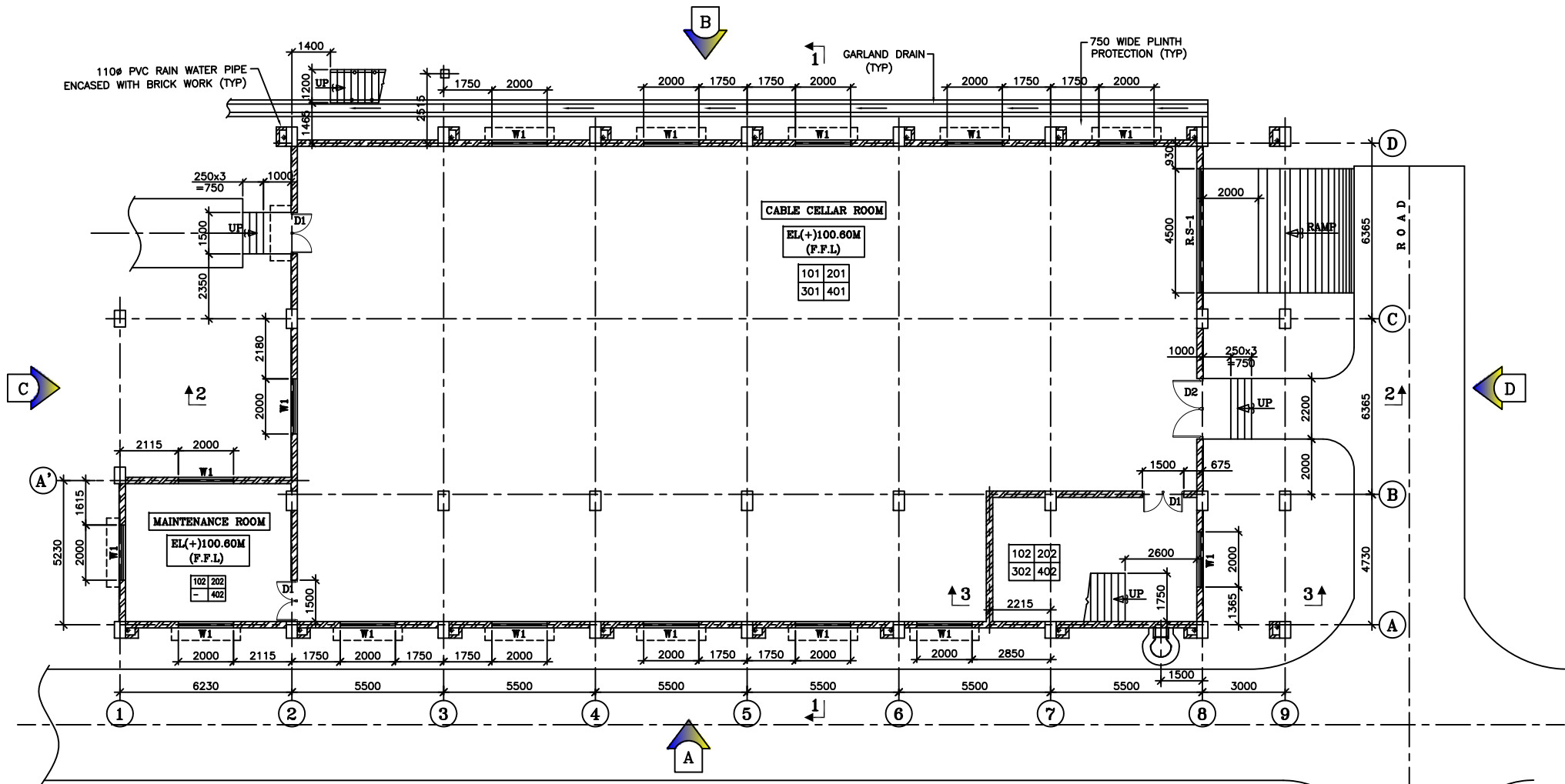
PROVIDING AND APPLYING FOUR COURSES OF WATER PROOFING TREATMENT AT ROOFS CONSISTING FIRST COURSE OF STRAIGHT RUN 85/25 GRADE BITUMEN CONFIRMING TO I.S. 73-1961@0.7 KG/SQM, SECOND COURSE OF ROOF GUARD CONSISTING OF POLYTHENE SHEETS WEIGHTING 0.12 KG/ SQM, WITH 75MM OVER LAPS, ALONG ROOF SLOPE, THIRD COURSE OF COLD CUT BACK BITUMEN B.S. GRADE @ 1.0 KG/ SQM AS PER I.S. 7290 AND THE FOURTH AND FINAL COURSE OF 1:1.5:3 CEMENT CONCRETE, 25MM THICK WITH WATER PROOFING COMPOUND (RECRON.3S) AS PER SPECIFICATIONS, INCLUDING ALL MATERIALS, LABOUR AND T & P ETC. REQUIRED FOR PROPER COMPLETION OF WORK.

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- EL(+100.00M) CORRESPONDS TO TOP LEVEL OF ROAD (T.B.M.) WHICH IS +100.0M ABSOLUTE ELEVATION.
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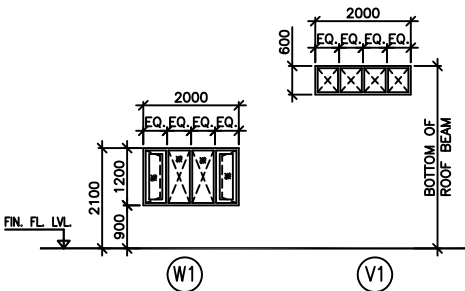
REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE			ZONE		

PROJECT: 400/220/132KV GIS SUBSTATION AT SHAMLI (U.P.)			
CUSTOMER: UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED			
BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA			
STRUCTURAL CONSULTANTS:- STRUC MECH ENGINEERS PVT. LTD. 87, OLD A.G. COLONY, KADRU, RANCHI. PH. 0651 2340631, FAX 0651 2340631		NAME	SIGN.
		DRN.	Subrata
		CHD.	Madhush
		APPD.	Madhush
		DATE	20.05.19
		DATE	20.05.19
		DATE	20.05.19
DEPT. TBG CODE	UNTOL DIMS. GR. g/m/f	SCALE	WEIGHT (KG)
		N.T.S	N.A.
TITLE 132KV GIS BUILDING ARCHITECTURAL GROUND FLOOR PLAN & FINISHING SCHEDULE		CARD CODE	REF. TO ASSY. DRG.
		NA	N.A.
		DRG.NO. TB-1-406-607-661-1	ITEM NO. N.A.
		SHT. No 01	NO. OF SHT. 02
		REV. 00	NO. OF ITEMS N.A.



LEGEND:-

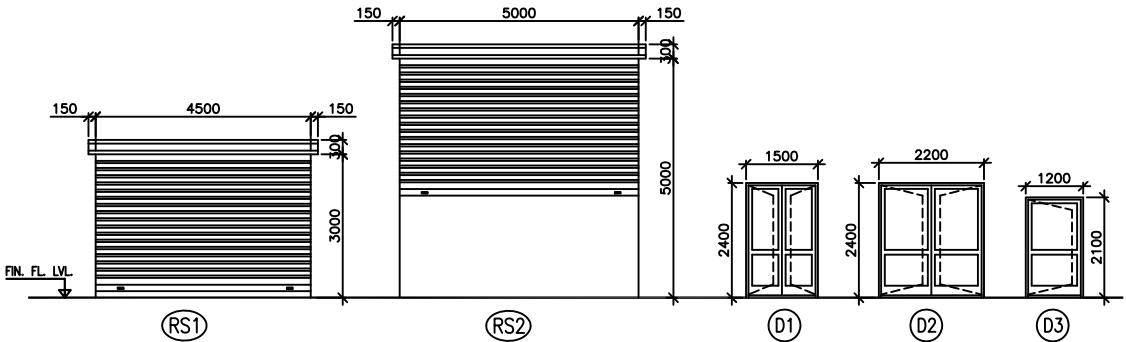
- ☐ SIDE HUNG OPENABLE PANEL
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- F.F.L. = FINISH FLOOR LEVEL
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- F.G.L. = FINISH GRADE LEVEL



PLAN AT EL(+100.60M (F.F.L.)
(SCALE- 1:100)

ILLUSTRATION OF FINISHES.			FINISHES OF SCHEDULE						
<table border="1"><tr><td>WALL SERIES 100</td><td>FLOORING SERIES 200</td></tr><tr><td>CEILING SERIES 300</td><td>SKIRTING/ DADO SERIES 400</td></tr></table>			WALL SERIES 100	FLOORING SERIES 200	CEILING SERIES 300	SKIRTING/ DADO SERIES 400	WALL FINISHES—		
WALL SERIES 100	FLOORING SERIES 200								
CEILING SERIES 300	SKIRTING/ DADO SERIES 400								
			SR.NO.	CODE NO.	DESCRIPTION				
			1.	101	ACRYLIC DISTEMPER EXTERNAL FINISHED OF WALL-WATER PROOF EXTERIOR EMULSION PAINT OF APEX ULTIMATE (ASIAN) / WEATHER SHIELD MAX (ICI) OR EQUIVALENT				
			2.	102	ACRYLIC EMULSION PAINT				
SKIRTING/DADO FINISHES			FLOORING FINISHES						
1.	401	20mm THK. (1:2) CEMENT PLASTER SKIRTING 150 MM HIGH	1.	201	CEMENT CONCRETE FLOORING(1:2:4) 40mm THK. WITH GLASS STRIP PANEL				
2.	402	VITRIFIED TILES	2.	202	VITRIFIED TILES				
CEILING FINISHES									
1.	301	ACRYLIC DISTEMPER							
2.	302	ARYLIC EMULSION PAINT							

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WATER PROOFING ON ROOF

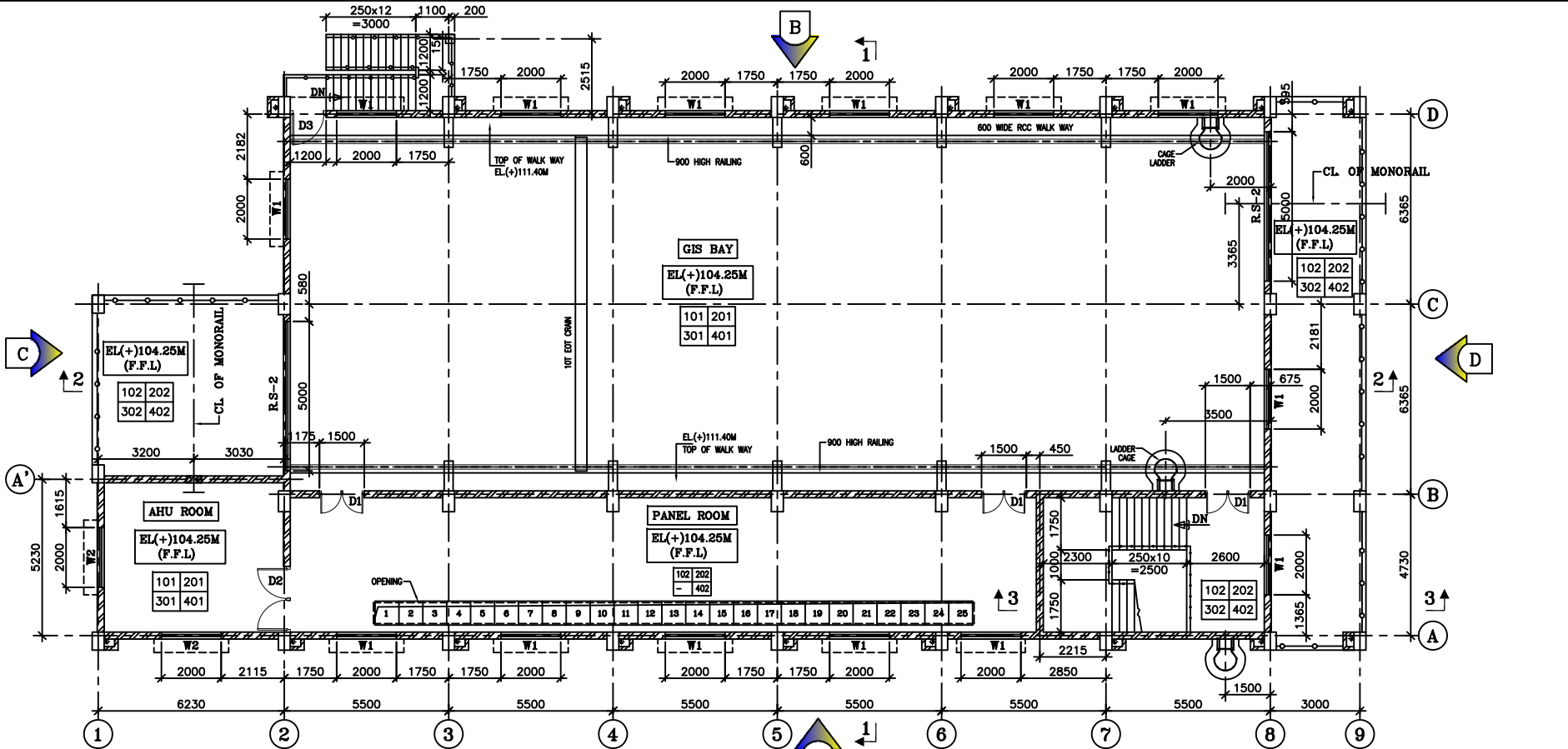
PROVIDING AND APPLYING FOUR COURSES OF WATER PROOFING TREATMENT AT ROOFS CONSISTING FIRST COURSE OF STRAIGHT RUN 85/25 GRADE BITUMEN CONFIRMING TO I.S. 73-1961@0.7 KG/SQM, SECOND COURSE OF ROOF GUARD CONSISTING OF POLYTHENE SHEETS WEIGHTING 0.12 KG/ SQM, WITH 75MM OVER LAPS, ALONG ROOF SLOPE, THIRD COURSE OF COLD CUT BACK BITUMEN B.S. GRADE @ 1.0 KG/ SQM AS PER I.S. 7290 AND THE FOURTH AND FINAL COURSE OF 1:1.5:3 CEMENT CONCRETE, 25MM THICK WITH WATER PROOFING COMPOUND (RECRON.3S) AS PER SPECIFICATIONS, INCLUDING ALL MATERIALS, LABOUR AND T & P ETC. REQUIRED FOR PROPER COMPLETION OF WORK.

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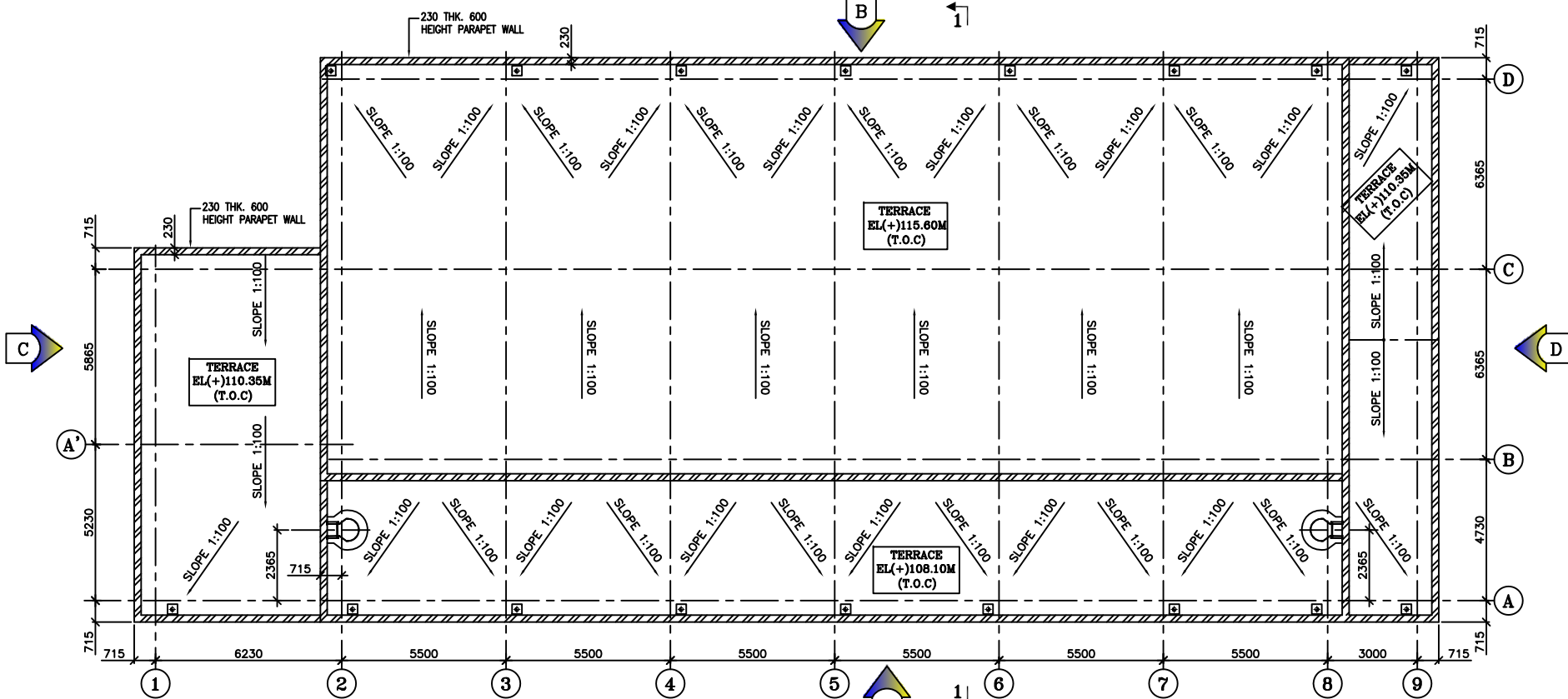
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ZONE			ZONE			ZONE			ZONE		

PROJECT:				400/220/132KV GIS SUBSTATION AT SHAMLI (U.P.)			
CUSTOMER:				UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED			
				BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA			
STRUCTURAL CONSULTANTS:- STRUC MECH ENGINEERS PVT. LTD. 87, OLD A.G. COLONY, KADRU, RANCHI. ☎ PH. 0651 2340631, FAX 0651 2340631				NAME	SIGN.	DATE	NO.OF VAR.
SME				DRN.	Subrata	20.05.19	N.A.
				CHD.	Madhush	20.05.19	N.A.
				APPD.	Madhush	20.05.19	N.A.
DEPT. TBG CODE	UNTOL DIMS. GR. g/M/f	SCALE N.T.S	WEIGHT (KG) N.A.	REF. TO ASSY. DRG. N.A.	ITEM NO. N.A.	NO.OF ITEMS N.A.	
TITLE 132KV GIS BUILDING ARCHITECTURAL GROUND FLOOR PLAN & FINISHING SCHEDULE				CARD CODE NA	DRG.NO. TB-1-406-607-661-1	REV. 00	
				SHT. No 01	NO. OF SHT. 02		



PLAN AT EL(+104.25M (F.F.L))
(SCALE- 1:100)



PLAN AT EL(+15.45M (F.F.L))
(SCALE- 1:100)

SCHEDULE OF DOORS & WINDOWS							REMARK
TYPE	OPENING SIZE	FRAME SIZE	CILL LEVEL	UNTEL LEVEL	NOS.	DESCRIPTION	AS PER SPECIFICATION
RS-1	4500x3000	4480x2990	-	EL(+103.60M	1	STEEL ROLLING SHUTTER	
RS-2	5000x5000	4980x4990	-	EL(+109.25M	2	STEEL ROLLING SHUTTER	
D1	2200x2400	2180x2390	-	EL(+103.00M	6	DOUBLE SHUTTER STEEL DOOR	
D2	1600x2400	1580x2390	-	EL(+103.00M	2	DOUBLE SHUTTER STEEL DOOR	
D3	1200x2100	1180x2090	-	EL(+106.35M	1	SINGLE SHUTTER ALUMINIUM DOOR	
W1	2000x1200	1980x1180	900	EL(+102.70M	31	ALUMINIUM WINDOW FULLY GLAZED	
V1	2000x600	1980x580	-	SOFFIT OF ROOF BEAM		FIXED ALUMINIUM VENTILATOR	

LEGEND:-

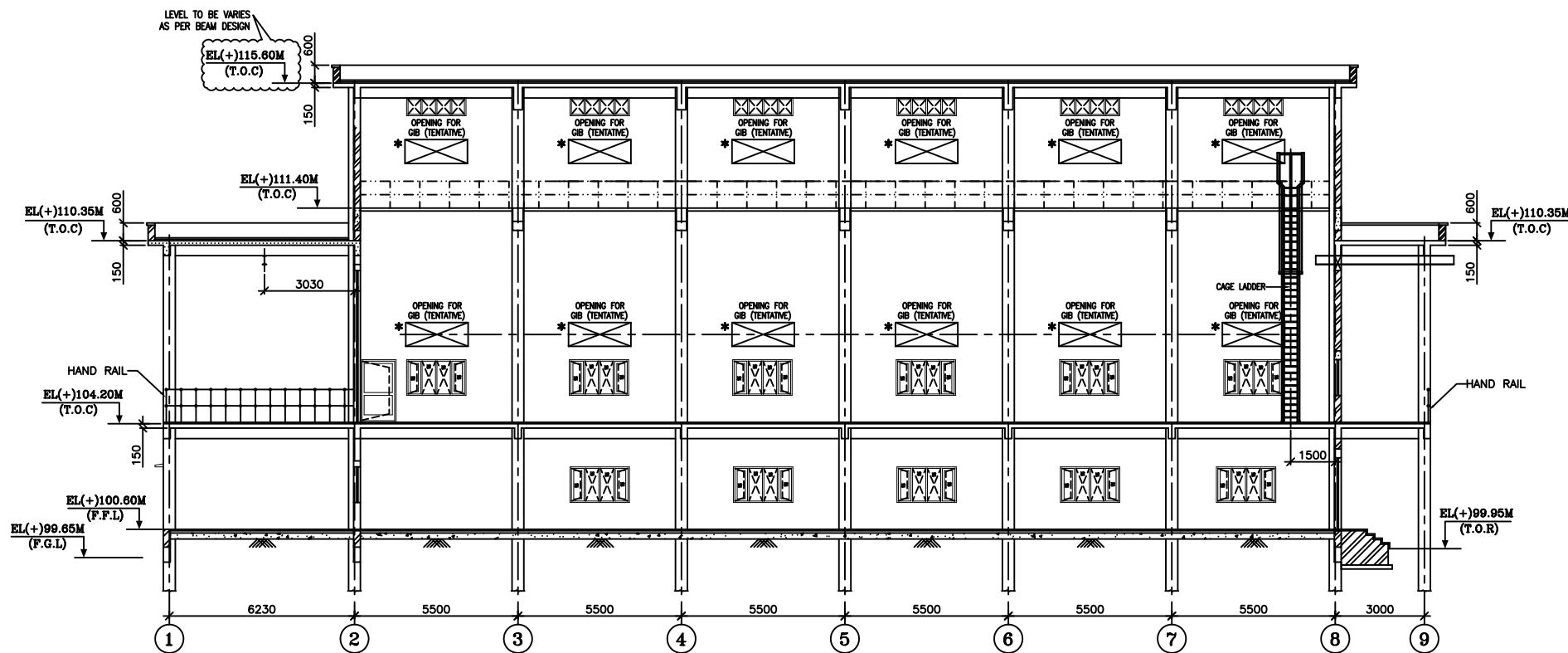
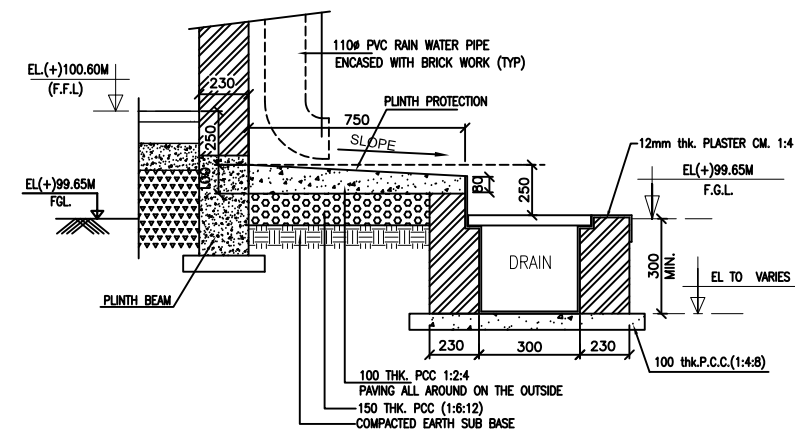
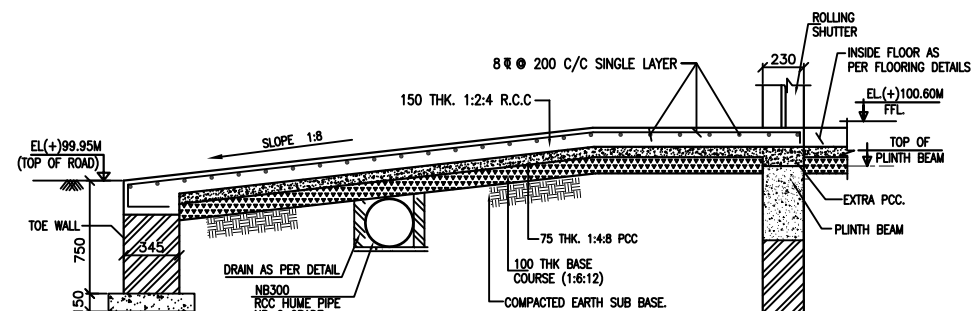
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PROJECT: 400/220/132kV GIS SUBSTATION AT SHAMLI (U.P.)											
CUSTOMER: UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED											
BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA											
STRUCTURAL CONSULTANTS:- STRUC MECH ENGINEERS PVT. LTD. 87, OLD A.G. COLONY, KADRU, RANCHI. ☎ PH. 0651 2340631, FAX 0651 2340631								NAME	SIGN.	DATE	NO.OF VAR.
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								CHD.	Madhush	20.05.19	N.A.
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DEPT. TBG CODE	UNTOL DIMS. GR. g/m/f		SCALE N.T.S	WEIGHT (KG) N.A.	REF. TO ASSY. DRG. N.A.	ITEM NO. N.A.	NO.OF ITEMS N.A.				
TITLE 132KV GIS BUILDING ARCHITECTURAL 1st FLOOR PLAN, CRAIN GIRDER LEVEL & TERRACE FLOOR PLAN								CARD CODE NA	DRG.NO. TB-1-406-607-661-1	REV. 00	
								SHT. No 02	NO. OF SHT. 02		

SECTION 2-2
(SCALE: 1:100)PLINTH PROTECTION ALONG BUILDING
WITH DRAIN-TYPICAL

DETAIL OF RAMP

LEGEND:-

- SIDE HUNG OPENABLE PANEL
- FIXED GLASS PANEL
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* RECTANGULAR CUTOUT TO BE PROVIDED CUTOUT DIMENSION & LOCATION SHALL BE PROVIDED AS PER GIS MANUFACTURE

PROJECT:
400/220/132kV GIS SUBSTATION AT SHAMLI (U.P.)CUSTOMER:
UTTAR PRADESH POWER TRANSMISSION CORPORATION LIMITED **BHARAT HEAVY ELECTRICALS LTD.**
TRANSMISSION BUSINESS GROUP
NOIDASTRUCTURAL CONSULTANTS:-
STRUC MECH ENGINEERS PVT. LTD.
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PH. 0651 2340631, FAX 0651 2340631

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DRN.	Subrata	20.05.19	
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APPD.	Madhush	20.05.19	

DEPT. TBG CODE	UNTOL. DIMS. GR. 2/M/F	SCALE N.T.S	WEIGHT (KG) N.A.	REF. TO ASSY. DRG. N.A.	ITEM NO. N.A.	NO. OF ITEMS N.A.
TITLE 132KV GIS BUILDING ARCHITECTURAL SECTIONS				CARD CODE NA	DRG. NO. TB-1-406-607-661-3	REV. 00
				SHT. No 01	NO. OF SHT. 01	

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ZONE			ZONE			ZONE			ZONE		

TYP. DETAIL OF FLOORING

TYP. DETAIL OF PARAPET

F

E

D

C

B

A

F

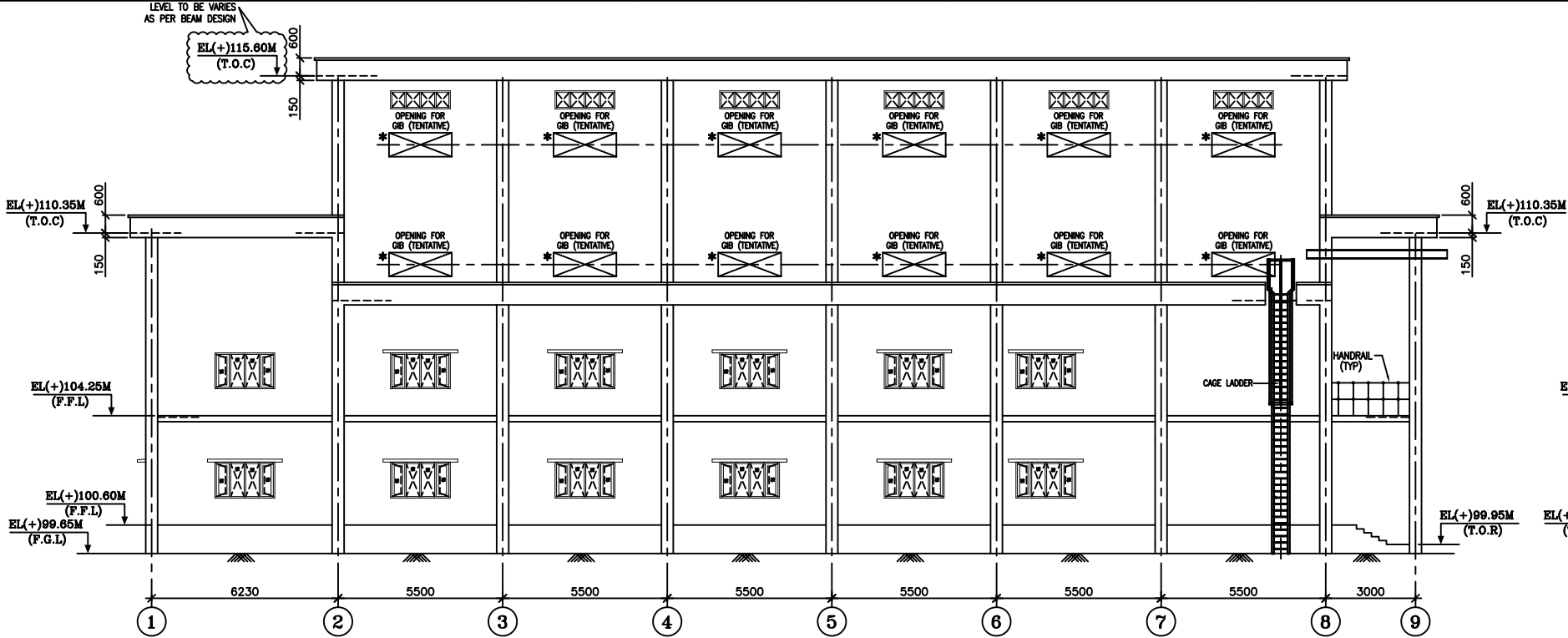
E

D

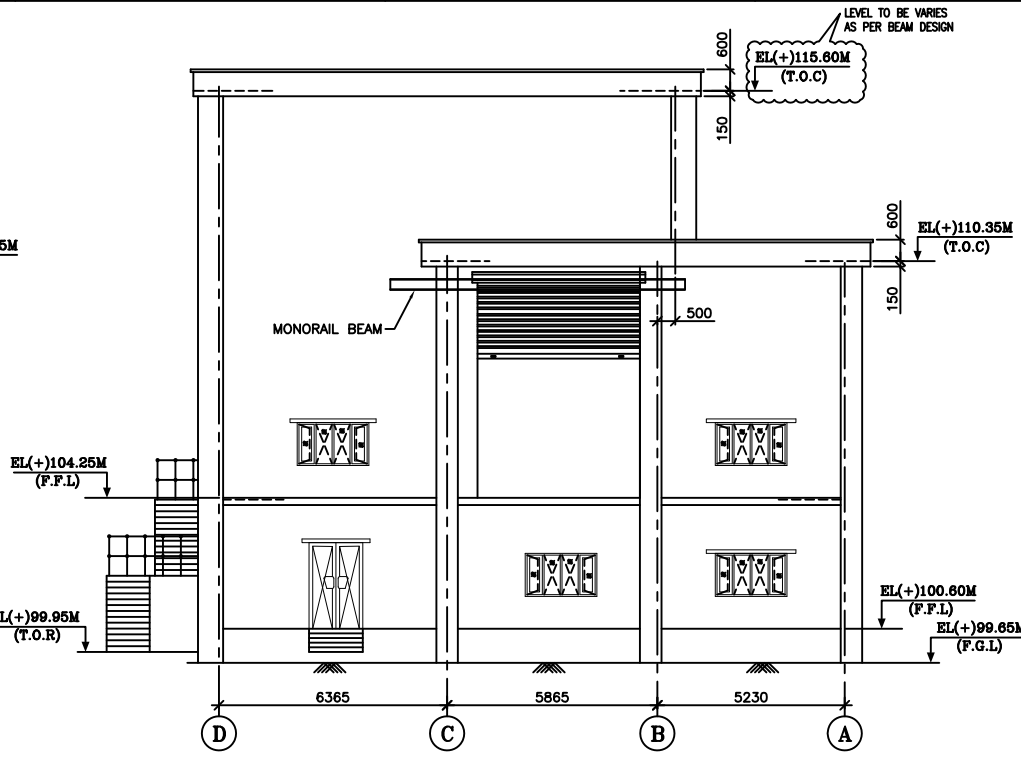
C

B

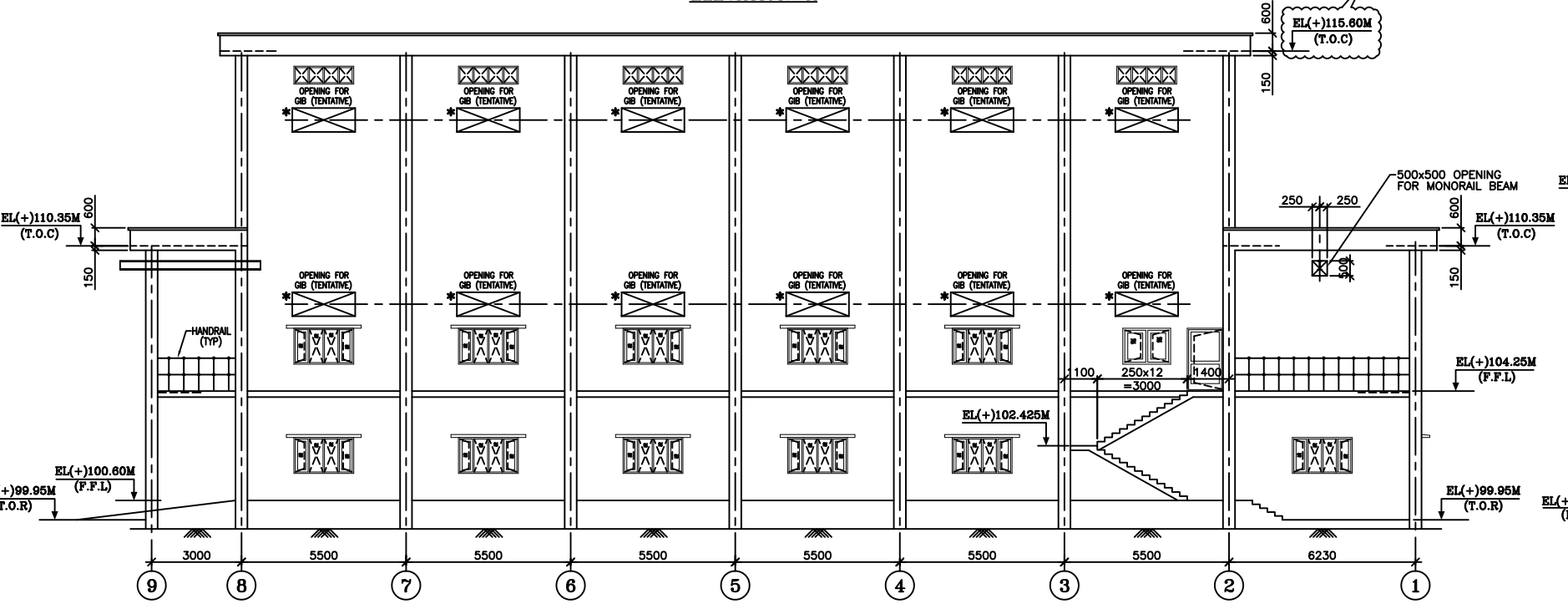
A



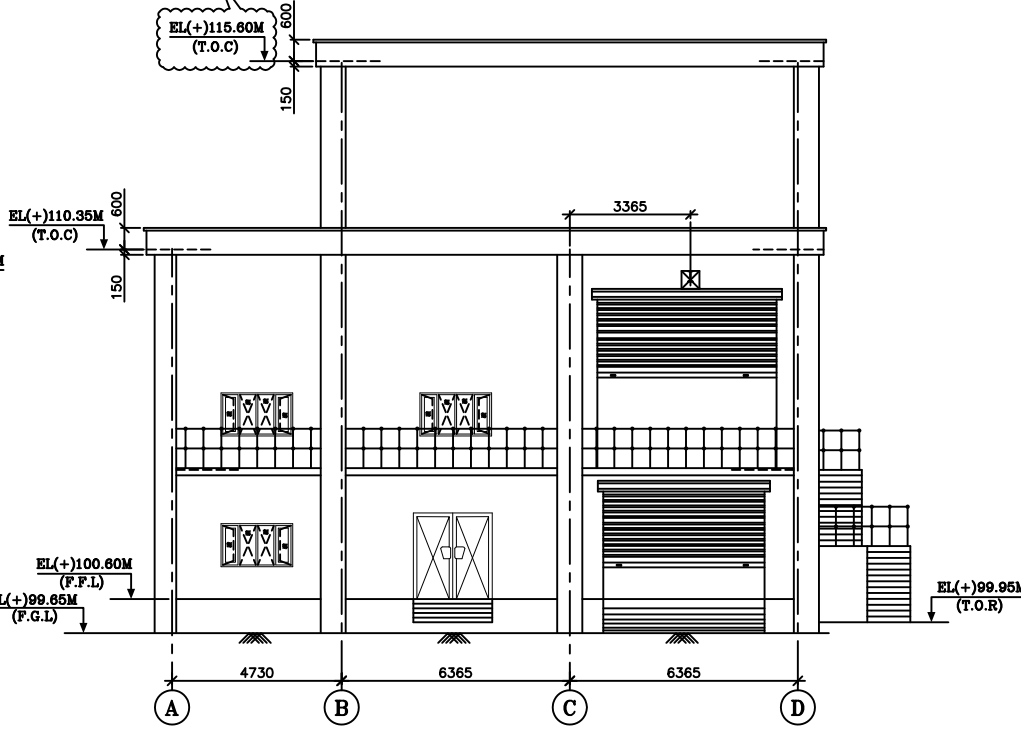
ELEVATION-A



ELEVATION-C



ELEVATION-B



ELEVATION-D

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TITLE 132KV GIS BUILDING ARCHITECTURAL ELEVATION								CARD CODE NA	DRG.NO. TB-1-406-607-661-2	REV. 00	
								SHT. No 01	NO. OF SHT. 01		