Bid Ref. No.: PKG-04-C1A (i)

Bid Documents

Work Package: Sub-Station, BBT, LPS & Solar System.

Project: **Bengal Hotels & Resort Ltd,**
208, Tejgaon-Gulshan Link Road, Dhaka

Client: **Bengal Hotel & Resort Ltd**
75, Gulshan Avenue, Gulshan 1, Dhaka

Project Management Consultant
Deltadesh (Pvt) Ltd.
Apt-C-1, House 1/A, Road 79, Gulshan 2, Dhaka

Main Consultant
Dynamic Engineering Consultants Co. Ltd.
Bangkok, Thailand

MEP Local Consultant:
Utility Professionals
House-38 (GF, 1F & 2F), Block-B, Road-07,
Banasree, Rampura, Dhaka.
Website:www.up-bd.com

Date: August 26, 2024

Deltadesh Pvt. Ltd. Dhaka

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ABSTRACT OF BID

1.	Name of the Project	:	**Bengal Hotel & Resorts Limited**
2.	Name of the work	:	Supply, Installation, Testing, Commissioning & Documentation of Sub-Station, BBT, LPS & Solar System.
3.	Performance Security / Guarantee	:	10% of the Contract amount for imported item (A) is to be deposited in the form of a Bank Guarantee in a specified format from a scheduled Bank. It will be released after successful completion of the work.
			10% of the Contract amount for local item (B) & Installation work (C) is to be deducted from each certified bill. It will be released after successful completion of one year of the warranty period.
4.	Work Completion Time	:	12 months from the date of the Work Order.
5.	Warranty / Defect Liability Period	:	18 months from the date of Delivery or 12 months from the date of commissioning whichever is later.
6.	Validity of Bid	:	90 (ninety) days from the opening of the Bid.
7.	Validity of Contract	:	3 (three) years from the date of the Work Order.
8.	Custom duty, VAT, Taxes, etc. on imported item	:	To be paid by the client
9.	Liquidated damage		0.1% of the Contract amount for delay of every calendar day. It shall not exceed 10% of the Contract amount
10.	Bidders' qualification	:	As per the Bid Notice. In addition, a. Require similar work experience in at least 3 (three) similar Projects within the last 7 (seven) years with the same brand of major equipment. Required to submit a copy of the work completion certificate from the competent authority. b. Must be an authorized distributor of the Major equipment. Required to submit a copy of the Authorization certificate.
11.	Supervision	:	The contractor's representative at the site must be a Graduate Engineer (Electrical) with at least 5 (five) years of experience in a relevant field as well as in a Hotel project.
			Need to submit proposed organogram with CVs for this Project Team to work at the site for full time.
12.	Rate Analysis	:	Every Bid must be accompanied by an analysis of rates of all the items quoted in Taka of the bill of quantity Schedule.
13.	Enhancement of rate	:	No enhancement of rate shall be entertained in the event of price escalation or any other reasons.
14.	Evaluation of Bid	:	The marks distributed for the technical offer is 70 and



			for the Financial offer is 30 marks. The Bids shall be sorted based on total marks obtained. However, the client reserves right to carry out post Bid negotiation with bidders for any technical and financial issues. The client reserves the right to accept any Bid or cancel all the Bids without assigning any reason.
15.	Currency of Bid and Payment	:	As per BOQ Schedule based on unit rate.
16.	Mode of payment	:	a)For imported items: by irrevocable L/C at sight by Client b)For local works: As per work progress
17.	Minimum amount for Running Bill	:	20% of the Contract amount of corresponding currency.
18.	Minimum amount of 3rd party insurance	:	Tk. 50,000 (fifty thousand) per incidence. A number of incidence is unlimited.
19.	Consistency of quoted rate	:	The rate must be the same for the same item repeating under different titles of works. In case of such evidence, the lowest rate to be considered.
20.	Language of Bid	:	All catalogs, manuals, etc. shall be in English.
21.	Equipment Plinth & Punch in RCC	:	The Contractor will supply Equipment Plinth drawings, and minimum Punch requirement drawings in RCC Wall floor or roof. The Client will carry out those works getting detailed structural drawings from the Structural designer.
22.	Special instruction	:	a) The Contractor is to verify the size and quantity of individual items before placement of the order.
		:	b)The work is based on actual measurement of work done. For any imported item, the Contractor is to verify the quantity before ordering.
23.	Recommended list of manufactures	:	A recommended list of manufacturers is enclosed. However, any internationally certified product from the USA/ EU / Japan/ Korea/ Turkey/ / Australia is acceptable.
Note: Any issue mentioned in Bid documents contradicts that of "Abstract of Bid", the same mentioned in "Abstract of Bid" shall be governed.			

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INSTRUCTIONS TO BIDDERS
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INSTRUCTIONS TO BIDDERS

A. General

1. Scope of Bid 1.1 Supply, Installation, Testing and Commissioning with documentation of Sub-Station, BBT, LPS & Solar System.

2. Eligible Bidders 2.1 As mentioned in Bid Notice or Abstract of Bid.

3. Bidder's information 3.1 All bidders shall include the following information and documents with their bids: (Annexure-A)

(a) Copies of original documents defining the constitution or legal status, place of registration, and principal place of business; written power of attorney of the signatory of the Bid (with attestation of signature) to commit the Bidder.

(b) Total monetary value of supply, installation, testing and commissioning of Sub-Station, BBT, LPS & Solar System. performed for each of the last ten years, copy of the Work Order and completion certificate must be attached.

(c) Experience in works of a similar nature and size for each of the last five years, and details of work under way or contractually committed; and clients who may be contacted for further information on those contracts.

(f) Organogram of the Company with CV's of fulltime appointed Key Technical personnel at least serving from last one year.

(d) Contractor's proposed Site Organogram with CV's of Key Technical personnel.

(e) Information regarding any litigation, current or during the last five years, in which the Bidder is involved, the parties concerned, and disputed amount; and

(f) Proposals for subcontracting components of the Works amounting to more than 10 percent of the Contract Price.

(g) Proposed Time schedule based on Work Completion Time in Microsoft Project.

3.2 Bids shall not be submitted with a Joint venture of two or more companies:

3.3 To qualify for award of the Contract, bidders shall meet the following minimum qualifying criteria:

(a) At least one experience as contractor for works with similar nature of complexity over the 5 years;

(b) Technical Manpower as listed below:
  (i) Graduate Electrical Engineer- having at least 5 years of experience on the relevant field.
  (ii) Junior Electrical Engineer- having at least 5 years of experience.

(e) The bidder should have at least one service centre located in Dhaka city with proper established facility e.g qualified manpower, stock of essential spare parts, transport and communication (telephone) etc. satisfactory to the employer. Full details of the facilities should be submitted along with offer.

A consistent history of litigation or arbitration awards against the

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Applicant or any partner of a Joint Venture may result in disqualification.

4. One Bid per Bidder Each Bidder shall submit only one Bid, either individually or as a partner in a joint venture. A Bidder who submits or participates in more than one Bid will cause all the proposals with the Bidder's participation to be disqualified.

5. Cost of Bidding The Bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible or liable for those costs.

6. Site Visit The Bidder, at the Bidder's own responsibility and risk, is encouraged to visit and examine the Project Site and its surroundings and obtain all information that may be necessary for preparing the Bid and entering into a contract for the construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.

Bidding Documents:

7. Content of Bidding Documents The set of bidding documents comprises the documents listed below, and addenda issued in accordance with Clause 9:

Bid Notice
Abstract of Bids
Instructions to Bidders
Form of Bid
Form of Agreement
Form of Performance Guarantee
Conditions of Contract
Special Conditions of Contract
Specifications
Recommended List of Manufacturers
Bill of Quantity Schedule
Drawings

8. Clarification of Bidding Documents A prospective Bidder requiring any clarification of the bidding documents may notify the Employer in writing or by fax at the Employer's address indicated in the invitation to bid. The Employer will respond to any request for clarification received earlier than 7 days prior to the deadline for submission of bids. Copies of the Employer's response will be forwarded to all purchasers of the bidding documents, including a description of the inquiry, but without identifying its source.

9. Amendment of Bidding Documents

9.1 Before the deadline for submission of bids, the Employer may modify the bidding documents by issuing addenda.

9.2 Any addendum thus issued shall be part of the bidding documents and shall be communicated in writing to all purchasers of the bidding documents. Prospective bidders shall acknowledge receipt of each addendum to the Employer.

9.3 To give prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer shall extend, as necessary, the deadline for submission of bids.

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C. Preparation of Bids

10. Language of Bid All documents relating to the Bid shall be in English.

11. Documents Comprising the Bid

The Bid submitted by the Bidder shall comprise the following:

(A) Technical Offer comprising

(a) Transmittal Letter of the Offer (Annexure-B)
(b) Authorization to sign the Contract (if applicable)
(c) A summary table of item ref. Item name, Brand, Model, Country of origin, Country of Manufacturing, etc.
(d) All documents listed in Clause 7 excluding Priced Bill of Quantities
(e) Technical specifications of all offered items
(f) Any other materials required to be completed and to be submitted by bidders, as specified in the document.
(g) List of Deviation from the Bid Documents (if any).
(h) Software selection of Generator Works.
(i) Item name, Technical Specifications, and Quantity of any item with unit price for items that are not mentioned in BOQ schedule but require completing the work.
(j) Documents comprising previous experience
(k) Documents comprising After sale services facilities
(l) Documents comprising international certification of Principal.

Bidder shall not provide any information about the price of the bid in any paper included in the Technical Offer. Violation of above may be liable the bid for outright rejection.

(B) Financial Offer shall comprise

(a) Earnest Money.
(b) The Priced Bill of Quantities. Bidders must have to quote price in the blank space of BOQ schedule by hand writing.
(c) In case of any item mentioned in drawing but not shown in BOQ, the Bidder shall provide unit rate and quantity of such items with specifications in separate page(s).
(d) In case of any item that is not shown in drawing or BOQ, but the Bidder deems that it will be required for completion of the work, Bidder shall provide unit rate and quantity of such items in a separate page(s).



12. Bid Prices

12.1 The Contract shall be for the whole Works, as described in Sub-Clause 1.1, based on the priced Bill of Quantities submitted by the Bidder.

12.2 The Bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items for which no rate or price is entered by the Bidder will be considered zero price. For such item, Employer shall not pay the Contractor and shall be deemed that the price of such item(s) are covered by the other rates and prices in the Bill of Quantities.

12.3 All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause shall be included in the rates, prices, and total Bid price submitted by the Bidder.

12.4 Bidder must be supported with proper rate analysis for all the items of work supporting the quoted rate without which the Bid may be summarily rejected. Such analysis in any case shall contain the following,

12.4.1 Cost of basic materials with quantities,
12.4.2 Cost of consumable materials with quantities,
12.4.3 Cost of labour with breakup and rates of different categories of labour,
12.4.4 Bank charge, duties, VAT, Income Taxes, etc., (if applicable)
12.4.5 Profit and overhead.

13. Bid Validity

13.1 Bids shall remain valid for a period mentioned in Abstract of Bid.

13.2 In exceptional circumstances, the Employer may request that the bidders extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing. A Bidder may refuse the request without forfeiting the Earnest Money. A Bidder agreeing to the request will not be required or permitted to otherwise modify the Bid but will be required to extend the validity of Earnest Money for the period of the extension.

14. Earnest Money

14.1 The Bidder shall furnish, as part of the Bid, an Earnest Money mentioned in the Abstract of Bid in favour of the Client from a scheduled bank located in the country.

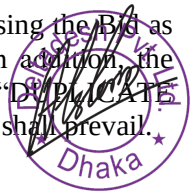
14.2 Any bid not accompanied by acceptable Earnest Money shall be rejected by the Employer.

14.3 The Earnest Money may be forfeited

(a) If the Bidder withdraws the Bid after the Bid opening during the period of Bid validity;
(b) If the bidder submits any false statement or fake document.
(c) If the Bidder does not accept the correction of the Bid price, pursuant to Clause 21;
(d) If the bidder does not agree to comply all Technical requirements as mentioned in the Bid Document.
(e) If the Bidder Transfigure any writing of original Bid Document.
(f) In the case of a successful Bidder, if the Bidder fails within the specified time limit to
(i) Furnish the required Performance Security or
(ii) Sign the Agreement

15. Format and Signing of Bid

The Bidder shall prepare one original of the documents comprising the Bid as described in Clause 11 and clearly marked "ORIGINAL." In addition, the Bidder shall submit 1 copy of the Bid, clearly marked as "DUPLICATE COPY." In the event of discrepancy between them, the original shall prevail.



D. Submission of Bids

16. Sealing and Marking of Bids

16.1 The Bidder shall seal the original and all copies of the Technical and Financial Offers in two separate envelopes duly marking the envelopes as **Technical Offer** and **Financial Offer**.

17. Deadline for Sub-mission of Bids

17.1 Bids shall be delivered to the Employer at the following address within time mentioned with a forwarding letter (Annexure-B).

17.2 The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 9, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will then be subject to the new deadline.

18. Late Bids

Any Bid received by the Employer after the deadline prescribed will be returned unopened to the Bidder.

E. Bid Opening and Evaluation

19. Bid Opening

19.1 The Employer will open the Technical Offer of the bid, in the presence of the bidders' representatives who choose to attend at the time and in the place specified in the notice inviting bids.

19.2 The Employer will open the Financial Offers of those bidders whose Technical Offers are considered as substantially responsive on a date to be fixed and informed by the employer by fax or email, in presence of the bidders who wish to be present.

19.3 The Bidders names, bid prices, the total amount of each bid and such other details as the employer may consider appropriate will be announced by the employer at the time of opening.

20. Examination of Bids and Determination of Responsiveness

20.1 Prior to the detailed evaluation of bids, the Employer will determine whether each Bid (a) is accomplished with Earnest Money, (b) meets the eligibility criteria defined in Clause 3; (c) has been properly signed off; (d) is substantially responsive to the requirements of the bidding documents, (e) Submitted valid Software selection for Sub-Station, BBT, LPS & Solar System.

20.2 A substantially responsive Bid is one, which conforms to all the terms, conditions, and specifications of the bidding documents.

20.3 If a Bid is not substantially responsive, it will be rejected by the Employer.

20.4 In case of any non conformation or ambiguity, the Client / Consultant reserves right to get clarification / confirmation from the bidder(s). If the bidder fail to clarify or to meet the technical requirement, the Bid may be declared Non-responsive.

21. Correction of Errors

21.1 The Employer for any arithmetic errors will check bids determined to be substantially responsive. Errors will be corrected by the Employer as follows:

a) Where there is a discrepancy between the amounts in figures and in words, the amount in words will govern; and

b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.

21.2 The amount stated in the Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and,

with the concurrence of the Bidder, shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected amount, the Bid will be rejected, and the Earnest Money may be forfeited.

22. Evaluation and Comparison of Bids

22.1 The Employer will evaluate and compare only the bids determined to be substantially responsive and having confirmation that is accompanied by the required **Earnest Money**.

22.2 Financial Offers of the bidders whose Technical Offers are not found substantially responsive will be returned to the respective bidders un-opened along with the earnest money.

F. Award of Contract

23. Award Criteria

Marks distributed for the Technical offer is 70 and for the Financial offer is 30 marks. The minimum qualifying mark for a Technical Bid is 50. Bids shall be sorted based on the total marks obtained. However, the client reserves the right to carry out post-negotiations with bidders for any technical and financial issues. The client reserves the right to accept any Bid or cancel all the Bids without assigning any reason.

24. Employer's Right to Accept any Bid and to Reject any or all Bids

Notwithstanding Clause 23, the Employer reserves the right to accept or reject any Bid, and to cancel the bidding process and reject all bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or bidders or any obligation to inform the affected Bidder or bidders of the grounds for the Employer's action.

25. Notification of Award and Signing of Agreement

25.1 The Bidder whose Bid has been accepted will be notified of the award by the Employer prior to the expiration of the Bid validity period in writing.

25.2 The notification of award will constitute the formation of the Contract, subject to the Bidder furnishing the Performance Security in accordance with Clause 26 and signing the Agreement in accordance with Sub-Clause 25.3.

25.3 The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will be signed by the Employer and sent to the successful Bidder, within 7 days following the notification of award along with the Letter of Acceptance. Within 7 days of receipt, the successful Bidder will sign the Agreement and deliver it to the Employer (Annexure-C).

25.4 Upon the furnishing by the successful Bidder of the Performance Security, the Employer will promptly notify the other bidders that their bids have been unsuccessful.

26. Performance Security

26.1 Within 7 days after receipt of the Letter of Acceptance, the successful Bidder shall deliver to the Employer a Performance Security in the amount stipulated in the Contract and in the form attached as Annexure-D.

26.2 Failure of the successful Bidder to comply with the requirements of Sub-Clause 26.1 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Earnest Money.

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Annexure-A

FORMS OF BID

(The Bider must type and print this form in their Letter Head Pad and fill up all blank spaces of this form)

To
The Project Incharge,

Sub: **Bid for the Supply, Installation, Testing and Commissioning of Sub-Station, BBT, LPS & Solar System for ----------**

Dear Sir,

Having examined the Bid Notice, Instruction to Biders (General), Special Instruction to Biders, Performance Bond Proforma, Form of Agreement, Drawings, General Terms and Conditions of Contract, Technical Specifications and Schedule of Items for "Supply, Installation, Testing and Commissioning of Sub-Station, BBT, LPS & Solar System" for the ----------, we the undersigned, offer to complete whole of the said work in conformity with the said General Terms and Conditions of Contract, Technical Specifications and Schedule of Items in consideration of payment at the rates Bided in the Schedule of Items of Financial Bid Document.

1. We understand and undertake, if our Bid is accepted, to deliver the whole of the work within the specified time from the date of issue of work order, in default thereof, we are liable to be penalized under the conditions of the contract, including forfeiture of our Earnest Money.

2. We further understand and undertake, if our Bid is accepted, to commence the work within 15 (fifteen) days from the date of issue of work order, in default thereof we shall be liable to be penalized under the conditions of the contract including forfeiture of our Earnest Money.

3. We also further undertake, if our Bid is accepted, to enter into and execute when called upon by the Client to do so, a Contract Agreement in the form mentioned in the Table of Contents with such modification as may be necessary and that all charges for preparation of Agreement in quadruplicate and fees for stamping if required shall be borne by us.

4. We further undertake, if our Bid is accepted, to furnish an unconditional and irrevocable Bank Guarantee from a schedule Bank acceptable to Client operating in Bangladesh to be bound to you within 7 (seven) days of issuance of the Owner written order to commence the work in a sum equal to [percentage mentioned in Abstract of Bid] for the due performance of the Contract under the terms of a Bond (Performance of Bond) to be approved by you.

   We understand that the Security Money will be released 12 (twelve) months after successful operation and remedial of all defects incurred of the system.

5. We further understand unless and until a Formal Agreement is prepared and executed this Bid, together with your written acceptance thereof shall constitute a binding contract between us.

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6. We agree to abide by this Bid for a period of 90 (Ninety) days from the date fixed for opening the Bid and it shall remain binding upon us at any time before the expiry of the aforesaid period; and on our failure to abide by this condition, our earnest money will stand forfeited to the Owner.

7. We solemnly declare that we have noted the conditions of contract to the effect that there shall be no change whatsoever in the item rates entered in the Bill of Quantities under the contract on account of any increase in prices of materials and fuel, rates of wages, costs of transport, hire of equipment and plant, taxes and duties or any other component entering into the cost of execution of the work, and that we shall not make any claim for enhancement of rate while executing the Contract.

8. We also do hereby agree to the execution of the works as specified in this Bid Document, within the time specified and at the rate quoted in the Bill of Quantities and in accordance with the specifications, designs, drawings, and instruction in writing that may be issued from time to time by the Engineer-in-Charge during the execution of work.

9. We have enclosed the requisite amount of Earnest Money in proper form.

10. We understand that you are not bound or under legal obligation to accept the lowest or any Bid and you may reject any or all Bids without assigning any reason whatsoever.

_____
Signature of Bidder

Address _____

_____

_____

Date:



Annexure-B

Bank Guarantee for Earnest Money (Bid Bond/Bid Security)

Invitation for Bid No: Date:

Bid Package No: Work Package name:

To:

[Name and address of the Procuring Entity**]**

BID GUARANTEE No:

We have been informed that *[name of Bider]* (hereinafter called "the Bider") intends to submit to you its Bid dated *[date of Bid]* (hereinafter called "the Bid") for the execution of the Works of *[description of works]* under the above Invitation for Bids.

Furthermore, we understand that, according to your conditions, the Bid must be supported by a Bank Guarantee as Earnest Money for Bid Security.

At the request of the Bider, we *[name of bank]* hereby irrevocably undertake to pay you, without cavil or argument, any sum or sums not exceeding in total an amount of Tk *[insert amount in figures and words]* upon receipt by us of your first written demand accompanied by a written statement that the Bider is in breach of its obligation(s) under the Bid conditions, because the Bider:

1. has withdrawn its Bid after opening of Bids but within the validity of the Bid Security; or
2. refused to accept the Notification of Award (NOA) within the period as stated; or
3. failed to furnish Performance Security within the period stipulated; or
4. refused to sign the Contract Agreement by the time specified ; or
5. did not accept the correction of the Bid price following the correction of the arithmetic errors
6. If it is proved that they submitted any false document or statement.

This guarantee will expire

(a) if the Bider is the successful Bider, upon our receipt of a copy of the Contract Agreement signed by the Bider or a copy of the Performance Security issued to you; or

(b) if the Bider is not the successful Bider, twenty eight (28) days after the expiration of the Bider's Bid validity period, being *[date of expiration of the Bid validity plus twenty eight (28) days]*.

Consequently, we must receive at the above-mentioned office any demand for payment under this guarantee on or before that date.

Signature Signature

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Annexure-C

FORM OF CONTRACT AGREEMENT

AGREEMENT BETWEEN CONTRACTOR AND OWNER FOR SUPPLY, INSTALLATION, AND COMMISSIONING OF SUB-STATION, BBT, LPS & SOLAR SYSTEM AT ……..

THIS AGREEMENT is made on the _____ day of _____ in the year two thousand ……...

BY AND BETWEEN

(Full name and address)
---------- (hereinafter called "the Owner") and

(Full name and address)
---------- (hereinafter called "the Contractor")

WITNESSETH,

that whereas the Owner intends to erect and install ……

----------for the Owner.

NOW, THEREFORE,

the Owner and the Contractor, for the consideration hereinafter named, agree as follows:

1. THE WORK TO BE DONE AND THE DOCUMENTS FORMING THE CONTRACT

The Contractor agrees to provide and supply all the labour, equipment and materials and to do all things necessary for the proper constructions, installation and completion of the works shown and described in Drawings, Specifications or Bill of Quantity schedule. Following items as enclosed constitute the Contract:

a. The said Bid Notice,
b. Instruction to Bidder,
c. General Conditions of Contract & Special conditions of contract
d. Form of Bid,
e. Memorandum or Amendment,
f. Technical Specifications
g. Priced Bill of Quantity
h. Rate Analysis
i. Approved Brand, Model, Country of origin and manufacturing schedule
j. Approved Technical submission
k. Approved Time Schedule
l. Approved Drawings (It may be updated as per project requirement)

2. TIME OF COMPLETION

The work to be performed under this Contract shall be commenced and completed within ---------- months from the date of issue of Work Order.

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3. CHANGES IN THE WORK

The Owner, may from time to time by written instructions or drawings issued to the Contractor, make change in the above named Drawings and Specifications, issue additional instructions, require additional work or direct the omission of work previously ordered and the provisions of this contract shall apply to all such changes, modifications and additions with the same effect as if they were embodied in the original Drawings and Specifications.

4. FAILURE TO PERFORM

In the case the Contractor fails to perform in accordance with the terms and conditions of this agreement, the Owner shall have the full right to take any action as deemed necessary to safeguard the interest of the Owner, including that the Contractor will be barred from participating in any other future Bid of the Owner.

5. THE CONTRACTOR'S DUTIES AND STATUS

The Contractor recognizes the relations of trust and confidence established between him and the Owner / Consultant by this Agreement. He covenants with the Owner to furnish his best skill and Judgment and to Co-operate with the Consultant in forwarding the interests of the Owner. He agrees to furnish efficient business administration, superintendence and to use every effort keep upon the work at the times an adequate supply of workmen and materials, and to secure its execution in the best and soundest way and in most expeditious manner consistent with the interest of the Owner. The Contractor will co-ordinate with other services Vendors and co-operate them to carry out respective works.

6. AUTHORITY FOR INTERPRETATION

Except where otherwise provided in the contract all questions and disputes relating to the meaning of the specification, designs, drawings and instructions herein before mentioned and so to the quality of workmanship or materials used on the work, or as to any other question claim, right matter or thing whatsoever, in drawings, specifications, estimates, instructions, orders of these conditions, or otherwise concerning the works or the execution or failure to execute the same whether arising during the progress of the work or after the completion or abandonment thereof shall be referred to the Owner who after such investigation as he may think proper, as sole judge, shall deliver his decisions which shall be final, conclusive and binding on all parties to this contract.

7. THE CONTRACT DOCUMENT

Notice inviting Bid, Instructions to Bidders, General Terms and Conditions of Contract, Technical Specifications and Schedule of Items, Drawings together with this Agreement form the Contract etc. shall form integral part of this contract Agreement for all purposes.

_____	_____
Name and seal of the Contractor	Name and Signature of Owner
Address:	Witnesses:
Witnesses:	
1. Name_____	1. Name _____
Address_____	Address_____
2. Name_____	2. Name _____
Address_____	Address_____



Annexure-D

FORM OF PERFORMANCE GUARANTEE / SECURITY

WHEREAS

1. **.....** (the "Employer") of _____ _____ has entered into a contract dated _____ (the" Contract") for the Supply, Installation, Testing and Commissioning of Generator works of the building complex for its with _____ of _____ (the "Contractor").

2. Under the terms of the Contract, Contractor is required to furnish a Performance Guarantee for the performance of the Contract covering Tk. .....(in word, Taka.....) as defined hereunder.

At the request of the Contractor, we, the _____ Bank Limited, (_____ Branch) having our place of business at _____ do hereby irrevocably and unconditionally undertake to pay you, on first demand, irrespective of the validity and the effects of the above mentioned Contract and waiving all rights of objection and defense arising from the Contract (without absolutely no recourse to the Contract) any amount within the limit of Performance Guarantee amount, upon receipt of your written and duly signed request for payment, and your written confirmation that Contractor has failed in the performance of the aforesaid Contract.

Our Guarantee is valid until _____ the Bank receives in writing from the Employer that the obligation of the Contractor under the Contract has been fully discharged.

The Employer shall be entitled to interest at the rate of _____ over any amount demanded for but not paid by the Bank, commencing from the date such amount is due for payment until the amount is paid to the Employer.

The laws of Bangladesh govern this Guarantee and the place of jurisdiction is Bangladesh.

Signature

Name

Official seal

Deltadesh Pvt. Ltd. Dhaka

Notification of Award

(Annexure E)

Contract No: Date:

To:

[Name of Contractor]

This is to notify you that your Bid dated *[insert date]* for the supply of Goods and related Services for *[name of contract]* for the Contract Price of Tk *[state amount in figures and in words]* as corrected and modified in accordance with the Instructions to Biders, has been approved by *[name of Procuring Entity]*.

You are thus requested to take following actions:

i. accept in writing the Notification of Award within seven (7) days of its issuance pursuant to ITT Sub-Clause 59.3

ii. furnish a Performance Security in the specified format and in the amount of Tk *[state amount in figures and words]* ,within fourteen (14) days of acceptance of this Notification of Award but not later than *(specify date),* in accordance with ITT Clause 61.2

iii. sign the Contract within twenty eight (28) days of issuance of this Notification of Award but not later than *(specify date),* in accordance with ITT Clause 64.2

You may proceed with the execution of the supply of Goods and related Services only upon completion of the above tasks. You may also please note that this Notification of Award shall constitute the formation of this Contract, which shall become binding upon you.

We attach the draft Contract and all other documents for your perusal and signature.

Signed

Duly authorized to sign for and on behalf of
[name of Procuring Entity]

Date:



CONDITIONS OF CONTRACT

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CONDITIONS OF CONTRACT

A. General

1. Definitions

Boldface type is used to identify defined terms.

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Bid.

The **Completion Date** is the date of completion of the Works as certified by the Consultant.

The **Consultant** is the person/Firm, appointed by the Employer and notified to the Contractor, who is responsible for the design and inspection of Works execution.

The **Contract** is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in Clause 2.2.

The **Contractor** is a person or corporate body whose Bid to carry out the Works has been accepted by the Employer.

The **Contractor's Bid** is the completed bidding document submitted by the Contractor to the Employer.

Contract Price means the price stipulated in Clause 32 for the completion of the Project by the Contractor under the terms and Conditions set forth hereunder.

The **Date of Commencement** is the latest date when the Contractor shall commence execution of the Works but not later than 7 (Seven) days after issuance of Work Order.

Days are calendar days; months are calendar months.

Defect means any discrepancy in, damage to or non-conformity of Materials and Works provided by the Contractor, including and not limited to Works not completed in accordance with the terms of this Contract.

Defects Liability Certification means the certificate issued by Consultant in consultation with the Employer upon expiration of the Defect Liability Period or date when all defects discovered during the Defect Liability Period has been rectified, replaced or repaired by the Contractor to the satisfaction of the Consultant.

The **Defects Liability Period** is one year calculated from the Completion Date.

Drawings mean all drawings, layout plans, and basic Architectural & Engineering designs and such similar documents provided by the Consultant for the Project and shall be a part of the Contract annexed herewith as Section VII.

The **Employer** is **Employer** is the person or organization whose name is mentioned in Abstract of Bid.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Project. The list of which shall be a part of the contract.

Materials means all supplies, materials and things, including consumables

supplied and used by the Contractor for the project.

Mobilization Fee means the advance to be paid by the Employer to the Contractor in accordance with the Clause 42 hereunder.

Specification means the Specification of the Works and Materials mentioned in Technical Specifications and BOQ schedule. Such Specification shall also include any modification or addition approved by the Consultant with the consent of the Employer.

Sub-Contractor means any person, firm or company employed by the Contractor to carry out any part of the Works with the written approval of the Employer, provided that the Contractor shall be fully responsible for all the acts, deeds and omissions on the part of such Sub-Contractor.

Temporary Works are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works.

Variation means a variation of Works approved by the Employer in accordance with the concern clause.

Works means the supply of Materials and workmanship for the construction of the Project in accordance with the Drawings, Specifications and terms of this Contract.

2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Consultant will provide instructions clarifying queries about these Conditions of Contract.

2.2 The documents forming the Contract shall be interpreted in the following order of priority:

(1) Agreement,
(2) Letter of Acceptance,
(3) Contractor's Bid,
(4) Special Conditions,
(4) Conditions of Contract,
(5) Specifications,
(6) Drawings (which may be updated time to time),
(7) Bill of Quantities, and
(8) Any other document listed as forming part of the Contract.

3. Language and Law

The language of the Contract will be English and the law governing the Contract will be the laws of the People's Republic of Bangladesh.

4. Consultant's Decisions

Except where otherwise specifically stated, the Consultant will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

5.Communications

Communications between parties that are referred to in the Conditions shall be effective only when in writing. A notice shall be effective only when it is delivered.

6. Subcontracting

The Contractor shall submit a list of sub-contractors to be appointed for performance of any part of the Works under this Contract for approval by the

Employer in consultation with the Consultant. The appointment of Sub-Contractors by the Contractor shall under no circumstance absolve, relieve or diminish the obligations of the Contractor under this Contract.

7. Other Contractors

7.1 The Contractor shall cooperate and share the Site with other Contractors, public authorities, utilities, and the Employer. The Contractor shall also provide facilities and services for them as described in the Schedule. The Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification.

8. Personnel

8.1 The Contractor shall employ the key personnel named in the Schedule of Key Personnel, to be attached with the bid or other personnel approved by the Consultant. The Consultant with notification to the Employer may approve any proposed replacement of key personnel only if their relevant qualifications and abilities are substantially equal to or better than those of the personnel listed in the Schedule with a notice to the Employer.

8.2 If the Consultant asks the Contractor to remove a person who is a member of the Contractor's staff or work force, the Contractor shall ensure that the person leaves the Site within three days and has no further connection with the work in the Contract.

9. Employer's and Contractor's Risks

The Employer carries the risks, which this Contract states are Employer's risks, and the Contractor carries, the risks, which this Contract states, are Contractor's risks.

10. Employer's Risks

10.1 From the Commencement Date until the Defects Correction Certificate has been issued, the following are the Employer's risks:
(a) The risks of damage to the Works, Plants, Materials, and Equipment to the extent that it is due to a fault of the Employer or in the Employer's design.

10.2. From the completion date until the defects correction certificate has been issued, the risks of a loss or damage to the Works, Plants, and Materials is an Employer's risks except loss or damage due to –
(a) a defect which existed on the completion date and as stated in 10.1

11. Contractor's Risks

From the Starting Date until the Defect Correction Certificate has been issued, the risks of personal injury, death and loss of or damage to property (including without limitation the Works, Plants, Materials and Equipments), which are not Employers risks, are contractor's risks.

12. Insurance

12.1 The Contractor should submit the insurance coverage from the date of commencement to the end of the Defects Liability Period for the following events which are due to the Contractor's risks:

(a) Loss of or damage to the Works, Project and Materials;
- 100% of value of contract

(b) Loss of or damage to Equipment;
- 100% of value

(c) Loss of or damage to property (except the Works, Project, Materials, and Equipment) in connection with the Contract;
- Tk. 25,00,000/-

(d) Personal injury or death. - Tk. 100,000/- each for injury
- Tk. 500,000/- each for death

12.2 Policies and certificates for insurance shall be provided by the Contractor to the Employer.



12.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

12.4 In the event of variation or expiry of the policy, the insurer will notify in writing the Employer of such variation or expiry of the Policy.

12.5 Both parties shall comply with any conditions of the insurance policies.

13. Site Investigation Report

13.1 The Contractor in preparing the bid shall consult all site investigation reports available with the Employer supplemented by any information available to the Bidder.

13.2 The Contractor hereby acknowledge that all information provided by the Employer in connection with the Site is merely for reference and does not absolve the obligations of the Contractor to conduct its own independent investigation for which the Contractor shall perform the Works accordingly and supply the requisite Materials.

14. Contractor to Construct the Works

The Contractor shall perform the Works and construction of the Project in accordance with the Drawings and Specifications provided herein under the terms and conditions set forth in this Contract.

15. The Works to be Completed by the Completion Date

The Contractor shall commence execution of the Works on the Date of Commencement and shall carry out the Works in accordance with the Master Program and complete the works within the time limit. The Contractor shall have to meet the target time of individual work to facilitate Other Contractors works. The Contractor shall remove all materials and plant that are not used and a part of the works including temporary works as directed by the Consultant within the completion date and to the satisfaction of the Employer.

16. Approval by the Consultant

16.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Consultant, who is to approve them if they comply with the Specifications and Drawings.

16.2 The Contractor shall be responsible for the design and construction of Temporary Works.

16.3 All Drawings prepared by the Contractor for the execution of the temporary Works, are subject to prior approval by the Consultant, for permanent works, Employer's consent is necessary.

17. Safety

The Contractor shall be responsible for the safety of all activities on the Site. The Contractor at all times keep the site safe with construction fence, temporary structures and any other means necessary and acceptable to the Employer.

18. Discoveries

Anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the Employer.

19. Possession of the Site

The Employer shall hand over possession of the Site to the contractor, who shall be responsible for the same within seven (7) days from execution of this Contract. Upon taking possession, the Contractor shall commence the Works in accordance with the terms and conditions set forth hereunder.

20. Access to the

The Contractor shall allow the Consultant and any person authorized by the

Site Consultant access to the Site and to any place where work in connection with the Contract being carried out or is to be carried out.

21. Instructions, Inspections and Audits The Contractor shall carry out all instructions of the Consultant with the written consent of the Employer.

22. Disputes If any of the instructions given by the Employer through the Consultant is not acceptable or the Contractor believes that the Consultant has acted in excess of its authority, the Contractor shall within ten (10) days of receipt of the disputed instruction or the excess act of the Consultant refer the matter to the Employer in writing stipulating the grounds for objection.

23. Procedure for Disputes

23.1 The Employer shall give his decision in writing within 30 days of receipt of the reference from the contractor.

23.2 If the contractor is not satisfied with any decision of the Employer, the contractor may refer the decision of the Employer to an Arbitrator within 14 days from the date of the Employer's written decision. The Employer's decision will be final and binding if not referred to an Arbitrator within the period of 14 days from the date of the written decision of the Employer.

23.3 The arbitration shall be conducted in accordance with the arbitration procedure under the Laws of Bangladesh.

B. Time Control

24. Program After signing of the Contract and not later than 14 days, the Contractor shall submit to the Consultant for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works to be completed within time specified in Abstract of Bid. The Program approved by the Employer in consultation with the Consultant shall be made a part of the Contract and annexed hereto.

25. Extension of the Completion Date

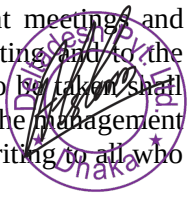
25.1 The Consultant may extend the Completion Date with the consent of the employer, if a Variation is issued which makes it impossible for Completion to be achieved by the Completion Date or any delay caused by the employer or any delay caused on which Contractor had no control.

25.2 The Consultant shall decide the period of extension to be granted by the Employer within fourteen (14) days of receipt of the written request for extension with full written supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Completion Date.

26. Management Meetings

26.1 The Consultant and the Contractor shall hold a management meeting at least once a month. The Project In-charge or his designee shall be present in the management meeting. The business of a management meeting may be to review the progress of work and to deal with matters raised in accordance with the early warning procedure.

26.2 The Consultant shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken shall be decided jointly by the Consultant and the Employer at the management meeting or after the management meeting and stated in writing to all who attended the meeting.



27. Early Warning

The Contractor shall warn the Consultant at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work increase the Contract Price or delay the execution of the Works. The Consultant may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The Contractor as soon as reasonably possible shall provide the estimate.

C. Quality Control

28. Identifying Defects

The Consultant shall check the Contractor's work and notify the Contractor of any Defects that are found. The Consultant's inspection shall not under any circumstance absolve, reduce or diminish the liability of the Contract regarding performance under this Contract. The Consultant may instruct the Contractor to search for a Defect and to uncover and test any work that the Consultant considers may have a Defect.

29. Tests

29.1 The Contractor shall give notice to the Consultant for attendance to observe important tests, verify critical alignments and witness performance of parts of the Works as described in the Specifications. The Consultant shall provide the Scope of Testing.

29.2 All materials and workmanship shall be subject to inspection and test by the Consultant during construction at the Site and all other times and places, to the extent practicable. The Contractor, as required by the Consultant shall promptly correct or replace without charge therefore all defective or non-conforming materials and workmanship.

30. Correction of Defects

30.1 The Consultant may give written notice to the Contractor of any Defect detected in the Works and/or Materials at any time during the tenure of the Contract but before the end of the Defect Liability Period. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

30.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Consultant's notice.

31. Uncorrected Defects

31.1 If the Contractor has not corrected a Defect within the time specified in the Client / Consultant's notice, the Consultant will assess the cost of having the Defect corrected, and the Contractor will pay this amount with 30% additional cost to cover Overhead, Time delay & Penalty.

31.2 The Employer shall be entitled by contract or otherwise, correct or replace such defective or non-conforming material or workmanship and charge the cost thereof to the Contractor. The payment method shall be as per choice of Client.

D. Cost Control

32. Bill of Quantities

32.1 The Bill of Quantities shall contain items for the construction, installation, testing, and commissioning work to be done by the Contractor.

32.2 The Bill of Quantities is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate in the Bill of Quantities for each item.



33. Changes in the Quantities

33.1 The Employer has the right to delete/increase/decrease any item of work during the progress of work without change in its rate.

33.2 Quantity mentioned in Bill of Quantity Schedule are estimated. Contractor is to take off item quantity from Shop drawing before placement of any order or L/C (if applicable). Payment shall be made as per actual quantity installed.

34. Variations

Any items or sizes not mentioned in BOQ shall be considered as Variation. The Contractor is bound to execute Variation works within agreed time schedule once a variation order is issued.

35. Payments for Variations

The Contractor shall provide the Consultant with a quotation with rate analysis for carrying out the Variation when requested to do so by the Consultant. The Consultant shall assess the quotation, which shall be given within seven days of the request or within any longer period stated by the Consultant and before the Variation is ordered. The Contractor shall submit an estimated quantity of such item (with a maximum deviation of +/-10%). However, the Contractor shall carry out execution of any variation work only after receiving technical and financial approval of the item from the Employer.

36. Payment Certificates

36.1 The Contractor shall submit to the Consultant statements of the estimated value of the work executed less then the cumulative amount certified previously as per clause 11.0 of the special term and condition.

36.2 The Consultant shall check the Contractor's statement of work done and certify the amount to be paid to the Contractor.

36.3 The value of work executed shall be certified by the Consultant and approved by the Client.

36.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed and the valuation of Variations.

37. Payments

37.1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Consultant within thirty (30) days from the receipt of the bill by the Client.

37.2 Subject to Clause 34, the Contractor shall only be paid for the items in accordance with the rates stipulated in the Bill of Quantities or any amendment thereof.

38. VAT and other Govt. Taxes

The Contractor shall quote their rates for the items mentioned in the bill of quantities including all govt. taxes/charges like VAT, income tax etc. The employer shall deduct any govt. taxes, VAT or other duties of the total billed amount from the payment to the Contractor.

39. Retention

The Contractor will deposit an amount mentioned in Abstract of Bid as Performance Guarantee for one year. The Employer will return it after successful completion of Work.
The Employer shall retain a percentage mentioned in Abstract of Bid from each payment due to the Contractor until twelve months after completion of the whole works. This amount will be released after successful completion of Warrantee period.

40. Liquidated

Time is the essence of the Contract. In event of any delay in completion of the

Damages

Project within the Completion Date or such extensions approved by the Employer, the Contractor shall be liable to pay liquidated damages to the Employer at the rate specified in abstract of Bid. The total amount of liquidated damages shall not exceed 10% of the amount of Contract. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall under no circumstances absolve or diminish the obligations of the Contractor under this Contract.

41. Payment for Mobilization

The Employer shall not pay any advance to the Contractor for mobilisation.

42. Securities

The Contractor shall furnish the Employer a performance guarantee in the form of an unconditional and irrevocable bank guarantee from a bank acceptable to the Employer covering percentage mentioned in Abstract of Bid in the form attached herewith as Annexure D. The bank guarantee shall remain effective until the date 30 days from the date of issue of the Certificate of Completion. The Security Money may be forfeited if:

a. the Contractor's imported item is deviated from the Contract.
b. the installed item fails to meet the required capacity & performance.
c. the Contractor fails to furnish information, data, etc. of their offered item/work, that is required for the Client/Consultant within the stipulated time (maximum seven days).
d. Fail to meet desired workmanship of work.
e. Fail to replace defective works or inferior quality of material.
f. Fail to meet the targeted dateline of completion of the different zones.

In addition to the above measure, the progress /Final payment of the Contractor may be held up.

43. Cost of Repairs

Loss or damage to the Works or Materials to be incorporated in the Works between the Date of Commencement and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost.

E. Finishing the Contract

44. Completion

Upon completion of the Works, the Contractor shall request the Consultant in writing to issue the Certification of Completion. The Consultant will issue the Certification of Completion upon successful completion of all Works to the satisfaction of the Consultant.

45. Taking Over

The contractor shall make the necessary arrangements to hand over the site to the employer within 30 days after the issuance of a certificate of completion by the consultant.

46. Final Account

The Contractor shall supply the Consultant with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Consultant shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 30 days of receiving the Contractor's account if it is correct and complete. If it is not, the Consultant shall issue within 15 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Consultant shall decide on the amount payable to the Contractor and issue a payment certificate.

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47. Defect Liability Period

The Defect Liability Period shall be one year from the date of completion of the works. Notwithstanding the foregoing, the Defect Liability Period will not expire until all Defects have been rectified to the satisfaction of the Consultant.

48. Operating and

48.1 "As built" Drawings and operating and maintenance manuals, approvals

Maintenance Manuals

and permissions obtained for the project (if originals were given, the same have to be returned in original) by the Contractor shall be supplied to the Consultant for the Employer.

48.2 If the Contractor does not supply the Drawings and manuals or do not receive the Consultant's approval, the Employer shall be entitled to withhold the Security Money.

49. Termination

49.1 Unless otherwise provided hereunder, any one party may terminate this Contract upon an event of default under the Contract immediately if such breach cannot be remedied in the sole opinion of the Employer, and in case of such breach which can be cured, on the expiration of thirty (30) days from the date of notice by the non-defaulting party to cure the breach or from the date the non-defaulting party is aware of the breach and the defaulting party fails to take any steps to effectively cure such breach.

49.2 The events of defaults are:

(i) Material breach of any terms or conditions of the Contract, including and not limited to supply of materials and supplies which do not conform to the Specifications.

(ii) Failure to make payment when the same is due for payment.

(iii) Unauthorized stoppage of work by the Contractor for fifteen days.

(iv) Delay in completion of Works beyond the Completion Date or any approved extension date for which the maximum amount of liquidated damages can be paid;

(v) Indulging in corruption or fraudulent practices in competing for or in execution of the Contract, in the sole judgment of the Employer;

(vi) Instructions to the Contractor to delay or suspend the progress of Work or supply of materials which is not withdrawn within 28 days from the date of the instruction due to the negligence or default of the Contractor;

(vii) The Contractor fails to correct any Defect by removing any material from the Site or pull down, repair or replace any work within thirty (30) days from the date of receiving written notice from the Consultant to do so;

(viii) Any party subject to bankruptcy or winding up proceedings;

(ix) Flagrant and persistent failure to execute the Works in accordance with Drawings and Specifications or to maintain the pro-rata progress of Works;

(x) The contractor has a tendency to supply under specified materials or to supply materials without prior approval of the sample.

(xi) The use of unskilled and inexperienced labour for critical Works resulting to Defects in the Works and unacceptable workmanship;

(xii) The Contract assigns or sub-contracts the Works or any part thereof without the written approval of the Employer.

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49.3 Notwithstanding the foregoing, the Employer may terminate this Contract without assigning any reason upon serving fifteen (15) days notice to the Contractor.

49.4 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site within 7(seven) days from the date of the termination notice.

50. Payment upon Termination

50.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Consultant shall issue a certificate for the value of the work done and materials ordered less advance payments received up to the date of the issue of the certificate. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.

50.2 If the Contract is terminated because of a fundamental breach of contract by the Employer, the Consultant shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate with reasonable compensation to the Contractor for termination not exceeding 5% of the total cost of contract.

50.3 Amount of Penalty to be imposed on Termination of Contract due to default of the Contractor

50.3.1 Penalty to be imposed for termination of Contract shall be direct Penalty and indirect Penalty. Direct penalty is the penalty which shall be imposed for failing to fulfil the Contract and Indirect Penalty is the additional amount, if any, that shall be incurred for completion of the balance work plus the additional cost for managerial and administrative services @ 10% on the additional amount.

50.3.2 The direct penalty to be imposed shall be as follows:

Progress of work when the works is terminated (to be measured in terms of the value of work with respect to Contract price)	**Penalty to be imposed in percentage with respect to Contract Price**
90% and above	2.00%
70% and more but less than 90%	4.00%
50% and more but less than 70%	6.00%
30% and more but less than 50%	6.00%
30% and more but less than 50%	8.00%
Less than 30%	10.00%

50.3.3 The amount of indirect penalty shall be the difference Between the estimated cost of the balance work at the contract

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rate of the Contractor whose contract has been terminated and the Contract rate of newly appointed contractor, which shall be increased plus 10% as administrative and managerial expenses. If the work is completed by the Owner or by his authorized agent directly (force account), the estimated cost of completion of the balance work as prepared by the Owner, plus 10% as administrative and managerial expenses minus the estimated cost of completion of the balance work at the contract rate of the Contractor, shall be the amount of Indirect Penalty,

50.3.4 The payment of the original Contractor shall be withheld till the new Contractor is appointed.

50.3.5 Maximum and Minimum Limit of Penalty

The Direct Penalty and Indirectly Penalty as referred To above clause 50.3.2, 50.3.3 and 50.3.4 are independent and shall be added to fix total penalty to be imposed for failure of fulfilment or the contract, with the following Minimum and Maximum Limit:

Minimum Limit Contract Price.	:	2.0% of the
Maximum Limit Contract Price.	:	10% of the

50.3.6 Payment of final bill on Termination of Contract

The Final Bill on termination of the Contract shall only be paid to the Contractor, if all the dues to the Contractor including all penalties imposed can be realized from the ill. If not, the Final Bill shall be due and paid only after expiry of Defect Liability Period.

50.3.7 Refund of Security Deposit in case of Termination of Contract:

The Security Deposit shall not be refunded until the Defect Liability Period and any extension thereof has Expired. If any defect is detected in the Works or Materials supplied by the Contractor which is required to be corrected by the Contractor and the Contractor Fails to do so, the Employer shall be entitled to deduct the cost of correction of the Defect from the Security Deposit.

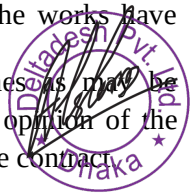
51. Clearance of Site On Completion

On completion of the works the Contractor shall clear away and remove from the site all construction plant, surplus materials, rubbish and temporary works of every kind and leave the whole of the site and works clean and in a workman like conditions to the satisfaction of the Consultant and the Employer.

52. Removal Of Improper Works and Materials

The Consultant or his designee shall during the progress of the works have power to order in writing from time to time for

a. The removal from the site within such time or times as may be specified in the order, of any materials, which in the opinion of the Consultant or his designee are not in accordance with the contract.



b. The substitution of proper and suitable materials and

c. The removal and proper re-execution (not withstanding any previous test thereof or interim payment thereof) of any work which in respect of materials or workmanship is not in the opinion of the Consultant in accordance with the contract.

53. Property

All Materials on the Site, Plant, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor's defaulted.

54. Release from Performance

In case a force majeure event (the "Force Majeure Event") intervenes and impede the performance of the Contract the performance of the Contract shall remain suspended. The party so affected by such Force Majeure shall forth notify the other party in writing the occurrence of such Force Majeure event and both parties shall in their best endeavor try to arrive to a reasonable solution or decision.

Force Majeure Events shall include Acts of God, fire, floods, government embargo, civil unrest, hartals, withdrawal of any material licenses, war and such other events beyond the control of either party, in the sole opinion of the Employer, provided that, increase in cost of Material, supplies, wages, and shortage of transport and labour will not be included.

If, by reason of a Force Majeure Event continuing for a period not exceeding sixty (60) days, the performance of this Agreement within a reasonable time becomes impossible, either party shall be entitled to terminate the Agreement by fifteen (15) days notice in writing to the other party in event of each both parties shall be absolved of their respective further obligations under the Contract up to the date of termination of the Contract.

55. Drawings

55.1 The Consultant shall submit the Drawings to the Contractor for execution of work. All subsequent additions to the Drawings shall also be Submitted to the Contractor. The Contractor shall keep on the Project Site a copy of the Approved Drawings, Specifications and other Contract documents at all times give Consultant, its representative's free access thereto. Where there is found differences between the drawings and specifications, the Consultant's decision shall be governed.

55.2 All drawings as set out in the Drawings and any additional drawings Thereto shall be the property of the Employer which shall have the right to use the same as it deem fit.

Omissions from the drawings or specifications, or the mis-description of details of the Works which are evidently necessary to carry out the intent of the drawings and specifications, or are reasonably inferable from the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing for no additional payment such omitted or mis-described details of the Work, but they shall be performed as if fully and correctly set forth and described in the drawings and specifications.

56. Guarantees

The Contractor guarantees the quality of materials used and its workmanship and undertake to promptly correct, Defects in materials or workmanship

existing in the Works performed or services rendered under this Contract by repairing or replacing the Defective portion of the Work in accordance with Clause 28 herein.

The Contractor further guarantees that the repair, or repaired or replaced components furnished hereunder shall be free from defect for a further period of twelve (12) months.

If any such repair, or repaired or replaced part is found to be defective and the Contractor is presently advised of this fact, the Contractor will promptly repair the defective portion of the Work or repair or replace such defective component at no additional expense to the Employer.

57. Covenants

57.1 Unless otherwise specifically provided for, all workmanship, equipment, materials and articles incorporated in the Works covered by this Contract are to be new and of the most suitable grade of their respective kind for the purpose. Full information concerning the equipment, materials or articles, which it contemplates incorporating in the Works, is attached herewith in section II.

57.2 The Contractor shall enforce strict discipline and order among its employees and those of its sub-contractors and shall abide by and enforce all rules, regulations and laws in connection therewith. In the execution of the Work, no person other than the Contractor, sub-contractors and their employees shall be allowed on Site except by written permission of the Consultant.

57.3 The Contractor shall protect the materials and Work from loss, deterioration, and damage during construction; store and secure inflammable material from fire; remove oily rags, waste and refuse from buildings each night; and during cold weather furnish all necessary support for the proper conduct of the Work. The Contractor shall maintain all temporary walkways, roadways, trench covers, barricades and other devices necessary to provide for safety and traffic. The Contractor shall see that the buildings and premises are kept free at all times of debris and rubbish caused by the Work.

57.4 The Contractor shall take all reasonable steps to prevent injury to any and all persons or property in performance of this Contract.

57.5 The Contractor agrees that, in the performance of the Works hereunder, it shall give all required notices and will comply with all applicable laws, statutes, rules, regulations or orders of the Government of Bangladesh and of any authorized entity. The Contractor shall, without additional expense to the Employer obtain licenses and permits including any required import permits and pay all taxes or fees, which may be required for the execution of the Works.

58. Representations and Warrants

58.1 Each party hereby warrant and represent to each other that:

It is duly incorporated and validly existing under the laws of Bangladesh and has power under its constitution to enter into and execute this Contract and to exercise its rights and perform its obligations pursuant thereof and all corporate or other actions required to authorize the execution and performance of its obligations hereunder has been duly taken, including the obtaining of all requisite consents or approvals of, or exemptions by, any state, government or public bodies and authorities.

58.2 The signing and delivery of this Contract and the performance of any transactions contemplated there under will not:

- contravene or constitute a default under any provision contained in any agreement, instrument, law, judgment, order, licenses, permit or consent by which it is bound or affected; or
- cause any limitation on it or the powers of its management body (whether imposed by any of its constitutional documents or by any law, order, judgment, agreement, instrument or otherwise) to be exceeded.

58.3 The Contractor further represents and warrants that knowing the requirement of the Employer and the Project, it has the requisite skill, experience, manpower, financial support and expertise to perform the Works and render the services required for completion of the Project in accordance with the terms of this Contract.

59. Indemnity

The Contractor shall secure and protect itself, and hereby agrees to protect and indemnify the Employer and Consultant, their respective officers, agents and employees from any liability, claim, loss, or damage whatsoever for any injury, including death, to any person or damage to any property whatsoever not caused by any negligent act or omission of Employer and Consultant, their respective officers, agents and employees arising out of the performance of this Contract.

60. Notices

Any notice or the like required to be given by either party shall be in writing and it is to be sent by messenger to the other party with a copy to the Consultant. Both parties are bound to receive other party documents providing a receipt signature and official seal.

61. Arbitration and Governing Law

61.1 All disputes of any nature in connection with or arising out of this Contract, which cannot be settled amicably, shall be submitted to Arbitration in accordance with the Arbitration Act, as in force in Bangladesh. The Arbitration shall be final and binding on both parties and enforceable in any court of competent jurisdiction.

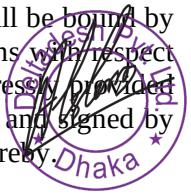
62. Miscellaneous

61.2 This Contract shall be governed by the laws of Bangladesh.

62.1 The failure of either party to insist in any one or more instances upon strict performance of any of the terms of this Contract or to exercise any rights herein conferred shall not be construed as a waiver or relinquishment to any extent of the parties' right to assert or rely upon any such terms or rights on any future occasion.

62.2 The Contractor is, and shall be deemed to be, an independent Contractor, and is not, and shall not become, an agent of the Employer.

62.3 This Contract together with its Annexures, attachments, drawings and specifications set forth the entire Contract and understanding between the parties as to the subject matter of this Contract and merges all prior discussions between them, and neither of the parties shall be bound by any conditions, definitions, warranties, or representations with respect to the subject matter of this Contract other than as expressly provided in this Contract, or as subsequently set forth in writing and signed by an authorized representative of the party to be bound thereby.



List of Deviation		
Project:		**Work Package No.**
Client:		**Work Package Name.**
BoQRef	**As Per Bid Requirement**	**As per offer**
A	B	C
	Seal and Signature	



SPECIAL TERMS AND CONDITIONS OF CONTRACT

1.0 SCOPE OF WORK

1.1 The Contractor shall be fully responsible for supply, installation, erection, testing and commissioning of complete equipment, controls and all other ancillary parts and materials required for the concern work packages for the project.

1.2 The Contractor shall be responsible for all types of works included in the Bill of Quantity Schedule and drawing. He will also identify extra item (if any) require to complete the project before execution of the Contract.

1.3 The Contractor shall be responsible for supply of all skilled and other labours, supervisors, tools, and plants necessary for the work of the project. He shall be responsible for efficient management and supervision of the work.

1.4 The Contractor shall be responsible for thorough study of the drawings, preparing shop drawings and detailed bill of materials required for the completion of the project. Shop drawing shall be prepared in line with design drawing. In case of any specification and size deviation between Design Drawing and Shop Drawing, the design Drawing will govern, until written approval of the specific item.

1.5 All the bidders must submit the letter of authorization from the concern manufacturer that the manufacturer will supply the equipment, spare parts and after-sale service through the successful bidder.

1.6 All items / equipment must be new and from reputed manufacturers.

1.7 The Bidder shall clearly indicate the source of supply and furnish full particulars of materials and the name and address of the manufacturers and the country of origin, which shall not be changed after the opening of tenders and award of the Contract.

1.8 The Principal / the contractor shall give guarantee to the owner for supplying spares for a period of at least 10 years from the date of commissioning. Such guarantee shall be furnished from the manufacturer of the machine/equipment.

1.9 The Contractor shall arrange trial run for a period of 3 months from the date of commissioning on successful completion and handing over to the Owner.

1.10 The Contractor shall be responsible for complete maintenance works for a period of one calendar year from the date of official handing over to the Owner.

1.11 The Contractor shall remain totally responsible for attending faults, rectification (including any replacement works) of major or minor kind during commissioning, operation or maintenance period.

1.12 The Contractor shall impart full local training to a team of Engineers, Technicians and Operators deputed by the Owner in the field of operation, handling, maintenance, trouble shooting throughout the period of installation, testing, commissioning, operation and maintenance.

1.13 The Contractor shall submit drawing for requisite RCC foundations for the vibration isolating arrangements of various equipment.

1.14 The Contractor shall also execute all relevant electrical works including power control and wiring from the Electrical Power Switch Board.



1.15 The Client/Employer reserve the right to exclude any part of work from the Contractor's scope for project requirement.

1.16 Dimension of any item shown in drawing is approximate. Contractor is to survey site to be satisfied with the dimension or size before ordering such item.

1.17 Quantity shown in BOQ Schedule is approximate. The Contractor is to verify quantity before placement of order. In case of any shortfall, the Contractor is to supply it. No, extra time shall be allowed for such shortfall.

2.0 PRE-SHIPMENT INSPECTION/ FACTORY ACCEPTANCE TESTING

Before shipment of the equipment shall be inspected by an internationally reputed and recognized inspection agency to be approved by the Employer.

Factory inspection of main equipment shall be carried out by two persons of Client & Local Consultant at manufacturing factory. All costs including Air tickets of Economy Class, Lodging at least a 3 star rated Hotel, Fooding, Transport, Visa processing, Travel Tax, etc. shall be carried out by the Contractor.

3.0 SHIPPING

3.1 Notice of shipment shall be made by Cable/Telex to:

(i) Project Incharge.....
(ii) The Insurance Company (if required) with intimation to the Owner.

3.2 Notice of shipment shall contain the following:

i) Contract number
ii) Description of items and number of packages
iii) Name of Vessel
iv) Bill of Lading No and Date
v) Port of loading (in the source country)
vi) Port of discharge (Country belongs to the physical location of the Project)
vii) Date of shipment
viii) Expected time of arrival of ship at the Port of discharge i.e. Chittagong Port

3.3 Upon shipment the Contractor shall supply the following documents directly by airmail to the Owner with a copy to the Insurance Company (if needed):

i) Copies of Supplier's invoice indicating the unit and total delivered prices

ii) Copies of non-negotiable clean on board Bill of lading marked "Freight Prepaid" and

iii) Manufacturer's / Supplier's Guarantee Certificate Guaranteeing quality and quantity.

iv) Certificate of pre-shipment inspection confirming quantity shown in the Bill of Lading and showing conformity of the goods to contracted specifications, packing weight per package by the Owner's Inspection Team.

v) Certificate of the Country of Origin.

vi) The Contractor shall be responsible for demurrage, handling charges or other expenses arising from any delay in the dispatch of shipping documents or incorrect preparation thereof.



4.0 MATERIALS HANDLING

4.1 All the materials, machinery and equipment shall be delivered at the under construction site.

4.2 Contractor shall be responsible for handling of all materials. He shall be responsible for clearing, handling of materials at the port. He shall be responsible for all types of transportation of materials up to the site and handling of materials at the site.

4.3 Contractor shall be responsible for lifting, placement in position installation of all machinery, equipment and other materials to different floors as per drawings and requirements of the project.

4.4 The packing of machinery, equipment and other items shall be seaworthy, rail worthy, roadworthy and as per international standard for such items.

4.5 The Contractor shall be responsible for all kinds of breakages, losses, damages, pilferages etc.

4.6 For protecting Terrazzo floors from any damages, during lifting, positioning to place and installation of any component of equipment, machinery, construction material etc. two layers of gunny bags/ tarpaulin covering shall be used over the entire floor area throughout the period of work in the respective building.

5.0 SUPPLY OF TECHNICAL DATA AND MATERIALS

5.1 Contractor shall supply 4 (four) copies of installation, operation maintenance manuals and other related documents for all the machinery, equipment and other items and installation design and drawings.

5.2 Contractor shall supply detail installation drawing along with materials specifications. He shall furnish complete electrical drawing including wiring and conduit layout and circuit diagram.

5.3 All designs, drawing, Shop drawing and specifications furnished by the contractor are subject to approval of the Consultant.

5.4 The Client / Consultant may require any other project related information / data from Contractor. The Contractor shall provide that information without any delay.

6.0 PACKING AND MARKING

6.1 The Contractor will be responsible for properly packing and marking the goods for shipment by rail, road, sea and /or air Goods shall be assembled to the maximum extent practically prior to shipment. All goods shall be packed so as to withstand unusually rough handling and ensure delivery without loss or damage. Packing case sizes and weights shall take into consideration the remoteness of the delivery point and any absence of heavy handling facilities. Where necessary heavy equipment should be mounted on skid so that cable slings may be readily attached. Packing of complete units is desired in those instances where an item is to be warehoused upon acceptance and later reshipped or issued as a complete unit. Special packing instructions may be included in the specifications for each item.

6.2 Each case/ Package must have a copy of the packing list inside.

6.3 Each case / Package must have the following information printed in BOLD LETTERS on the outside.

a. Destination
b. Name of Consignee
c. Letter of Credit Number
d. Brief Description
e. Gross and Net weights



f. Name and address of Supplier

7.0 TERMS OF DELIVERY

7.1 Materials are to be shipped to C & F Chittagong (Liner terms basis) or any other port approved by the Client and within the time stated from the day of issuance of Formal Work Order in the Schedule.

7.2 The materials shall be delivered in perfect and original condition. In case of any deviation from the Tender Specification or 'Accepted Deviation' the item shall be rejected. Contractor shall be held responsible ,

7.3 Normally the Owner will not allow any extension of time beyond that already provided for in the Schedule. But in case of any unavoidable circumstances beyond the control of the Contractor the Owner may at his discretion extend time to a suitable limit. In such cases the Contractor shall have to apply 14 (fourteen) days in advance giving full justification for his request for extension to the owner.

8.0 INSURANCE ON IMPORTED MATERIALS

The Contractor shall provide for full insurance cover for all the imported materials and equipment for the lifts and he shall as such compute CIF cost accordingly in his pro forma Invoices. He shall as such remain totally responsible for any damage/loss of imported materials (part or full) during transportation. All documents of such Insurance made on the full value of the materials by the Supplier/Contractor must be submitted to the Owner along with the shipping documents. The Contractor shall also undertake all relevant works in this respect. The Insurance shall cover the entire period from shipping of goods until final acceptance is made.

9.0 TRANSPORTATION

9.1 Ocean transportation shall be by vessels belonging to shipping conferences.
The vessel transporting the goods from the port of shipment to the port of entry must of seaworthy condition and it should possess a certificate to that effect from Lloyds or equivalent any other competent authority internationally acceptable. The age of the vessel whether chartered or Liner terms basis must not exceed 15 years. The vessel carrying the goods will have fast speed and workable winches. The length of the vessel carrying the goods shall be restricted to 540 feet it must come with permissible draught of port. If the ship exceeds the draught limit of the port, the Contractor of their risk and cost shall arrange ligherage if any.

10.0 GUARANTEE AND WARRANTY

10.1 The Contractor shall submit warranty certificate from the principal(s) of their products concerning manufacturing defects and performance for a period of twelve months from the date of formal acceptance of the plant.

10.2 Contract shall be responsible for prompt replacement and /or repair of any component lost or damaged during handling, installation, commissioning, testing, test running or due to mechanical/ electrical fault. Such replacement of any unit or component parts of a unit or of any auxiliaries and materials shall be made by the Contractor at his own cost without waiting for settlement of any insurance claims the Contractor may have lodged. In case of such repair and /or replacement of any part by the Contractor, the period of performance guarantee and warranty shall start from the date when the machinery are restarted.

11.0 PAYMENT TO THE CONTRACTOR



11.1 In the event of any delay in dispatch of shipping documents or incorrect preparation or submission thereof, the Contractor shall be responsible for any demurrage, handling charges or other charges arising thereof.

11.2 Payment shall be made by the Employer to the Contractor as mentioned in Abstract of Tender.

11.3 The retention money shall become due for refund after satisfactory completion of the maintenance period of 12 (twelve) months less the amount already incurred by the owner or considered necessary by him for any rectification/repair not executed by the Contractor in accordance with the "Conditions of Contract".

12.0 TAXES AND DUTIES

12.1 All tariffs, duties, income taxes and other charges levied on the goods shall be borne by the party as described in Abstract of Tender.

13.0 SPARE PARTS AND TRAINING

13.1 Spare Parts:

The Tenderer shall submit separately with the tender full list of spare parts including price in Taka against item recommended and deemed by the manufacturer to be adequate for operation and maintenance for a period of 5 years. The Employer will review this list and may select the spare parts to be included in the Contract for such purpose. However this cost will not be considered in the evaluation of the Tender.

13.2 The Tenderer shall give a protective maintenance Guarantee for 1(one) year after commissioning of the plant for major equipment. In case of malfunction of any component of machinery, equipment, construction materials, instruments, control etc. the Tenderer/manufacturer will rectify the defects and replace the defective components free of all cost and charge.

13.3 Training Program:

The duration of the training program to the essential operating staff of the employer for operation & maintenance of the equipment should be minimum 1 (one) month and acceptable to the employer.

The Training Program shall be drawn up and included with the offer. The Employer will designate and depute the agreed number and category of personnel for the training. All training shall be completed before completion of maintenance period.

14. Excluded Works (but the Contractor will provide the requirement in drawings in well advance)

a. Plinth making of equipment and pipe support
b. False ceiling, wall, floor opening cutting and mending for concern services passing.
c. Power supply upto main electric Panel Board
d. Water supply line to Plant Room.

15. OTHERS

15.1 All materials should be supplied by the Contractor. The Contractor’s supplied materials must be of the best quality. Material sample need to be approved by the Consultant before procurement.

15.2 The qualities of the work may vary at the time of execution of work and some items may not be executed at all. For such work no claim will be entertained. No extension of time will be allowed for excess quantity of work done.

15.3 For misuse, damage or pilferage of materials supplied by the department or supplied by the Contractor and if any accident of labor occurred the contractor himself will be liable and no claim will be entertained. For misuse and pilferage of materials (if any) the cost will be recovered at double the issue rate.

15.4 The work may be done round the clock for which under any circumstances, no extra claim will be entertained.

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15.5 No claim from the contractor shall be entertained if the work is not executed for any reason.

15.6 The arrangement of water supply, sanitation, electrification, Gas connection, etc. if any required for the purpose of execution of work should be made by the contractor himself at his / their own cost and risk.

15.7 If any clearance / No Objection Certificate (NOC) need from any department / authority for installation of any kind of equipment / component at site as per tender documents, the Tenderer will arrange the same for execution of the work from the concern department / authority at their own cost in favour of the Client.

15.8 The Contractor shall have to bear the expenses of all kinds of test, which will be necessary time to time for this work, for which no extra payment will be made by the department.

15.9 The Contractor is to prepare shop drawings in coordination with other services, Interior Design and site condition. They are to work keeping coordination with other services works.



TECHNICAL SPECIFICATIONS



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SECTION 16010

GENERAL REQUIREMENTS FOR ELECTRICAL SERVICES INSTALLATION AND ASSOCIATED EQUIPMENT

16010-1 GENERAL

The works shall include the supply, installation, delivery, erection, installation, connection, testing, commissioning and setting to work of the new electrical services installation and equipment for the Bengal Hotel and Resort. This shall include the provision of all skilled and unskilled labour necessary for the proper execution of the works, supervisory and management staff, site establishment and storage facilities, tools and other installation and lifting/handling equipment, ladders, scaffolding and access apparatus, wiring enclosures and supports, cabling and all plant, systems and equipment shown or implied on the electrical services Design drawings or detailed within this Specification.

This Specification includes standards of materials to be used and standards of workmanship applicable to the electrical installation and it shall be read in conjunction with the electrical services design Drawings.

16010-2 SCOPE OF WORKS

The works shall commence at the medium voltage intake substation where the DESCO will provide and connect an incoming 11 kV 3 phase 50 Hz 3 wire electricity supply. The works shall include the following complete installations:

i) Medium voltage intake substation equipment including 12 kV switchgear, 12 kV cabling, 11 kV-230/400 V dry type transformers and earthing installation.

ii) Main 400 V/230 V distribution switchgear.

iii) Distribution boards and associated distribution equipment requirements.

iv) Motor control centres

v) Main and final circuit distribution cabling, cabling supports and wiring enclosures including wiring for telephone cabling.

vi) General and emergency lighting installations and lighting controls.

vii) General power outlet and emergency power outlet and services to fixed items of power using equipment each of which shall be provided with a local isolator of rating and arrangement to suit the application.

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viii) Fire detection and Alarm system.

ix) CCTV System

x) Standby generator installation.

xi) Building Automation System

xii) Telephone system

xiii) Public address system.

xiv) Computer system wiring

xv) Earthing system

xvi) UPS

xvii) Lightning protection installation

The foregoing is a general outline of the scope of works which shall be provided as described in greater detail in the following clauses of this Specification and as shown on the design Drawings.

16010-3 REGULATIONS AND STANDARDS

All installations and equipment shall be provided strictly in accordance with the following regulations and standards, reference to which shall mean the latest or current publications at the time of tender:

i) Bangladesh National Building Code.

ii) The Regulation of the Electrical Equipment of Building as issued by the Institution of Electrical Engineers, London.

iii) The British Standards and Electrical Codes of Practice (BS).

iv) National Electrical Manufactures Association (NEMA).

v) National Electric Code of the USA (NEC).

vi) Institute of Electrical and Electronic Engineers (IEEE).

vii) Standards of the International Electrotechnical Commission (IEC).

viii) American National Standards institute (ANSI).

ix) National Fire Protection Association (NFPA).

In the absence of a standard for any piece of equipment, it shall be of best quality available. Equipment shall be of metric dimensions unless otherwise stated. When ordering materials, the Contractor shall advise the manufacturer

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of the required standards. Failure to comply with required standards shall be the sole responsibility of the Contractor.

16010-4 DESIGN AND SPECIFICATION

The contract works shall be provided to facilitate inspection, cleaning and repairs and for operation in which continuity of service is the first consideration. All apparatus shall be designed to ensure satisfactory operation under the environmental conditions prevailing at the site and under such sudden variations of load and voltage as may be met under working conditions on the system. The installation and equipment shall also be of adequate rating to withstand the electro-mechanical forces that may be set up by prospective short circuit currents.

The works shall incorporate every reasonable precaution and provision for the safety of all those concerned in the installation, operation and maintenance and of associated works supplied under other contracts.

All materials used shall be of the best quality and of the class most suitable for working under the conditions specified and shall withstand the variations of temperature and environmental conditions arising under working conditions without distortion, or deterioration or the setting up of undue stresses in any part, and also without affecting the strength and suitability of the various parts for the work which they have to perform. No welding, filling or plugging of defective parts will be permitted without the approval in writing of the Engineer.

All apparatus shall operate without undue vibration and with the least practicable amount of noise.

Cast iron shall not be used for chambers of oil-filled apparatus or for any part of the equipment which is in tension or subject to impact stresses except where it can be shown that service experience has been satisfactory with the grade of cast iron and the duty proposed.

Operating boxes, kiosks, cubicles and similar enclosed compartments forming part of auxiliary equipment shall be adequately ventilated to restrict condensation and, where environmental conditions require it, suitable integral low-temperature heaters shall be provided. All contactors or relay coils and other parts shall be suitably protected against corrosion. All exterior enclosures and in place where subject to chemical abrasive shall be made of stainless steel.

All external apparatus shall be so designed as to avoid pockets in which water can collect and shall be weatherproof, to IP65 Standard generally.
Unless otherwise stated, all electrical equipment shall be suitable for operation on a 400 volt 3 phase 50 Hz 5 wire system or at 230 volts 50 Hz single phase 3 wire

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All apparatus shall be designed to obviate the risk of accidental short circuit due to animals, birds and vermin. Openings in ventilated enclosures shall be so constructed to prevent the entry of vermin and insects.

All apparatus incorporating doors or adjacent to doors shall be erected so that the doors can be opened to at least 120° after adjacent equipment has been installed.

16010-5 MANUFACTURER'S STANDARDS

Except where specified otherwise, all materials and equipment associated with the installation shall be handled and installed strictly in accordance with the manufacturer's recommendations and shall be handled and installed by workmen who have had previous experience of the equipment and materials and who have, where necessary, attended a manufacturer's course on use and installation.

The Contractor shall ensure that any special tools recommended by manufacturers for the installation of their materials and equipment are used by the workmen. Spare part lists shall be issued for Engineer’s approval at the time of materials and equipment submitted for approval.

16010-6 GALVANISING

Galvanising, where specified, shall be applied by the hot dipped process. The preparation for galvanising and the galvanising process shall not adversely affect the mechanical properties of the material being coated.

Pre-site drilling, punching, cutting, bending and removal of burrs shall be completed before galvanising where appropriate. In case of negligence, the zinc rich 95% with 5% binder paint shall be applied.

Surfaces in contact with oil shall neither be galvanised nor cadmium plated, unless finished with an oil resisting coating.

The average thickness of the zinc coating shall be equivalent to not less than 0.6 Kg/sq. m of zinc for all surfaces, except steel wires.

16010-7 MARKING AND LABELLING

All equipment within the installation shall be clearly and permanently labelled in a comprehensive manner to the approval of the Engineer. Where labels are provided for making clear the method of operation of apparatus, they shall be concise and preferably diagrammatic in form.
All labels shall be fixed using screws.

All outdoor switchgear shall be clearly and permanently identified by number plates and phase discs of appropriate colours.

Labels, number plates and their fixing screws for outdoor use shall be of stainless steel or other corrosion resistant material. Where the use of vitreous enamelled labels is approved, the whole surface including the back and edges shall be properly covered and protective washers shall be provided front and back on the fixing screws.

All distribution boards, isolators, control units and other LV equipment shall be fitted with an identification label. Each label is to be rear engraved perspex secured to its item of equipment by means of non-corrodible screws and shall indicate the phase and function of the unit and its coding reference. The filling used in the engraving is to be of a clearly distinguishable and approved colour.

Typewritten circuit lists shall be provided adjacent to all distribution boards used throughout the installation. These circuit lists are to be mounted on a sheet of aluminium and be provided with a transparent protective cover. Duplicate copies of each circuit list shall be bound into the operating and maintenance manual.

Danger notices shall have red lettering on a white background. All other labels and number plates shall have black lettering on a white background. Generally, lettering for danger notices shall be 10 mm high and all other lettering 6 mm high.

Labels for similar equipment shall be of uniform appearance and size, and the dimensions and size of lettering shall be to the approval of the Engineer.

16010-8 FIXING

Fixing to brickwork and blockwork shall be made in the bricks and blocks and not in the bond. Wood screws shall be zinc coated and machine thread screws shall be solid brass and greased before installation. Accessories mounted in fixed equipment shall incorporate adjustable slotted fixing holes.

Heavy equipment shall be fixed with approved purpose-made clamp brackets, rag bolts or patent fixing bolts. Short plugs or bolts shall not be used without the written agreement of the Engineer.

No structural steelwork shall be drilled for any purpose without the written agreement of the Engineer.

In general, all fixing to steelwork shall be by means of studs welded to the steelwork or by clamp-brackets or hook bolts. Exterior steelwork fixings shall be galvanised.
The supply and fixing of all supports, brackets, clamps and spacers and any other steelwork, whether or not shown in detail on the Drawings required for the proper and effective fixing of any equipment, shall be considered to be included in the material and labour covered by the supply of that equipment.

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Nuts shall be locked in position with lock nuts or lock washers, or castle-nut and split pin, or other devices, if approved. Lock washers shall not be used above except when a spring type is specially approved.

No bolt or stud shall project through its nut by more than approximately 10 mm or four threads whichever is the less, except for terminals and relay stems.

Bolts, nuts and washers on outdoor equipment shall be of non-corroding material where they are in contact with non-ferrous parts in conductor clamps and fittings and elsewhere, if specially required.

Suitable special spanners shall be provided for bolts and nuts which are not properly accessible by a standard spanner.

16010-9 CLEANING AND PAINTING

Before painting or filling with oil or compound, all galvanised parts shall be thoroughly cleaned, free from rust, scale, burrs, grease and moisture and all external rough surfaces on castings shall be filled.

The following minimum painting requirements shall apply to all ferrous parts, unless the Contractor can show, to the satisfaction of the Engineer, that any alternative he proposes is in all respects equal or superior to the specified requirements:

(a) INTERNAL SURFACES

Apparatus:-

Oil filled chambers and tanks.

Painting:-

Epoxy based enamel.

Apparatus:-

Kiosks for use outdoors.

Painting:-

Three coats of paint, the final coat being an anti-condensation finish coloured white or light grey.

Apparatus: -

Cubicles, kiosks and apparatus boxes for use indoors.

Painting: -

Three coats of paint with the final coat being in enamel.

(b) EXTERNAL SURFACES

Apparatus: -

All un-galvanised surfaces other than nuts, bolts and washers which may be removed for maintenance purposes.

Painting: -

At Works

- One primary coat of corrosion inhibiting paint applied immediately after cleaning.

- Two coats of non-glossy weather resistant paint applied after inspection and testing and before despatch.

At Site

- One finishing coat of glossy, weather resisting, non-fading paint applied as erection is completed. For equipment despatched completely assembled, the final coat may be applied at the works unless otherwise required by the Engineer.

Apparatus: -

Exposed un-galvanised nuts, bolts and washers which may be removed for maintenance purposes.

Painting: -

One coat of weather resisting, non-fading paint applied after erection.

Successive coats of paint shall be easily distinguishable by shade or colour and shall be applied to a clean dry and properly prepared surface. Each coat shall be compatible with the previous coat.

The colour and shade of all painted external surfaces shall be to the agreement of the Engineer.

All paint work which has been damaged during transport or erection shall be made good before the application of any final coat.

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16010-10 FIRE PRECAUTIONS

All apparatus, connections and cabling shall be designed and arranged to minimise the risk of fire and any damage which might be caused in the event of fire.

16010-11 RADIO INTERFERENCE

All equipment shall be designed so as to minimise radio interference in the frequency range 0.15 MHz to 30 MHz by means of suppression at source.

16010-12 PADLOCKS

Padlocks or other approved locking devices for circuit-breakers, isolating devices, control switches, valves, marshalling kiosks, cubicles, screened enclosures and other equipment shall be supplied under this Contract.

All padlocks and other locks shall be provided with two identical operating keys. Each key shall have an engraved durable identification label. It shall be impossible to open any lock or padlock with the key of any other lock or padlock provided under this Contract. Locks or padlocks shall be in suites or areas provided with group master key facilities to the requirements of the Engineer.

Keys and locks shall be impressed with the manufacturer's special serial number.

Wall mounting cabinets with glazed doors suitable for the accommodation of keys, shall be provided and mounted in approved positions and shall be labelled in a similar manner to the keys, with a labelled hook arrangement for each key. The engraving on all labels shall be in accordance with an approved scheme.

16010-13 TOOLS

The Contractor shall supply in steel boxes, complete with keys, all tools including any special tools that may be required for making adjustments to equipment during normal operation or maintenance periods. All tools shall be of high quality complying with relevant Specifications, steel and stamped with an approved identification.

16010-14 EXPANSION JOINTS

Building expansion joints may occur throughout the building works. Wherever such joints are provided, the Contractor shall ensure that all pipes, ducts, conduits and cables crossing the joints are suitably sleeved, set and flexibly coupled across the expansion joint, adequately fixed each side of the joint and properly bonded.

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16010-15 SPARES

The Contractor shall supply, suitably packaged and labelled, one set of recommended spare parts for all electrical services equipment provided under this Contract and covered by this Specification and the associated design Drawings to cover one year's normal operation. The spares shall be delivered to the client's designated stores.

16010-16 DEFECTS LIABILITY

The Contractor shall guarantee all works, materials and equipment provided under this Contract for a period of two years after acceptance and the issue of a practical completion certificate by the Engineer. During the guarantee period, the Contractor shall correct at his own expense any defect or failure occurring or becoming apparent, fair wear and tear excepted. Where defects or failures are rectified, the guarantee period of two years for rectified parts, equipment and services shall again commence from the date of rectification.

16010-17 `AS INSTALLED' DRAWINGS

The Contractor shall keep a set of design Drawings on site and mark these with actual installation details as the work proceeds.

Two weeks prior to practical completion of the works, the Contractor shall provide to the Engineer for approval two complete sets of draft `As Installed' drawings covering all equipment, installations, and associated diagrammatic information. Failure to provide the draft `As Installed' drawings will delay practical completion.

Following approval/comments by the Engineer, the Contractor shall amend the As Installed' drawings as necessary and issue them to the Engineer in the following format for distribution:

i) Five complete sets of drawings on paper prints.

ii) Two CAD discs, each complete with all drawings.

16010-18 OPERATING AND MAINTENANCE INSTRUCTION MANUALS

Two weeks prior to practical completion of the works, the Contractor shall provide to the Engineer for approval, a draft copy of the operating and maintenance instruction manual covering all equipment and installation details. Failure to provide the draft manual will delay practical completion.

Following approval/comments by the Engineer, the Contractor shall amend the manual and issue four copies to the Engineer for distribution. Each copy of the manual shall be ring bound with title, project name and description, details of services included, consulting engineer's name, address and

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telephone numbers and Contractor's name, address and telephone numbers on the front cover.

Each copy of the operating and maintenance instruction manual shall contain the following as a minimum:

Section 1 - General description of all services, systems and equipment.

Section 2 - Operating procedures for all services, systems and equipment.

Section 3 - Periodic maintenance and fault finding procedures for all services, systems and equipment.

Section 4 - Copy of all distribution board circuit schedules.

Section 5 - Copy of all appropriate equipment, installation and system test and approvals certificates and associated sheets.

Section 6 - Schedule of all manufacturer's and supplier's, names, addresses and telephone/fax numbers.

Section 7 - Copies of all relevant technical literature for equipment and systems provided.

16010-19 TEST AND ACCEPTANCE

After the electrical services and associated equipment installation has been completed, they shall perform the acceptance test according to the reference standards and codes. Any defect appearing shall be remedied before any equipment is installed or connected. The Contractor shall submit the test procedure to the Engineer for approval prior to starting the test. When the medium voltage 12 kV cable terminations has been made, all MV cable shall be tested by hi-pot tester as specified kV rating by ANSI C37.06. Other medium equipment shall be of insulation test by Megohmmeter 2500 V or higher voltage tester. The insulation test shall be performed by DESCO or by the Contractor whichever as directed by the Engineer. All instruments, labours and other facilities required for such test shall be provided and in responsibility of the Contractor.

16010-20 AS INSTALLED DRAWING

The Contractor shall prepare the “As Installed” drawing numbers according to the Owner standard of maintenance drawing which may be classified into building and specific type of work:
According to Specific Woks (***example***):

0 = General
1 = Lightning and grounding system
2 = Medium voltage single line diagram, electrical riser diagram
3 = Lighting system
4 = Power system
5 = Telephone and Computer system
6 = Fire alarm system
7 = Paging system
8 = Building Automation System
9 = Miscellaneous

16010-21 TRAINING COURSE

When any system installation has been finished and prior to acceptance test, the Contractor shall effectively train maintenance staff operator locally so that they will be capable of performing their job effectively.

The Contractor shall state the appropriate number of trainees, the basic background knowledge of trainee required, the period of training and class rooms. The trainers, training equipment, training materials and documents shall be provided by the Contractor.

END OF SECTION

SECTION 16070

FIRE AND SMOKE STOPS

16070-1 GENERAL

(a) Opening around electrical penetrations i.e. conduit, raceway, bus way and etc. through fire resistance wall, partitions, floor shall be fire-stopped using approved material and method to maintain the fire-resistance rating.

(b) Provide Fire/smoke stops in a same time-rated of walls and floors for cable, cable tray, and conduits or minimum 2 hours time rated.

(c) System shall readily permit changes and additions to systems after completion.

(d) Provide accessories and other components as required to complete installation

16070-2 PRODUCTS REQUIREMENT

(a) The fire barrier materials shall comply with the standards of the Underwriter's Laboratory Inc.

(b) The fire barrier materials shall have a minimum 2- hour fire resistant rating unless otherwise specified.

(c) The fire barrier materials must not be toxic during installation or in the case of fire.

(d) The fire barrier materials must be submitted to the Employer’s Representative for approval before installation.

16070-3 INSTALLATION

(a) Follow manufacturer’s recommended procedures to provide smoke and/or fire stops in time-rated walls and floors.

(b) Demonstrate to Engineer, Installation procedures for changes and additions to the systems.

END OF SECTION

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SECTION 16105

GENERAL ELECTRICAL INSTALLATION

16105-1 SCOPE OF WORK

The work shall include the furnishing of materials, labour, equipment, tools, transportation, superintendence and services required to construct and install the complete electrical system as specified herein. The Contractor shall be responsible for all expenses of DESCO coordination, application fees, inspection fees, Bangladesh Electrical Licencing Board fees and others required by DESCO. The electricity consumption charges during installation of the electrical work in the project including the charges for temporary connection and all other charges in this connection shall have to be borne by the Contractor.

16105-2 GENERAL

(a) All equipment and materials undersized and unspecified in the Specifications and on the plans, but required and necessary to complete the works as specified on the plans and in the Specifications and to make the specified works conform to the regulations of the latest B.S. and U.S. National Electrical Code shall be deemed to have been included in the Contract and the Owner shall not be charged additionally.

(b) The Drawings indicate the extent and general locations and arrangements of equipment, wiring and raceway systems. Exact locations and arrangements shall be specified during construction by the Engineer. These minor deviations shall be done without additional expense to the Owner.

(c) The work under this Contract shall be installed in accordance with the B.S. and U.S. National Electrical Code Regulations, recommendations of the manufacturer as approved by the Engineer, and/or as modified by the Contract.

(d) All materials and equipment furnished under this Specification shall be new, unused and as herein specified. Where not specified, all materials shall be of the best of their respective kinds. Samples of materials or manufacturer's Specifications shall be submitted for approval of the Engineer prior to their use.

(e) All work shall be performed by workmen skilled in this type of work.

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(f) The Drawings are diagrammatic and functional only and are not intended to show exact circuit layouts, number of fittings, or other installation details. Additional circuits shall be installed by the Contractor wherever needed to conform to the specific requirements of the equipment.

(g) The Contractor shall investigate each space in the building through which equipment must pass to reach its final location. If necessary, the manufacturer shall be required to ship his material in sections sized to permit passing through such restricted areas in the building.

(h) The Contractor shall provide name plates of lamacoid sheet, with engraved white letters on black background, secured to the equipment in a permanent manner. All markings shall be as approved by the Engineer.

(i) After all the electrical system installation is complete, the Contractor shall conduct an operating test and insulation test for approval in the presence of the Engineer. The insulation test of each conductor shall not be lower than the accepted level as required by B.S. The Contractor shall furnish all instruments and personnel required for the tests.

(j) Upon approved completion of electrical work and before final payment, the Contractor shall furnish "As Built Drawings" incorporating all field changes.

(k) All materials and equipment furnished under this section of the Specifications shall be guaranteed against defective materials, design and workmanship for a period of one year from the date of acceptance. Upon receipt of notice from the Owner of the failure of any item during the guarantee period, the affected part or parts shall be replaced promptly with new parts by and at the expense of the Contractor. The Owner reserves the right to make emergency repairs and shall charge to the Contractor for the expenses.

16105-3 ELECTRICAL DISTRIBUTION SYSTEMS

16105-3.1 Low Voltage

The distribution system for the low voltage shall be 400/230 volts, 3 phases, 4 wires with ground. The ratings of the equipment in this system shall be specified in the material list by the Contractor for the approval of the Engineer.

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16105-3.2 Colour Codes

All busbars, cables, wires, terminals, etc. shall be colour coded as specified in the IEC standard. Thus, white or blue-colour shall be used as neutral, brown-colour for phase A, blak-colour for phase B, grey-colour for phase C and green/yellow bi-colour for ground. Large wire, cables and busbars shall be colour coded by using suitable paints.

16105-4 MATERIALS AND EQUIPMENT

16105-4.1 Wires and Cables

Except as specified on the plan, all electric wires and cables shall be insulated copper conductor conforming to B.S. Specification for PVC insulated Cables and Flexible Cords, rated not less than 750 volts and 70^{o}C.

16105-4.2 Motor Control Centers, Motor Controllers and Control Panel

(a) The contractor shall submit four correct copies of shop drawing of the following items for approval of the Engineer:

Details of each cubicle;
Complete arrangement of all materials and equipment; and
Detailed drawing and Specifications for all equipment.

(b) The Contractor shall be responsible for all dimensions to be confirmed and correlated to the job site and for coordination of his work with the work of all other trades. No material shall be ordered or shop work started until the approval of shop drawings has been given by the Engineer.

(c) The check and approval of shop drawing shall be only for conformance with the design concept of the project and compliance with the Specifications and Contract Drawings and shall in no way relieve the Contractor from the responsibility of work required by the Contract Drawings and Specifications which may not be indicated on the shop drawings.

16105-4.3 Panel Boards

(a) Panel boards shall be 400/230 volts, 3 phases, 4 wires, or 230 V 1 phase 2 wires dead front panels for automatic circuit breakers, surface or flush mounted with door and provision for the size and number of circuit breakers.

(b) Panel boards shall be of steel with primer and baked enamel finish.

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(c) All panel boards shall be of the same type and from the same manufacturer.

16105-4.4 Safety Switches

(a) Safety switches shall have switch blades which are fully visible in the OFF-position with the door open. Switches shall be quick-make, quick-break and unless specified otherwise, shall be the heavy-duty type.

(b) Safety switches shall be of steel with primer and baked enamel finish.

(c) All safety switches shall be of the same type and from the same manufactured as panel boards.

16105-4.5 Circuit Breakers

(a) Circuit breakers shall be installed in the cubicle or panel as shown on the Drawing and shall be of the types and ratings indicated.

16105-4.6 Lighting Fixtures

(a) Lighting fixture shall be manufactured locally by approved factory or imported from abroad. These lighting fixtures shall be submitted for approval prior to placing of an order.

(b) LED lamps shall be adopted as indicated on the drawings.

(d) Other lighting fixture shall be of the types and manufacturers accepted by the Engineer. The Contractor shall submit detailed Specifications and catalogues for the approval of the Engineer before procurement.

16105-4.7 Switches

(a) Switches shall be as specified on the design drawings.

16105-4.8 Receptacles

(a) All receptacles indicated on the Drawings except weather-proof receptacles shall be the duplex type and rated as specified on the design drawings. Receptacle shall be a switched (combined) and shuttered and shall be for 3 pin flat pin type (rectangular cross section) or as per the local code required. All receptacles shall be installed in outlet boxes. The receptacle shall be from the same manufacturer as that of the switch.

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(b) Weather-proof receptacles shall consist of a single outlet in an outlet box with a gasket, weather-proof, threaded metal cover plate fastened to it by a short length of chain. The receptacles shall be rated 13 amperes at 250 volts and configuration of prongs and grounding slot shall be the same as required in (a) above.

16105-4.10 Conduits

(a) Rigid metal conduit: ANSI C80.1, galvanized rigid steel conduit.

Conduit fittings: Cast ferrous alloy, galvanized.

Couplings and fittings: Threaded type. Threadless fittings may be used only with specific approval of the Engineer.

Conduits terminating at rain tight enclosures: terminate in rain tight hubs.

(b) Electrical metallic tubing; ANSI C80.3, steel metallic tubing. Provide rain tight fittings for box connectors and conduit couplings. Set screw and indenter type fittings not allowed.

(c) Flexible metallic conduit; Galvanized, single strip type, UL 360. Use American Brass Sealtite flexible, liquid-tight conduit in damp or wet locations.

(d) Exterior underground duct and raceways, concrete encased; polyvinyl chloride (PVC) conduit. Rated for 90^0C cable.

(e) Rigid PVC conduit: Heavy wall polyvinyl chloride conduit, Carlon type 40.

Conduit: Conform to provisions of code and rated for 90^0C cable.

(f) Intermediate metal conduit (IMC): Conform to code requirements.

16105-4.11 Surface Raceways

Surface metal raceways for power and communication circuits: Wiremold 4000 with divider and cover, or accepted substitute.

(a) Base: 1.25 mm galvanized steel.
(b) Cover: 1.0 mm thick galvanized cover.
(c) Fittings: Couplings, elbows, and connectors designed for use with raceway system.

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(d) Boxes and extension rings: Designed for use with raceway systems.
(e) Finish: Gray.

16105-4.12 Cable Trays

(a) Ladder Type Cable Tray: NEMA VE 1, Class 20C ladder type tray.

- Material: Steel.
- Finish: ASTM A123, hot dipped galvanized after fabrication.
- Inside width: As indicated.
- Inside depth: As indicated.
- Straight section rung spacing; 300 mm.
- Inside radius of fittings: As required.
- Provide manufacturer's standard clamps, hangers, brackets, splice plates, reducer plates, blind ends, barrier strips, connectors, and grounding straps.
- Covers: Flanged, solid, flush cover.

(b) Channel Type Perforated Cable Tray: NEMA VE 1, Class 20C channel type tray.

- Material: Steel.
- Finish: ASTM A123, hot dipped galvanized after fabrication.
- Inside width: As indicated.
- Inside depth: As indicated.
- Inside radius of fittings: As required.
- Provide manufacturer's standard clamps, hangers, brackets, splice plates, reducer plates, blind ends, barrier strips, connectors, and grounding straps.
- Covers: Flanged, ventilated, raised cover.

(c) Warning Signs

Engraved nameplates: 25 mm high black letters on yellow laminated plastic nameplate, engraved with following wording in both Bangla and English

WARNING ! DO NOT USE CABLE TRAY AS WALKWAY, LADDER, OR SUPPORT. USE ONLY AS MECHANICAL SUPPORT CABLES AND TUBING !

16105-5 GROUNDING METHODS

(a) All non-current carrying metallic parts of the system shall be grounded.

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(b) Before passing through the Zero-phase-sequence Current Transformer, the neutral wire shall be grounded only to the grounding busbar of the main distribution board.

(c) The ground conductor shall be stranded with copper wires of size as specified on the drawing.

(d) Ground rods shall be copper ϕ 16 mm x 4000 mm long installed for the transformers, switchboard, lightning protection etc., and at location as specified / recommended by the Engineer.

(e) Grounding clamps shall be used for securing the ground wires to the grounding electrodes. Copper ground wire shall be bonded to the grounding electrode by thermo-weld.

16105-6 WIRING METHODS

16105-6.1 Wires and Cables Installation

(a) In the luminaires, wire sizes shall not be smaller than 1.5 mm^2.

(b) Control wire sizes shall not be smaller than 1.5 mm^2.

(c) Wires for lighting branch circuit shall not be smaller than 2.5 mm^2.

(d) Wire connected to the convenience outlets shall not be smaller than 4 mm^2.

(e) No wire shall be pulled into the conduit system until it is complete in all details.

(f) Lubricant shall be used to facilitate wire pulling. Lubricants shall be approved by the Engineer for using with the insulation specified.

(g) Conductor shall be continuous from outlet to outlet.

16105-6.2 Splicing of Copper Wires and Cables

(a) Splicing of wires and cables is permitted only in the boxes, luminaires, handholes and manholes.

(b) For small wires and cables, insulated solderless wire connectors shall be used and compression type, solderless wire connectors indented by special hydraulic tool for large wires and cables shall be used. The splice shall be insulated with half lapped rubber tape for inner layer and

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PVC insulating type and it at least the same thickness as the wire insulation but shall not be less than three layers shall be used.

(c) Compression type, solderless lugs indented by proper tool shall be used at the end of all wires and cables, connected to the screw type terminals of the equipment and to the busbars.

16105-6.3 Raceways and Fittings Installation

16105-6.3.1 General

(a) No conduit smaller than 3/4 inch electrical trade size shall be used.

(b) The bending radius of the conduit shall not be less than six times the outer diameter of the conduits.

(c) The total bending angles of conduits shall not exceed 360 degrees in any one run.

(d) The end of all conduits shall be tightly plugged to exclude dust and moisture while installing under construction.

(e) Exposed conduit supports shall be spaced at intervals 2.5 m or less.

(f) The conduits shall be cleaned before pulling in the wires.

(g) Liquid tight flexible metal conduit shall be used for all motor termination and other equipment where vibration is present.

(h) Where the conduits enter the cabinets and equipment, conduit bushings and double locknuts shall be used.

(i) The conduits used shall not have any internal and external defects. Each end of the conduit shall be made smooth with the conduit reamer to prevent damage to the wire.

(j) Install wiring in metal or rigid PVC raceways. Install raceways concealed, except in electrical closets, or where indicated on Drawings. Install wiring in metal cable trays. Install cable trays where indicated on Drawings.

16105-6.3.2 Raceways

(a) Provide rigid conduit in equipment rooms and for exposed installation where subject to damage. Subject to damage includes exposed installations where vehicle traffic or similar operations may cause

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damage to raceway other than rigid metal. Run exposed raceways in straight lines at right angles or parallel with walls, beams, or columns.

(b) Provide steel or intermediate metal conduit for raceways embedded in concrete, in outside walls.

(c) Provide rigid steel or intermediate metal conduit where exposed to weather.

(d) Unless otherwise noted on Drawings, provide rigid PVC conduit for raceways in earth and in contact with earth. Install rigid PVC raceways with rigid steel sweeps, elbows, and penetrations through floor systems. At point of floor penetration, install coupling with its upper end flush with top of floor. Provide rigid PVC conduit for raceways below floor slabs on grade and stub with rigid metal conduit for above ground, and in concrete.

(e) Provide vibration isolation for raceway connections to motors, transformers and other equipment subject to vibration. Isolate with length of flexible conduit not less than 300 mm for 25 mm conduit and smaller, and additional 15 mm per 25 mm of nominal conduit size for conduits larger than 25 mm.

(f) Continuity: Provide metallic raceways continuous from outlet to outlet and from outlets to cabinets, junctions and pull boxes. Enter and secure conduit to boxes to provide electrical continuity from point of service outlets. Provide double lockout and bushing on terminals of metallic conduits.

(g) Raceways in plain concrete: Do not lace raceways in plain concrete, such as concrete toppings on structural floors, without approval. Install in non-reinforced concrete headers provided for installation.

(h) Raceways in reinforced concrete: Do not displace reinforcing steel to accommodate installation of raceways and outlet boxes.

Do not install outlet boxes in beams or joists: use concrete headers, beams and other reinforced members. Place inserts to avoid displacing reinforcing.

Locate embedded conduits in physical center of particular section of concrete unless otherwise indicated.

Provide raceways embedded in reinforced concrete conforming to the following usual types of conditions, unless otherwise accepted by Architect.

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Location	Maximum Allowance
Columns	Displacement of 4 percent of plan area of column
Floors and Walls	Displacement of 1/3 thickness of concrete space not less than 3 diameters OC
Beams and Joists	Displacement of 1/3 least dimension, spaced not less than 3 diameters OC
Sleeves through Floors and Walls	50 mm maximum pipe size, not less than Floors and Walls three diameters OC

Special acceptance will be required for conditions not covered by the following usual conditions.

(i) Raceways over roof: Use PVC coated rigid steel or intermediate metal conduit for raceway.

(j) Straps and Hangers: Substantially support raceways by straps, suitable clamps or hangers to provide rigid installation.

Preformed strap hangers and twisted wire attachments not allowed. Do not support or fasten raceways to duct or pipe supports or in a manner to prevent ready removal of ducts or pipes.

(k) Joints and Connections:

(i) Metal conduits: Make threaded connections watertight in threaded conduits. Cut joints square, ream smooth, and properly thread.

Fit box connections with minimum two approved locknuts and one steel, plastic or fiber bushing to form tight bond with box. Provide locknuts both inside and outside of enclosure to which conduit is attached.

Use rain tight compression type fittings for electrical metallic tubing systems and use at least one locknut inside each enclosure entry.

Provide grounding locknuts or bushing where required.

(ii) PVC conduits: make couplings and connectors watertight in conduit runs. Utilize solvent cement joints of type approved by

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manufacturer. Provide adapters and locknuts where conduit is attached to panels, etc.

(iii) Stub-ups: Extend conduit stubs at least 300 mm above slab or fill before connection is made electrical metallic tubing. For conduit stub-ups through slabs, install coupling with upper end flush with top of slab.

(iv) Threads: Clean threads of rigid metal conduits. Coat male threads of steel conduit installed in concrete with red or white lead immediately before coupling together.

(v) Running threads: Use threaded couplings in lieu of running threads.

(l) General Location Requirements:

(i) Use care in locating raceways in close proximity to heating duct, steam and hot water lines. Where such crossings are unavoidable, clear covering of lines by at least 15 cm.

(ii) Raceway runs indicated are diagrammatic. Determine exact locations in field except where specific dimensions are indicated on Drawings.

16105-6.3.3 Cable Trays

(a) Install metallic cable tray in accordance with NEMA.

(b) Provide supports at each connection point, at end of each run, and at other points to maintain spacing between supports of 1.0 meter maximum.

(c) Ground and bond cable tray.

(i) Provide continuity between tray components.

(ii) Use anti-oxidant compound to prepare aluminum contact surfaces before assembly.

(iii) Provide 35 mm bare copper equipment grounding conductor through entire length of tray, bond to each component.

(iv) Connections to tray may be made using mechanical or exothermic connectors.

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(v) Install warning sign at 15 m OC along cable tray, located to be visible.

END OF SECTION

SECTION 16112

CONDUITS, FITTINGS AND BOXES

16112-1 DESCRIPTION

This work shall consist of the furnishing and installation of all the conduits fittings, pull and junction boxes, conduit expansion joints and incidental parts necessary to provide for future lighting or operation of structures. The type, size and location of conduits, fittings and boxes will be as indicated on the Drawings.

16112-2 MATERIALS

16112-2.1 Metallic Conduit, Fittings and Boxes

Conduit shall be formed of mild steel without laminations due to slag breaks, blisters or pockets, and without cinders or other foreign matter. Conduit shall have a circular cross-section, with uniform wall thickness to permit the cutting of clean, true threads. All seams shall be completely and thoroughly welded.

The conduit shall be galvanized on the outside by one of the three methods of hot dip galvanizing, sherardizing or electro-galvanizing, and the inner surfaces shall be protected in a like manner by a thick coating of enamel. All mill scale shall be removed before pickling and conduit shall be thoroughly cleaned and dried after pickling is completed. Galvanizing shall be done under controlled temperatures. The zinc coating and enamel coating, if used, shall have an even, smooth appearance and be of uniform quality. Conduits shall be capable of standing five dips in the Preece Copper Sulphate test for galvanized coating ASTM Designation A-239-40.

The conduit seam and coating shall withstand being bent cold at minimum temperature of 60^{o}F under slowly applied pressure through 90^{o} to a radius six times the outside diameter of the conduit with the seam on the outside of the bond, without developing cracks or opening the weld and without cracking or flaking the coating.

All conduit fittings without exception shall be made from the same material and shall have the same coating as specified for conduit. The test for the continuity of coating shall be the same as specified for conduit. One coupling shall be furnished with each length of conduit or bend.

Pull or junction boxes shall be made of sheet steel of cast iron in accordance with the Drawings and/or Special Provisions. Sheet steel boxes shall have sharp, straight edges and continuous electric welded seams. A 1 centimeter flange, turned in, shall be used to take a rubber gasket and shall

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be drilled and tapped for an approved number of ½ centimeter brass machine screws. If box is to be encased in concrete, the cover shall extend 1 centimeter beyond dimensions of the box and shall be drilled to match tapped holes in flange of same. When boxes are completely exposed, the cover shall conform to the outside dimensions of the box. All holes for conduit entrances into sheet steel boxes shall be drilled. Sheet steel boxes shall be galvanized in the same manner as for conduit.

16112-2.2 Asbestos Cement Conduit, Fittings and Boxes

Asbestos Cement Conduit shall consist of an intimate mixture of asbestos fiber and cement. The fiber shall be carefully selected and graded and shall be so interspersed with the cement as to serve effectively as an aggregate and reinforcement to the resultant mass. The fiber and cement shall be dispersed in water, formed into a thin web having a width equal to the full length of the finished section and wrapped on a smooth cylindrical mandrel under continuously applied pressure to produce a conduit having a dense, uniform and homogenous structure.

Conduit shall have an inside diameter not smaller than nominal sizes indicated by the manufacturer. All fittings shall be of the same material as used for straight conduit and shall possess the same characteristics. The inner surface shall be free from obstructions, rough or flaky areas as gauged by the ability to freely pass a ball of a diameter ½ centimeter less than the nominal size of the conduit with which the fitting is used.

The bore shall be straight as gauged by the ability to freely pass a 1meter long mandrel ½ centimeter less in diameter than the nominal size of the duct.

The conduit shall not contain free alkali or any other material in sufficient quantities to contribute in any greater degree to the corrosion of the lead sheath, lead alloy sheath, rubber covered or waterproofed cables than the water and soils ordinarily encountered in underground work.

Pull or junction boxes shall be built of sheet material identical in composition with the one used for the conduit. All corners shall be square, all edges true and all joints strongly braced and fastened as recommended by the manufacturer. Edges shall be waterproofed with a waterproofed joint sealing compound recommended by the conduit manufacturer and approved by the Engineer, and a gasket shall be used under all covers.

16112-3 CONSTRUCTION METHODS

16112-3.1 General

The size of each conduit shall be such that the sum of the areas of the cross-section of all conductors, including insulation and protective coverings, shall be not greater than 30 percent of the inside area of conduit, except that no conduit encased in concrete or installed underground shall be less than 5

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centimeters, inside diameter, and no conduit smaller than 2 centimeters inside diameter shall be used except for fixture hangers.

All conduit sizes and conduit layout shall be approved by the Engineer before installation, and the Contractor shall submit data on the layout for the exact makeup, overall diameter, and cross-sectional areas of the actual conductors he intends to use and the sum of the areas of the conductors in each conduit.

Bends shall be of long sweep, free from kinks and of such easy curvature as to permit the drawing in of conductors without injury. The radius of curvature of inner edge of bends shall not be less than ten times the inside diameter of the conduit except as may be otherwise noted on the Drawings or in the Special Provisions. Conduits shall be not flattened or distorted. The total angle of all bends between any two boxes or fittings shall not exceed 90 degrees.

All conduits used on a project shall be the product of one manufacturer.

Exposed conduit runs shall be parallel to or at right angles to walls, slabs, girders and in locations giving greatest accessibility for painting and least accumulation of dirt. All exposed conduit runs shall be attached to steel, masonry, concrete or timber by galvanized malleable iron or galvanized steel straps, clamps or hangers of an approved type, held at not less than two points by galvanized steel bolts or lag screws. The runs shall be supported at not greater than 3 meter centers on horizontal runs, unless otherwise specified and not less than 5 centimeters clear of the supported members. Conduits mounted on structural steel members shall be securely clamped to prevent rattling and wear.

All ends of conduits installed during construction, or for future use, shall be closed against the introduction of foreign material by the use of standard pipe or bush caps. All conduits shall be installed so that they will drain and necessary holes for this purpose shall be made as directed.

All conduit risers in railing posts shall, unless otherwise shown on the Drawings, terminate 2 centimeters below the top surface of the post. The risers shall be accurately placed so that they may be located for future use.

All conduits installed underground shall have a concrete envelope which shall afford a 7 centimeter cover beyond the maximum dimension of the conduit. Class “A” concrete shall be used.

Excavation for the encasement shall be carefully done, sidewalls trimmed to line at bottom of trench graded, so that the envelope will be uniform, and there will be no pockets or low points in the conduit run. All backfill shall be carefully tamped to conform to the requirements of Section 02221, unless otherwise specified, and care shall be taken not to injure concrete envelope or conduit.

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All conduits, boxes, etc., to be encased in concrete must be accurately placed and rigidly held in position so that no variation from line or grade occurs when concrete is placed.

Conduits, fittings and boxes shall be stored under cover and above ground.

Upon completion of the conduit installation, the system shall be cleared in the presence of the Engineer before any conductors are installed. Immediately prior to the installation of conductors in any run, the conduits comprising that run shall again be checked. Any and all obstructions shall be removed to the approval of the Engineer.

The Contractor shall install and leave in place a No. 10 iron wire in all conduit runs installed for future use.

The Contractor shall furnish work drawings of 53x83 centimeters, in duplicate, for the Engineer's preliminary examination. After work drawings have been accepted by the Engineer and revisions made, the Contractor shall furnish additional copies as may be requested.

16112-3.2 Metallic Conduits, Fittings and Boxes

Conduits runs shall be with as few couplings as standard lengths will permit. Screw couplings shall be used. All cuts shall be made with the hacksaw and reamed clear of fins or burrs with a reamer.

Conduit shall have threaded ends coated with red or white lead and of sufficient length so that they will butt squarely and tightly in the coupling. Long running threads will not be permitted. Conduits shall be installed so as to be continuous and watertight between boxes and/or equipment.

Where conduits cross expansion joints in the structure, or where otherwise specified, they shall be provided with expansion fittings of an approved type. The electrical continuity of the conduit runs across the expansion fittings shall be assured by approved fittings and bare No. 8 copper wire.

Pull boxes shall be used wherever necessary to facilitate the installation of the conductors. Conduits entering into cast iron pull boxes or enclosures shall be threaded into hubs on same. Conduits entering into sheet steel boxes or enclosures shall be secured with two lock nuts and the projecting ends shall be equipped with an approved insulating bushing.

All surfaces of conduit, boxes, fittings, etc., in contact with concrete encasement shall be painted one coat of approved paint.

16112-3.3 Asbestos-Cement Conduits, Fittings and Boxes

Conduits shall be cut with a saw, and all ends shall be accurately tapered or otherwise finished, depending on type of conduit and coupling specified. Tools recommended by the conduit manufacturer shall be used, and finished ends shall be equal to those supplied by the manufacturer. All ends

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shall be smoothed of burrs or fins. Standard bends shall be used wherever possible, and special bends shall preferably have a radius not less than that of standard bends. All special conduit shall be accurately dimensioned and manufactured.

All joints shall be sealed with a waterproof joint sealing compound recommended by the conduit manufacturer and approved by the Engineer.

Expansion couplings shall be of a type designed and manufactured by the conduit manufacturer. They shall be sized to fit the conduit run in which they are to be used and of length as indicated on the Drawings. Expansion couplings shall be placed not more than 16 meters apart where an exposed conduit run, between boxes or terminals, is equal to or more than 22 meters. One expansion coupling shall be used on all exposed runs less than 33 meters between boxes or terminals. Expansion couplings on conduit runs encased in concrete shall be placed as indicated on the Drawings.

Exposed conduit shall be supported by approved hangers at not more than 3 meter centers. Hangers shall be of a type which permits movement of the structure. Expansions couplings shall be rigidly secured to the structure.

END OF SECTION

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SECTION 16120

WIRING SYSTEMS AND ACCESSORIES

16120-1 GENERAL

Makers test certificates shall be submitted prior to the installation for all cables and relevant equipment.

Neutral conductors shall be full size throughout.

The Contractor shall be responsible for confirming to equipment suppliers the sizes and types of cables to be connected to the equipment. All equipment shall be arranged to accommodate the required cable as detailed on the design drawings.

The use of nylon or similar cable ties shall be limited to the securing of sheathed cables laid on horizontal cable trays. These ties shall not be used for supporting cables.

16120-2 STEEL CONDUIT

Unless otherwise specified, the whole of the various installations required shall be carried out in steel conduit. No conduit less than 20 mm diameter will be permitted.

Steel conduit shall be heavy gauge screwed and welded and have galvanised finish.

a) Steel Conduit Accessories

Small circular boxes and extension rings for use with steel conduit systems shall be constructed of malleable cast iron.

Boxes shall be complete with an earth terminal and be of the same class of finish as the conduit. Where loop-in pattern boxes are required, they shall be of the small circular pattern with back outlets of the appropriate number.

Inspection bends, solid bends, elbows, tees or normal bends shall be installed as required.

Box lids shall be made of sheet steel. Overlapping lids shall be used. All lids shall be secured by brass screws.

Where a number of conduits converge, they shall terminate in a metal box so as to avoid bunching. The boxes shall be of large malleable cast iron or substantial heavy gauge sheet steel with welded corners. Lids

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shall be made of the same material as the box and flush work shall overlap the box adequately on all sides. For surface work, they shall make good contact with the box.

Deep boxes or extension rings on standard circular conduit boxes shall be used where necessary in order to bring the front of each box flush with the surface of the ceiling or wall. Where conduits are laid direct on the shuttering of reinforced slab construction, conduit extension rings or deep boxes shall be used to raise the run of conduit between the top and bottom reinforcing. PVC tape shall be installed around butt joints on extension rings to prevent the ingress of wet concrete. Galvanised draw wires shall be provided where conduits are not to be wired on completion or are to be wired by others.

All draw boxes and junction boxes shall be of ample size to permit the cables to be drawn in and out. They shall be of malleable iron with the joining surface machined to ensure a dust tight joint. All circular boxes shall be provided with long spouts internally threaded incorporating a shoulder for the proper butting of the conduit and a solid brass earth terminal tapped and screwed into the base of the box.

All conduit boxes shall be screwed on or in walls, ceilings etc. by countersunk wood screws of appropriate size. Holes in boxes shall be adequately countersunk to ensure the complete recession of the fixing screws. All inspection and draw-in boxes shall be provided with covers fixed by round head brass screws.

Conduit boxes mounted outside the building or in damp areas shall have external fixing lugs. Each box shall include a gasket between the lid and the box.

b) Installation of Steel Conduits

Unless otherwise specified, surface conduits of steel shall be fixed by means of distance spacing saddles or approved purpose made clips, manufactured in the same material as the conduit which shall allow the conduits to be taken directly into the accessories without sets or bends.

All surface conduit runs shall be planned by the Contractor and his proposals shall be indicated on working drawings.

Where multiple parallel conduit runs would normally occur, use may be made of standard cable trunking with removable lid subject to the provisions of this Specification and approval by the Engineer. Due regard shall be given to derating of cables due to bunching.

Concealed conduits shall be securely fixed to prevent movements during building operations. Fixing shall be by means of purpose made

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clips or other approved means so as to ensure that there will be no conduit deformation.

Where conduits are installed in ducts or voids, fixing shall be in a manner specified for surface conduits.

Conduit boxes cast into concrete walls or floors shall be held in place in an approved manner so that they are absolutely rigid until and while the concrete is poured and/or vibrated.

Conduits installed in chases of walls and floors shall be firmly secured by wrought iron pipe hooks or crampets and these fixings shall in themselves be sufficient to hold the conduits in place. Conduits installed in chases shall be painted with one coat of rust inhibiting paint before erection and a further coat shall be applied to all accessible surfaces including the hooks and crampets after erection.

Recessed conduit buried in plaster shall permit a full 6 mm depth of cover over its entire length.

The conduit shall be mechanically and electrically continuous throughout so that cables are full protected.

Every steel conduit and conduit fitting to be installed shall be free from internal burrs, and other defects and shall be cleaned out. Adequate precautions shall be taken to prevent the ingress of silt or moisture into the conduit system. If this should occur, the affected conduits shall be swabbed clean before wiring starts.

Where the finish of the conduit is damaged during erection or suffering from the effect of corrosion, the surfaces shall be wire brushed and painted with rust inhibiting paint to the same standard as the normal surface.

All exposed threads shall also be protected with rust inhibiting paint.

Throughout the duration of the Works conduits shall be maintained in good condition by re-painting.

Where conduits are laid in slab floors or shuttered walls, the Contractor shall arrange for a competent person to be in attendance whilst the concrete pouring or screeding operation is being carried out, in order to avoid damage being caused to the conduits and also to ensure that the conduit work is in sound condition and properly and efficiently maintained during this installation period.

Particular care shall be taken when setting out conduit runs to outlet points which are to be fitted to furniture and similar fittings. The Contractor shall ascertain exact details of furniture and fittings

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constructions in order that all conduit work shall, wherever possible, be concealed.

Provision shall be made for the tapping of condensed moisture.

Care shall be taken to prevent water, dirt or rubbish entering the conduit system during erection. Screwed metal caps or plugs shall be used for protecting open ends.

All conduit systems shall be erected completely with all conduit accessories connected. They shall be offered for inspection and approval by the Engineer before any cables are installed.

Conduit boxes shall be fixed to the structure of the building independently of the conduit except where drilling the box will break down any requirements for weatherproofing.

In positions where the appearance of the conduit run is likely to be improved by the introduction of dummy lengths of conduit and where a more secure fixing for the suspension of fittings would be obtained, such dummy conduits and continuations shall be provided.

All bends shall be made utilising a standard type of bending machine where wide radius bends are required - care shall be taken to prevent conduit deformation. Conduit sets through walls will not be permitted.

The conduits throughout shall be of adequate section arranged with draw-in boxes to allow for easy draw in and out of all cables in the conduit.

Draw-in boxes shall be of ample size and unless otherwise detailed on the Drawings shall be generally not smaller than 75 mm x 75 mm x 50 mm for larger cables or conduits. For boxes installed in "in-situ" concrete, the depth of the draw-in box shall be such that the open side is flush with the finished surface.

Where conduits cross expansion joints in the building structure, special expansion couplings shall be used or other approved methods adopted. Continuity through all such joints shall be maintained.

Knurled locknuts shall be used at all positions where running joints are required and great care shall be taken to ensure that they seat firmly and evenly on to mating faces of couplings or other accessories. All running joints shall be painted immediately after erection.

Where a conduit terminates at a main switch, distribution board, sub-switch or other metal clad accessory, a screwed socket shall be employed and so arranged as to be in good mechanical and electrical contact with the metal case with a brass male bush screwed into the

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sockets from inside the case and the two locked together with a compression washer between. For boxes with tapped entries, and where internal space permits, a ring bush shall be used as a lock nut. Where there is not room a knurled locknut shall be used on the outside of the box.

For surface work where conduits pass directly through concrete, terrazzo or similar floors and where washing down is likely to occur, the conduits shall be "sleeved". The sleeve shall be flush with the underside of the floor, extend 75 mm above the top surface of the floor and be secured to the wall by means of a heavy gauge saddle.

Conduits shall be saddled to the structure of the building within 150 mm of each box.

Surface mounted conduits shall be vertical, horizontal or parallel with the features of the building and shall be supported at intervals in accordance with the following schedule:

Size	Interval
¾ inch	1.2 m
1 inch	2.0 m
1¼ inch	2.5 m

Where bends and sets occur in a conduit run, the conduit shall be securely fastened at a distance of 225 mm either side of the diversion.

Where purpose made clips are necessary, these shall be fabricated from strip iron or mild steel flat bar and shall receive one coat of red oxide paint after fabrication and a further coat after erection.

Conduit runs shall, wherever possible, be concealed in ceilings, voids and walls, chases, etc. and in rooms of secondary importance (with back outlet entries to switch boxes, etc. especially on fair faced brickwork). Otherwise, the conduits shall be securely fixed to the surface of walls using heavy cast distance saddles.

Where the system of wiring is concealed, the "looping-in" system of conduit shall be used.

All work involving steel conduit and accessories shall be carried out using surface galvanised conduit and accessories. Saddles for galvanised conduit shall be distance pattern, fixed with non ferrous screws.

A surface installation is defined as one where the conduit is installed on a surface of the building finishes and is normally visible. All other installations are described as flush or concealed.

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Wherever the installation is specified as being for a hazardous area, conduit runs entering these areas shall have a barrier box inserted in the run immediately before the conduit passes into the hazardous area. All conduit work inside the hazardous area shall be carried out with solid drawn galvanised conduit and all conduit fittings. Sockets and accessories shall be galvanised and certified suitable for the hazard as specified. At the completion of wiring, all machined faces of the accessories shall be thoroughly cleaned and greased, prior to the screwing or bolting of all accessory cover plates into their final secured position.

All bends are to be made on site to suit conditions and not more than two right angle bends will be permitted without the interposition of a draw box. Generally long straight conduit runs from point to point shall have draw boxes installed at a maximum spacing of ten metres.

Conduits in ceiling cavities shall be supported independent of the suspended ceilings.

Where a conduit is exposed to different temperatures (either by surrounding air conditions or by virtue of the surrounding medium with which it is in contact) at any particular time, the section of the conduit at the higher temperature shall be isolated from the section at the lower temperature by means of a conduit box filled with an approved permanently plastic compound, after completion and testing of all wiring. Such a condition would arise, for example, if a conduit running in a heated building is run to exterior points.

Where galvanised conduit is used, all conduit, accessories, switch boxes and all associated apparatus used in the installation must also be galvanised, unless otherwise directed by the Engineer. Galvanised conduit shall be used when mounted outside a building, installed in floor trenches subject to dampness or accidental flooding, or buried in the ground. The conduit system shall be weatherproof when erected outside a building. Exposed conduit threads shall be given a coat of zinc rich paint.

Conduit buried in the ground shall be wrapped with PVC self adhesive tape half lapped. The taping shall extend for a distance of 150 mm beyond the point where the conduit emerges from the ground. Joints in galvanised conduit systems shall be made weather tight using lead aluminium paint and hemp and/or gaskets. The joints shall be partially screwed up before the paint and hemp are applied to maintain continuity.

All adaptable boxes shall be grey iron pattern, unless otherwise specified. Where adaptable boxes are fitted flush, the cover plates shall

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be heavy gauge metal with 12 mm overlap on all sides. The internal depth of a box shall not be less than 40 mm.

Covers shall be secured by a screw at each corner and by additional screws as necessary to provide a maximum spacing of 300 mm between adjacent screws. Fixing screws shall be brass (round or cheese head).

Covers for boxes shall be of the same material as that of the box. For boxes mounted in external situations, the cover shall have a machined surface around the perimeter mating with a similar machined surface on the box and shall be complete with gasket.

Every flush outlet box to which a luminaire pull cord switch or similar is to be fitted shall, unless otherwise specified be fitted with an approved type break joint ring.

Cabling for each circuit contained within a steel conduit system shall incorporate a separate protective conductor.

16120-3 FLEXIBLE CONDUIT

Final conduit connections to motors or other apparatus specifically mentioned shall employ a through type box and galvanised watertight pattern flexible conduit with PVC oversheath. Mechanical brass adapter glands, providing a male thread for connection to the through box shall incorporate positive means of preventing the conduit becoming loose. An earth wire shall be drawn through the length of flexible conduit and connected to the conduit system at one end, and to the apparatus at the other. (Note: Connections to small motors such as small ventilating fans shall be made by means of multicore PVC cable with brass packing gland type adapters at each end). Each flexible connection shall include not less than a 400 mm length of flexible conduit. Flexible conduit where use in hangar trench or classified area, shall be stainless steel corrugated, stainless steel braided.

16120-4 STEEL CABLE TRUNKING

The requirements for conduits specified herein shall, wherever appropriate, be deemed to apply generally to trunking installations.

Except where otherwise specified, all cable trunking shall be galvanised and constructed of 1.65 mm minimum thickness sheet steel for flush floor trunking and 1.2 mm minimum thickness otherwise and shall have a removable cover throughout its length with centre screw latch fixings. Trunking shall be rigidly fixed and supplied complete with purpose manufactured fittings, connectors, dividers, flanges, cable retaining clips and racks.

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Vertical cable trunking shall be fitted with cable pin racks arranged to avoid any strain on the cables.

Trunking installed with bottom lid shall be provided with cable retainers near to lid fixings to ensure that cables cannot be damaged when the lid is secured.

Trunking shall be fixed to walls, ceiling, etc. by means of two roundhead screws at fixing centres spaced at not more than 1000 mm apart.

Trunking shall be fixed at each side of bends and junctions. All bends and junctions, shall also be fixed.

Where trunking passes through fire barriers, suitable fire resistant barriers shall be provided within.

All trunking shall be installed so that cables are not liable to mechanical damage due to abrasion.

Where trunking terminates at electrical apparatus, a suitable flanged coupling shall be provided. Sealing end pieces shall be used to blank off trunking ends. Where cutting or slotting of trunking is carried out, all sharp edges and burrs shall be removed. Where cables pass through slots in trunking, the slot shall be shrouded with PVC sleeving. Steel trunking systems shall be electrically continuous.

Where cable trunking accommodates LV cables serving lighting or power circuits, at each position where the trunking emanates from a distribution board, the Contractor shall screw fix a label stating "The installation of additional cables in this trunking system may cause a reduction in the current rating of the exiting cables" on the first section of lid.

Earth continuity shall be maintained between each section of steel trunking by means of copper links fixed to the outside of the trunking.

Cabling for each circuit contained within a steel trunking system shall incorporate a separate protective conductor.

16120-5 CABLE TRAY

Cable tray shall be heavy duty perforated metal tray with double edge return.

All tees, intersection units and sets shall be purpose made by the manufacturer. Where this is not possible, these units may be made up on site only with the agreement of the Engineer.

Cable tray shall be installed with the greater dimensions in the horizontal position unless otherwise agreed with the Engineer.

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Cable shall be laid in a single tier on the cable tray, unless otherwise approved, and neatly installed.

Cable tray shall only be cut along a line of plain metal (not through perforations). All cut edges shall be prepared and treated according to the original finish of the metal. Where welding has been employed in fabrication and also on galvanised tray, a zinc rich paint shall be used for this treatment.

Holes cut in cable tray for the passage of PVC covered cables shall be provided with grommets or alternatively bushed and/or lined to prevent damage to the PVC covering.

Cable trays shall be manufactured from perforated mild steel and shall have hot-dipped galvanised finish for indoor use. But shall be made of stainless steel if providing outdoor installation.

Cable trays shall be supported by mild steel galvanised brackets at regular intervals of 1.2 m maximum and at 255 mm from bends and tees. Mushroom-headed steel roofing bolts and nuts shall be used for the installation and coupling of trays. Cable tray brackets shall be of sufficient depth to provide access to the rear of the tray for easy installation of PVC saddle type fixings.

All cables shall be secured to cable trays by means of PVC covered copper saddles of the two screw fixing type or PVC covered metal strip with non-corrodible cheese-headed screws and nuts. The shanks of the screws shall not protrude beyond the nuts by more than four threads. Alternatively purpose made cable fixing devices may be proposed for consideration. Due allowance shall be made for expansion in long runs of tray.

16120-6 CABLES IN CONDUITS AND FLEXIBLE CABLES

Fixed and flexible cables shall be insulated with PVC and shall be delivered with the maker's seals intact which shall be retained for inspection.

Flexible cables shall be kept to a minimum.

All flexible cords shall be rated in accordance with service requirements but the minimum employed shall be rated at 6 amperes.

Connections to luminaires or other apparatus above 80^{o}C shall be made using silicon coated cable with a non-hygroscopic fixed block connector.

Cables in conduit shall be of the 750 volt grade. Flexible cables shall be 300/500 volt grade, PVC insulated and PVC sheathed. The sheath shall be white unless specified otherwise.

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16120-7 INSTALLATION OF CABLES IN CONDUIT AND FLEXIBLE CONDUIT

Cables shall only be drawn into conduits after the conduits have been finally fixed and cleaned out. Where cables emanate from separate distribution boards or are serving different parts of an installation (e.g. lighting and power), they shall be installed in separate conduits or trunking unless otherwise specified. When trunking or adaptable boxes are suitably barriered in an approved fashion, cables for differing services may be installed through the same trunking or box provided always that the different services are each run in separate compartments.

The number and size of cables in any conduit or trunking shall not exceed **manufacturer's recommendations** and requirements of relevant regulations, making due allowance for derating to suit grouping factors.

No cable with a conductor smaller than 2.5 sq. mm shall be used for general purpose circuits or smaller than 4 sq. mm for socket outlet circuits. Conductors shall be stranded.

No joints will be permitted and cables shall be looped from point to point.

At all terminations of wires and cables, the insulation shall be neatly stripped without damaging the conductor. In no case shall bare conductors be allowed to project beyond any insulated shrouding or moulding of a live terminal.

In no case shall flexible cables depend on the electrical connections for mechanical retainment.

The installation of connector blocks will be permitted only where cables cannot be terminated direct into an appliance and if agreed by the Engineer. Connector blocks shall be rated to suit the circuit, fixed base and installed in an adaptable box. Unfixed connectors will not be permitted. Connector blocks within trunking will not be permitted.

16120-8 CABLE-SOCKETS

For cables rated in excess of 30 amperes, sockets shall be brass castings machined on the lug faces to a smooth finish and drilled to meet the conductor size, excessive clearances being avoided.

Cable sockets for low voltage cables shall be of the crimped type.

16120-9 LOCAL SWITCHES

Local switches controlling lighting and equipment shall be installed in the positions required.

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Switches shall be of slow break 'AC only' pattern in which the successful operation of the switch does not wholly depend upon the action of a spring and the operating mechanism is insulated from all parts. The switches shall be 20 amp minimum rating for hibay lighting circuit and shall be 10 A. rating for general lighting circuit.

Where more than one phase is present, barriers shall be installed to segregate the circuits on different phases. In addition, a label engraved `Danger - 400 volts' shall be attached to or engraved upon the front cover plate.

All boxes used for fixing switches shall be supplied with an earth terminal or screw in the base of the box.

Every switch controlling an appliance not visible from the switching position shall be engraved with the name of the appliance which it controls, and where required shall be fitted with a neon indicating lamp.

Switches shall be located and be of type as shown on the design Drawings. They shall be rocker operated, of colour specified and mounted in a sheet steel box not less than 40 mm deep.

For surface mounted switches, the cover plate shall be stainless steel and shall fit flush with the edge of the box.

For flush mounted switches, the cover plate shall be stainless steel as shown on design Drawings and where appropriate of the colour specified.

Boxes for surface installations shall not have knockouts but be drilled on site as necessary.

Where more than one phase is present, barriers shall be installed to segregate the circuits on different phases. In addition a label engraved "Danger 400 Volts", shall be attached to or engraved upon the front cover plate.
All boxes used for fixing switches shall be supplied with an earth terminal or screw in the base of the box.

Weatherproof switches shall be rated IP65 and shall be mounted in heavy galvanised cast iron boxes having dome covers with waterproof machined joints, neoprene seals and external fixing lugs.

16120-10 SOCKET OUTLETS

Socket outlets shall be of the type, rating and configuration shown on the design Drawings. They shall be cabled as indicated with minimum conductor size used being 4 sq. mm. They shall be mounted in steel boxes of type and depth suitable for the application with appropriate cable and conduit entries. Where socket outlets are provided for a surface installation, the boxes shall not have knockouts but shall be drilled on site as required.

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Socket outlets mounted externally shall be switched, galvanised, water resistant pattern, fitted with machined joint and gasket, screwed brass plug top and screwed brass cover plate with securing chain.

Three phase socket outlets shall be 5 pole with earth connection three phase socket outlets 63 A. and greater shall be 5 poles with earth connection and interlocked switch.

Socket outlets shall not be interchangeable for different voltages and each unit shall be effectively earthed and provided with an approved type plug.

16120-11 SAFETY ISOLATING TRANSFORMERS

Low voltage transformers with 55-0-55 volt secondary shall be double wound air cooled pattern contained in dust tight cases. Separate windings shall be provided for the primary and secondary and the mid point of the low voltage winding shall be earthed and an earth screen provided between the windings.

16120-12 INDICATOR PILOT LIGHT UNITS

Where indicated pilot light units shall be supplied and installed, they shall be suitable for surface or recessed mounting as appropriate comprising an integral transformer unit with screw pattern wiring connections including an earthing terminal, lamp holder and glass lens coloured in accordance with specified requirements.

The front plate shall be engraved as required.

The transformer shall be double wound on a core of silicon steel grain orientated laminations. The secondary windings shall be earthed and designed for an open circuit of 5 volts.

Each unit shall be complete with a 6 volt 6 watt MES 15 mm lamp.
Where required groups of pilot lights shall be incorporated into a composite unit.

16120-13 TELEPHONE SOCKET OUTLETS

Telephone socket outlets shall be of similar type and finish as lighting control switches and power socket outlets. They shall be of line jack master type unless otherwise specified and served from a conduit system of materials similar to the power conduit system. One 20 mm conduit shall serve no more than 2 No telephone outlets and one 25 mm conduit no more than 3 no outlets.

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16120-14 MOUNTING HEIGHTS

Equipment shall generally be installed in accordance with the following mounting heights and the measurement indicated shall be the distance between the finished floor level and the top edge of each unit. Any variations to the general mounting heights will be specified.

Unit	Mounting Height (mm)
Lighting Switches (General)	1300
Socket Outlets (passageways)	300
Socket Outlets (Plant room Areas)	1050
Socket Outlets (General)	300
Socket Outlet (Computer)	450
Fire Alarm Manual Break glass Call Points	1400
Fire Alarm Sounders	2200
Fire Alarm Detectors	Ceiling Mounted
Telephone Outlets (Desk Type)	300
Telephone Outlets (Wall Type)	1300
Clocks	2400
Distribution Boards	1900
Isolators	1300
Hand-Lamp Transformer Units	1300
Flex-Outlet Plates (General)	300
Wall Lighting Points (General)	1900

16120-15 ALIGNMENT AND FIXING OF ACCESSORIES

The Contractor shall pay very particular attention to the method of fixing of outlet boxes so that they shall, when completed, be level and in an exact position relative to the finished surrounding surface to permit the cover plate to be fixed accurately.

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Where conduit work is to be concealed, the Contractor shall take full responsibility for the alignment of outlet boxes and shall ascertain a definite datum line from which all measurements can be taken, and also thickness of walls, depths of finished plaster and final finishes of all relevant surfaces.

END OF SECTION

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SECTION 16121

CABLES AND CABLE INSTALLATION

16121-1 MEDIUM VOLTAGE CABLES

Medium voltage cables shall be rated 12 kV for use at 11 kV. They shall be of single core type having cross linked polyethylene (XLPE) insulation and circular compacted stranded copper conductor. Between the copper conductor and XLPE insulation, there shall be a conductor shield of semi-conducting cross linked polyethylene. Around the XLPE insulation, there shall be an insulation shield also of semi-conducting cross linked polyethylene over which shall be provided a shield of annealed copper tape or annealed copper wire. The whole shall be provided with a black PVC oversheath beneath which there shall be a serving tape.

Medium voltage cables shall be able to continuously carry rated load current and shall be of suitable size to handle the prospective fault current of 16 kA at the intake of the distribution substation for at least the period for which it takes the protective equipment to operate.

Medium voltage cables shall be clearly labelled to indicate the operating voltage and phase to which they are connected. They shall be installed completely segregated from cables operating at lower voltages.

Each medium voltage cable shall be terminated in a cold shrink silicone rubber one piece termination kit of 3M manufacturer or equivalent comprising stress control tube insulated with a moulded silicone rubber skirted insulator for 12 kV and appropriate cable lugs.

16121-2 LOW - VOLTAGE CABLES

All cables shall conform to the IEC or British Standard. All conductors of the insulated cables shall be copper wire.

The rating of current carrying capacity of the cables shall comply with the IEC or B.S.

Unless otherwise noted, the type of low tension cables to be installed shall be as follows:

(a) Type XLPE cross linked polyethylene insulated and polyvinyl chloride jacket.

(b) Type NYY for direct burial or exposed wiring, or cable trench, cable tray.

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(c) Type BYA, thermoplastic insulated copper conductor 750 V 70^0C running in conduit.

Unless otherwise specified in other sections of the Specification or on the Drawings, no conductor shall be smaller than the 2.5 mm^2 wire, except for the control wiring. All conductors 10 mm^2 or larger shall be stranded.

In all lug connections for main feeders, sub-feeders and branches made in switchboards and panels, etc., copper solderless connectors having either a 2-bolt cast-copper clamp or an indent compression attachment shall be used.

Branch taps from branch circuit shall be made in junction boxes with an approved method of insulation. No splice shall be made in conductors for instrument circuits or control circuits. Splicing of main feeders and sub-feeders shall not be accepted.

In general termination and splices for conductors 6 mm^2 and larger shall be of the pressure or bolted type and shall be wrapped with "SCOTCH" tape No. 23 and No. 33 respectively.

16121-3 CABLE COLOUR IDENTIFICATION

Phase A	-	Brown
Phase B	-	Black
Phase C	-	Grey
Neutral	-	Blue
Earth	-	Yellow/Green Bi-Colour

END OF SECTION

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SECTION 16301

MEDIUM VOLTAGE INCOMING SYSTEM

16301 GENERAL

16301-1 SCOPE OF WORK

The Contractor shall provide all materials, labour, equipment, tools, appliances, services, hoisting, scaffolding, crane, supervision and over head for furnishing and installing of electrical system and related work, complete in accordance with the Drawings, schedules and Specifications.

16301-2 APPLICABLE SPECIFICATIONS AND STANDARDS

- IEEE (The Institute of Electrical and Electronic Engineer)
- ASA (American Standard Association)
- ASTM (American Society For Testing Materials)
- IPCEA (Insulated Power Cable Engineers' Association)
- NEMA (National Electrical Manufactures Association)
- NEC (National Electrical Code 1993)

16301-3 ELECTRICAL INSTALLATION

The installations shall conform to the latest applicable rules of the National Electrical Code. Workmanship shall be of the highest grade. Electrical materials shall be new and approved by the Under-writers' Laboratories, Inc., wherever standards have been established by that agency. In lieu of the Underwriters' Laboratories, Inc., approval, consideration will be given to certified test reports of adequately equipped recognized independent testing laboratories, competent to perform such testing, indicating conformance to all requirements of the applicable Underwriters' Laboratories, Inc., Standards. Defective equipment or equipment damaged in the course of installation or test, shall be replaced or repaired in a manner meeting with the approval of the Engineer.

16301-3.1 Variation

If any departures from the contract drawings are deemed necessary by the Contractor, comparative details of such departures and the reasons therefore shall be submitted as soon as practicable, and within 30 days after award of the contract to the Engineer for approval. No such departures shall be made without the prior and specific written approval of the Engineer.

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16301-3.2 Substitutions

If any substitutions of materials or equipment specified and/or shown are deemed necessary by the Contractor, comparative details of such substitutions shall be submitted as soon as practicable, and within 30 days after award of the contract, to the Engineer for approval. In addition, the Contractor shall furnish proof satisfactory to the Engineer that items identical to those proposed as substitutions are in current use and performing satisfactorily in similar installation. No such substitutions shall be made without the prior and specific written approval of the Engineer.

16301-3.3 Standard Products

Unless otherwise indicated in writing by the Engineer, the materials to be furnished under this Specification shall be the standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturers' latest standard design that complies with the Specification requirements.

16301-3.4 Material and Equipment Schedules

As soon as practicable and within 30 days after the date of notice to proceed and before commencement of installation of any materials or equipment, the Contractor shall submit to the Engineer for approval a complete list, in triplicate, of materials, fixtures, and equipment to be incorporated in the work. The list shall include catalog numbers, cuts, diagrams, and such other descriptive data as may be required by the Engineer. No consideration will be given to partial lists submitted from time to time. Approval of materials will be based on manufacturers' published ratings. Any materials, fixtures, and equipment listed that are not in accordance with the Specification requirements will be rejected.

16301-3.5 Interruption of Service

All work shall be conducted in such a manner that interruptions of electrical service are kept to a minimum in duration and number. Request for interruption of electrical service and a schedule of operations in connection there with shall be submitted by the Contractor prior to commencement of operations. Request shall be submitted in writing not less than 5 days prior to the intended outage and the Contractor shall proceed with the outage only if written approval is given by the Engineer.

16301-4 FUNGUS CONTROL FOR ELECTRICAL COMPONENTS

The equipment shall be treated to resist fungus and moisture as specified below:

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(a) Materials and components which are inherently fungus resistant or are protected by hermetic sealing need not be treated.

(b) Circuit elements, not covered above and which have a temperature rise of not more than 25 degrees Celsius, when operating at full load, shall be coated with a fungus- resistant varnish. Circuit elements include cable and wire.

16301-5 GROUNDING

Except where specifically indicated otherwise, all exposed non-current carrying metallic parts of electrical equipment, raceways and neutral conductor of the wiring systems shall be grounded. Ground rods shall be driven so that the tops are approximately 150 mm below the finished grade. Ground electrodes shall be driven ground rods of cone pointed, copper. The rods shall have clean, smooth, continuous copper surfaces and the proportion of copper shall be uniform throughout the length of the rod. Ground wires shall be secured to the upper ends of ground rods by exothermic weld to the ground rods. Ground rods shall be 4000 mm long and shall have diameters sufficient to permit driving to the necessary depth without being damaged, but in no case shall they be less than 16 mm in diameter. Each ground rod shall be die-stamped near the top with the name or trademark of the manufacturer and the length of the rod in feet. The maximum resistance of the grounding systems shall not exceed one ohm. If this resistance cannot be obtained by the number of rods indicated, a sufficient number of additional rods shall be installed not closer than two (2) meters on centers.

16301-5.1 Grounding at Poles

The grounding terminal of each lightning arrester and of the transformer neutral (s) shall be solidly interconnected and connected to ground at each pole. The tank of each transformer shall be connected through a gap to ground as indicated. Ground rods shall be at least 1000 mm from the pole.

16301-5.2 Grounding Conductor

Grounding Conductor sizes shall be as indicated and be of stranded, bare, medium hard drawn copper. Grounding conductors at poles shall be protected by PVC pipe extending not less then 2500 mm above grade.

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16301-6 SPECIAL CONDITIONS

All equipment and overhead line construction shall be for a light loading district, and shall withstand winds of 80 km per hour.

END OF SECTION

SECTION 16310

MEDIUM VOLTAGE DISTRIBUTION SYSTEM

16310-1 Substation

16310-1.1 General

The following Specifications apply to modular indoor switchboards comprising factory built, metal-enclosed switchgear assembles.

The equipment to be supplied shall consist of aligned cubicles satisfying the following criteria:

- Open-ended design,
- Easy to install,
- Safe and easy to operate,
- Compact design,
- Low maintenance.

The supplier must be able to prove that he possesses extensive experience in the field of MV switchgear, that he has already supplied equipment of the same type and same make and that this equipment has been in operation for at least three years.

16310-1.2 Standards

The switchgear shall comply with the latest issues of the following IEC recommendations:

- IEC 60298 AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 54 kV,
- IEC 60265 MV switches,
- IEC 60129 AC disconnectors and earthing switches,
- IEC 60694 Common clauses for MV switchgear and controlgear,
- IEC 60420 MV AC switch-fuse combinations,
- IEC 60056 MV AC circuit breakers,
- IEC 60282-1 MV fuses,
- IEC 60185 Current transformers,
- IEC 60186 Voltage transformers,
- IEC 60801 Electromagnetic compatibility for industrial process measurement and control equipment.

16310-1.3 Rated Voltage and Short-time Withstand Current

- The switchgear shall be suitable for three-phase systems operating at 11 kV, and 50 Hz.

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- The rated voltage shall be at least 12 kV.
- The short-time withstand current shall be 25 kA - 1 s / 12 kV .

All switchgear shall be capable of withstanding the above conditions without provoking damage, in accordance with the IEC standard recommendation.

16310-2 System parameters

The insulation level of the switchgear shall comply with IEC recommendations (SFG or Vacuum) and the values indicated in the following table:

16310-2.1 Main Electrical Characteristics

The hereunder values are for working temperatures from -5° C up to +40° C and for a setting up at an altitude below 1000 m.

Rated voltage (kV)		12
Insulation level		
50 Hz / 1 min	Insulation	28
1.2/50 µs	Insulation	75
Transformer off load (A)		16
Cables off load (A)		31.5
Short–time withstand current (KA)		25

The making capacity is equal to 2.5 times the short-time withstand current.

16310-2.2 General Characteristics

Maximum breaking capacity		
rated voltage (kV)	12	
Switch unit	630 A	
Fuse-switch unit	25 kA	
Contactor unit with fuses	25 kA	
Circuit breaker unit	25 kA	
Endurance		
Units	Mechanical endurance	Electrical endurance
Switch unit (*)	IEC 62271 1000 operations	IEC 62271 100 breaks at Ir, pf = 0.7
Contactor unit	IEC 60470 2500 000 operations	IEC 60470 250 000 breaks at Ir
Circuit breaker unit	IEC 62271	IEC 62271

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	10 000 operations	25 breaks at 25 kA 10 000 breaks at Ir,pf=0.7

(*) as per recommendation IEC 60420 three breaking at f = 0.2; 1730 A/12 kv

16310-3 GENERAL REQUIREMENTS RELATIVE TO THE DESIGN AND MANUFACTURE OF THE SWITCHGEAR

16310-3.1 Introduction

The equipment shall satisfy the criteria for indoor, compartmented, metal-enclosed switchgear in accordance with IEC 62271 recommendations.

The cubicles shall be designed with five compartments housed in a single enclosure:

- Switchgear compartment,
- Busbar compartment,
- Connection compartment,
- Operating mechanism compartment,
- LV compartment.

16310-3.2 Switchboards

The switchboards shall be made up of separate factory built cubicles housing the switchgear (switch-disconnector and switch enclosures shall be mounted horizontally in the cubicles and the circuit breaker shall be disconnectable and mounted vertically). The cubicles therefore form a compartmented distribution switchboard that can be extended if necessary.

The cubicles shall meet the requirements of degree of protection index IP2XC. The galvanized and electro-galvanized sheet metal and metal fittings shall be painted to provide protection against corrosion. The epoxy-based paint shall have a thickness of at least 50 microns and shall be applied to both sides of all sheet metal. The colour shall correspond to the RAL colour range proposed.

The switchboard shall be suitable for mounting above cable trenches, crawl spaces or base structures.

Each cubicle shall carry a suitably dimensioned identification label clearly indicating the functions and electrical characteristics of the cubicle.

The switchgear and the switchboards shall be designed in such a way that the positions of the various switchgear devices shall be visible by the operator from the front of the switchboard. It shall also be possible to operate the switchgear from the front of the switchboard.

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The civil works Specifications shall be unique for all cubicles making up the MV switchboard. The cubicle widths shall be multiples of 375 mm. In particular, the civil works for the circuit breaker cubicles shall be identical to the civil works for the switch cubicles. The manufacturer shall provide an installation drawing to serve as a guide for the civil works.

In accordance with applicable standards, the switchboards shall be designed to prevent access to all live parts when in operation as well as during maintenance work.

16310-3.3 Earthing of Live Parts

The earthing bars of each of the cubicles making up the switchboard shall be interconnected by a set of busbars which shall be connectable outside the switchboard and extend over its full width.

The cross-section of the busbars shall be determined so as to withstand the rated short-circuit current of the switchgear in accordance with IEC 62271 recommendations.

The earthing bar shall be designed for connection to the main earthing bar of the substation without dismantling any of the bars.

16310-3.4 Earthing of the Power Circuit

Cable earthing shall be carried out by an earthing switch with a short-circuit making capacity, in accordance with IEC 62271 recommendations. It shall be possible to operate the earthing switch when the switch or disconnector is open.

A padlocking system shall be provided to lock the earthing switch in either open or closed position. The position of the earthing switch shall be clearly visible from the front of the cubicle.

Mechanical interlocking systems shall be provided to prevent incorrect operations such as the closing of the earthing switch with the switch or disconnector in closed position.

The use of keyed or electric locks to actuate the above mentioned interlocking system shall not be accepted.

16310-3.5 Switches

The switches shall use low pressure SF6 gas for current interruption and shall require no maintenance. The switch enclosure shall be mounted horizontally within the cubicle and the position of the main and earthing contacts shall be clearly visible from the front of the cubicle. The position

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indicator shall be placed directly on the contact operating shaft. The switch enclosures shall be made of cast epoxy resin.

The switches shall be of the high operating frequency type in accordance with IEC 62271 recommendations. They shall have three positions (closed, open and earthed) and shall be fully assembled and tested before leaving the factory. The relative pressure of the SF6 gas inside the enclosure shall not exceed 0.5 bars (500 hPa).

The pole unit enclosures shall be of the "sealed pressure system" type as defined by IEC 62271 recommendations, with a service life of at least 30 years. No refilling of the gas shall be required over this period.

Switch pole units requiring maintenance or gas refilling will not be accepted.

The mechanical endurance of the switch operating mechanisms shall ensure at least 10,000 operations.

16310-3.6 Circuit Breakers

The circuit breakers shall be mounted vertically and shall be disconnectable. They shall use vacuum as the current interruption medium. They shall require only minimum maintenance and shall provide a high level of electrical endurance. The position of the circuit breaker shall be clearly visible.

The breakers shall comply with VDE Specification 0670 part 102, recommendation and publication 561EC 695, BS116, BS 5311.

Furthermore, the circuit breakers shall be mechanically interlocked with the power circuit disconnector.

Circuit breaker shall be maintenance free. The mechanical and electrical endurance shall ensure at least 10,000 operations.

The circuit breakers shall be covered by test reports issued by a recognized organization affiliated with an international organization.

They shall be equipped with a fast-acting stored energy type operating mechanism or battery and battery charger including:

- Pushbuttons for opening and closing,
- Mechanical "open/closed" position indicator,
- "Charged/discharged" indicator for the operating mechanism springs,
- Local means for manually discharging the springs,
- Auxiliary contacts.

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The spring charging lever shall form an integral part of the mechanical operating mechanism. The spring charging lever must not be removable.
It shall be possible to add, on site, a motor mechanism for electrical charging of the operating mechanism as well as the necessary accessories.

16310-3.7 Busbars

The busbar compartment shall be located at the top of the cubicle. It shall include three parallel-mounted bars without phase separating means. Connections shall be made to the top pads of the switch or disconnector enclosures. Access to the busbars shall only be possible after removing a single access panel carrying a symbol warning of the danger of electrical shock. No other busbar access system will be accepted.

16310-3.8 Connections

The MV cable connection pads shall be designed to accept simplified terminations for dry-type cables or to accept paper-insulated cables impregnated with a non-draining material.

No phase separating means will be accepted.

The compartment shall be capable of withstanding internal arc testing, the minimum required is 12.5 kA/0.7 s. Access to the connection compartment shall only be possible after closing the earthing switch. No other access mode will be accepted.

Heaters with thermostat shall be provided in the compartment to avoid condensation of moisture.

16310-3.9 Operating Mechanisms

The operating mechanisms shall provide in front all the necessary means for operating the switches, disconnectors and circuit breakers.

The operating mechanism compartment shall include a switch and earthing switch position indicator fixed directly to the shaft of the moving pole, thereby satisfying the positive break criteria.

This compartment shall also house the voltage indicators and the mechanical "fuse blown" indicator for fuse-switch combination units.

The compartment shall be accessible with the cables and busbars live, without isolating the entire switchboard, and shall be designed for easy installation of padlocks, key locks, auxiliary contacts, releases and the usual LV accessories.

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The front cover of the operating mechanism shall be suitable for the application of all symbols, mimic diagrams, nameplates and padlocking fixtures required by the function implemented.

The compartment shall allow addition of a motor mechanism without having to change the operating mechanism.

Operating mechanisms that must be replaced for motorization will not be accepted. All switch and earthing switch operations shall be carried out with an anti-reflex lever and shall be independent of the action of the operator after charging the operating mechanism springs.

The operating mechanism compartment shall include:

- Mechanical "open/closed" position indicator,
- "Charged/discharged" indicator for the operating mechanisms springs,
- Spring charging lever forming an integral part of the operating mechanism; circuit breakers not satisfying this condition will not be accepted,
- Local means for opening and closing the circuit breaker,
- Local means for manually discharging the springs.

16310-3.10 LV Compartment

The LV compartment shall be included in the overall volume of the cubicle. It shall be designed to house the various LV elements required for the operation of the motor mechanism and auxiliary equipment.

For specific needs, it shall be possible to enlarge or extend the LV compartment by adding an enclosure with a door to the top of the cubicle. The overall height of the cubicles shall not exceed 2250 mm.

In all cases, these volumes shall be accessible with the cables and busbars live, without isolating the entire switchboard. LV compartments not satisfying these criteria will not be accepted.

16310-3.11 Current Transformers

The current transformers shall have the same short-time withstand current and rated voltage as the switchgear. They shall be made of cast epoxy resin and must be labeled individually.

The manufacturer shall be in a position to provide type-test reports certified by an approved laboratory affiliated with international organizations.

Current transformers not satisfying these criteria will not be accepted.

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16310-3.12 Voltage Transformers

The voltage transformers shall be made of cast epoxy resin and must be labeled individually. Depending on the needs, they shall be of the phase-to-phase or phase-to-earth type. They shall be protected by MV fuses or by circuit breakers on the power circuit.
The manufacturer shall be in a position to provide type-test reports certified by an approved laboratory affiliated with international organizations.

Voltage transformers not satisfying these criteria will not be accepted.

16310-3.13 LV Auxiliaries

Auxiliary equipment shall satisfy IEC 62271 recommendations.

The LV cables shall be of the self-extinguishing type with a 1000 V insulation level. They shall be marked at each end for easy verification during maintenance or servicing work. The cable cross-sections shall not be less than 2.5 sq. mm for circuits carrying high currents, or 1 sq. mm for other circuits.

16310-3.14 Control and Monitoring

All the relays, instruments and meters shall be incorporated in the LV compartment located at the top of the cubicle.

The relays shall be of the “integrated unit” type, meeting all protection and automatic control needs.

They shall comply with IEC 61000 recommendations concerning electromagnetic compatibility.

If necessary, they shall be able to communicate:

- Using standardized protocols,
- Adapting to a wide range of power supply voltages,
- With the possibility of being disconnected while live without any danger to installation,
- Storing the information in memory in the event of an auxiliary power failure.

The manufacturer shall provide proof that he has already supplied equipment of the same type and same make and that this equipment has been in operation for at least three years.

16310-3.15 Type Tests and Routine Tests

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Depending on switchboard, type-test certificates may be required for the equipment, including the switches and the circuit breakers.

- Impulse dielectric tests,
- Power frequency dielectric tests,
- Temperature-rise tests,
- Short-time withstand current tests,
- Mechanical operating tests,
- Verification of the degree of protection,
- Verification of electromagnetic compatibility.

In addition, for the switches and circuit breakers, the rated making and breaking capacities shall be substantiated by a test report.

For the earthing switch, the making capacity, the short-time withstand current and the corresponding peak value shall be substantiated by a test report.

The routine tests carried out by the manufacturer shall be substantiated by a test report signed by the manufacturer's quality control department.

The report shall cover the following aspects:

- Conformity with drawings and diagrams,
- Power frequency tests,
- Manual operating mechanism tests,
- Functional tests of LV auxiliaries and relays.

16310-3.16 Quality

If requested by the client, the supplier shall provide proof of application of a quality procedure complying with standards. This means:

- Use of a quality manual approved and signed by a management representative,
- Regular updating of this manual so that it reflects the most recent applicable quality control procedures,
- ISO 9002 certification.

16310-4 DISTRIBUTION TRANSFORMERS

a) General

The transformer shall be of dry type (cast resin) having windings cast with epoxy resin, installed in steel enclosure. This equipment is to conform to VDE, IEC or equal and shall have the following ratings:

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- Rated power As specified in Drawings
- Type of cooling AN or AN/AF as specified in Drawings
- Number of phases 3
- Rated frequency 50 Hz
- Vector group DYN 11
- Medium voltage wiring 11,000 volts delta with ± 2 x 2.5% off load tap
- Rated Impulse withstand voltage (Peak) 75 kV (minimum)
- Rated Power Frequency withstand voltage (rms) 28/3 kV (minimum) HT/LT
- Low voltage winding 400/230 V.
- Impedance Voltage at any Tapping not less than 6%
- Minimum sound level 1.00 m measuring distance 60 dB (A) (measured at 1 m)
- Insulation class
  MV winding class F
  LV winding class F
- No load loss and full load loss shall be submitted
- Reference Standard IEC or ANSI
- Steel enclosure IP 31 ventilated by double roof fans

b) Construction

The transformer core shall be constructed of high grade, grain oriented silicon steel laminations with high magnetic adequate mechanical strength and to reduce vibration and shall be protected against corrosion. The method of corrosive protection shall be specified. The transformer coil shall be copper. The coil construction must be continuous (no splices). The case coil shall be free from partial discharge for up to 2 times rated voltage. Low voltage winding shall be separated from high voltage winding and shall have strong structure. Coil must not absorb moisture and shall be capable of immediately being switched on after such storage without pre-drying. Stresses developed during faults shall not exceed the inherent strength of the conductors and support system.

The low voltage terminals shall be tin plate mounted on the different side of the high voltage terminals.

The high voltage terminals shall be located at the sidewall of the transformer.

High voltage connection to the cable shall be of safe-to-touch plug-in type and low voltage connection shall be insulated for safety to touch.

c) Fan for Forced Air Cooled Transformer

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The fan shall be radial fan type, mounted under the transformer winding permitting a 30% power increase. The fan shall be controlled by temperature of transformer winding.

d) Accessories

The following accessories shall be provided:

1. Temperature monitoring devices which are embedded in the low voltage coil of the transformer shall be provided for alarm and tripping.

2. Pulling eyes or towing eyes.

3. Jacking provisions.

4. Lifting lugs or equivalent.

5. Pads for isolation of core and coil vibration.

6. Bi-directional wheel.

7. Two diagrammatic type nameplates are preferred. One shall be attached to the low voltage side of transformer, and the other to the transformer enclosure.

8. Ground terminal.

e) Standard factory tests shall be made in accordance with reference standard or equivalent.

16310-5 AUTOMATIC VOLTAGE REGULATOR (AVR)

Automatic voltage regulator shall be of dry type (cast resin) having windings cast with epoxy resin, enclosed in steel enclosure and shall be capable of handling voltage fluctuation between 9500 – 13500 volts, complete with:

- MR ON-Load tap changer, type VT
- Motor drive MA7 and Relay MK 30
- AVR (SKB 30)

The equipment is to be designed according to IEC 60076 for indoor installation and produced strictly in accordance with ISO 9001 quality system with the following:

- High voltage windings are void free, cast under full vacuum.

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- Low voltage windings are of copper foil with prepreg as insulation material bound by heating process to a strong cylinder.
- Impulse resistant.
- Short circuit performance capable.
- Partial discharge free (below 20 pc at measurement according to IEC 60076).
- Fire class FO.
- Environmental Class F1
- Climate class C2

The automatic voltage regulator shall have the following ratings:

KVA	: As shown on Drawings
Rated Primary	: 11 kv +/- 15%
Tapping	: 10 taps x 4.5% on primary side
Rated Secondary Voltage	: 11 kv
Frequency	: 50 Hz
Vector group	: YNd 11
Highest voltage of equipment	: 17.5/12.0 kv
Power frequency withstand voltage	: 38/28 kv (HT/LT)
Impulse withstand voltage	: 95/60 kvp
Protection	: IP 31
Cooling	: AN
Insulation class	: F
Max. temperature rise	: 100 k
Impedance voltage at 75 c	: 7%
Noise level	: 67 dB (A)
No-load losses	: 8000 w
Load loss at 75 c	: 28000 w
Manufactured in	: USA/UK/Germany/Japan

16310-6 FACTORY TEST

The tests described below shall be required on the complete switchgear:

a) Power-frequency voltage dry tests 50 kV for 12 kV system of the main circuit.
b) Power-frequency voltage test 2000 V on auxiliary circuit.
c) Five times of mechanical operation tests.
d) Verifications of wiring.

END OF SECTION

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SECTION 16350

CIRCUIT BREAKER

16350-1 AIR CIRCUIT BREAKER (ACB)

a) ACB shall be triple pole, metal clad, flush mounted horizontal draw-out type with back connection.

b) ACB shall be motorized and with the capability to install protective equipment as follows or as shown in the Drawings:

1) Shunt trip
2) Instantaneous over current trip
3) Time delay over current relay
4) Ground fault relay
5) Asymmetrical relay or Phase failure check relay with adjustable +, - 5 to 10% asymmetrical voltage
6) Under Voltage relay with adjustable range from +, - 10 to 20% symmetrical.

c) The rated short circuit breaking capacity shall be as shown on the Drawings with 1 sec. short circuit period.

d) Isolating and main contact shall be silver plated self aligning cluster type backed by phosphor bronze spring. The arcing tip shall be specially treated to minimize erosion and eliminate contact welding under all conditions. Heat resistant quenching device shall be provided.

e) Auxiliary contacts for the ACB shall be 4 NC + 4 NO. All auxiliary wiring shall be connected to a plug by flexible cable with socket type adapter at the outer casing of the circuit breaker.

f) Interphase barrier, positive permanent "ON", "OFF", "TRIP" and "SPRING CHARGED" indicator, "service", "TEST" and "ISOLATED" position indicator, shall be provided. The ACB shall be lockable by padlock in "ON" of "OFF" position.

g) Mechanical interlocking device shall be provided so that:

1) ACB cannot be racked-in "ON" condition.
2) ACB cannot be withdraw in "ON"
3) ACB draw out mechanism shall trip the breaker before isolating contact opens.
4) Main ACB's and tie ACB shall be interlocked as shown on the Drawings.

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h) ACB shall be manual-charged, manual release spring assisted closing and opening mechanism. The operation handle shall be retractable. Damping device shall be provided or smooth switching or tripping. The spring tripping operation shall be shunt trip release either manually or by protecting relays such as, under voltage, overload/earth fault etc. ACB shall be trip free i.e. contact will not be held closed when closing on the fault.

16350-2 MOLDED CASE CIRCUIT BREAKER (MCCB)

a) MCCB shall be manufactured and tested to conform to the UL listed applicable requirement of NEMA Standard or approved equal.

b) All mechanical and live parts, except terminals and toggles, shall be contained in completely sealed molded case of high mechanical strength and non-tracking phenolic materials.

c) Load handling contacts shall be of anti-welding silver/tungsten tips electrolytically deposited onto high conductivity copper backing.

d) The MCCB shall be "Trip free". The tripping mechanism shall be thermal magnetic, and must be fully compensated for ambient temperature of 25^{o}C to 50^{o}C and calibrated at 40^{o}C to carry full load.

e) MCCB for switchboard installation shall be bolt on type with short circuit rated at not less than that of the main ACB of the panel where it belongs to.

f) MCCB shall be completed with overload, short circuit, and shall have an inverse current/time characteristic with time delay inversely proportional to the current up to seven times full load rating. On higher over current, the breaker shall trip instantaneously. Wherever specified, additional under voltage relay protection shall be provided. Clear indication of fault when tripped, shall be indicated for all MCCB.

g) MCCB for tee-off circuit from busduct or cable riser shall be of the fault limiting type with maximum let through energy limited to such value which equal to the withstand short circuit fault current of the upstream MCCB.

16350-3 FUSES FOR CONTROL CIRCUIT

a) High rupturing capacity fuse links shall comply with B.S. 1361 (1971) or approved equal. Fuse shall be cylindrical cartridge fuse.

b) Fuse link shall be capable of opening circuits if protected, if:

1) Having a maximum voltage not exceeding 1.1 times their rated voltage.

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2) Having any prospective current greater than their rated minimum fusing current up to their breaking capacity rating.

3) Having any power equal to or greater than that associated with their breaking capacity rating.

c) Fuse carriers and fuse holders shall be constructed of ceramic porcelain or of high dielectric phenolic moldings. Phenolic molding units shall be complying with B.S. 771:1959 and non-hygroscopic and unaffected by heat generated by an overloaded fuse or by a blown fuse.

d) Modular fuse carriers shall be so designed that there is no risk of touching live parts when withdrawing a fuse.

e) The maximum rating of the fuse inserted in a fuse holder shall not be greater than the rating for which the holder is designed.

f) No live metal shall be exposed when the fuse carrier is removed from the base and the base contact shall be enclosed by insulating shrouds.

END OF SECTION

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SECTION 16375

UNDERGROUND DUCT LINES

16375-1 GENERAL

Underground duct lines shall be of individual conduit of HDPE pipe, except where rigid metallic conduit is indicated or specified, and shall be encased in concrete as indicated. Conduit in underground ducts shall be not smaller than 4 inches in diameter, inside, unless indicated or specified otherwise. The concrete work shall conform to section 03310. Duct lines shall slope downward toward manholes and away from buildings with a pitch of not less than 1 cm in 400 cm. The top of the concrete envelope shall be not less than 45 cm below grade except that under roads and pavement, it shall be not less than 60 cm below grade and under railroad tracks, not less than 91 cm below grade. Changes in direction of runs exceeding a total of 10 degrees, either vertical or horizontal, shall be accomplished by long sweep bends having a minimum radius of curvature of 7.5 m, except that manufactured bends may be used at ends of short runs of 30 m or less, and then only at or close to the end of the run. The long sweep bends may be made up of one or more curved or straight sections or combinations thereof. Manufactured bends shall have a minimum radius of 45 cm for use with ducts of less than 3 inches in diameter and a minimum radius of 91 cm for ducts of 3 inches in diameter and larger.

Conduits shall terminate in end bells where duct lines enter manholes (handholes). Separators shall be precast concrete or of unfilled high impact polystyrene molding compound. The joints of the conduits shall be staggered by rows and layers so as to provide a duct line having the maximum strength. During construction, partially completed duct lines shall be protected from the entrance of debris such as mild, sand, and direct by means of suitable conduit plugs. As each section of a duct line is completed from manhole (handhold) to manhole (handhold), a testing mandrel not less than 12 inches long with a diameter ¼ inch less than the size of the conduit shall be drawn through each conduit, after which a brush with stiff bristles shall be drawn through until the conduit is clear of all particles of earth, sand, or gravel; conduit plugs shall then be immediately installed. The kind of conduit used shall not be mixed in any one bank.

16375-2 CONDUITS INSTALLED UNDERGROUND WITHOUT CONCRETE ENCASEMENT

Where indicated or specified, conduits shall be installed underground without concrete encasement except that under paved areas, roads, and railroad tracks, they shall be encased in concrete as specified for underground duct lines. Conduits shall be 4 inches inside diameter unless specified otherwise. The top

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of conduits shall be not less than 60 cm below grade, and the conduit shall have a minimum slope of 1 cm in each 400 cm, away from buildings and toward manholes and other necessary drainage points, and shall be run in straight lines except where a change of direction is necessary.

Joints in conduit runs shall be staggered not less than 15 cm in rows and tiers. As each conduit run is completed, a testing mandrel not less than 30 cm long with a diameter 0.63 cm less than the inside diameter of the conduit shall be drawn through, after which a brush with stiff bristles shall be drawn through until the conduit is clear of all particles of earth, sand, or gravel; conduit plugs shall then be immediately installed. There shall be not less than 7.6 cm clearance from the conduit to either side of the trench. The bottom of trenches shall be graded carefully and shall be smooth; where rock, soft spots, and/or sharp edged materials are encountered for an additional 3 inches and filled and tamped level with the original bottom with sand or earth free from particles that would be retained on a ½ inch sieve. The concrete encasement shall extend not less than 100 cm beyond the edge of paved areas and roads, and 150 cm beyond the end of tire of railroad tracks. Identification slabs (markers), backfilling, and reconditioning of surface shall be as specified. The kind of conduit used shall not be mixed in any one duct bank.

16375-3 HDPE CONDUIT

HDPE conduit shall conform to Specification DIN. 8074/75. End bells, flexible couplings, and expansion joints shall be provided as necessary. Fitted plastic or other tough nonmetallic fitted couplings providing a watertight joint may be used. HDPE conduit shall be of 110 mm OD and 3.5 mm wall thickeners.

16375-4 MANHOLES AND HANDHOLES

Wires and cables shall be placed on cable racks. Manholes and handholes shall be cleaned of all loose materials, dirt, and debris immediately after completion and covers installed, and shall be in a clean condition when the project is completed.

16375-5 IDENTIFICATION SLABS (MARKERS)

Identification slabs (Markers) shall be provided at each change of direction of cable, over the ends of ducts or conduits, which are installed under paved areas and roadways, and over each splice. Identification slabs shall be of concrete approximately 30 cm square by 15 cm thick and shall be set flat in the ground so that the top surface projects not less than 2 cm nor more than 3 cm above ground. The concrete shall conform to the applicable provisions of the section 03310. An identifying legend such as "cable", "duct", "splice", or other applicable designation shall be inscribed on the top surface before the concrete hardens. Circuit identification symbols shall also be inscribed on identification

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slabs as directed. The letters and/or figures shall be approximately 5 cm high and the grooves shall be approximately 0.63 cm in width and depth. The identification slabs shall be installed so that the nearest side is 30 cm, horizontally, from the cable, splice, splice conduit, or duct and the inscription on the top shall include an arrow indicating the nearest side.

16375-6 BACKFILLING

Backfilling shall be in layers not more than 20 cm deep and shall be thoroughly tamped. The first layer shall be earth or sand, free from particles that would be retained on a ¼ inch sieve and extending not less than 7.6 cm above the top of the cables. The succeeding layers shall be excavated material having stones no larger than would pass through a 10 cm ring. The backfill may be moistened. The backfill shall be level with the adjacent surface except that in sodded areas a space equal to the thickness of the sod shall be left.

16375-7 RECONDITIONING OF SURFACE

The surface disturbed during the installation of duct and/or cable shall be restored to its original elevation and condition. Sod or topsoil shall be preserved carefully and replaced after the backfilling is completed. Sod that is damaged shall be replaced by sod of a quality equal to that removed. Where the surface is disturbed in a newly seeded area, the restored surface shall be re-seeded with the same quantity and formula of seed as that used in the original seeding.

16375-8 CAST TYPE SPLICE

The insulation shall be provided by means of a molded casting process employing a thermosetting epoxy resin type material conforming to Specification IEEE 404-1977. The resin insulation shall be applied by a gravity poured cast method or by a pressure method. The gravity poured method shall not be used for splices in shielded cables. The materials, equipment, and method of application shall be of an approved type. The work shall be of an approved type. The work shall be in accordance with the instructions supplied by the manufacturer of the splicing materials. The component materials of the resin insulation shall be in a packaged form ready for convenient mixing without removing from the package.

END OF SECTION

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SECTION 16425

LOW VOLTAGE DISTRIBUTION SYSTEM

16425-1 MAIN DISTRIBUTION BOARD

16425-1.1 Switchboard

a) Switchboards shall be indoor, self contained, factory built assembly, floor standing, front and rear access, extensible cubicle type and shall be tested. Switchboards shall be uniform in height and depth.

b) Switchboard shall be constructed from zinctec sheet steel angle and channel sections welded to form a robust, self supporting structure. The cubicle tops, floor plates, side panels, front and rear doors, shall be detachable gasketed sheet metal plant of at least 2 mm thick.

The bare edges shall be lipped. Each panel shall be divided vertically by isolating sheet metal and horizontally by insulation between compartments for each switchgear and/or instrument. The sheet steel of min 1.2 mm thick shall be used.

c) Switchboards shall consist of the following components:

1) Cabling chambers
2) Main busbar chamber
3) Instrument-protection relay, protection CT.
4) Metering-PT, energy meter, selectors, indication light, measuring CT.
5) Switchgear including ACB, non-fuse switch, MCB, HRC Fuses and magnetic contactor.
6) Spare and space for future circuit as shown on the Drawings.
7) Earth bar
8) Mimic bus of 3 mm and 10 mm wide plastic strip or an A3 size fitted on the front of the panel showing schematic lines of the equipment.
9) Name plates shall be provided as indicated in the Drawings for every ACB, MCB, other equipment including all meters on front of the switchboard.

d) All components shall be suitable derated and the switchboard shall be naturally ventilated to operate under the service condition. The switchboard shall be dust tight and vermin proof. All cable termination shall be shrouded.

e) Copper earth bar of 25 mm x 6 mm or as specified in the design drawings shall be provided to link all panels.

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f) Busbar shall be air insulated hard drawn electro-tin plated high conductivity copper bars to BS 1432 or 1433 or approved equal, properly rated, and supported by porcelain or other non-hygroscopic material at suitable spacing.

g) Cabling chamber shall be of ample dimension for case of cable termination and shall be provided with

1) Cable end box
2) Cable lugs
3) Cable glands
4) Armour champs
5) Gland plates
6) Straps
7) Cable shroud

and suitable for the appropriate size, type and direction of cable entry.

h) Switchboard shall stand on a concrete plinth of minimum 100 mm high.

i) All hinged or removable metal doors of plate shall be earthed by flexible earth tape to the earth bar.

16425-1.2 Switchgear

Switchgear shall include all metal clad switches and circuit breakers:

1. Air circuit breaker
2. Moulded case circuit breaker
3. Automatic transfer switch.

The switchgear shall be Triple Pole with Neutral (TPN), Single pole with Neutral (SPN). Switchgear shall be of surface mounting or flush mounting or floor mounting type suitable for switchboard installation.

All switchgear shall have ratings as specified and carry continuously, make and break the rated current without any damage.

Switchgear shall be dust and vermin-proof. For outdoor application, the switchgear shall be in lockable weather-proof enclosure with 3 sets of keys. For application in damp, wet or humid area such as pump room, chiller plant room etc. damp-proof and splash-proof type shall be used.
All switchgears shall be constructed to prevent tempering with the protection device, altering trip point or time delay settings. Switchgear shall be provided with mechanical interlocking device so as to prevent the closing of switchgear when the door is opened and the opening of the door when the switchgear is “ON”. All switchgears shall be externally lockable.

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All switchgears shall have a quick-make and quick break action operated by DC. power supply. With the exception of MCBs which are totally enclosed, switchgears shall be complete with removable phase barrier, contract shrouds and are quenching devices. All switchgears shall be equipped with spring accelerating mechanism to ensure positive "ON" and "OFF" action independent of hand operation. Clear indication of "ON, OFF and TRIP" shall be permanently provided.

Surface mounted metal clad switchgear shall be at least to IP 31 and have casing constructed of at least 2 mm heavy gauge sheet metal.

The switch casing shall be hot-dip galvanized (at least 2 layers) or cleaned, degreased, prime coated for anti-corrosion before painting.

Externally, the switchgear shall be finished with gloss grey paint and internally in matt white paint. All paint shall be synthetic enamel and air drying type. For flush mounting type, the furnish shall be same and uniform as the cubicle and other components.

Earth terminal shall be provided for all metal clad switchgears. Parallel operation of switchgear as a single unit is not allowed.

16425-1.3 Automatic Transfer Switches (ATS)

a) The automatic transfer switches shall be twin unit consisting of two 4-pole, motorized circuit breaker type or approved equal.

b) Automatic transfer switch shall be with double relay control. On detection of the failure of the main supply by the no-volt relay as well as the built up of the rated voltage from the emergency generator by the voltage sensing relay. The switch shall automatically change over for the reserved power source.

c) The automatic transfer switches shall have the same interrupting capacity as the panel where it belongs to.

d) The twin unit shall be mechanically interlocked so that it prevents the normal and emergency sources from ever being in parallel operation.

e) Spare voltage free auxiliary contract shall be provided, minimum 2 NC + 2 NO for each set of ATS.

f) Relay and time delay relays shall be provided for the following functions:

- Voltage and frequency relay for emergency source.
- Time delay normal to emergency, adjustable 0.1 - 10 min.
- Time delay emergency to normal, adjustable 0.2 - 30 min.

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16425-2 DISTRIBUTION BOARDS

16425-2.1 Typical Specifications

16425-2.1.1 General

Furnish and install where indicated a dead-front panel board incorporating switching and protective devices of the number, rating and type noted herein or shown on the Drawings. Panel boards shall have general purpose enclosures and shall be surface mounted except where noted. All panel boards shall be rated for the intended voltage and shall be in accordance with the Underwriters' Laboratories, Inc. "Standard for Panel board" and "Standard for Cabinets and Boxes" and shall be so labelled where procedures exist. Where panel boards are to be used as service entrance equipment, they shall be so labelled. Panel boards shall also comply with NEMA Standard for panel boards and National Electric Code, where applicable.

16425-2.1.2 Interiors

All interiors shall be completely factory assembled with switching and protective devices, wire connectors, etc. All wire connectors, except screw terminals, shall be of the anti-turn solderless type and all shall be suitable for copper or aluminium wire of the sizes indicated.

Interiors shall be so designed that switching and protective devices can be replaced without disturbing adjacent units and without removing the main bus connectors and shall be so designed that circuits may be changed without machining, drilling or tapping.

Branch circuits shall be arranged using double row construction except when narrow column panels are indicated.

A nameplate shall be provided listing panel type and ratings.

Bus bars for the mains shall be of copper or tin plated aluminium, sized in accordance with Underwriters' Laboratories standards. Unless otherwise noted, full size neutral bars shall be included. Bus bar taps for panels with single pole branches shall be arranged for sequence phasing of the branch circuit devices.

The short circuit rating of the assembled panel board shall be in accordance with U.L. Inc. Standards and their test verification.

Phase bussing shall be full height without reduction. Cross and centre connectors shall be copper or tin plated aluminium.

Neutral bussing shall have a suitable lug for each outgoing feeder requiring a neutral connection.

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Spaces for future switching and protective devices on lighting and appliance panel boards shall be bussed for the maximum device that can be fitted into them.

Space heaters shall be provided along with thermostat to avoid condensation of moisture in the distribution boards.

16425-2.1.3 Box

Boxes shall be made from unpainted galvanized code gauge steel having multiple knockouts except where noted. Boxes shall be of sufficient size to provide a minimum gutter space of 4" on all sides. Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment, the box shall be so sized as to include this wiring space. This wiring space shall be in addition to the minimum gutter space specified above and the limiting width may be increased accordingly.

At least 4 interior mounting studs shall be provided.

Box identification number shall be on box.

Lighting panel boxes shall use three piece construction-wrapper sheets for back and two sides with removable top and bottom ends.

16425-2.1.4 Trim

Hinged doors covering all switching device handles shall be indulged in all panel trims, except that panel boards having individual metal clad externally operable dead front units may be supplied without such doors.

Doors in panel board trims shall conform to the following:

1. In making switching device handles accessible, doors shall not uncover any live parts.

2. Doors shall have flush-type cylinder lock and catch, except that doors over 48" in height shall have auxiliary fasteners at top and bottom of door in addition to flush-type cylinder lock and catch. Door hinges shall be concealed. All locks shall be keyed alike; directory frame and card having a transparent cover shall be furnished on each door.

The trims shall be fabricated from code gauge sheet steel.

All exterior and interior steel surfaces of the panel board trim shall be properly cleaned and finished with grey ANSI-61 paint over a rust-inhibiting phosphatized coating.

Trims for flush panels shall overlap the box by at least ¾" all around. Surface trims shall have the same width and height as the box. Trims shall be mountable by a screwdriver without the need for special tools. After

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installation, trim mounting mechanism or hardware shall not be accessible when panel door is closed and locked.

16425-2.2 Distribution Board Free Standing Type

Switchboard shall be of construction of free standing type.

All sections of the switchboard shall be 50 cm deep, except service sections containing large amperecity main circuit breakers or pressure contact type main fusible switches which may be deeper. All sections of the switchboard shall align so that the back of the complete structure may be placed flush against a wall.

Construction shall allow maintenance of incoming line terminations, main device connections and all main bus bolted connections to be performed without rear access.

The feeder or branch devices shall be removable from the front and shall be panel mounted with the necessary device line and load connections front accessible.

The main horizontal bus bars shall be mounted on glass polyester insulators with all three phases arranged in the same vertical plane. The main bus shall have a maximum amperecity as shown on Drawing and shall be braced for short circuits up to (50,000) RMS amperes. Main bus splices shall be supplied between adjacent distribution sections.

Vertical sections shall be completely factory assembled, wired and tested before delivery. Design shall meet NEC and NEMA standards as well as OSHA requirements. Individual vertical sections shall be designed for bolting together at installation site.

16425-3 BUS DUCT

Low impedance bus duct shall be a low-voltage-drop, totally-enclosed bus way distribution system. It shall be enclosed type and approved for mounting in either the horizontal or vertical position. Degree of protection is IP54.

Provide a complete bus way system of the size and capacity as show on the drawings. The bus duct system shall be completed with accessories and boxes, rapid tap-off connections, plug-in tap-off units shall be circuit breaker type.

Bus bars shall be copper or aluminium as specified with PVC insulated throughout, and all connections shall be silver or tin plated.

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The housing shall be totally enclosed and after being assembled shall be continuously grounded and mechanical rigidity through the entire bus way system. Provide fire barrier at each building floor.

Installation shall be as per drawings and as specified. Manufacturer's recommendation for supports, fittings and accessories shall be followed strictly. Shop drawings shall be submitted for approval prior to installation.

16425-4 UNINTERRUPTIBLE POWER SUPPLY (UPS)

a) General

An Uninterruptible Power Supply (UPS) system shall be the static UPS type (solid-state type) based on the Double Conversion Technology. The UPS system shall be supplied and installed as indicated on the drawings and shall comply with the IEC 62040 – Uninterruptible Power System (UPS).

b) UPS System Characteristics

1. Input Supply

Input voltage : 400 ± 15% V

Input frequency : 50 ± 10% Hz

Input power factor : > 0.8

2. Output Supply

Output Voltage

- Steady state output voltage : 400/230 ± 1% V.
- Transient 100% step load addition or rejection : 400/230 ± 10% V.
- Transient recovery time to 1% output voltage : < 50 msec.

Output Frequency

- Steady state output frequency: 50 ± 1% Hz
- Free running : 50 ± 0.1% Hz
- Slew rate (df/dt) : 0.5 Hz/sec to 2 Hz/sec adjustable according to program

Total Harmonic Distortion

- 100% linear load : < 3%
- 100% non-linear load : < 5%

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Overload Capacity

- 125% of rated load within 10 minutes
- 150% of rated load within 1 minute

c) UPS Components

1. Rectifier / Charger

The rectifier/charger shall be IGBT Pulse Width Modulator type with harmonic reduction equipment. The rectifier / Charger shall be rated to supply full load current of the inverter unit and the charge current to restore the battery to its full-charge condition.

A walk-in circuit shall eliminate over currents during startup by imposing a gradual increase of the rectifier / charger DC output voltage over a period of approximately 10 seconds.

The rectifier / charger shall incorporate a programmable input current limiter in order to preset maximum power level specified by the battery supplier or the generator supplier.

2. Inverters

The UPS inverter shall be of solid state type with IGBT component capable of accepting the output of the rectifier / charger or emergency battery and providing and alternating current output.

The output frequency of the inverter shall be maintained in a phase-locked condition with the frequency of the bypass source for as long as it is within ± 2% of the normal frequency.

The inverter shall have fault sensing facilities for the removal of the inverter output from the load without exceeding their short circuit capacity limit.

3. Static By Pass Switch

The static bypass switch shall be equipped to provide uninterrupted transfer the critical load from the inverter to the main power source in the event of overload exceeding system capacities or inverter shutdown.

The transfer shall be performed on a “make before break” basis such that the static bypass switch is closed before the static interrupter and/or the output circuit breaker is tripped or opened.

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4. Battery

The battery set shall be maintenance-free and sealed lead acid type with more than 10 years designed life for float operation. Each battery will be installed in battery cabinet equipped with appropriate insulation.

Back up time of the battery shall not less than 15 minutes at full load condition at load P.F. 0.8.

A battery calculation is to be submitted by the Contractor assuming conditions of constant current at 25°C and end voltage not below than 1.65 V/cell basis.

The battery shall be UL 1778 and ISO 9001.

The UPS module shall be supplied with a manufacturer's standard moulded case circuit breaker that enables on load connection and disconnection of the battery to be made when necessary. The circuit breakers shall be able to tripped the battery from the UPS module.

5. Controls and Monitors

The UPS module shall incorporate multi-processor based control and indicating alpha numeric display panel. All instrumentation, alarms and indicators showing the operation of UPS module shall be incorporated on the display panel. Simple LED's alarm indications shall be installed at the standard front panel and shall remain live even after the relevant module has been shutdown.

Alarm and other indications shall maintain memory even after the failure of the relevant module.

The display unit on the UPS module shall indicate at least the following information:

- Inverters output line –to-line voltages, line to neutral voltage
- Inverters output currents.
- Inverters output frequency.
- Voltage across battery terminals.
- Battery charge or discharge current
- Battery discharge time
- Normal AC input source line-to-line voltage, line-to-neutral voltage.
- Rectifier / Charger input currents.
- Output power and load crest factor.

The UPS system shall provide visual indication for the following alarms:

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- Overload
- Overload shutdown
- Equipment over temperature
- Battery circuit breaker open
- Battery discharging
- Low battery voltage
- Input power failure
- Inverter output over-voltage/under voltage
- Load on bypass

An audible alarm shall be triggered whenever anyone or combination of the alarms is detected. The audible alarm shall be mutable with an acknowledgement button.

The UPS system shall provide an output interface port for connection of workstation or remote alarm and monitoring.

END OF SECTION

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SECTION 16450

GROUNDING SYSTEM

16450-1 METHODS OF EARTHING

Any metal work that is exposed in an electrical system including exposed metal work in fittings, etc. must be connected to earth in such a manner as will ensure at all times an immediate discharge of electrical energy without endangering any personnel or equipment.

In the case of normal installation, the metal work exposed shall be connected to earth via one or more of the following methods:

a) Protective conductor carried in the cable.

b) Metallic conduit, trunking or duct containing the wiring.

c) A special bare conductor or tape run to a suitable earth point.

d) A separate earth wire enclosed in conduit or trunking.

16450-2 EARTHING WITHIN SUB-STATION AND SWITCHROOM

The size of earthing bars and earthing tape within the sub-station and switch room shall be as required.

The Contractor shall supply and install an earthing bar within each low voltage switch room. The earthing bar shall be 300 sq. mm copper minimum and shall have sufficient studs to enable earthing tapes from the associated equipment to be connected separately.

Series earthing from one piece of equipment to another will not be permitted.

The Contractor shall supply and install an earth tape from each item of equipment, i.e., MV Switchgear, Transformers and Main Low Voltage Switchboard, to the earthing bar.

Cables from the MV switchgear to the transformer and the feeder cable from the transformer to the LV switchgear shall be bonded to the corresponding earth tape in the position shown on the Drawings.

Where joints are shown, all tape contact surfaces shall be tinned and kept in metal contact by means of sweating and riveting. All joints in exposed sections shall be protected against moisture and corrosion by the application of two coats of anti-corrosive paint and shall be bound with self-adhesive PVC tape.

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Joints and connections to the earthing systems shall be so affected as to avoid undue reduction of the current carrying capacity and shall be approved. Special precautions shall be taken to ensure that the available contact area is fully utilised in all connections to plant and apparatus.

Joints shall have a resistance not exceeding that of an equivalent length of conductor and the Engineer may require any joint to be tested to prove compliance with this requirement.

Links shall be provided adjacent to all junctions in the earthing tape to enable tests to be carried out. The links shall have tensile steel bolts and the nuts shall be tightened by means of a torsion spanner to the recommended torque.

The earthing tapes shall be fixed by means of single hole screw gun metal Holdfast type saddles at intervals not greater than 900 mm.

No drilling of the earth conductor will be allowed except in jointing or terminating unless agreed with the Engineer.

16450-3 EARTH ELECTRODE ARRANGEMENT

Earth electrodes shall be placed in the required positions. These shall be manufactured from materials that are suitable for installation in the respective ground conditions with due regard to chemical reaction and hardness of ground.

Earth rods shall be 4 m (minimum length) x 16 mm diameter with internally tapped thread at one end and screwed stud at the other. Threads shall be roll formed to maintain integrity of the copper.

The electrodes shall be connected with copper earth tape.

Where the rods are driven into soft ground, an inspection pit and cover shall be provided at each position.

After the installation of the electrodes, tests shall be carried out to ascertain the overall resistance to earth. If necessary, further rods shall be driven and connected until the overall resistance reaches the required value. The star points of the secondary winding of transformers shall each be connected to an earth electrode system locally to provide maximum impedance to earth of one ohm. If necessary, in order to achieve this value of impedance, earth rods may be installed surrounded by marconite or similar conductive concrete.

The Conductor shall ensure that the rods are installed so that their zones of earthing do not overlap.

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16450-4 EARTHING AND BONDING

Copper earthing leads, bonding leads and circuit protective conductors, unless otherwise specified herein, shall be sized in accordance with the relevant regulations.

Where the required operation of earth fault protection cannot be satisfied by the normal earthing arrangements, which shall be indicated by means of the required site earth tests, earth leakage protection shall be provided by one or more residual current devices for all parts of the installation to which the requirement for earthing applies.

Every circuit protective and bonding conductor, other than copper tape or where contained in a composite cable or flexible cord, shall be protected by PVC or heat resisting insulation as applicable and shall be identified by the colours GREEN and YELLOW.

Copper earthing or bonding tape run under floors, in ducts, or damp situations shall be PVC sheathed.

All copper earthing tapes, bare or PVC sheathed, shall be fixed by means of a single hole fixing gun metal "Holdfast" type saddle of a correct size to hold the tape firmly.

Bonding conductors and tapes shall be concealed where practicable. Where bonding conductors are run on the surface or within the building structure, these shall be protected by conduit terminating in an approved manner adjacent to the earthing terminal and/or metal work to be bonded.

The ends of every protective conductor, whether stranded or solid, shall be connected in an approved manner with spring washers and lock nuts, pinching screws or to pipes with a clamp.

The bonding connections to any gas or water services shall be made, as near as practicable, to the point of entry of these services into the building. Should there be an insulated section in the service run, the connection shall be made to the metal work on the building premises side of the insulated section. These bonding connections shall be made with the appropriate pipe clamps and precautions shall be taken to avoid damage.

A metal label embossed with the words in letters not less than 4.75 mm high

SAFETY ELECTRICAL EARTH - DO NOT REMOVE

shall be permanently fixed at the main earthing terminal and the bonding connection of the incoming gas and water services.

The earth continuity of metal conduits and metal trunking shall be maintained by efficient bonding between the conduit, trunking and the metal case of the

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main switch fuse, distribution board, or other metal clad accessory or appliance at which these terminate. All metal-clad fittings, accessories, enclosures, and metal cable trays shall be efficiently earthed.

For all conduit installations, circuit protective conductors shall be run to all lighting points, switches, socket outlets and other accessories.

The earthing system for telephone services shall be separate from the power earth system and shall comprise of 4000 mm x 16 mm diameter copper earth rods buried in the ground near to the Telephone Equipment Room. The earth electrodes shall be connected to a 70 sq mm copper tape which shall terminate through a sweated and bolted connection on the telephone equipment racks. Earth resistance shall not be greater than one ohms or as specified.

A similar independent earth system shall be provided, as necessary, for generator supplies and copper rods shall be similarly provided with 70 sq mm section copper tape bonding alternator frames, bedplates and control panels.

Each of the entire conduit installations shall be electrically continuous throughout forming completely bonded systems.

The Contractor shall test every complete final circuit earth loop impedance comprising of conduits, conductors, transformer windings and the general mass of the earth.

16450-5 BONDING OF METAL WORK

The Contractor shall make provision to ensure that extraneous conductive parts which are simultaneously accessible to other conductive parts, are bonded to ensure that in the event of an earth fault, the voltages between all simultaneously accessible parts are of such magnitude and duration as not to cause danger.

Where necessary, supplementary equipotential bonding shall be provided. In areas where the system of wiring is concealed, the supplementary bonding conductor shall also be concealed up to the point of termination.

END OF SECTION

SECTION 16480

MISCELLANEOUS ELECTRICAL EQUIPMENT

16480-1 SWITCHES

Switches, isolators, switch fuses, fuse switches and changeover switches shall be metal clad of finish and colour particularly specified, where appropriate. All units shall be of the `on-load' air break insulated type. All metal clad switches shall have undrilled detachable end plates or knock outs.

The covers of all metal clad switch units shall have solid hinges and the free end of the cover shall be provided with a suitable locking device.

Switches shall be fully interlocked and contacts shall be hard drawn copper or copper alloy as applicable with fixed contacts fully shrouded.

On/off indication shall be provided for all metal clad switches which shall be lockable in the off position.

16480-2 CONTACTORS

Contactors shall be contained within metal clad enclosures and be of the continuously rated pattern as required by the particular duty. Each contactor shall be fitted with a minimum of one normally open and one normally closed auxiliary contact.

All contactor coils, unless otherwise specified, shall be suitable for operation from a single phase AC supply. The coil shall be fed through a rectifier (one per coil) with a separate protective device for the control circuit.

16480-3 RESIDUAL CURRENT DEVICE

Unless otherwise specified, residual current devices shall have a 30 mA residual operating current and shall incorporate protection features to ensure that pulsating DC fault currents do not affect the operation of the unit. Operating time shall not exceed 40 ms. at a residual operating current of 150 mA.

16480-4 CAPACITOR BANKS AND AUTOMATIC CONTROLLERS

a) Ratings

The unit shall have at least the following characteristics:

- Type — Dry type dielectric, Self-healing and Non-Flammable integral discharge resistor
- Rated voltage — 3 phases, 400 V

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- Rated frequency 50 Hz.
- Switch step As shown on Drawing
- Power loss Less than 0.5 watt/kVAR
- Overvoltage 1.1 Un
- Overcurrent 1.5 In
- Control Voltage 220-230 V
- Ambient Temperature - 20^{o} to 40^{o} C

b) Design

The capacitor unit shall be individual capacitors assembled together in the quantity as required by the switching steps, mounted together with the controller on the mounting plate and installed in the switchboard. The controller shall be at least equipped with the following:

1) Cable size shall be at least 1.35 times of maximum capacitance current.

2) Circuit breaker protection shall be of capacity not less than 1.35 times of rated capacitor current.

3) Reactive power regulator, electronic type.

4) Contactor, heavy duty type shall be capacitor switching rating but not less than 1.35 times of rated capacitor current.

5) Automatic/manual switching device.

6) Indicator lamps.

The capacitor banks shall be designed so that alteration or addition of the capacitor in the future will not affect the system. If the capacitor banks are not installed in the low voltage switchgear and installed in separate cubicle, the enclosure shall be of the same design as the main distribution and as the manufacturer's recommendation. The capacitor bank shall be designed to avoid the resonant harmonic frequency.

c) Test

The unit shall be installed as recommended and certified by the manufacturer.

16480-5 MOTOR CONTROL CENTERS

16480-5.1 General Requirement

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This provision covers the design and construction of motor control centre of floor or wall mounting type.

16480-5.2 Ratings of Equipment in Motor Control Centre

If the ratings of the equipment in the motor control centre are not specified on the Drawings and in this Specification, these shall be provided and complied with NEMA, ANSI, IEC, or VDE standard.

The ratings of the equipment shall be as follows:

Rates voltage	:	400V/230V 3-Phase, 4-Wire (Solid grounded neutral)
Rated Frequency	:	50 Hz
Rated Current	:	Shall be submitted by the Contractor
Rated Power Frequency Withstand Voltage Test (50 Hz x 1 min.)	:	2.5 KV rms.

16480-5.3 The Construction of Motor Control Center

(a) Motor control center shall consist of one or more vertical sections bolted together to form a rigid construction. The vertical section shall be made of sheet steel minimum thickness of 2 mm. Each vertical section shall consist of four compartments, via compartment, and each compartment shall be separated by sheet steel barrier.

(b) Each control unit compartment shall be the combination of starter, circuit breaker and the drawout type other accessories for each motor. The unit shall be completely enclosed and insolated from all other units. Unit side plates shall be permanently attached so much so that it can not be accidentally discarded. Each unit shall have a single door mounted on removable pin hinges. Each door shall be provided with a removable panel suitable for mounting push button, select or switches and pilot lamp. The door of each control unit and drawout carriage unit shall be interlocked so that it cannot be opened while the circuit breaker is in "on" position.

(c) Efficient vent opening shall be provided on the panel. The opening shall be screened so as to be insect-proof.

(d) Each panel shall undergo a treatment of degreasing and derusting by electro-galvanized or other equivalent method for anti-rust and shall be coated by an oven-baked enamel paint finished.

(f) Plastic nameplate with engraved letters of at least 3 mm thick shall be placed at ever circuit breaker and starter indicating their uses.

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(g) Mimic bus diagram shall be applied for each motor control centre.

(h) The panel shall have heaters with thermostat to avoid condensation of moisture inside the panel.

16480-5.4 Circuit Breakers

(a) All circuit breakers shall comply with NEMA, or JIS or IEC standard and shall be manually operated, trip-free.

(b) Main circuit breaker shall be equipped with the following protection devices:

- Over current and short circuit protection
- Phase sequence protection
- Over and under voltage protection
- Time delay relay
- Ground fault protection.

(c) All circuit breakers shall be equipped with operating handle and pad-locked mechanism.

(d) The rated current and rated breaking capacities shall be submitted by the Contractor. The minimum rupturing capacity of MCB is 6 KA and that of MCCB is 25 KA.

16480-5.5 Motor Starters

(a) Motor starters shall comply with NEMA, IEC standard rating. Motors less than 5 Hp shall have DOL, 5 Hp and up to 15 Hp shall have automatic star-delta starters and starter size greater than 15 Hp and included shall be of reduced voltage starting type.

(b) The thermal or over current trip units shall be hand reset, and a suitable push/button shall be provided on the door of each unit.

(c) At least 2 normally open and 2 normally closed free contacts for both starting and tripping signals shall be provided. These free contacts shall be wired to the terminal blocks for remote indicator.

16480-5.6 Measuring Instrument and Current Transformer

(a) All measuring instruments and current transformers shall comply with IEC or ANSI or JIS standards.

(b) All metering shall be the flush-mounted type with a dimension approximately 96 x 96 mm accuracy class 1.5. The overload capacity is 1.2 times of the normal continuous load, except for motor circuit where

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the overload capacity of ammeter shall be 2 times the normal continuous load. The voltmeters shall be provided with selector switch.

(c) Current transformers shall be the single phase insulated type and can withstand a continuous overload of 20%. The accuracy class of the transformer shall be class 1 for metering winding and class 3 for instrument winding. The insulation of the current transformer shall be of class 600 volts.

16480-5.7 Busbar & Busbar Holder

(a) Busbar shall be of bare copper conductor (purity 98%); the size and amparecity of busbar shall comply with DIN standard.

(b) Busbar Spacing shall comply with NEMA regulation.

(c) Busbar holder shall be of fibreglass reinforced polyester or epoxy resin (flame-proof material) and shall withstand the short-circuit stresses.

(d) Each busbar shall have a colour identification, conforming to the colour coding of the cable.

16480-5.8 Control Wiring

(a) Control wire in the motor control centre shall be flexible annealed copper wire 750V fire retardant insulated.

(b) The size of control wire shall be 1.5 mm^2 for control circuit, fire retardant insulation

(c) All control wiring shall be run in conduit.

(d) Wire marker shall be applied on both ends of the control wiring.

16480-5.9 Installation

(a) All motor control centres shall be installed in accordance with NEC standard and the manufacturer's recommendation.

(b) All metal parts and non-carrying current of motor control centre shall be grounded.

(c) All electrical installation shall comply with NEC standard.

16480-5.10 Testing and Inspection

All motor control centres shall be not only tested at the manufacturing factory but also checked at the site for the follow performances:

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(a) Insulation of all cables

(b) Operating and protecting of the equipment

(c) Grounding

END OF SECTION

SECTION 16551

MARKINGS AND TESTING

16551-1 MARKINGS

The cases of transformers, switches, cabinets, and similar equipment shall be identified by labels stenciled in white oil paint and worded as directed. Terminal marking strips on terminal blocks shall be marked in accordance with the wiring diagrams. A red and white enameled metal sign with the legend "DANGER, HIGH VOLTAGE" both in Bangla and English in letters not less than 10 cm high shall be provided where indicated.

16551-2 TESTS

After the installation of the system is completed, and at such time as the Engineer may direct, the Contractor shall conduct an operating test for approval. The equipment shall be demonstrated to operate in accordance with the requirements of this Specification. The test shall be performed in the presence of the Engineer or his authorized representative. The Contractor shall provide all the necessary instruments and personnel required for the test. The Contractor shall submit in writing to the Engineer on completion of project, the measured ground resistance of the electrical system ground, indicating the location, the resistance and the soil conditions at the time the measurements were made.

END OF SECTION

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SECTION 16670

LIGHTNING PROTECTION

16670-1 GENERAL

The lightning protection installation shall be provided to comply with the relevant standards and shall consist of air terminals, copper tapes, clips, hold fasts, test clamps and earth rods. These shall be mounted to afford a complete protection network. Tapes shall normally be copper unless specified otherwise and they shall be complete with a PVC sheath of appropriate colour to match the structure to which they are attached. Roof tapes need not have a PVC sheath unless they are normally visible or specified as complete with PVC sheaths. Tapes between test clamps and earth electrodes shall always be copper.

A roof network shall be provided to roofs using 25 mm x 3 mm tape. The roof network shall be connected by bare copper 70 sqmm. down conductor terminating on to earth test connections. From the earth test connections a 70 sqmm., bare copper cable shall connect to the earth electrodes. A minimum of one 4000 mm copper earth electrode shall be provided for each earth connection. The earth electrode shall be buried at a minimum distance of 1000 mm from the building. The overall system earth resistance shall in no case exceed 2 ohms. If the earth resistance cannot be obtained by means of a single electrode per air termination, additional electrodes shall be connected in parallel. The terminal head of each electrode shall be located in a concrete inspection chamber.

Copper tapes shall be fixed to roofs and parapets at 1200 mm intervals and walls at 900 mm centres by means of bar type clips and hold fasts. The tape shall be fixed in as a direct line to earth as possible, avoiding sharp bends and turns. Metallic rail plugs shall be used for all fixings. All exposed metalwork shall be connected to the lightning protection system using tape of similar type to that provided for the system.

An earth test clamp shall be provided for each down tape and shall be mounted 1800 mm above ground level. Each test clamp shall consist of a solid gunmetal casting of adequate size to ensure that there is a contact area of 2500 mm^2 between conductors under the clamp. The conductors shall be clamped by set screws with lock nuts, but the screws shall not bear directly on the conductors. The ends of all conductor tapes shall be tinned and where it is necessary to make a joint, the conductors shall be tinned and riveted together.

When an installation is complete, the Contractor shall provide the necessary instruments and carry out continuity and earth resistance tests to the satisfaction of the Engineer.

END OF SECTION

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DRAWINGS

(Enclosed separately supplied by DEC)



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UPDATED FINAL ELECTRICAL DESIGN DRAWINGS

31 JULY 2020

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LIST OF ELECTRICAL DRAWINGS (1)

NO.	DRAWING NO.	DESCRIPTION	REV.	REMARK
		GENERAL		
1	MHB-EE-00-001	LIST OF ELECTRICAL DRAWINGS (1)	C	31/07/2020
2	MHB-EE-00-002	LIST OF ELECTRICAL DRAWINGS (2)	C	31/07/2020
3	MHB-EE-00-003	SYMBOL & ABBREVIATION	B	31/08/2018
4	MHB-EE-00-004	GENERAL NOTE	A	31/08/2018
5	MHB-EE-00-005	LIGHTING FIXTURE SCHEDULE	A	31/08/2018
		STANADARD		
6	MHB-EE-00-006	TYPICAL DETAIL (1)	A	31/08/2018
7	MHB-EE-00-007	TYPICAL DETAIL (2)	A	31/08/2018
8	MHB-EE-00-008	TYPICAL DETAIL (3)	A	31/08/2018
9	MHB-EE-00-009	TYPICAL DETAIL (4)	A	31/08/2018
10	MHB-EE-00-010	TYPICAL DETAIL (5)	A	31/08/2018
11	MHB-EE-00-011	TYPICAL DETAIL (6)	A	31/08/2018
12	MHB-EE-00-012	TYPICAL DETAIL (7)	A	31/08/2018
13	MHB-EE-00-013	TYPICAL DETAIL (8)	A	31/08/2018
14	MHB-EE-00-014	TYPICAL DETAIL (9)	A	31/08/2018
15	MHB-EE-00-015	TYPICAL DETAIL (10)	A	31/08/2018
		HOTEL BUILDING		
16	MHB-EE-01-001	ELECTRICAL SINGLE LINE DIAGRAM (1)	E	31/07/2020
17	MHB-EE-01-002	ELECTRICAL SINGLE LINE DIAGRAM (2)	E	31/07/2020
18	MHB-EE-01-003	ELECTRICAL SINGLE LINE DIAGRAM (3)	E	31/07/2020
19	MHB-EE-01-004	ELECTRICAL SINGLE LINE DIAGRAM (4)	E	31/07/2020
20	MHB-EE-01-005	ELECTRICAL SINGLE LINE DIAGRAM (5)	A	31/07/2020
21	MHB-EE-01-006	ELECTRICAL SINGLE LINE DIAGRAM (6)	A	31/07/2020
22	MHB-EE-01-007	ELECTRICAL SINGLE LINE DIAGRAM (7)	A	31/07/2020
23	MHB-EE-01-008	ELECTRICAL SINGLE LINE DIAGRAM (8)	A	31/07/2020
24	MHB-EE-01-011	ELECTRICAL RISER DIAGRAM	D	31/07/2020
25	MHB-EE-01-021	EARTHING SYSTEM SCHEMATIC DIAGRAM	C	29/05/2020
26	MHB-EE-01-031	MAIN INCOMMING ROUTING FOR HIGH VOLTAGE SYSTEM	C	29/05/2020
27	MHB-EE-02-001	LIGHTING SYSTEM PLAN – BASEMENT 3	D	31/07/2020
28	MHB-EE-02-002	LIGHTING SYSTEM PLAN – BASEMENT 2	D	31/07/2020
29	MHB-EE-02-003	LIGHTING SYSTEM PLAN – BASEMENT 1	D	31/07/2020
30	MHB-EE-02-004	LIGHTING SYSTEM PLAN – LEVEL 1	D	31/07/2020
31	MHB-EE-02-005	LIGHTING SYSTEM PLAN – LEVEL 2	D	31/07/2020
32	MHB-EE-02-006	LIGHTING SYSTEM PLAN – LEVEL 2M	D	31/07/2020
33	MHB-EE-02-007	LIGHTING SYSTEM PLAN – LEVEL 3	D	31/07/2020

NO.	DRAWING NO.	DESCRIPTION	REV.	REMARK
		HOTEL BUILDING		
34	MHB-EE-02-008	LIGHTING SYSTEM PLAN – LEVEL 4 AND LEVEL 4M	D	31/07/2020
35	MHB-EE-02-009	LIGHTING SYSTEM PLAN – LEVEL 5 AND LEVEL 5M	D	31/07/2020
36	MHB-EE-02-010	LIGHTING SYSTEM PLAN – LEVEL 6	D	31/07/2020
37	MHB-EE-02-011	LIGHTING SYSTEM PLAN – LEVEL 7-21 AND LEVEL 22-23	D	31/07/2020
38	MHB-EE-02-012	LIGHTING SYSTEM PLAN – LEVEL 24 AND LEVEL 25	D	31/07/2020
39	MHB-EE-02-013	LIGHTING SYSTEM PLAN – LEVEL 26	D	31/07/2020
40	MHB-EE-02-014	LIGHTING SYSTEM PLAN – ROOF AND LMR ROOF	D	31/07/2020
41	MHB-EE-03-001	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – BASEMENT 3	D	31/07/2020
42	MHB-EE-03-002	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – BASEMENT 2	D	31/07/2020
43	MHB-EE-03-003	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – BASEMENT 1	D	31/07/2020
44	MHB-EE-03-004	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 1	D	31/07/2020
45	MHB-EE-03-005	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 2	D	31/07/2020
46	MHB-EE-03-006	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 2M	D	31/07/2020
47	MHB-EE-03-007	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 3	D	31/07/2020
48	MHB-EE-03-008	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 4 AND LEVEL 4M	D	31/07/2020
49	MHB-EE-03-009	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 5 AND LEVEL 5M	D	31/07/2020
50	MHB-EE-03-010	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 6	D	31/07/2020
51	MHB-EE-03-011	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 7-21 AND LEVEL 22-23	D	31/07/2020
52	MHB-EE-03-012	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 24 AND LEVEL 25	D	31/07/2020
53	MHB-EE-03-013	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 26	D	31/07/2020
54	MHB-EE-03-014	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – ROOF	D	31/07/2020
55	MHB-EE-04-001	ELECTRICAL OUTLET PLAN – BASEMENT 3	D	31/07/2020
56	MHB-EE-04-002	ELECTRICAL OUTLET PLAN – BASEMENT 2	D	31/07/2020
57	MHB-EE-04-003	ELECTRICAL OUTLET PLAN – BASEMENT 1	D	31/07/2020
58	MHB-EE-04-004	ELECTRICAL OUTLET PLAN – LEVEL 1	D	31/07/2020
59	MHB-EE-04-005	ELECTRICAL OUTLET PLAN – LEVEL 2	D	31/07/2020
60	MHB-EE-04-006	ELECTRICAL OUTLET PLAN – LEVEL 2M	D	31/07/2020
61	MHB-EE-04-007	ELECTRICAL OUTLET PLAN – LEVEL 3	D	31/07/2020
62	MHB-EE-04-008	ELECTRICAL OUTLET PLAN – LEVEL 4 AND LEVEL 4M	D	31/07/2020
63	MHB-EE-04-009	ELECTRICAL OUTLET PLAN – LEVEL 5 AND LEVEL 5M	D	31/07/2020
64	MHB-EE-04-010	ELECTRICAL OUTLET PLAN – LEVEL 6	D	31/07/2020
65	MHB-EE-04-011	ELECTRICAL OUTLET PLAN – LEVEL 7-21 AND LEVEL 22-23	D	31/07/2020
66	MHB-EE-04-012	ELECTRICAL OUTLET PLAN – LEVEL 24 AND LEVEL 25	D	31/07/2020
67	MHB-EE-04-013	ELECTRICAL OUTLET PLAN – LEVEL 26	D	31/07/2020
68	MHB-EE-04-014	ELECTRICAL OUTLET PLAN – ROOF	D	31/07/2020

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C	31-07-20	REVISED FINAL DESIGN	DEC				
B	28-02-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

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PROJECT: BENGAL HOTELS AND RESORTS A FIVE STAR HOTEL

TITLE: LIST OF ELECTRICAL DRAWINGS (1)

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chonlatorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-00-001

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[N:\1073_BENGAL HOTEL\Drawings\MHB-EE-00-001.dwg, 31/7/2020 3:34:25 PM, A1, 1:1]

LIST OF ELECTRICAL DRAWINGS (2)

NO.	DRAWING NO.	DESCRIPTION	REV.	REMARK
		HOTEL BUILDING		
69	MHB-EE-06-001	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – ROOF AND LMR ROOF	C	29/05/2020
70	MHB-EE-06-002	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 26	C	29/05/2020
71	MHB-EE-06-003	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 10, 14,18 AND LEVEL 22	C	29/05/2020
72	MHB-EE-06-004	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 6	C	29/05/2020
73	MHB-EE-06-005	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 3	C	29/05/2020
74	MHB-EE-06-006	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 2M	C	29/05/2020
75	MHB-EE-06-007	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 2	C	29/05/2020
76	MHB-EE-06-008	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 1	C	29/05/2020
77	MHB-EE-06-101	EQUIPMENT AND EARTHING SYSTEM LAYOUT FOR HV, TRANSFORMER AND GENERATOR ROOM	E	31/07/2020
78	MHB-EE-06-102	EQUIPMENT AND EARTHING SYSTEM LAYOUT FOR MDB ROOM	C	29/05/2020
79	MHB-EE-07-001	PANEL SCHEDULE (1)	D	31/07/2020
80	MHB-EE-07-002	PANEL SCHEDULE (2)	D	31/07/2020
81	MHB-EE-07-003	PANEL SCHEDULE (3)	C	31/07/2020
82	MHB-EE-07-004	PANEL SCHEDULE (4)	C	31/07/2020
83	MHB-EE-07-005	PANEL SCHEDULE (5)	C	31/07/2020
84	MHB-EE-07-006	PANEL SCHEDULE (6)	C	31/07/2020
85	MHB-EE-07-007	PANEL SCHEDULE (7)	C	31/07/2020
86	MHB-EE-07-008	PANEL SCHEDULE (8)	C	31/07/2020
87	MHB-EE-07-009	PANEL SCHEDULE (9)	C	31/07/2020
88	MHB-EE-07-010	PANEL SCHEDULE (10)	C	31/07/2020
89	MHB-EE-07-011	PANEL SCHEDULE (11)	C	31/07/2020
90	MHB-EE-07-012	PANEL SCHEDULE (12)	C	31/07/2020
91	MHB-EE-07-013	PANEL SCHEDULE (13)	C	31/07/2020
92	MHB-EE-07-014	PANEL SCHEDULE (14)	C	31/07/2020
93	MHB-EE-07-015	PANEL SCHEDULE (15)	C	31/07/2020
94	MHB-EE-07-016	PANEL SCHEDULE (16)	C	31/07/2020
95	MHB-EE-07-017	PANEL SCHEDULE (17)	C	31/07/2020
96	MHB-EE-07-018	PANEL SCHEDULE (18)	C	31/07/2020
97	MHB-EE-07-019	PANEL SCHEDULE (19)	C	31/07/2020
98	MHB-EE-07-020	PANEL SCHEDULE (20)	C	31/07/2020
99	MHB-EE-07-021	PANEL SCHEDULE (21)	C	31/07/2020
100	MHB-EE-07-022	PANEL SCHEDULE (22)	C	31/07/2020

NO.	DRAWING NO.	DESCRIPTION	REV.	REMARK
		HOTEL BUILDING		
101	MHB-EE-07-023	PANEL SCHEDULE (23)	C	31/07/2020
102	MHB-EE-07-024	PANEL SCHEDULE (24)	C	31/07/2020
103	MHB-EE-07-025	PANEL SCHEDULE (25)	C	31/07/2020
104	MHB-EE-07-026	PANEL SCHEDULE (26)	C	31/07/2020
105	MHB-EE-07-027	PANEL SCHEDULE (27)	C	31/07/2020

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PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: LIST OF ELECTRICAL DRAWINGS (2)

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chonlatorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-00-00-002

Dhaka

Plotted: Jul 31, 2020 – 3:34pm
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ELECTRICAL : LIGHTING & POWER

SYMBOL

F / a	LIGHTING FIXTURE, CAPITAL LETTER 'F' INDICATES TYPE OF FIXTURE 'a' DENOTES SWITCHING OCCUPATION
○	DOWNLIGHT LUMINAIRE
⊢○	WALL MOUNTED LUMINAIRE
▽	FLOOD LIGHT LUMINAIRE
⊗	OBSTRUCTION LIGHT
	SELF – CONTAINED SEALED LEAD ACID BATTERY EMERGENCY LIGHT
	EMERGENCY REMOTE LIGHT
EX	EXIT SIGN LUMINAIRE, WALL MOUNTED
EX	EXIT SIGN LUMINAIRE, CEILING MOUNTED (SINGLE SIDE)
EX	EXIT SIGN LUMINAIRE, CEILING MOUNTED (DOUBLE SIDE)
Sa	WALL LIGHTING SWITCH 16A 1WAY 250V SUFFIX 'a' DENOTES LIGHTING FIXTURE TO BE CONTROLLED
S_2	WALL LIGHTING SWITCH 16A. 2 WAY 250V.
S_F	WALL MOUNTED EXHAUST FAN SWITCH 16A 1 WAY 250V WITH NEON LIGHT
D	DIMMER SWITCH RATING AS INDICATED
M	OCCUPANCY SENSOR FOR CORRIDOR (360° 24m. DIAMETER WITH DELAY TIME SETTING)
Ⓜ	OCCUPANCY SENSOR FOR TOILET (360° 7m. DIAMETER WITH DELAY TIME SETTING)
⊖	SINGLE RECEPTACLE OUTLET 13A , 2P+G , 250V WALL MOUNTED
⊖	DUPLEX RECEPTACLE OUTLET 13A , 2P+G , 250V
	FLOOR MOUNTED DUPLEX RECEPTACLE OUTLET 13A 2P+G 250V ,
	WALL MOUNTED POWER OUTLET 400/230V , 3P+N+G OR 230V 2P+G , AMPERE RATING AS INDICATED
	NORMAL MAIN DISTRIBUTION BOARD (MDB) OR NORMAL DISTRIBUTION BOARD (DB)
	ESSENTIAL MAIN DISTRIBUTION BOARD (EMDB) OR ESSENTIAL DISTRIBUTION BOARD (EDB)
	NORMAL BRANCH DISTRIBUTION BOARD (BDB)
	ESSENTIAL BRANCH DISTRIBUTION BOARD (EBDB)
MCC	MOTOR CONTROL CENTER
	NON–FUSE SAFETY SWITCH, RATING AS INDICATED
	SAFETY SWITCH WITH FUSE, RATING AS INDICATED
BDB1–1,3	HOMERUN TO BRANCH DISTRIBUTION BOARD , 'BDB1' CIRCUIT NO.1,3 NUMBER OF ARROW HEADS INDICATES NUMBER OF CIRCUITS AND NUMBER OF CROSS LINES INDICATES NUMBER OF WIRES IN CONDUIT
	WIRING IN STEEL CONDUIT CONCEALED IN WALL , IN FLOOR , OR IN CEILING
	WIRING IN STEEL CONDUIT EXPOSED
	WIRING IN STEEL CONDUIT UNDERGROUND UNLESS OTHERWISE INDICATED
—G—	GROUNDING CONTINUITY CONDUCTOR
	FLEXIBLE CONDUIT
	CONDUIT UP
	CONDUIT DOWN
P	PULL BOX
J	JUNCTION BOX
	AIR TERMINAL , SOLID COPPER ROD SIZE AS INDICATED
⊙	GROUND ROD , COPPER ø12.7MM. x 3330MM. LONG
T	GROUND TEST BOX
	GROUND PIT
	GROUND BAR

	CONDUCTOR GOING UPWARDS
	CONDUCTOR GOING DOWNWARDS
	CONDUCTOR PASSING THROUGH VERTICALLY
	GROUNDING
M	ELECTRIC MOTOR
	EXHAUST FAN WALL OR CEILING MOUNTED
	MOLDED CASE OR MINIATURE CIRCUIT BREAKER TYPE AS INDICATED
	AIR CIRCUIT BREAKER DRAW – OUT TYPE
	HRC FUSE
⊗	INDICATOR LAMP
	CURRENT TRANSFORMER
V	VOLT METER
A	AMMETER
VS	VOLT METER SELECTOR SWITCH
AS	AMMETER SELECTOR SWITCH
PFC	POWER FACTOR CONTROLLER
SPD	SURGE PROTECTION DEVICE
DM	DIGITAL POWER METER
	DROP OUT FUSE
	LIGHTNING ARRESTER
	DISCONNECTOR
	LOAD BREAK SWITCH
	CIRCUIT BREAKER
Δ / Y	TRANSFORMER
G	GENERATOR SET

ABBREVIATION

A	AMPERE
ACB	AIR CIRCUIT BREAKER
AT	AMPERE TRIP
AF	AMPERE FRAME
AFF	ABOVE FINISHED FLOOR
ATS	AUTOMATIC TRANSFER SWITCH
A/C	AIR CONDITIONING
ACU	AIR CONDITIONING UNIT
BC	BARE CONDUCTOR
CB	CIRCUIT BREAKER
C	CONDUIT
CKT	CIRCUIT
CT	CURRENT TRANSFORMER
CU	CONDENSING UNIT
C/W	COMPLETE WITH
DF	DEMAND FACTOR
DWG	DRAWING
E	EMERGENCY
EF	EXHAUST FAN
EL	EMERGENCY LIGHT
FA	FIRE ALARM
FCP	FIRE ALARM CONTROL PANEL
FCU	FAN COIL UNIT
FD	FLAME RETARDANT CABLE (LOW SMOKE & HALOGEN FREE)
FP	FIRE PUMP
FR	FIRE RESISTANT CABLE
FL	FLOOR
FS	FLOW SWITCH
G	GROUND
MV	MEDIUM VOLTAGE
IC	INTERRUPTING CAPACITY
JB	JUNCTION BOX
JP	JOCKEY PUMP
LV	LOW VOLTAGE
LTG	LIGHTING
MCB	MINIATURE CIRCUIT BREAKER
MCCB	MOLDED CASE CIRCUIT BREAKER
MDB	MAIN DISTRIBUTION BOARD
MCC	MOTOR CONTROL CENTER
MTD	MOUNTED
MTG	MOUNTING
MI	MINERAL INSULATED CABLE
MIN.	MINIMUM
MAX.	MAXIMUM
N	NEUTRAL
NIC	NOT IN THE CONTRACT
P	POLE
PH	PHASE
RMU	RING MAIN UNIT
SPD	SURGE PROTECTIVE DEVICE
TR	TRANSFORMER
TYP	TYPICAL
VF	VENTILATION FAN
W	WATT OR WIRE
W/	WITH

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BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
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REV. NO.	DATE	DESCRIPTION	BY
B	31–07–20	REVISED FINAL DESIGN	DEC
A	31–08–18	FINAL DESIGN	DEC
–	15–07–18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
SYMBOL & ABBREVIATION

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chonintorn
DATE :	31–08–2018
SCALE :	AS SHOWN
PROJECT NO.	113073
DWG.NO.	MHB-EE-00-003

Deltadesh Pvt. Ltd. Dhaka

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GENERAL NOTES

1. GENERAL

1. ALL ELECTRICAL WORKS SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING APPLICABLE CODES AND REGULATIONS :–
   1) BANGLADESH NATIONAL BUILDING CODE (BNBC)
   2) INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)
   3) BRITISH STANDARD (BS)
2. ALL BRANCH CIRCUIT WIRINGS SHALL BE RUN IN GALVANIZED STEEL CONDUITS
   1) WIRING CONCEALED IN CEILING SHALL BE ENCLOSED IN ELECTRICAL METALLIC TUBING. (E.M.T.)
   2) WIRING EXPOSED ON WALL OR CEILING SHALL BE IN INTERMEDIATE METAL CONDUIT. (I.M.C.)
   3) WIRING EMBEDDED IN CONCRETE SLAB SHALL BE IN INTERMEDIATE METAL CONDUIT (I.M.C.) OR IN RIGID STEEL CONDUIT (RSC) UNLESS OTHERWISE NOTED ON THE DRAWINGS.
3. THE LOCATION OF LIGHTING FIXTURES/SWITCHES/RECEPTACLES/DISTRIBUTION BOARD , ETC. ARE INDICATIVE ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE TO CHECK AND CONFIRM THE EXACT LOCATION WITH PHASING ON SITE PRIOR TO COMMENCEMENT OF WORK.
4. TEMPORARY OPENING IN CONDUITS SHALL BE PLUGGED OR CAPPED TO PREVENT INGRESS OF MOISTURE AND FOREIGN MATTERS DURING THE CONSTRUCTION.
5. CONDUITS SHALL BE SUPPORTED AT EVERY 3.00 METERS AND WITHIN 900 MM. OF EACH OUTLET BOX, JUNCTION BOX, CABINET, OR FITTINGS.
6. CONDUIT SHALL BE KEPT AT LEAST 300 MM. FROM STEAM OR OTHER HOT LINES WHERE CROSSINGS ARE UNAVOIDABLE. CONDUIT SHALL BE KEPT AT LEAST 150 MM. FROM INSULATION OF PIPES.
7. ALL CONDUIT RUNS UNDERGROUND SHALL BE HIGH DENSITY POLYETNYLENE (HDPE) PN6 AND HAVE A MINIMUM SIZE OF ø25 MM.
8. ALL OPENING, SLEEVES, AND SHAFTS BETWEEN FLOOR FOR LIGHTING AND POWER CABLES SHALL BE SEALED WITH FIRE RESISTANT MATERIAL OR CHEQUERED PLATE TO THE APPROVAL OF AUTHORITIES / ENGINEER
9. ALL CIRCUITS MUST BE PROVIDED WITH GROUNDING CONTINUITY CONDUCTORS HAVING THEIR SIZES COMPLYING WITH THE LOCAL REGULATIONS AND PROPERLY LABELLED IN ACCORDANCE WITH ITS CIRCUITS CONNECTED.
10. WHERE SWITCH BOXES CONTAIN MORE THAN ONE PHASE, APPROVED PHASE BARRIER SWITCH BOXES WITH A LABEL SHALL BE PROVIDED
11. THE CONTRACTOR SHALL BE RESPONSIBLE TO LIAISE WITH LOCAL AUTHORITY FOR ALL CLEARANCE, TESTING, & METERING FOR THE INSTALLATION.
12. SHOP DRWINGS SHALLL BE SUBMITTED TO THE ENGINEERS FOR APPROVAL PRIOR TO COMMENCEMENT OF WORK.
13. WIREWAY SHALL BE INSTALLED FOR EXPOSSED WORK AND CAN ACCESS FOR MAINTENANCE
14. FIRE RESISTANCE CABLE AND FLAME RETARDANT CABLE SHALL BE COMPLIED WITH THE LOCAL REGULATIONS OR AS SPECIFIED

2. LIGHTING AND RECEPTACLE SYSTEM

1. THE DRAWINGS WILL GENERALLY BE DIAGRAMMATIC THE LOCATION OF LIGHTING FIXTURES & RECEPTACLES MAY BE VARIED SLIGHTLY FROM THE DRAWING TO AVOID INTERFERENCES EXCEPT FOR REFLECTED CEILING & INTEGRATED CEILING PLANS. THE EXACT LOCATION OF FIXTURE SHALL BE DETERMINDED ON SITE
2. EXPOSED CONDUIT SHALL BE RUN EITHER PERPENDICULAR OR PARALLEL TO ADJACENT STRUCTURE OF BUILDING IN A WORKMANSHIP MANNER.
3. MOUNTING HEIGHT OF SWITCHES RECEPTACLE , AND LIGHTING FIXTURES SHALL BE KEPT AS FOLLOWS :–
   1) SWITCHES _____ 1.30 MM. ABOVE FLOOR TO TOP. OF SWITCH
   2) RECEPTACLE _____ 300 MM. ABOVE FLOOR TO TOP. OF RECEPTACLE
   3) LIGHTING FIXTURES _____ AS SHOWN ON DRAWINGS.
4. MINIMUM SIZE OF CONDUCTORS SHALL BE AS FOLLOWS :–
   1) LIGHTING CIRCUITS 2.5 SQ.MM.
   2) RECEPTACLE CIRCUITS 4 SQ.MM.

   ANY HOMERUNS GREATER THAN 30 METERS FROM THE PANEL SHALL BE 6 SQ.MM.
5. ALL EXIT SIGNAGE AND EMERGENCY BATTERY OPERATED LIGHTING FIXTURES SHALL BE WIRED DIRECTED FROM THE LIGHTING DISTRIBUTION BOARD AND SHALL NOT BE SWITCHED.

3. POWER SYSTEM

1. POWER AND CONTROL CABLE SHALL BE AS FOLLOWS. :–
   1) COPPER CONDUCTOR, 450/750 V. PVC. INSULATED (BYA) FOR LOW VOLTAGE POWER CABLE, INSIDE BUILDING.
   2) COPPER CONDUCTOR, 450/750 V. PVC INSULATED PVC SHEATHED (NYY) FOR LOW VOLTAGE POWER CABEL. OUTSIDE BUILDING.
   3) COPPER CONDUCTOR, 450/750 V. PVC. INSULATED (BYA) FOR CONTROL CABLE.
   4) COPPER CONDUCTOR 0.6/ 1 KV CROSS–LINKED POLYETHYLENE INSULATED PVC SHEATH (XLPE) FOR FEEDER AND POWER CABLE OUTSIDE BUILDING (IEC 60502)
2. MINIMUM SIZE OF CONDUCTOR SHALL BE AS FOLLOWS :–
   1) POWER CABLE 2.5 SQ.MM.
   2) CONTROL CABLE 1.5 SQ.MM. (UP TO 150 M.)
   3) MOTOR CABLE 4 SQ.MM.
3. MOUNTING HEIGHT OF ELECTRICAL EQUIPMENT SHALL BE AS FOLLOWS :–
   1) SAFETY SWITCH & MOTOR STARTER _____ 1.80 M. ABOVE FLOOR TO TOP. OF SWITCH OR STARTER BOARD
   2) WALL MOUNTED DISTRIBUTION BOARD_____ 1.80 M. ABOVE FLOOR TO TOP. OF RECEPTACLE
4. WHEN A LENGTH OF CABLE IS CUT FROM THE REEL, THE CABLE END ON THE REEL SHALL BE SEALED TO PREVENT INGRESS OF MOISTURE.
5. ALL POWER CABLE AND BUSBARS SHALL BE COLOR CODED AS FOLLOWS :–
   PHASE A_____ BROWN
   PHASE B_____ BLACK
   PHASE C_____ GREY
   NEUTRAL _____ BULE
   GROUND _____ YELLOW / GREEN. BI–COLOUR
6. ALL CABLES AND WIRES SHALL BE TAGGED AT BOTH ENDS WITH THE APPROPRIATE NUMBER USING A METHOD APPROVED BY THE ENGINEER ON CABLES AND BRADY TYPE ADHESIVE ALPHANUMERIC TAGGING WITH THE COMPLETE WIRE DESIGNATION FOR EACH INDIVIDUAL CONDUCTOR.

4. GROUNDING SYSTEM

1. STRANDED COPPER PVC INSULATED CABLE SHALL BE USED FOR THE ABOVEGROUND AND UNDERGROUND GROUNDING SYSTEM UNLESS OTHERWISE INDICATED.
2. ALL CONNECTIONS FOR GROUNDING AND LIGHTNING PROTECTION SYSTEM SHALL BE MADE BY EXOTHERMIC WELDING EXCEPT OTHERWISE SPECIFIED.
3. ALL STEEL STRUCTURES, PIPING AND NON–CURRENT CARRYING METAL PARTS OF EQUIPMENT SHALL BE BONDED TOGETHER AND PERMANENTLY GROUNDED.
4. GROUND CONNECTIONS OF ELECTRICAL EQUIPMENT ENCLOSURES, STEEL STRUCTURES, VESSELS, TANKS, ETC. SHALL BE MADE BY COMPRESSION TYPE TERMINAL.
5. GROUND RODS SHALL BE MADE OF ø12.7MM. x 3.33M. LONG COPPER.
6. THE ELECTRICAL CONTINUITY OF METAL ENCLOSURES FOR ELECTRICAL EQUIPMENT INCLUDING CONDUIT AND WIREWAYS SHALL BE ASSURED BETWEEN ENCLOSURES AND GROUND.
7. CABLE TRAY SHALL BE BONDED AT EACH SECTION WITH A COPPER BONDING JUMPER.
8. PROVIDE GROUNDING JUMPER FOR EVERY WIRING DROPS FROM CABLE TRAY TO CONDUIT.

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PROJECT:
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A FIVE STAR HOTEL

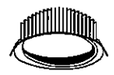
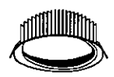
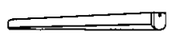
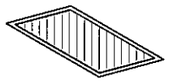
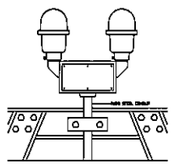
TITLE:
GENERAL NOTE

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chanintorn
DATE :	31–08–2018	SCALE	AS SHOWN
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DWG.NO.	MHB–EE–00–0004		

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CADD/SURASAK

LIGHTING FIXTURE DETAILS

TYPE	CONFIGURATION	LAMP	DESCRIPTION
D1		8W LED COOL WHITE (≥600 LUMENS)	RECESSED DOWNLIGHT DIE CAST ALUMINIUM HOUSING COMPLETE WITH HIGH GRADE ALUMINIUM REFLECTOR AND TRANSLUCENT DIFFUSER
D2		16W LED COOL WHITE (≥1200 LUMENS)	RECESSED DOWNLIGHT DIE CAST ALUMINIUM HOUSING COMPLETE WITH HIGH GRADE ALUMINIUM REFLECTOR AND TRANSLUCENT DIFFUSER
F1		38W LED COOL WHITE ≥4000 LUMENS	LED BATTEN LUMINAIRE, SHEET STEEL HOUSING COATED WITH RUSTPROOF PRIMER, WHITE PAINT FINISH AND FROSTED COVER SURFACE MOUNTED.
F2		34W LED COOL WHITE ≥4000 LUMENS	LED WATERPROOF LUMINAIRE, HOUSING AND DIFFUSER MADE OF POLYCARBONATE WITH UV RESISTANT, DUSTPROOF AND WATERPROOF HOUSING, IP 65 PROTECTION CLASS
F3		32W LED COOL WHITE ≥3700 LUMENS	RECESSED LED PANEL, SHEET STEEL HOUSING COATED WITH RUSTPROOF PRIMER, WHITE PAINT FINISH AND PMMA DIFFUSER
F4		32W LED COOL WHITE ≥3700 LUMENS	SURFACE MOUNTED/SUSPENDED LED PANEL, SHEET STEEL HOUSING COATED WITH RUSTPROOF PRIMER, WHITE PAINT FINISH AND PMMA DIFFUSER
OB		LED	LOW INTENSITY RED DOUBLE OBSTRUCTION LIGHT COMPLIANCE TO ICAO ANNEX 14 LOW INTENSITY TYPE B COMPLIANCE TO IMO 2009 MODU CODE (2010) PARAGRAPH 13.5.24&25 ETL CERTIFIED TO FAA AC 150/5345-43G FAA TYPE L-810 ETL CERTIFIED TO UL1598 FOR USE IN WET LOCATIONS BOTH LAMPS OPERATION AT THE SAME TIME (DJ) GROND WIRE INCLUDED AS STANDARD FOR USE ON 220-240VAC, 50/60 HZ INPUT POWER

LIGHTING FIXTURE DETAILS

TYPE	CONFIGURATION	LAMP	DESCRIPTION
–		2 x 9 W LED	WALL MOUNTED SELF-CONTAINED BATTERY EMERGENCY LIGHT, SHEET STEEL HOUSING COMPLETE WITH SEALED LEAD ACID BATTERY (1 HOURS OPERATING DURATION), CHARGER, BATTERY PROTECTION, TESTING SWITCH, AND CHARGING INDICATING LIGHTS
–		2 x 9 W LED	WALL MOUNTED EMERGENCY REMOTE LED LAMP, ELECTRO – GALVANIZED STEEL SHEET WITH EPOXY POWDER AND STOVE ENAMEL
–		9W LED	RECESS MOUNTED EMERGENCY REMOTE LED LAMP, HOUSING MADE OF ELECTRO-GALVANIZED STEEL, EPOXY POWDER COATED AND STOVE ENAMEL
–		10W LED	WALL OR PENDANT MOUNTED SELF-CONTAINED BATTERY ILLUMINATED EXIT SIGN SHEET STEEL HOUSING COMPLETE WITH SEALED LEAD ACID BATTERY (1 HOURS OPERATING DURATION) CHANGER, BATTERY PROTECTION, TESTING SWITCH, AND CHARGING INDICATING LIGHTS

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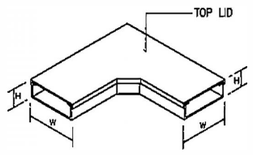
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTING FIXTURE SCHEDULE

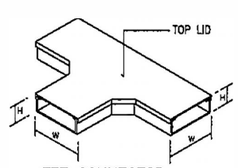
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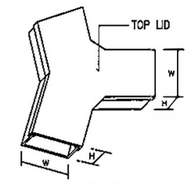
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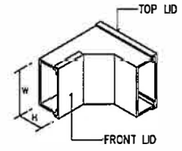
ELBOW CONNECTOR



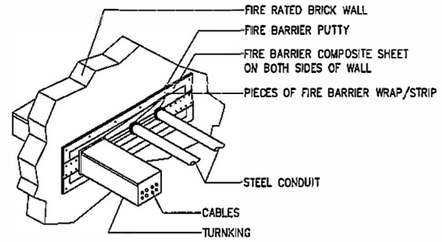
TEE CONNECTOR



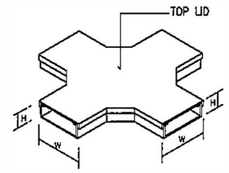
WYE CONNECTOR



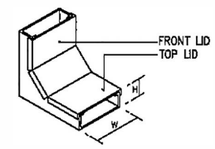
OPEN TOP AND FRONT TYPE



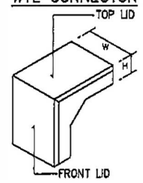
INSTALLATION DETAIL OF RACEWAY THROUGH WALL



CROSS CONNECTOR



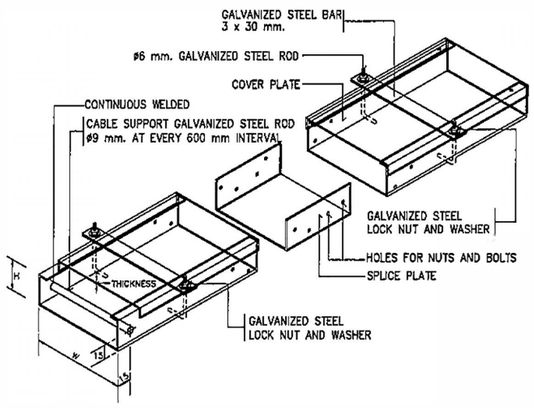
OPEN FRONT TYPE



OPEN TOP AND BACK TYPE

CABLE TRUNKING CONNECTOR

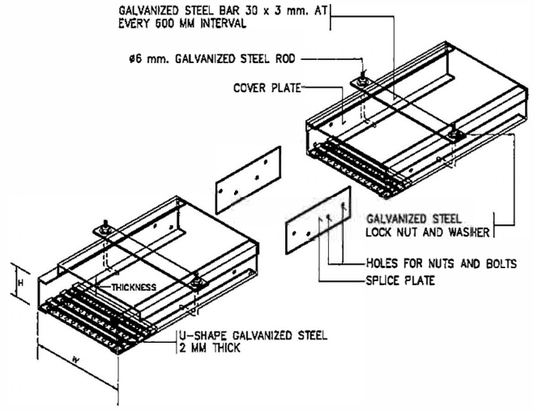
NOTE :
1. ALL RACEWAYS RUN THROUGH THE WALL SHALL BE FILLED WITH 2 HOURS RATED FIRE BARRIER.
2. BOC : BOTTOM OF CONDUIT
3. BOT: BOTTOM OF TRUNKING
4. BOCL : BOTTOM OF CABLE LADDER



SIZE OF TRUNKING (mm.)	W (mm.)	H (mm.)	THICKNESS (mm.)
100 X 50	100	50	1.20
100 X 100	100	100	1.20
150 X 100	150	100	1.20
200 X 100	200	100	1.60

NOTE - TRUNKING AND COVER PLATE SHALL BE GALVANIZED STEEL SHEET WITHOUT PAINTING
- THE LENGTH OF EACH COVER PLATE OF TRUNKING SHALL NOT BE MORE THAN 1200 mm.

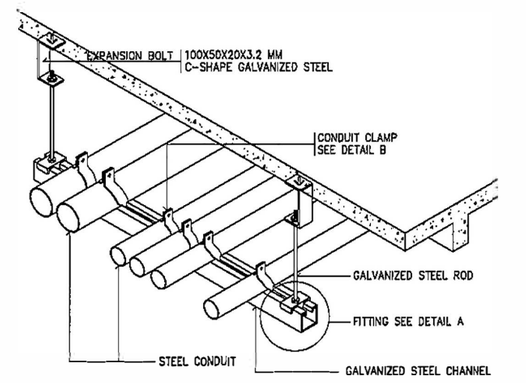
TRUNKING FOR SIZE UP TO 200 X 100 mm

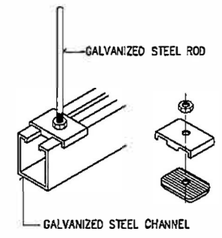


SIZE OF CABLE TRAY (mm.)	W (mm.)	H (mm.)	THICKNESS (mm.)
200 X 100	200	100	1.60
300 X 100	300	100	1.60
400 X 100	400	100	2.00
500 X 100	500	100	2.00
600 X 100	600	100	2.00
700 X 100	700	100	2.00
800 X 100	800	100	2.00
900 X 100	900	100	2.00
1000 X 100	1000	100	2.00

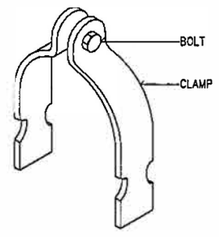
NOTE - CABLE TRAY AND COVER PLATE SHALL BE GALVANIZED STEEL SHEET WITHOUT PAINTING
- THE LENGTH OF EACH COVER PLATE OF CABLE TRAY SHALL NOT BE MORE THAN 1200 mm

CABLE TRAY FOR SIZE 200 X 100 mm OR LARGER





DETAIL A



DETAIL B

INSTALLATION DETAIL OF MULTIPLES CONDUIT SUPPORT

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

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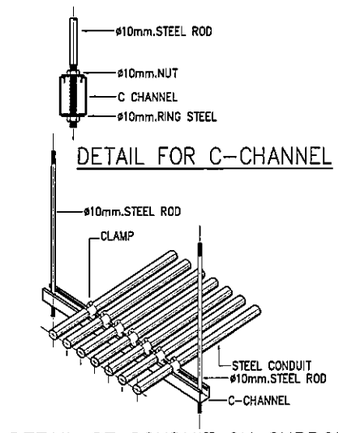
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
TYPICAL DETAIL (1)

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chonlnorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 0 0 - 0 0 6		

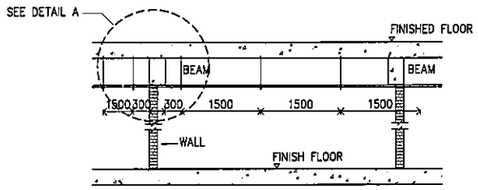
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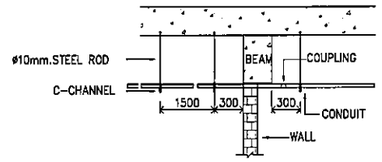


DETAIL FOR C-CHANNEL

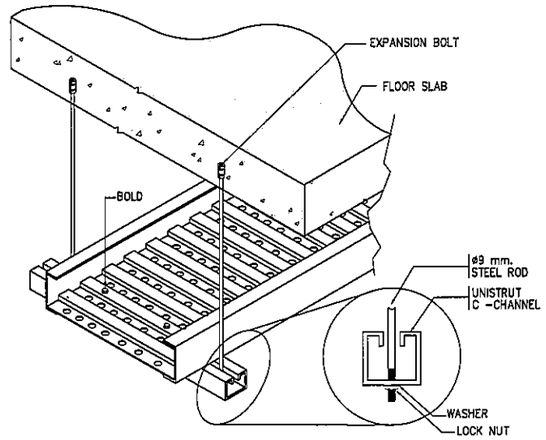
DETAIL OF CONDUIT ON SUPPORT



INSTALLATION OF CONDUIT ON SUPPORT

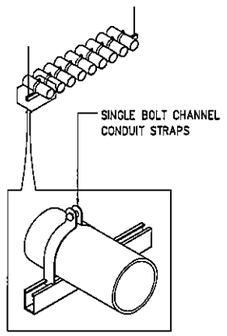


DETAIL 'A'



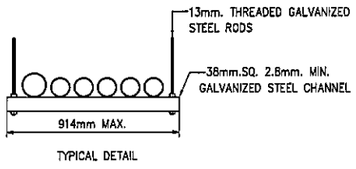
DETAIL OF CABLE TRAY SUPPORT

SCALE N.T.S.



DETAIL-CONDUIT HANGER

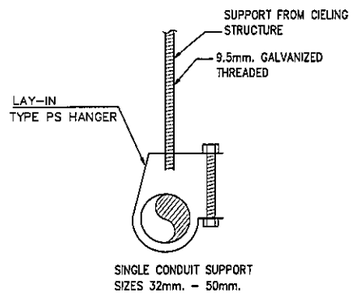
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TYPICAL DETAIL

NOTES:

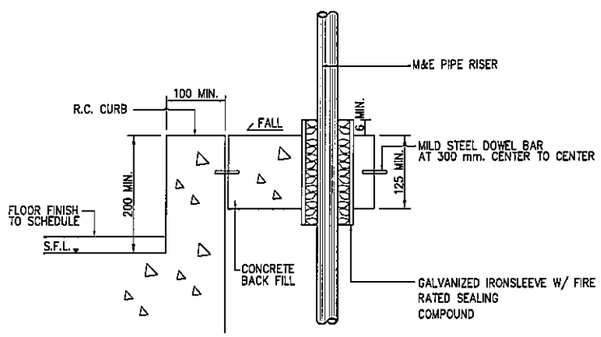
1. CONTRACTOR MAY USE A CONDUIT SUSPENSION SYSTEM EQUIVALENT TO THAT WHICH IS DETAILED, HAVING THE FEATURES SHOWN AND APPROVED IN ADVANCE BY THE RESIDENT ENGINEER.
2. PROVIDE A SAMPLE SUPPORT SYSTEM TO KEEP ON JOB SITE FOR CONSTRUCTION GUIDE PURPOSES.
3. CONDUIT SUSPENSION SYSTEM SHALL BE INDEPENDENT OF ANY OTHER SUSPENSION SYSTEM.



SINGLE CONDUIT SUPPORT
SIZES 32mm. - 50mm.

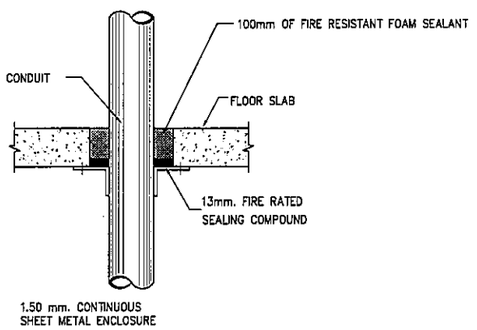
DETAIL OF SINGLE CONDUIT SUPPORT

SCALE NTS.



EXPOSED RISER IN M&E ROOM

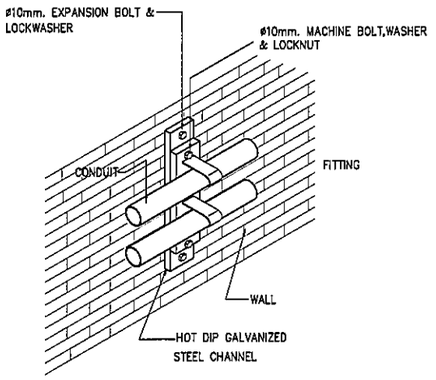
SCALE NTS



1.50 mm. CONTINUOUS
SHEET METAL ENCLOSURE

DETAIL OF CONDUIT FLOOR PENETRATION

SCALE NTS.



DETAIL OF TYPICAL WALL MOUNTING CONDUIT SUPPORT

SCALE NTS.

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BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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A	31-08-18	FINAL DESIGN	DEC				
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DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
281 SOI PRIDI BHANOMYONG 42, SUKHUMVIT 71 ROAD
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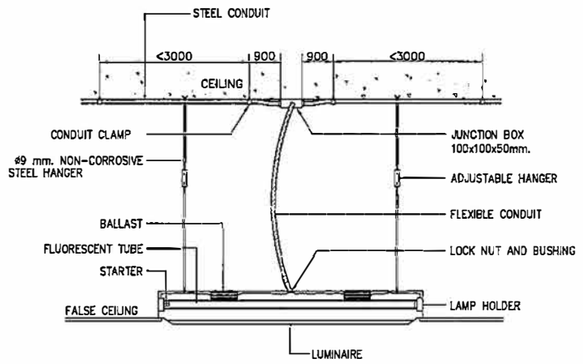
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
TYPICAL DETAIL (2)

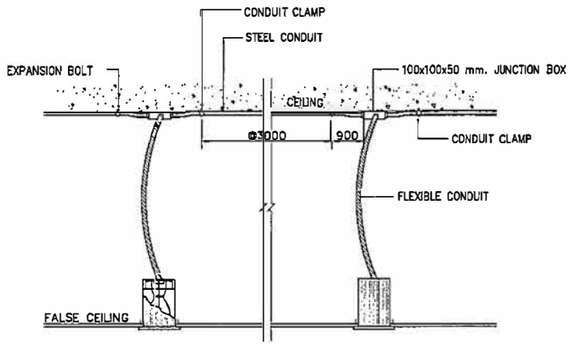
DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chaninton
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	MHB-EE-00-007		

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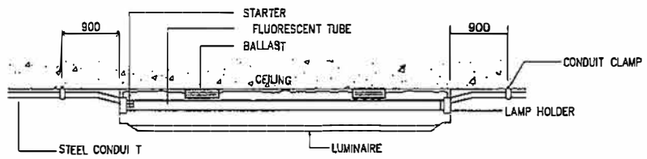
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INSTALLATION DETAIL OF RECESSED FLUORESCENT LUMINAIRE



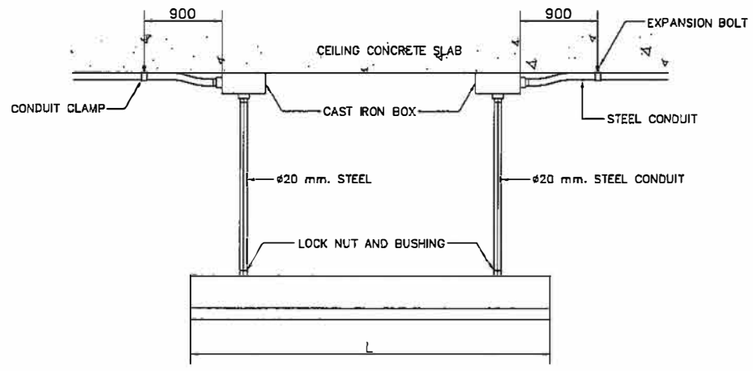
INSTALLATION DETAIL OF RECESSED DOWNLIGHT



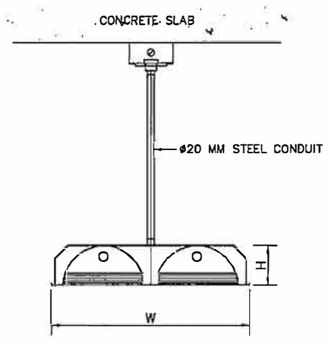
INSTALLATION DETAIL OF SURFACE MOUNTED LUMINAIRE

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE INDICATED
2. CONDUIT CLAMPS SHALL BE INSTALLED AT EVERY 3 M. INTERVAL EXCEPT WHERE ENTERING THE BOX SHALL BE 0.90 M.
3. ALL LUMINAIRES SHALL BE PROVIDED WITH GROUND TERMINAL INSIDE THE LUMINAIRE FOR GROUNDING THE METAL HOUSING OF LUMINAIRE

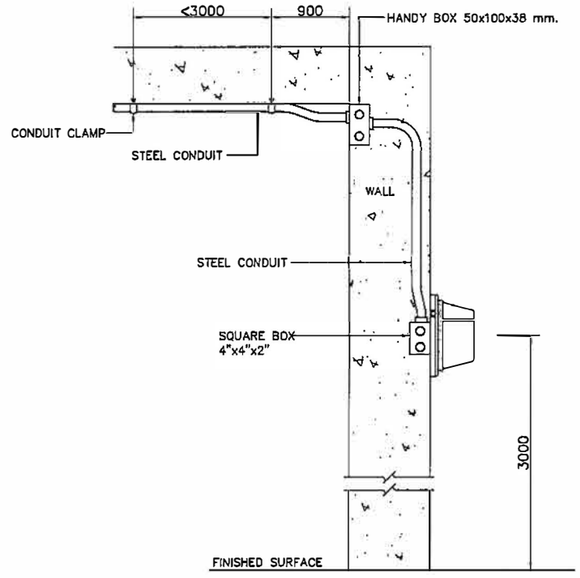


SIDE VIEW



FRONT VIEW

INSTALLATION DETAIL OF PENDANT MOUNTED LUMINAIRE



INSTALLATION DETAIL OF EXTERIOR LUMINAIRE

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BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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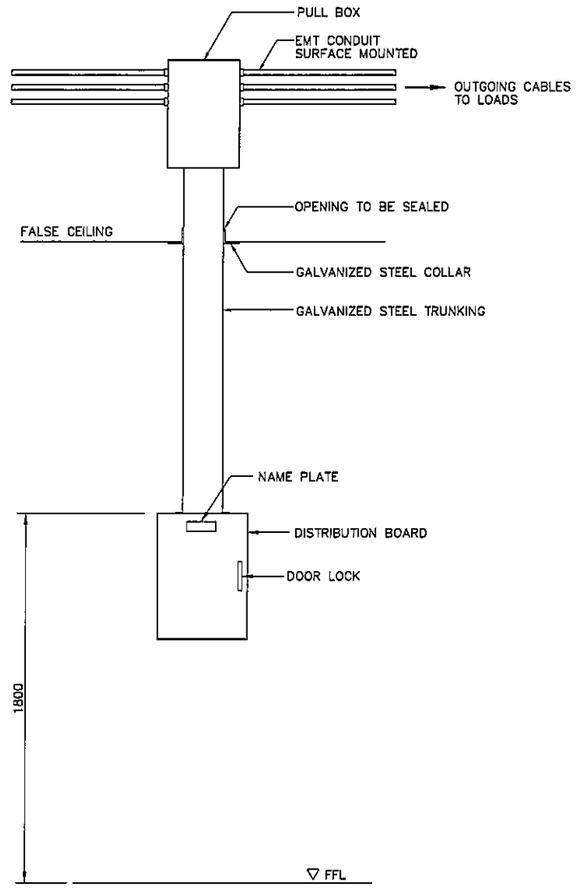
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
TYPICAL DETAIL (3)

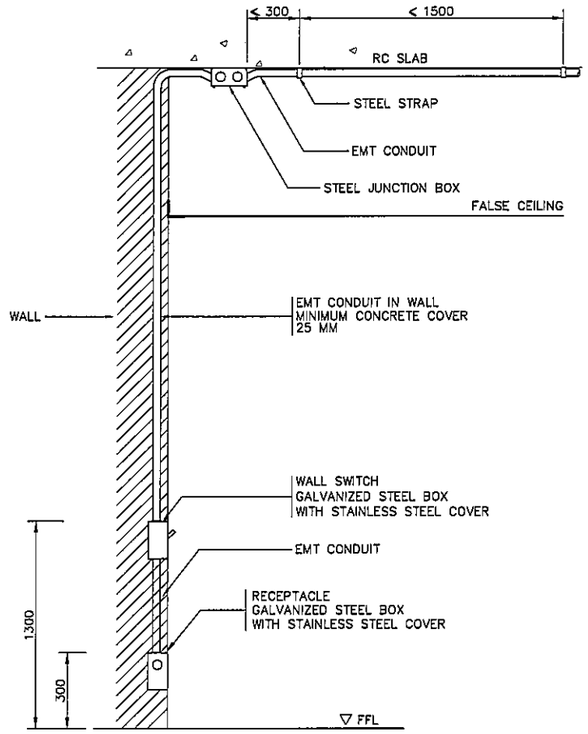
DRAWN BY:	SPH	CHECKED BY:	WTS
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DATE:	31-08-2018	SCALE:	AS SHOWN
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DWG.NO.	MHB-EE-00-008		

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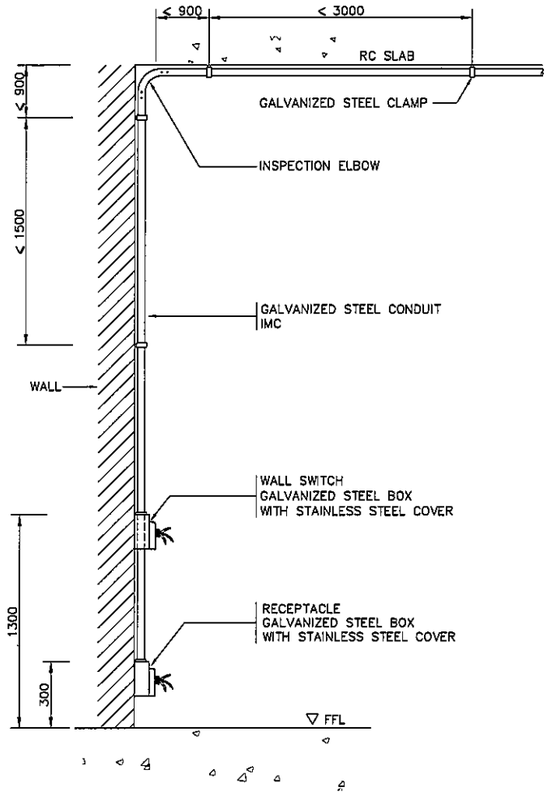
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PA\113073_BENGAL_HOTEL\Drawings\EM\MHB-EE-00-008.dwg [1] 31 Jul 2020 - 9:34am



INSTALLATION DETAIL OF DISTRIBUTION BOARD
NOT TO SCALE



SWITCH AND RECEPTACLE
FLUSH MOUNTED IN WALL
FOR OFFICE & PUBLIC AREA
NOT TO SCALE



SWITCH AND RECEPTACLE
SURFACE MOUNTED ON WALL
FOR MEP UTILITY ROOM
NOT TO SCALE

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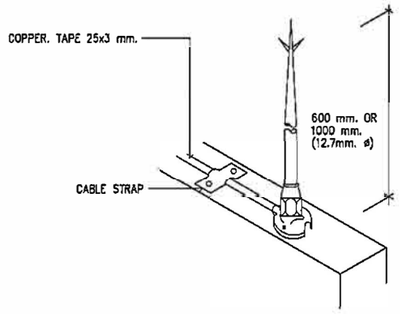
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
TYPICAL DETAIL (4)

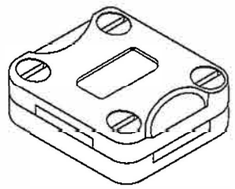
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DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 0 0 - 0 0 9		

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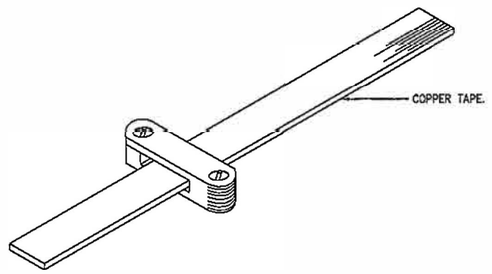
DETAIL OF AIR TERMINAL
NOT TO SCALE



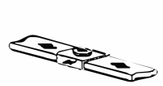
SQUARE TAPE CLAMP

FOR FORMING STRAIGHT THROUGH CROSS OR TEE JOINTS IN TAPE.

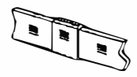
DETAIL OF SQUARE TAPE CLAMP
NOT TO SCALE



DETAIL OF SLATE HOLDFAST
NOT TO SCALE



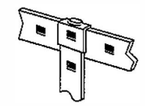
COPPER STRAP
CONNECTION,HORIZONTAL



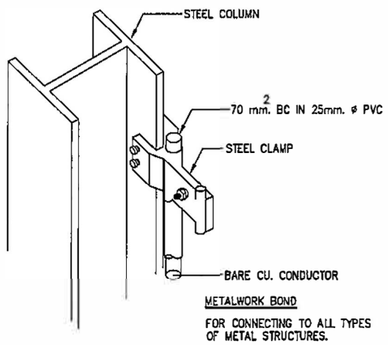
COPPER STRAP
CONNECTION VERTICAL



COPPER STRAP
TEE SPLICE HORIZONTAL



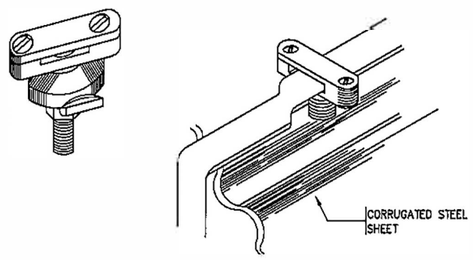
COPPER STRAP
TEE SPLICE VERTICAL



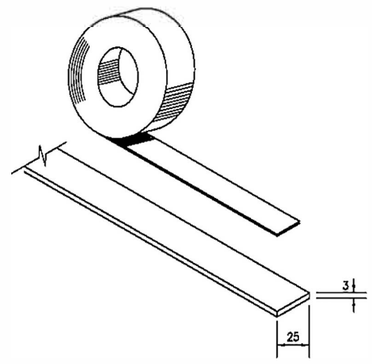
METALWORK BOND

FOR CONNECTING TO ALL TYPES OF METAL STRUCTURES.

DETAIL OF METALWORK BOND
NOT TO SCALE



DETAIL OF CORRUGATION HOLDFAST
NOT TO SCALE



3x25 HIGH CONDUCTIVITY ANNEALED COPPER TAPE.

DETAIL OF COPPER TAPE
NOT TO SCALE

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BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

REV. NO.	DATE	DESCRIPTION	BY
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
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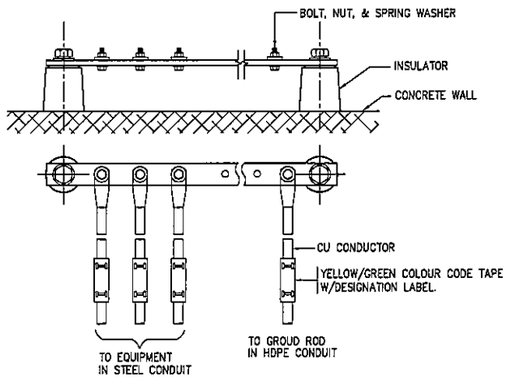
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
TYPICAL DETAIL (5)

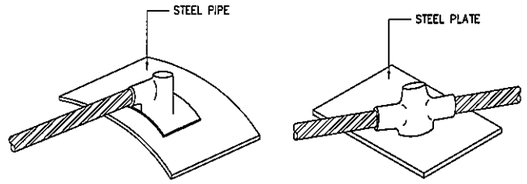
DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chonintorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	113073
DWG.NO.	MHB-EE-00-010

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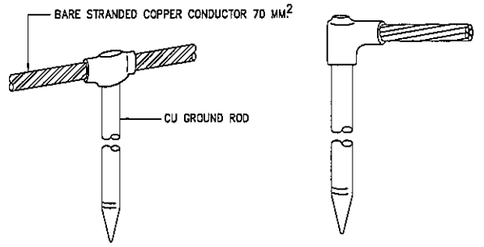
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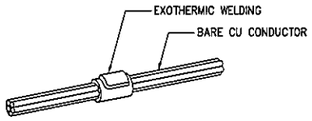
DETAIL OF GROUNDING TERMINATION BAR
NOT TO SCALE



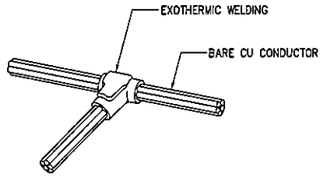
DETAIL OF WELDING CONDUCTOR TO STEEL PIPE OR PLATE
NOT TO SCALE



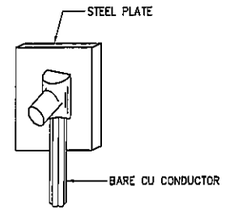
DETAIL OF CONDUCTOR WELDED TO GROUND ROD
NOT TO SCALE



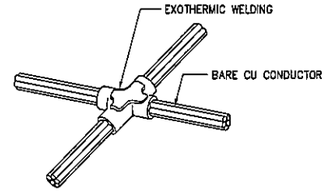
DETAIL OF WELDING CABLE TO CABLE
NOT TO SCALE



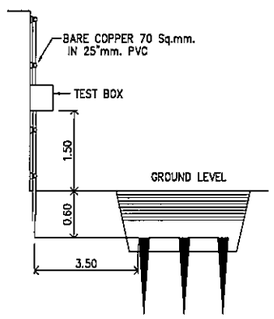
DETAIL OF TEE WELDING
NOT TO SCALE



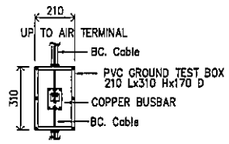
DETAIL OF WELDING CONDUCTOR TO STEEL STRUCTURE
NOT TO SCALE



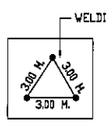
DETAIL OF 4WAY WELDING
NOT TO SCALE



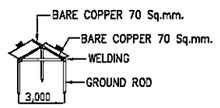
3 COPPER GROUND ROD
12.7mm.Ø x 3.33M.



DETAIL FOR TEST BOX



GROUNDING SYSTEM



DETAIL FOR GROUND LOOP

NOTES :-

1. BARE STRANDED COPPER CONDUCTOR SHALL BE USED FOR GROUNDING SYSTEM UNLESS OTHERWISE INDICATED.
2. ALL CONNECTIONS FOR GROUNDING SYSTEM SHALL BE MADE BY EXOTHERMIC WELDING EXCEPT OTHERWISE SPECIFIED.
3. ALL STEEL STRUCTURES,METALLIC EQUIPMENT,PIPING, AND NON-CURRENT METAL PARTS INSTALLED ABOVE GROUND SHALL BE BONDED TOGETHER AND PERMANENTLY GROUNDED.
4. COMPLETED GROUND INSTALLATION SHALL HAVE RESISTANCE TO GROUND NOT MORE THAN FIVE OHMS RESISTANCE TO GROUND,ADDITIONAL ELECTRODES SHALL BE ADDED IF THIS REQUIREMENT CAN NOT BE MET.

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
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E-mail : interdes331@gmail.com

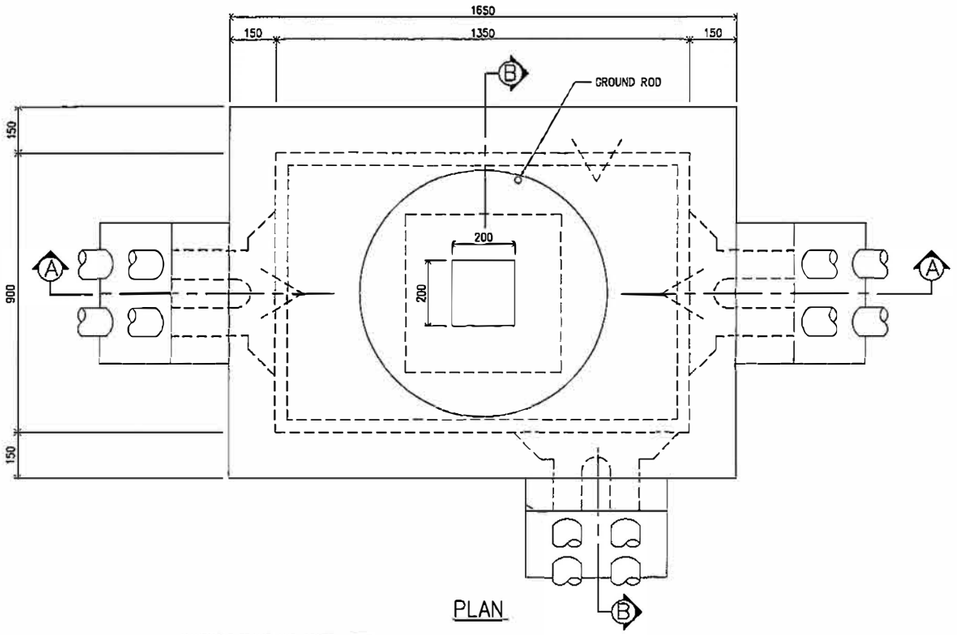
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
TYPICAL DETAIL (6)

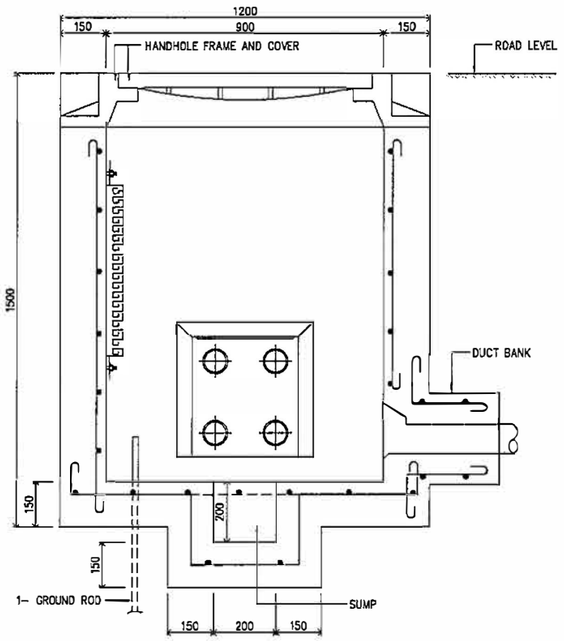
DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chonintorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	113073
DWG.NO.	MHB-EE-00-011

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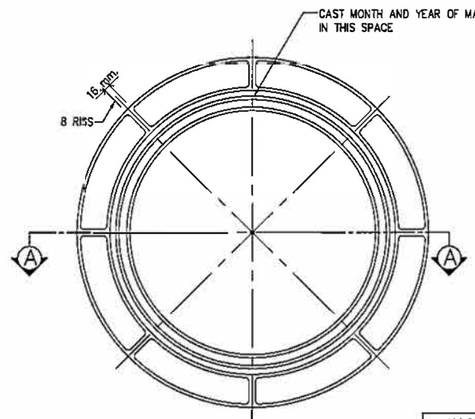
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PLOT BY: SAKIB



PLAN

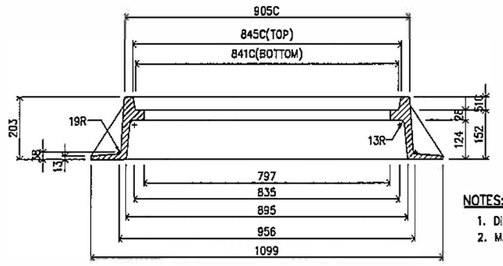


SECTION B–B



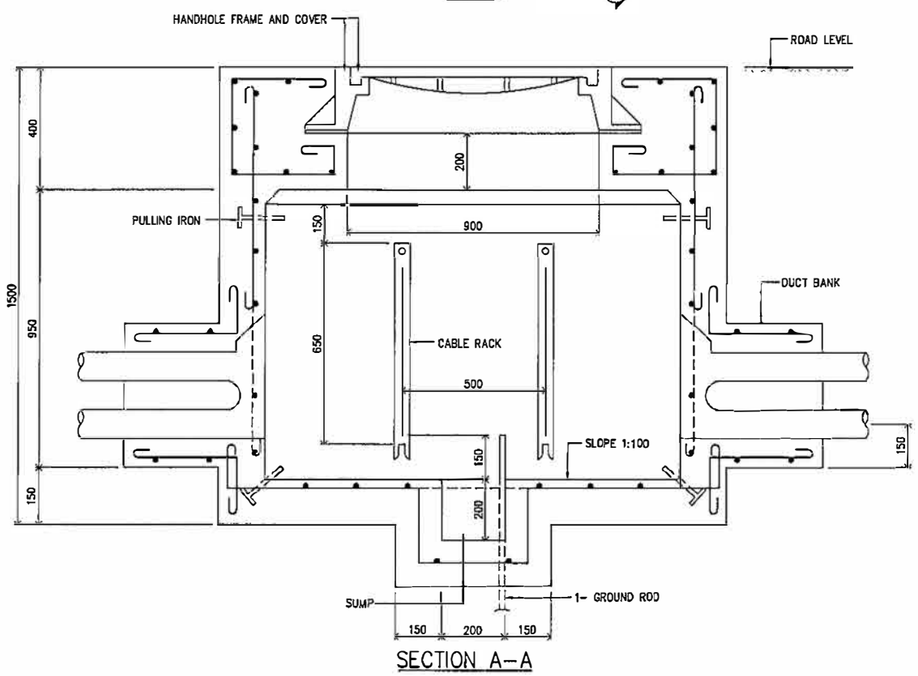
MANHOLE FRAME

ALLOWABLE VARIATION		
SYMBOL	OVER	UNDER
C	1.5 mm.	1.5 mm.



SECTION A–A

NOTES:
1. DIMENSIONS ARE IN mm.
2. MATERIAL: SEMI-STEEL OR CAST IRON



SECTION A–A

DETAIL OF MANHOLE

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BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
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Tel : (66-2) 252-7790 FAX : (66-2) 252-8492
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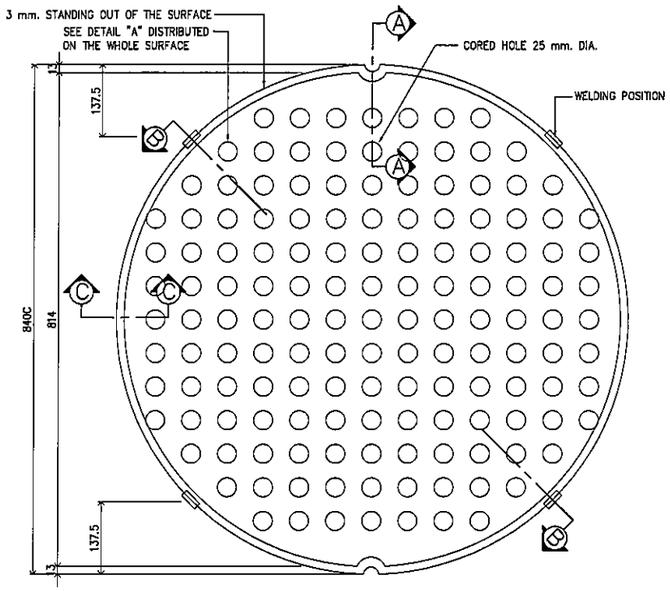
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
TYPICAL DETAIL (7)

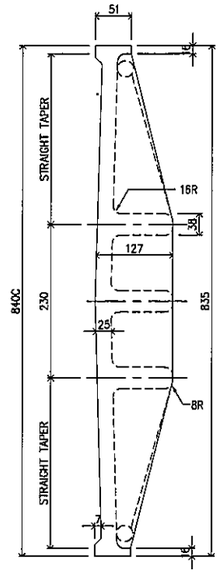
DRAWN BY:	SPH	CHECKED BY:	WTS
DESIGN BY:	WTS	PROJECT MGR.:	Chonlatorn
DATE:	31-08-2018	SCALE:	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	MHB-EE-00-012		

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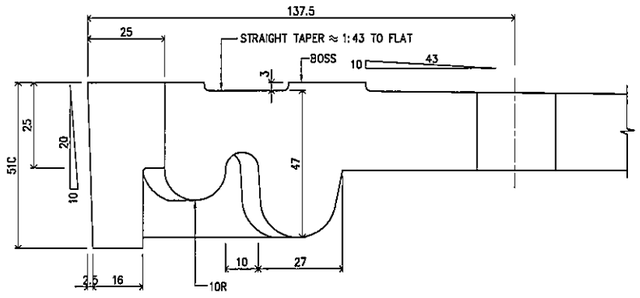
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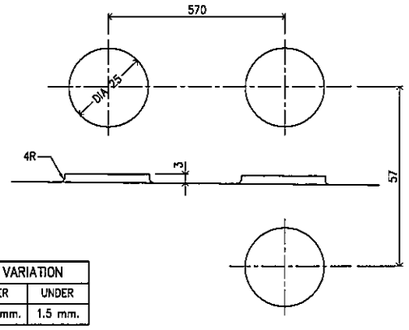
TOP VIEW



SECTION B–B

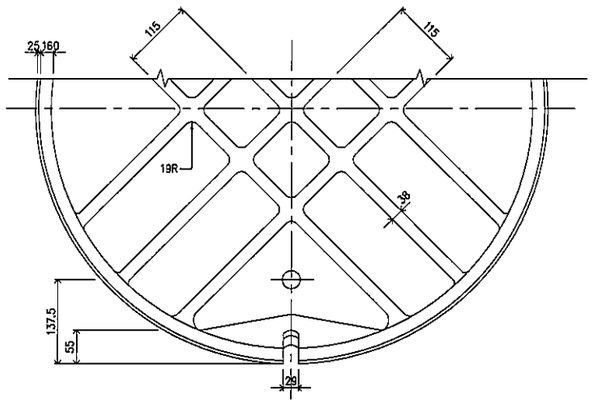


SECTION A–A



DETAIL A

ALLOWABLE VARIATION		
SYMBOL	OVER	UNDER
C	1.5 mm.	1.5 mm.



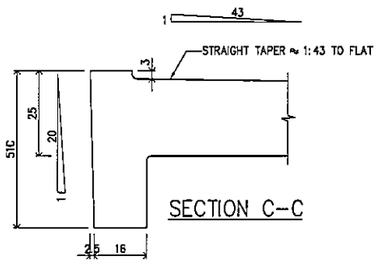
BOTTOM VIEW

ALLOWABLE VARIATION		
SYMBOL	OVER	UNDER
C	1.5 mm.	1.5 mm.

MANHOLE COVER

NOTES:

1. DIMENSIONS ARE IN mm.
2. THE COVER SHALL BE EVENLY PLACED ON ITS FRAME WITHOUT MINOR ROCKING. IN CASE OF UNEVENLY SEATING OR MINOR ROCKING, SEATING SURFACE MUST BE MACHINED.
3. MATERIAL: CAST IRON
4. FRAME AND COVER SHALL BE JOINTED BY BUIT WELDING AT FOUR JOINTS, EACH OF 2.5 cm. LONG.



SECTION C–C

DETAIL OF MANHOLE COVER

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BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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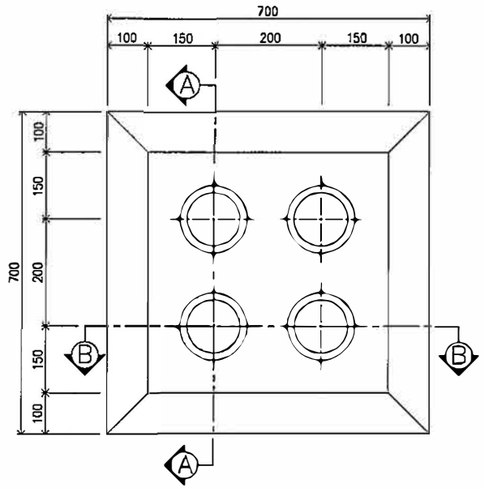
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
TYPICAL DETAIL (8)

DRAWN BY :	SPH
DESIGNED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chonlnton
DATE :	31–08–2018
SCALE	AS SHOWN
PROJECT NO.	113073
DWG.NO.	MHB-EE-00-013

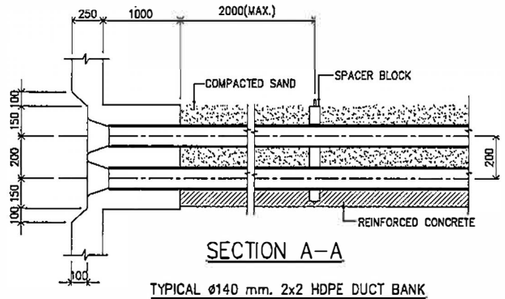
Deltadesign Pvt. Ltd. Dhaka

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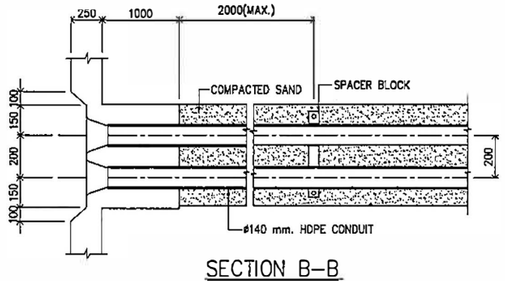
TYPICAL DUCT WINDOW END BELL
(ø140 mm. HDPE CONDUIT)

NOTE:
1. DIMENSIONS ARE IN mm.



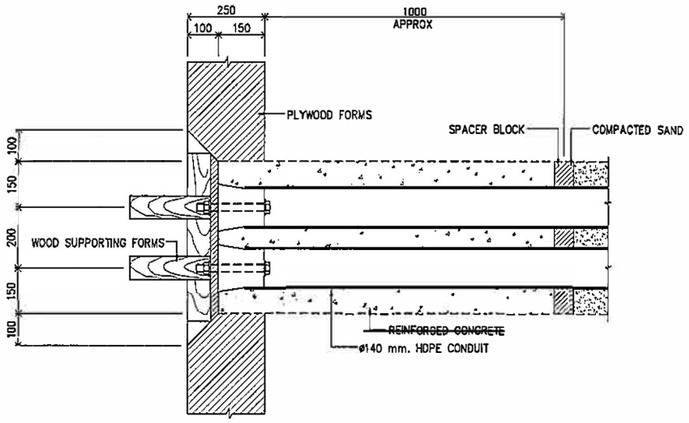
SECTION A–A

TYPICAL ø140 mm. 2x2 HDPE DUCT BANK



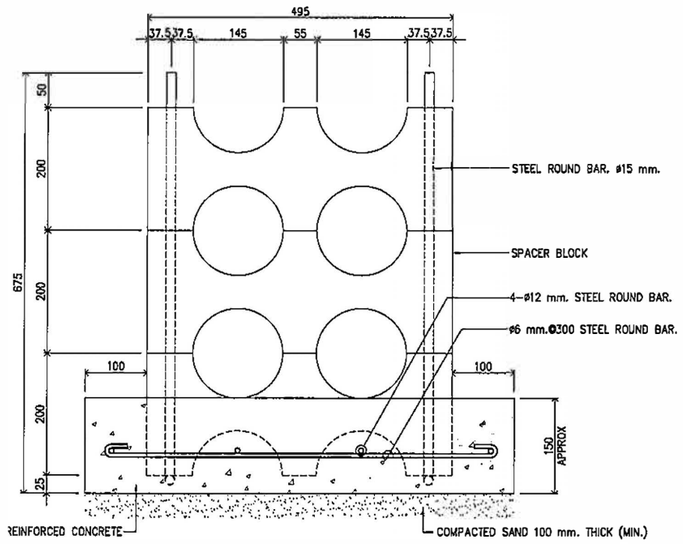
SECTION B–B

TYPICAL ø140 mm. 2x2 HDPE DUCT BANK



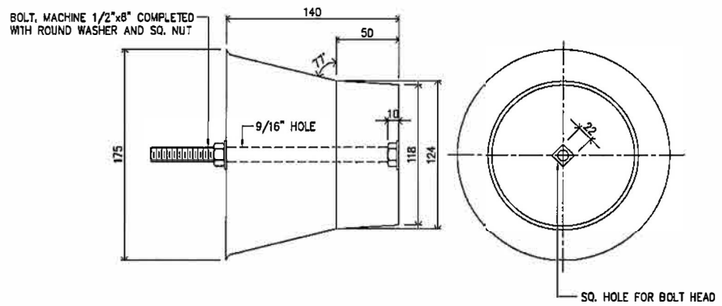
DETAIL "A"

METHOD FOR FORMING TYPICAL DUCT ENTRY
(ø140 mm. 2x2 DUCT BANK)



2x2 DUCT BANK
(ø140 mm. HDPE CONDUIT)

DETAIL OF DUCT BANK 1



END BELL FORM
(FOR ø140 mm. HDPE CONDUIT)

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BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
281 SOI PRIDI BHANOMYONG 42, SUKHUMVIT 71 ROAD
VADHANA, BANGKOK, 10110 THAILAND.
PHONE: (66-2) 713-3888, FAX: (66-2) 713-3883
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Tel : (66-2) 252-7790 FAX : (66-2) 252-8492
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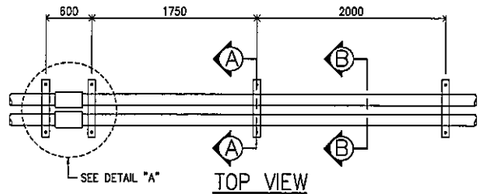
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
TYPICAL DETAIL (9)

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chanintorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	113073		
DWG.NO.	MHB-EE-00-014		

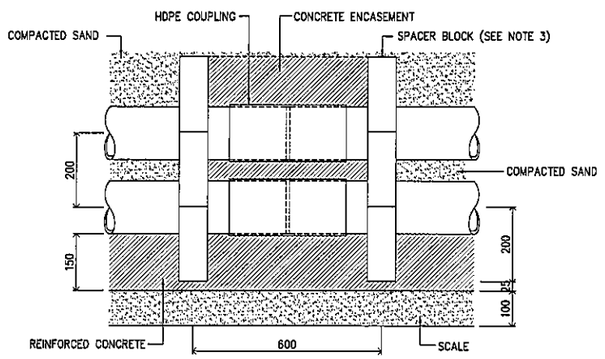
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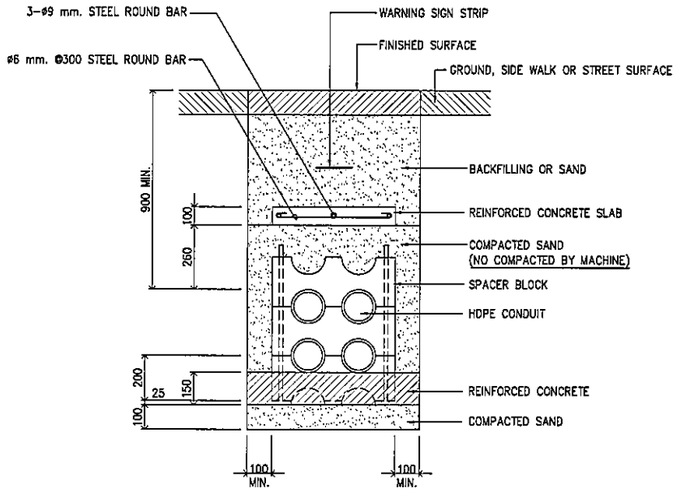
TOP VIEW

TYPICAL 2x2 DUCT BANK, ø140 mm. HDPE CONDUIT

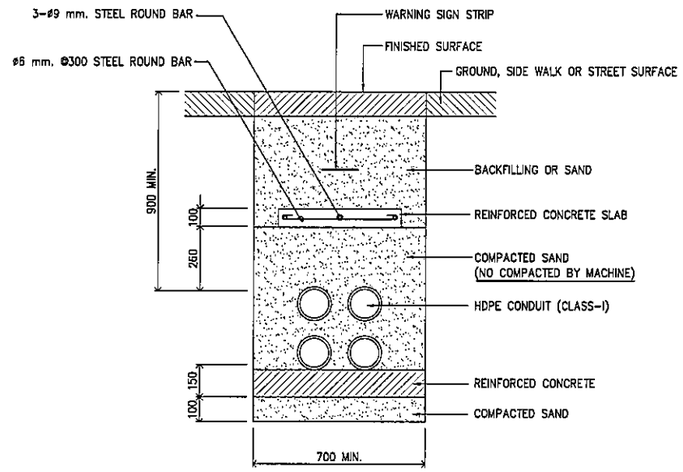


DETAIL "A"

NOTES:
1. DIMENSIONS ARE IN mm.
2. NO COMPACTED BY MACHINE.



SECTION A-A

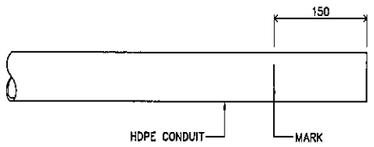


SECTION B-B

NOTES:
1. DIMENSIONS ARE IN mm.
2. BACKFILLING (OR SAND) IS COMPACTED ACCORDING TO REQUIREMENTS SET BY THE SIDE WALK OR STREET STRUCTURE.
3. THE WIDTH OF CONCRETE SLAB IS THE SAME AS OF SPACER BLOCK.

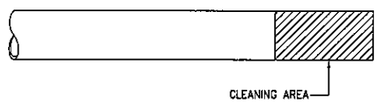
DETAIL OF DUCT BANK 2

1. MARKING



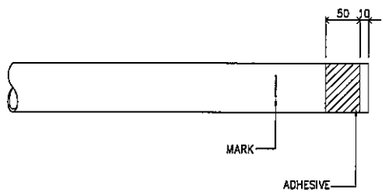
- MARK END OF CONDUIT TO BE CONNECTED.

2. CLEANING



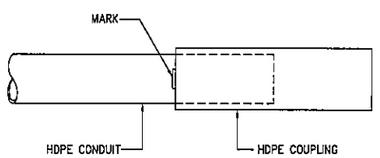
- USING DAMP CLOTH CLEAN OUTSIDE CONDUIT AND INSIDE OF COUPLING.

3. APPLY ADHESIVE



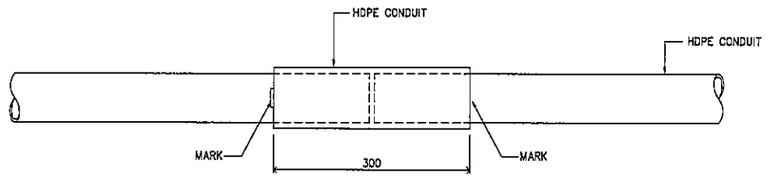
- APPLIED RUBBER ADHESIVEBY BRUSH ASSHOWN IN THE FIGURE

4. CONNECTION



- SLIDE A CONDUIT IN TO A COUPLING.

5. COMPLETED CONNECTION



- REPEAT STEP 1 TO 3 FOR THE OTHER CONDUIT AND SLIDE A CONDUIT INTO A COUPLING UNTIL THE BOTH END OF CONDUIT ARE BUTTED.

NOTES:
1. DIMENSIONS ARE IN mm.
2. THE METHOD SHOWN ABOVE CAN BE USED FOR BOTH CLASS-1 AND CLASS-II HDPE CONDUIT
3. THE PURPOSE OF APPLYING RUBBER ADHESIVE (RUBBER CEMENT) IS TO PROTECT LEAKING OF WATER INTO CONDUIT COUPLING.

METHOD OF HDPE CONDUIT CONNECTION

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BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
A	31-08-18	FINAL DESIGN	DEC				
-	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
TYPICAL DETAIL (10)

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chonintorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	MHB-EE-00-015		

Deltadesh Pvt. Ltd. Dhaka

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11 KV. OVERHEAD DISTRIBUTION LINE (DPDC)

RISER POLE

11KV, 10KA

POWER FUSE
400A, 11KV

BY DESCO ⟵ ⟶ BY CUSTOMER

RMU

HT METER

REVENUE METER

AVR1

AUTOMATIC VOLTAGE REGULATOR 11KV. 5,000 KVA

BYPASS

HV1

DS1
12KV.
630A
25KA

CB1
12KV.
630A
25KA

CB2
12KV.
630A
25KA

3x1C-240mm. Cu XLPE 12KV.
IN 125mm. RSC CONDUIT

THE PROVISION OF MV. INCOMING SCHEME TO BE CONFIRMED BY LOCAL POWER SUPPLY AUTHORITY (DESCO) IN ACCORDANCE WITH THE SPECIFIC REQUIREMENT OF LOCAL CODE/REGULATION

3x1C-240mm. Cu XLPE 12KV.
IN 125mm. RSC CONDUIT

TR1
DRY TYPE
3P 4W 11KV
/400-230V
2500 KVA

TR2
DRY TYPE
3P 4W 11KV
/400-230V
2500 KVA

AL. BUSDUCT 4000A 3 ,4W — FLEXIBLE BUSBAR 4000A

AL. BUSDUCT 4000A 3 ,4W — FLEXIBLE BUSBAR 4000A

CAP1

PF CONTROLLER

12 STEP
@ 60 KVAR
AUTO
CAP. BANK

MDB1
MAIN BUS : 4000A
NEUTRAL BUS : 100%
GROUND BUS : 25%
IC >65 KA

UV
OC
GFP

ACB DRAW-OUT TYPE
4P 4000 AT
4000 AF

DM DIGITAL METER

3xCT'S 4000/5A

CASS B+C
SPD

1	2	3	4	5	6	7	8	9	10
	MCCB 2500AT 2500AF	MCCB 1250AT 1250AF	MCCB 400AT 400AF	ACB 3000AT 3200AF	MCCB 160AT 160AF	MCCB 100AT 100AF	MCCB 63AT 100AF	SPACE	SPACE
					SPARE	SPARE	SPARE		

AL. BUSDUCT 3200A 3 ,4W I.C. 65KA

EMDB1

LMCC
A-MCC-501
(CHILLER 1)

BY A/C CONTRACTOR

LMCC
A-MCC-503
(PRIMARY 1, SECONDARY 5 CONDENSER 1 COOLING TOWER1)

BY A/C CONTRACTOR

TIE

M&E INTERLOCK

ACB DRAW-OUT TYPE
4P 4000 AT
4000 AF

MDB 2
MAIN BUS : 4000 A
NEUTRAL BUS: 100%
GROUND BUS: 25%
IC ⩾ 65 KA

UV
OC
GFP

ACB DRAW-OUT TYPE
4P 4000 AT
4000 AF

DM DIGITAL METER

3xCT'S 4000/5A

CASS B+C
SPD

1	2	3	4	5	6	7	8	9	10
MCCB 2500AT 2500AF	MCCB 1250AT 1250AF	MCCB 400AT 400AF	ACB 3000AT 3200AF	MCCB 160AT 160AF	MCCB 100AT 100AF	MCCB 63AT 1000AF	MCCB 32AT 32AF	SPACE	SPACE
				SPARE	SPARE	SPARE			

AL. BUSDUCT 3200A 3 ,4W I.C. 65KA

EMDB2

LMCC
A-MCC-502
(CHILLER 2)

BY A/C CONTRACTOR

LMCC
A-MCC-504
(PRIMARY 2, SECONDARY 8 CONDENSER 2 COOLING TOWER2)

BY A/C CONTRACTOR

CAP2

PF CONTROLLER

12 STEP
@ 60 KVAR
AUTO
CAP. BANK

ELECTRICAL SINGLE LINE DIAGRAM (1)

NOTE :
1. FOR CABLE SIZE & CONTAINMENT, REFER TO PANEL SCHEDULE

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BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY
C	26-03-20	FINAL DESIGN	DEC
B	04-02-19	FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
-	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

REV. NO.	DATE	DESCRIPTION	BY
E	31-07-20	REVISED FINAL DESIGN	DEC
D	29-05-20	REVISED FINAL DESIGN	DEC

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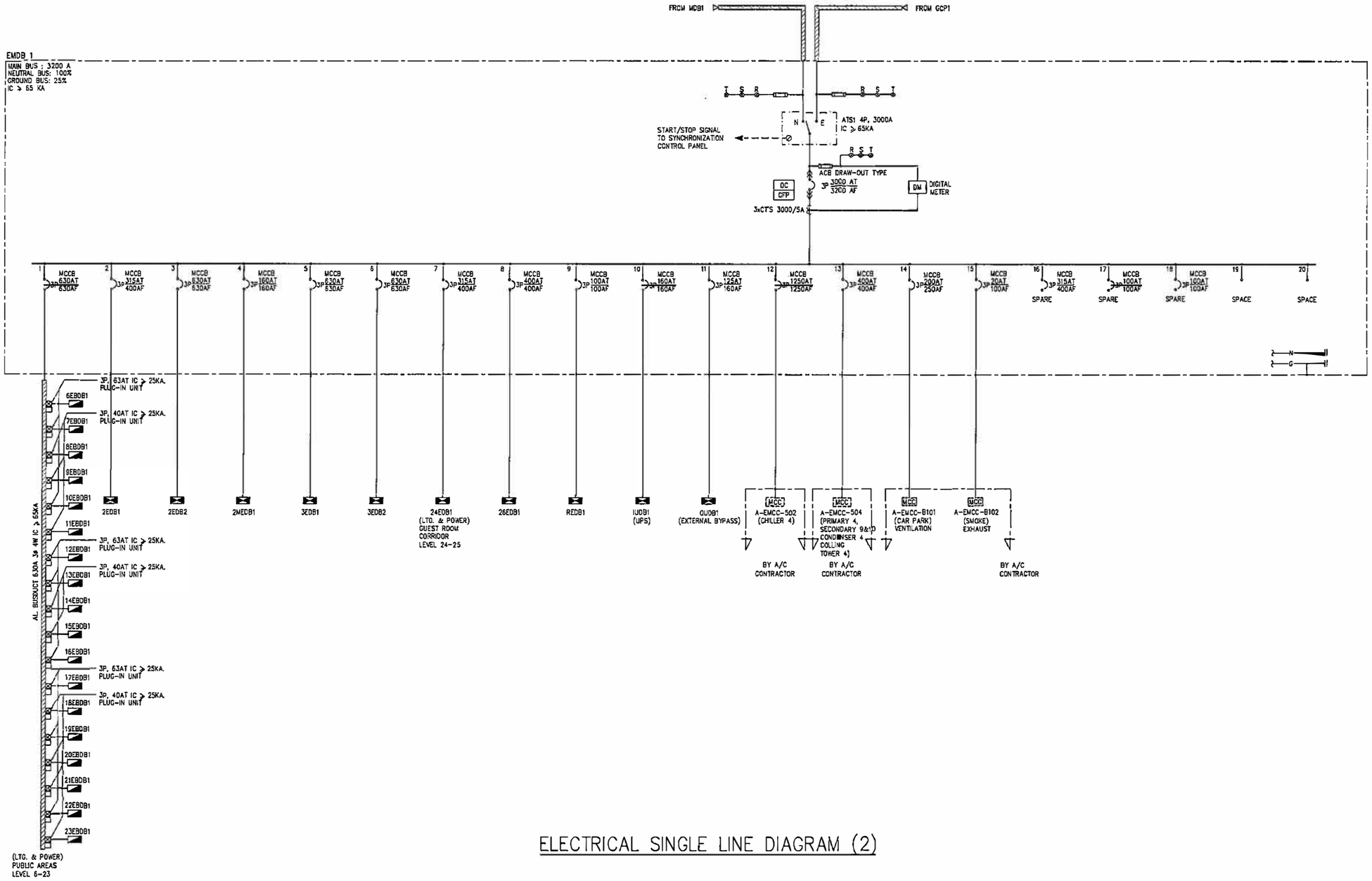
Architect & Planners
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E-mail : interdes331@gmail.com

PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
ELECTRICAL SINGLE LINE DIAGRAM (1)

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chanintorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B E E 0 1 0 0 1		

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ELECTRICAL SINGLE LINE DIAGRAM (2)

NOTE :
1. FOR CABLE SIZE & CONTAINMENT, REFER TO

REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	26-03-20	FINAL DESIGN	DEC				
B	04-02-19	FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC	E	31-07-20	REVISED FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	29-05-20	REVISED FINAL DESIGN	DEC

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BENGAL hotels & resorts
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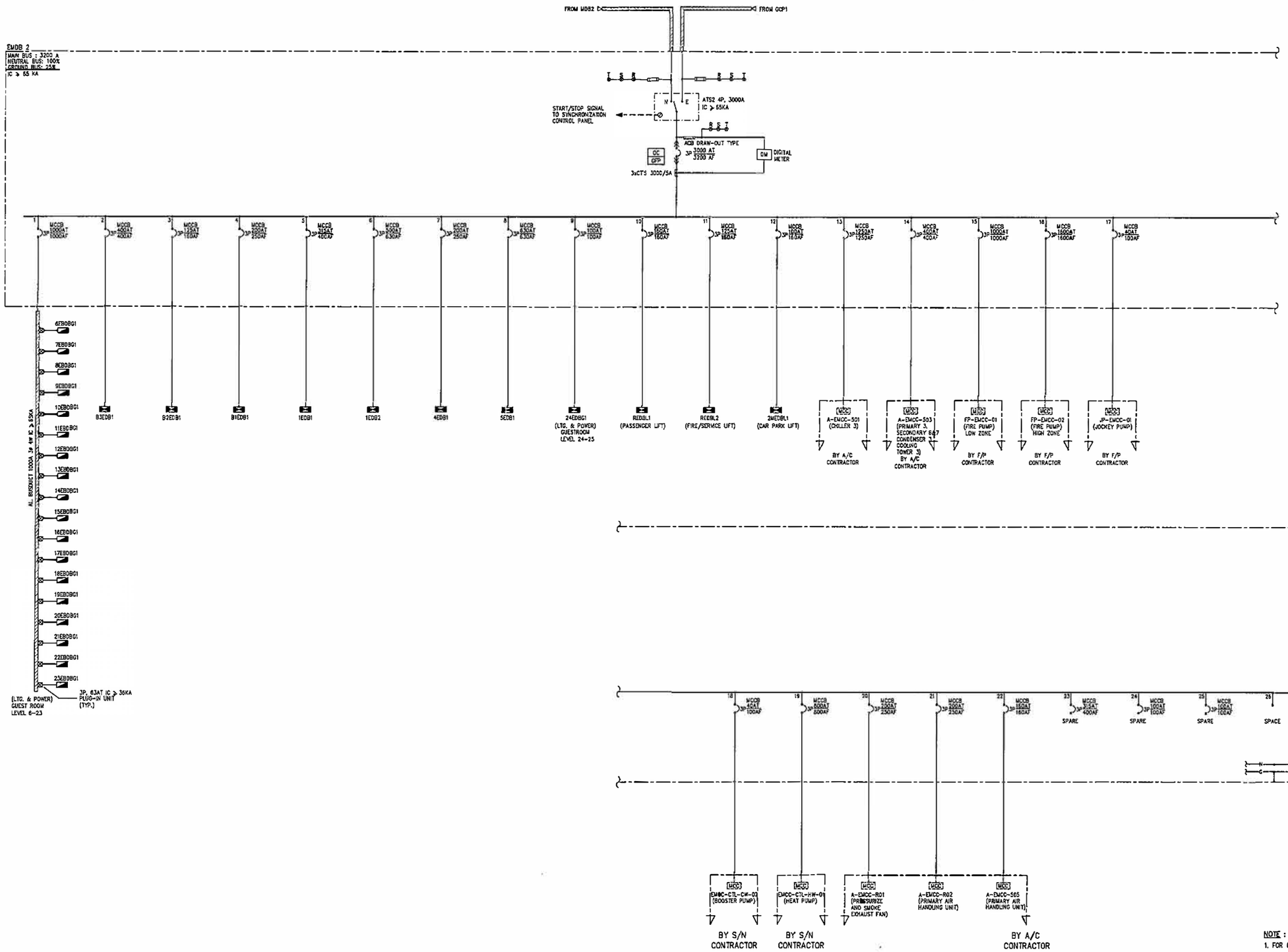
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
ELECTRICAL SINGLE LINE DIAGRAM (2)

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chonlatorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	113073
DWG.NO.	MHB-EE-01-002

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PLOTTED BY: Apoorva Kapoor
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NOTE :
1. FOR CABLE SIZE & CONTAINMENT, REFER TO PANEL SCHEDULE

ELECTRICAL SINGLE LINE DIAGRAM (3)

REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	26-03-20	FINAL DESIGN	DEC				
B	04-02-19	FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC	E	31-07-20	REVISED FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	29-05-20	REVISED FINAL DESIGN	DEC

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BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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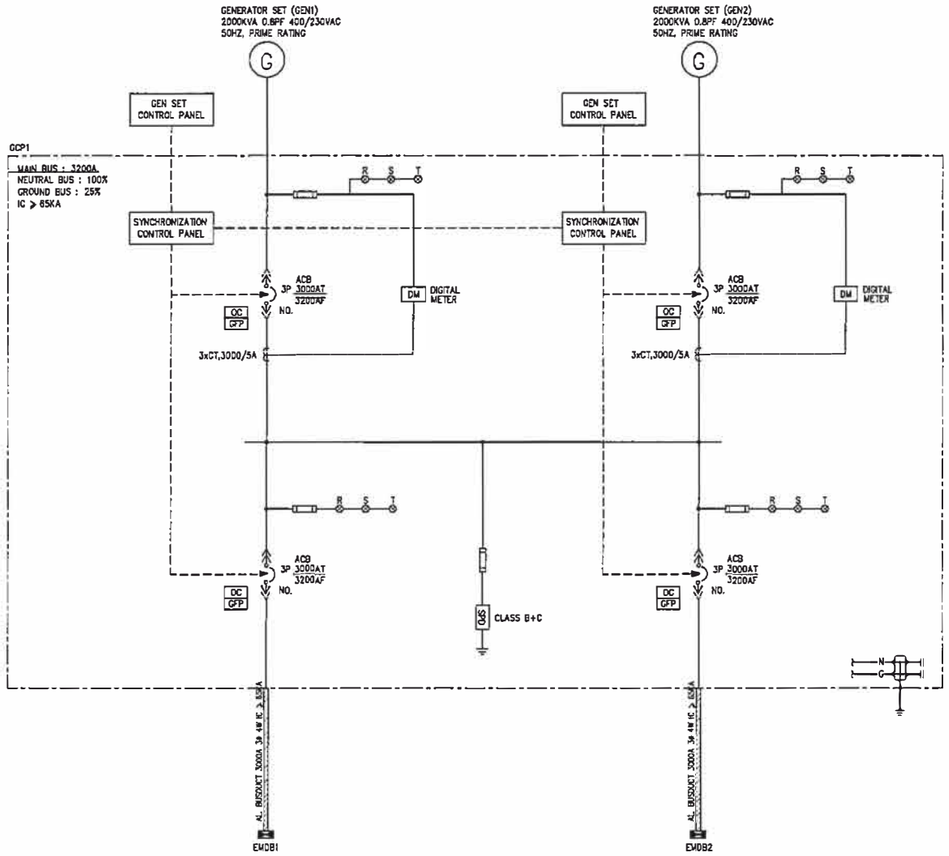
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

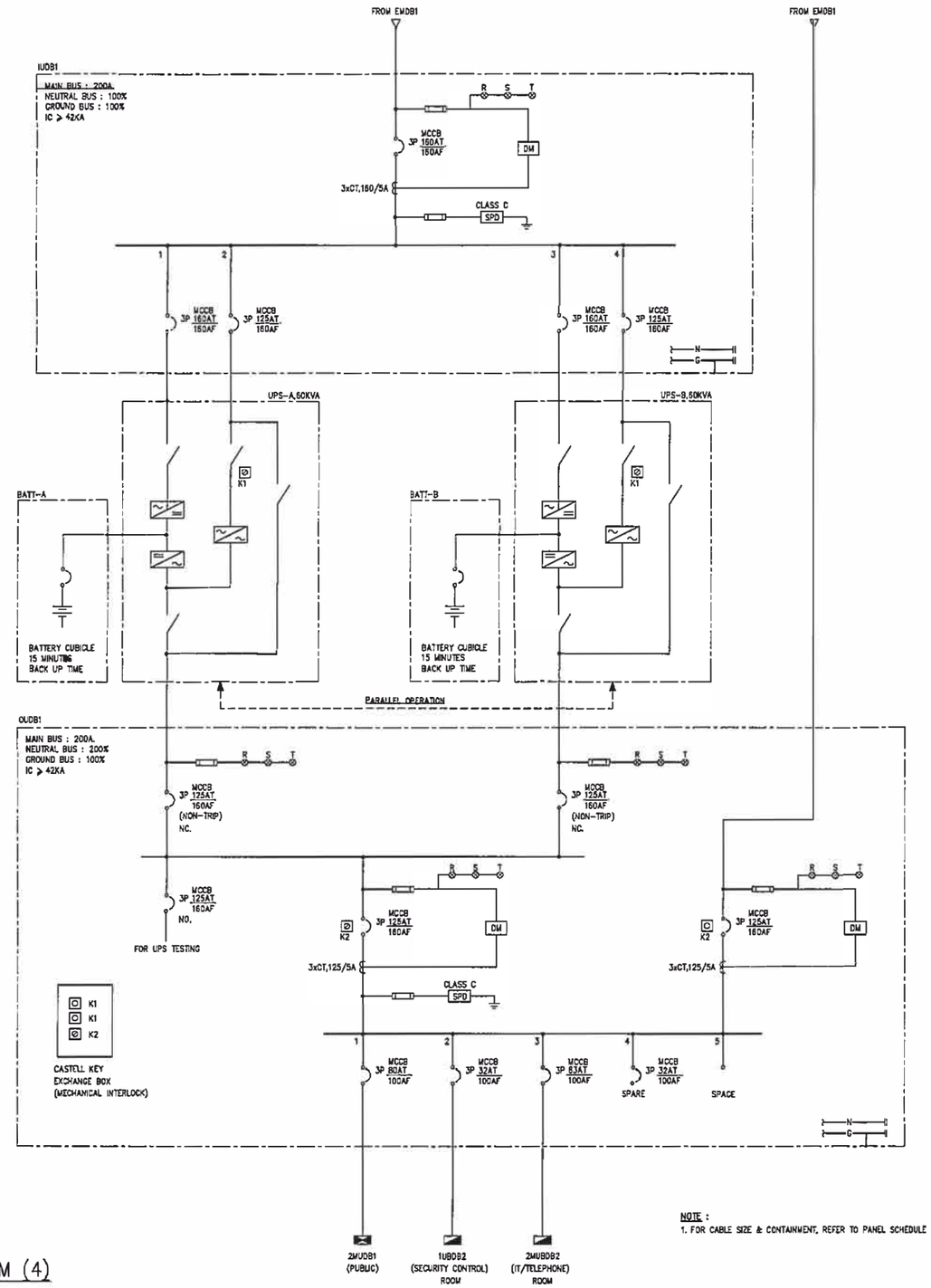
TITLE:
ELECTRICAL SINGLE LINE DIAGRAM (3)

DRAWN BY: SPH
CHECKED BY : WTS
DESIGN BY : WTS
PROJECT MGR. : Chonintorn
DATE : 31-08-2018
SCALE : AS SHOWN
PROJECT NO. 1 1 3 0 7 3
DWG.NO. MHB-EE-01-003

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NOTE :
1. FOR CABLE SIZE & CONTAINMENT, REFER TO PANEL SCHEDULE

ELECTRICAL SINGLE LINE DIAGRAM (4)

REV. NO.	DATE	DESCRIPTION	BY
C	25-03-20	FINAL DESIGN	DEC
B	04-02-19	FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
E	31-07-20	REVISED FINAL DESIGN	DEC
D	29-05-20	REVISED FINAL DESIGN	DEC

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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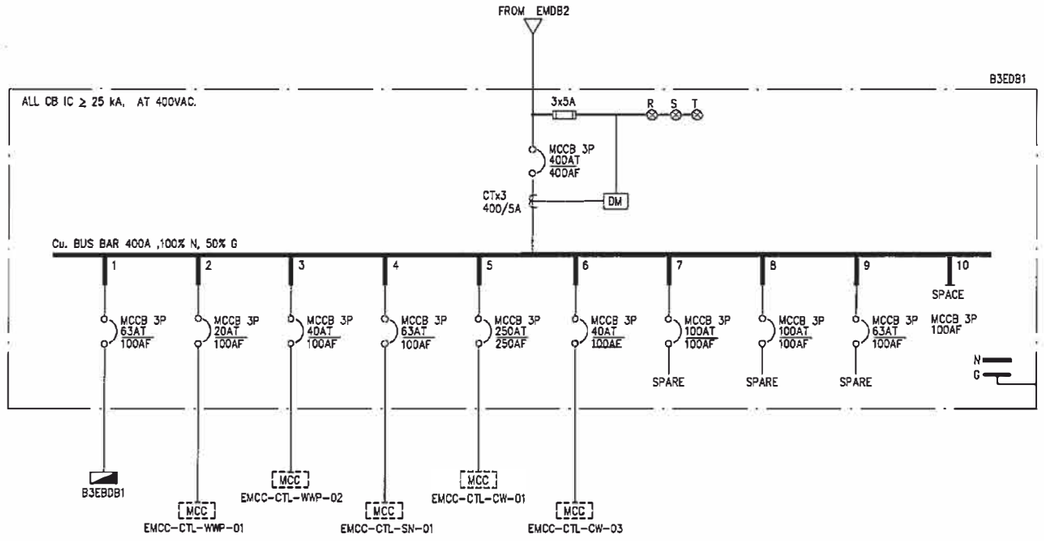
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

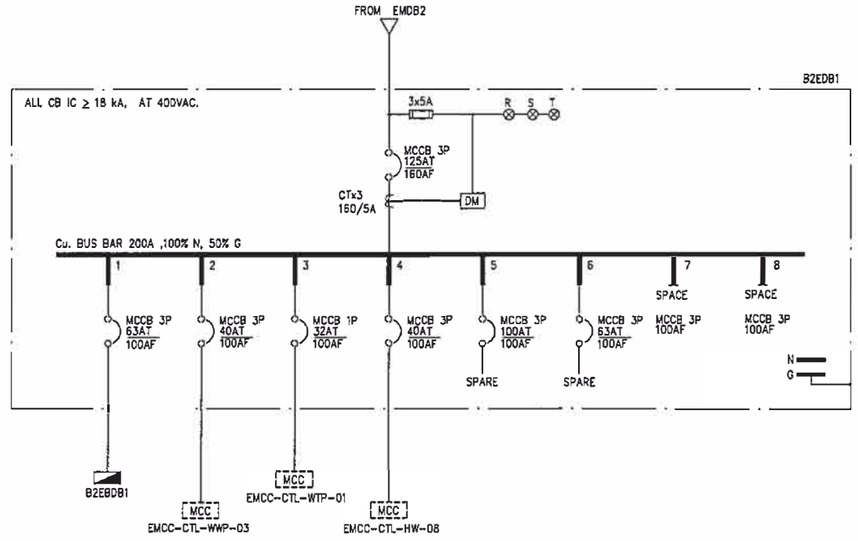
TITLE:
ELECTRICAL SINGLE LINE DIAGRAM (4)

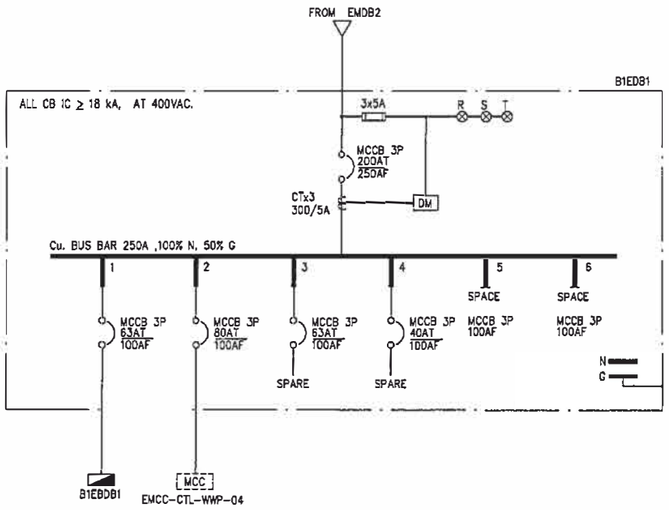
DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chonintorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-01-004

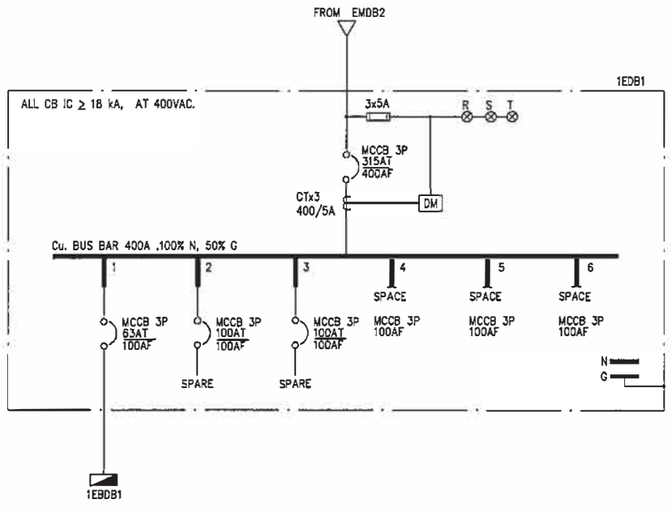
Deltatech Pvt. Ltd. Dhaka

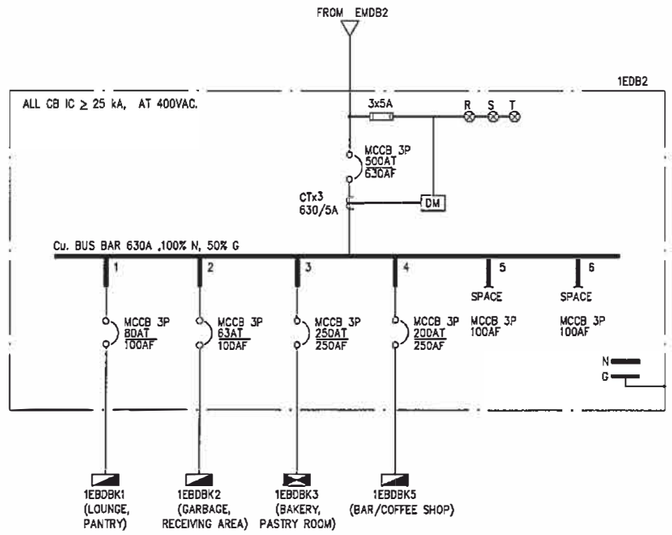
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NOTE :

1. FOR CABLE SIZE & CONTAINMENT, REFER TO PANEL SCHEDULE

BENGAL hotels & resorts

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BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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A	31-07-20	FINAL DESIGN	DEC				

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E-mail : interdes331@gmail.com

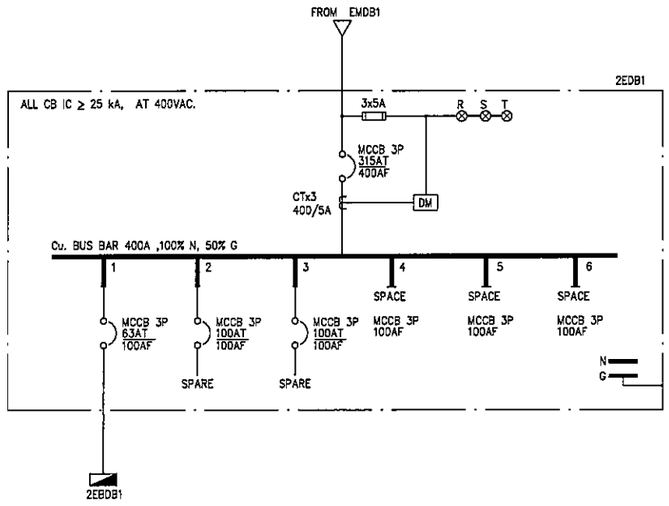
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

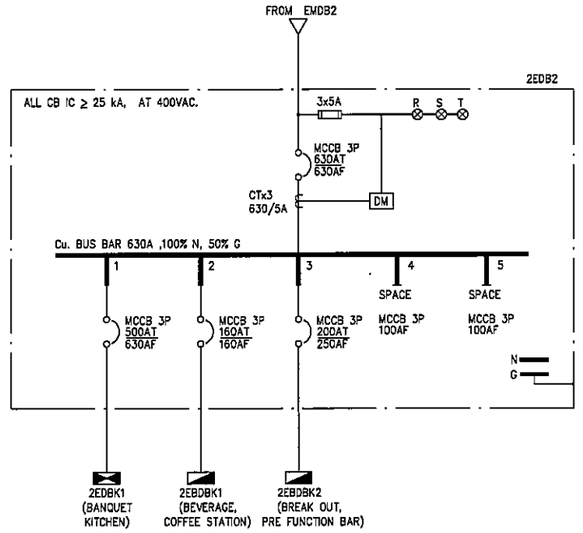
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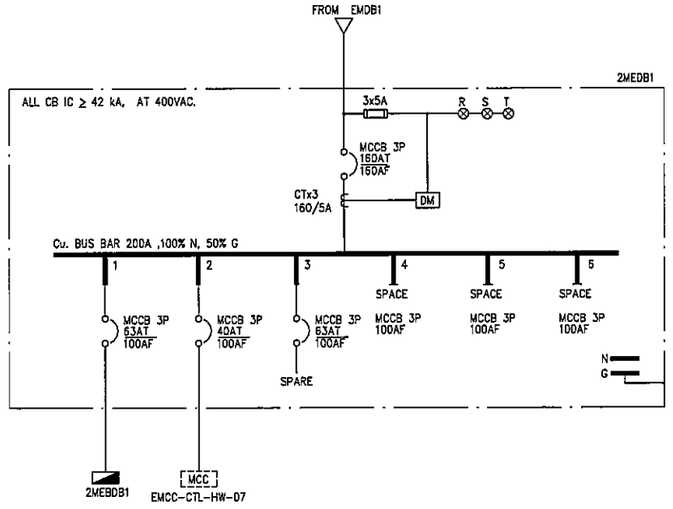
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DATE :	31-08-2018
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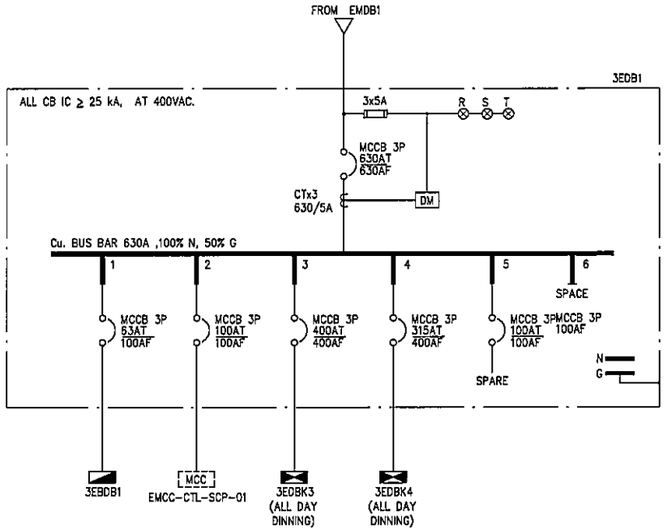
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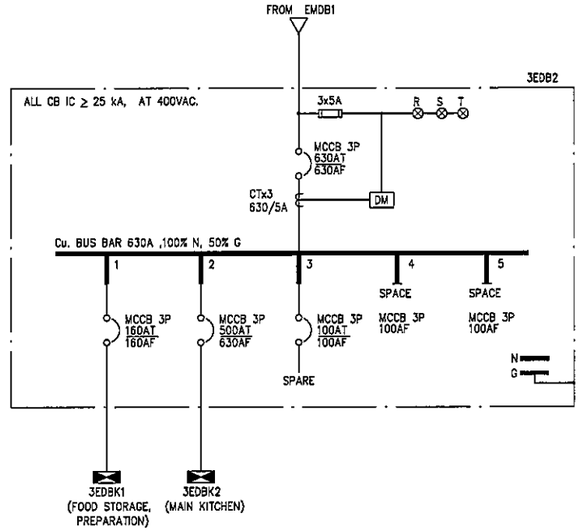
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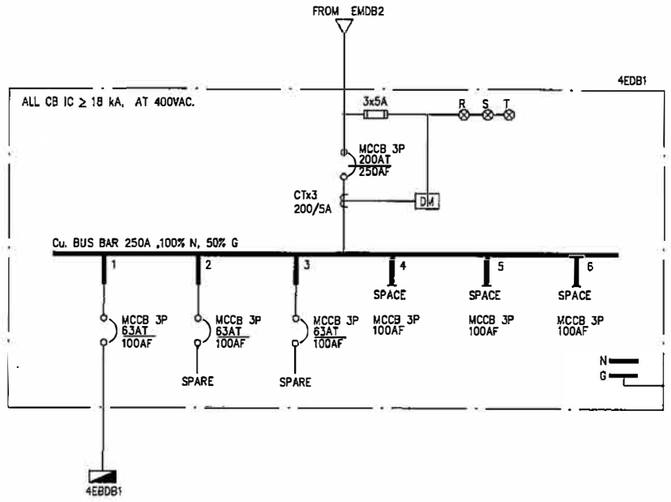
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

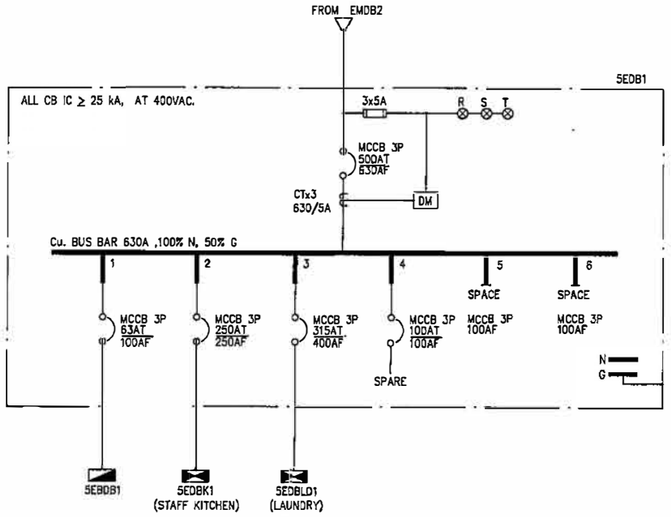
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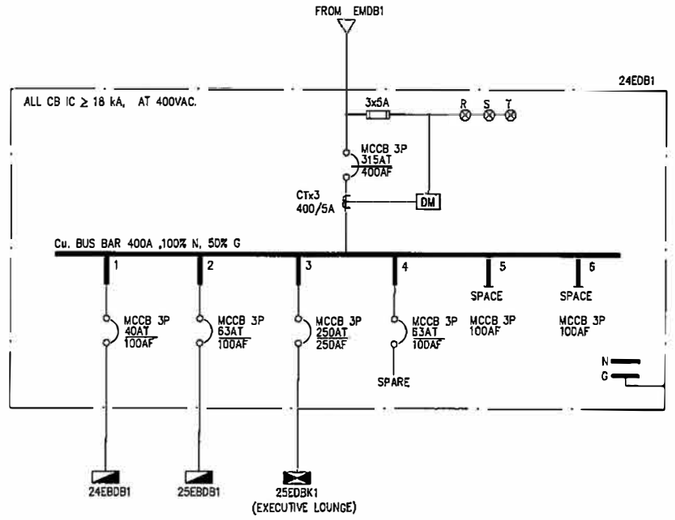
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CHECKED BY :	WTS
DESIGN BY :	WTS
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SCALE :	AS SHOWN
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DWG.NO.	MHB-EE-01-006

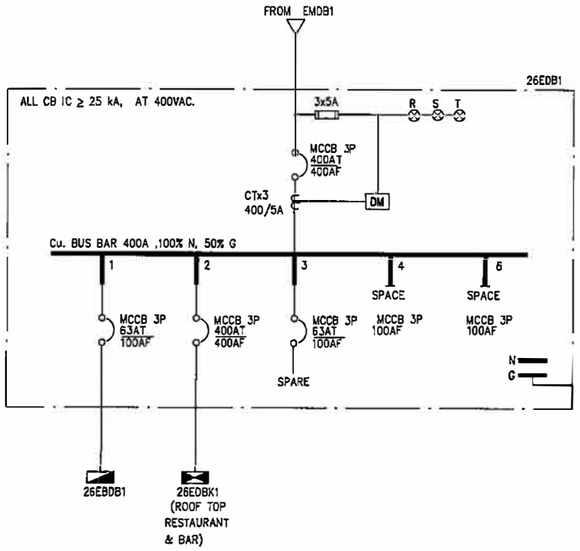
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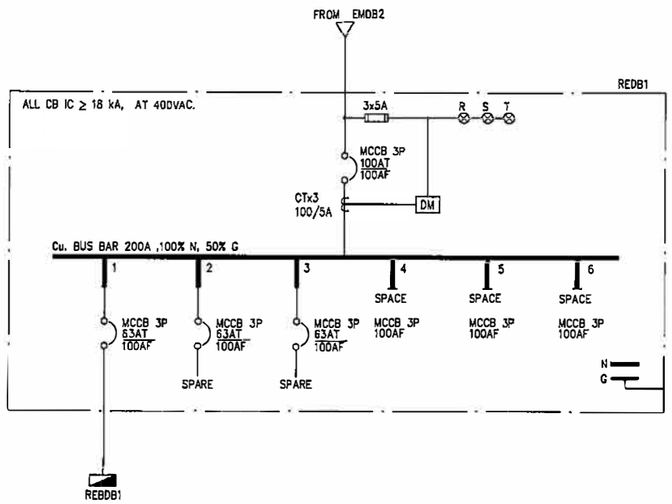
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BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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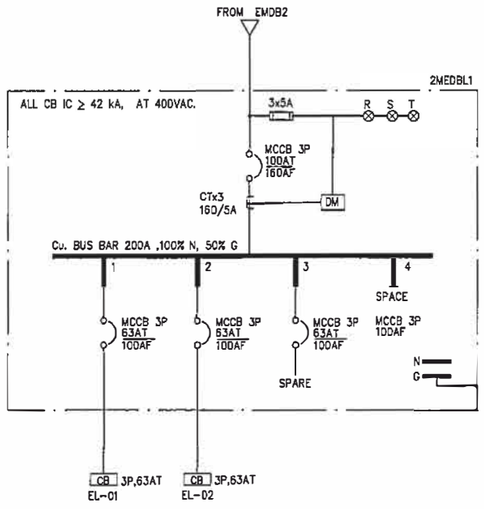
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

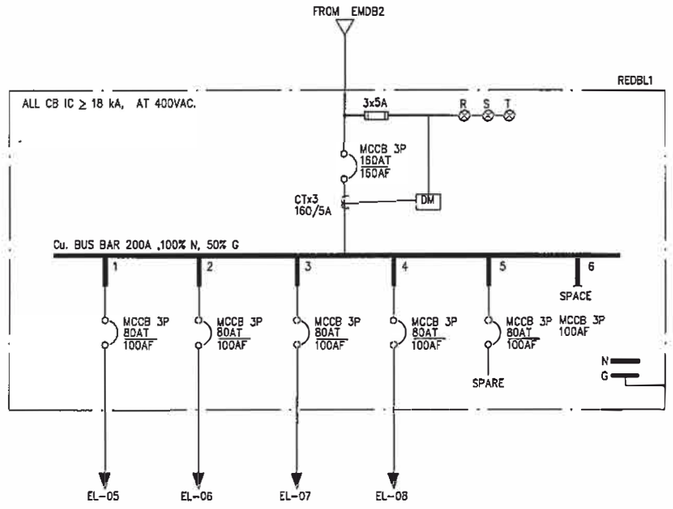
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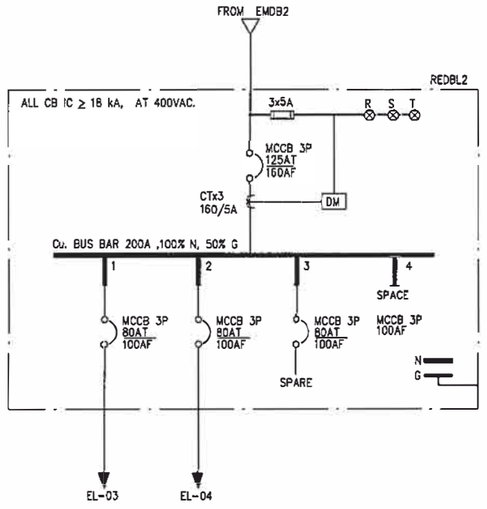
DRAWN BY :	SPH
DESIGN BY :	WTS
DATE :	31-08-2018
CHECKED BY :	WTS
PROJECT MGR. :	Chanitorn
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-01-007

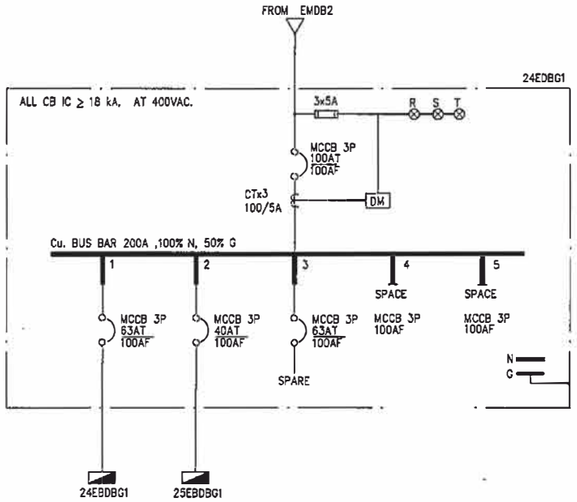
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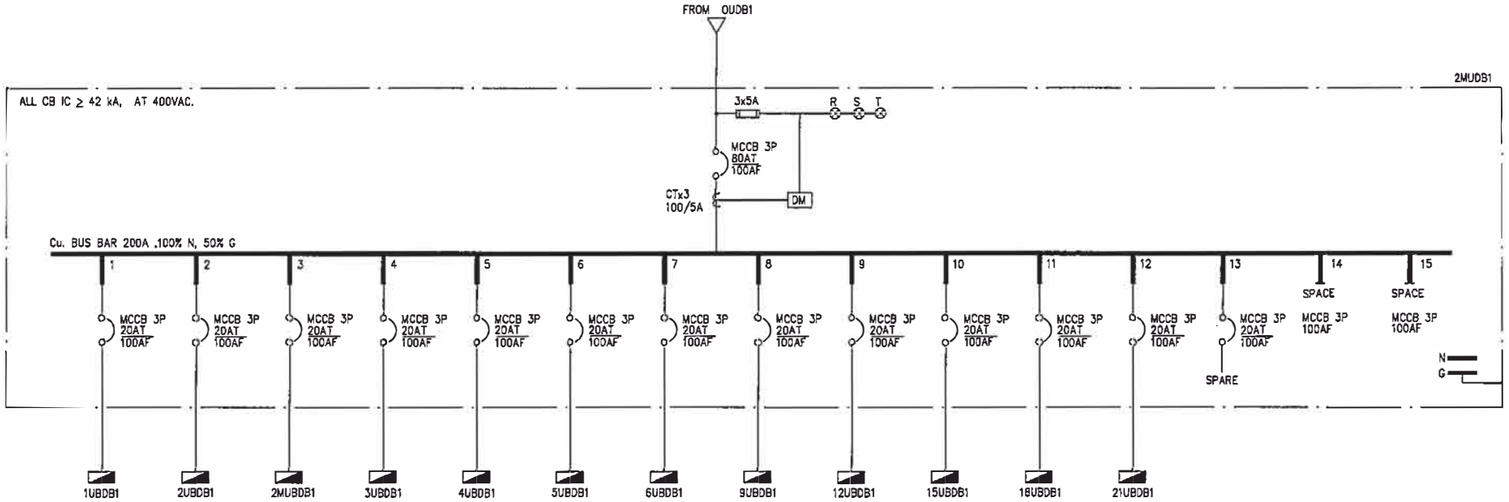
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NOTE :

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BENGAL hotels & resorts

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DHAKA 1212 BANGLADESH

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E-mail : interdes331@gmail.com

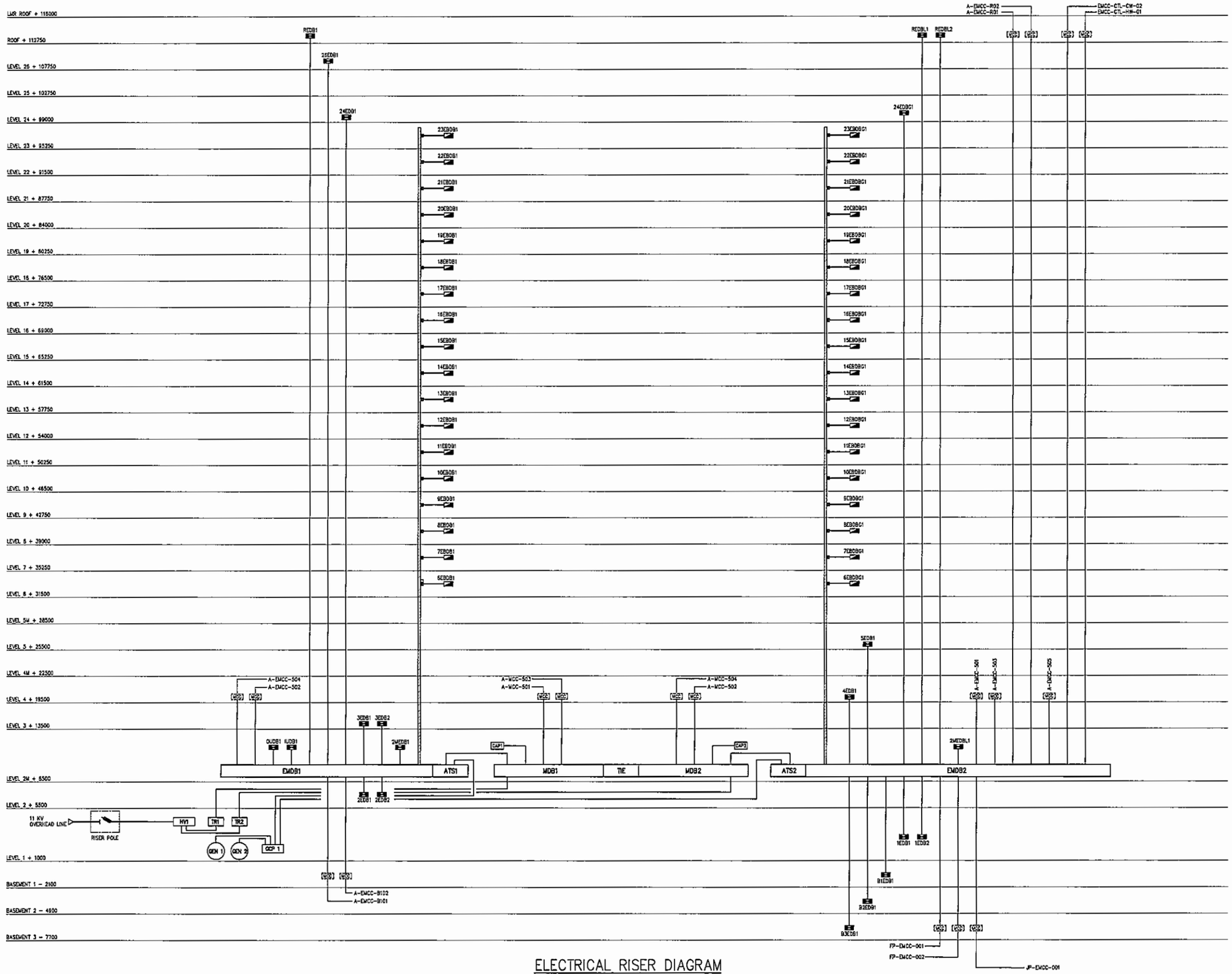
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
ELECTRICAL SINGLE LINE DIAGRAM (8)

DRAWN BY:	SPH
CHECKED BY:	WTS
DESIGN BY:	WTS
PROJECT MGR.:	Chonlatorn
DATE:	31-08-2018
SCALE:	AS SHOWN
PROJECT NO.	113073
DWG.NO.	MHB-EE-01-008

Ellades Pvt. Ltd.

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ELECTRICAL RISER DIAGRAM

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B	04-02-19	FINAL DESIGN	DEC				
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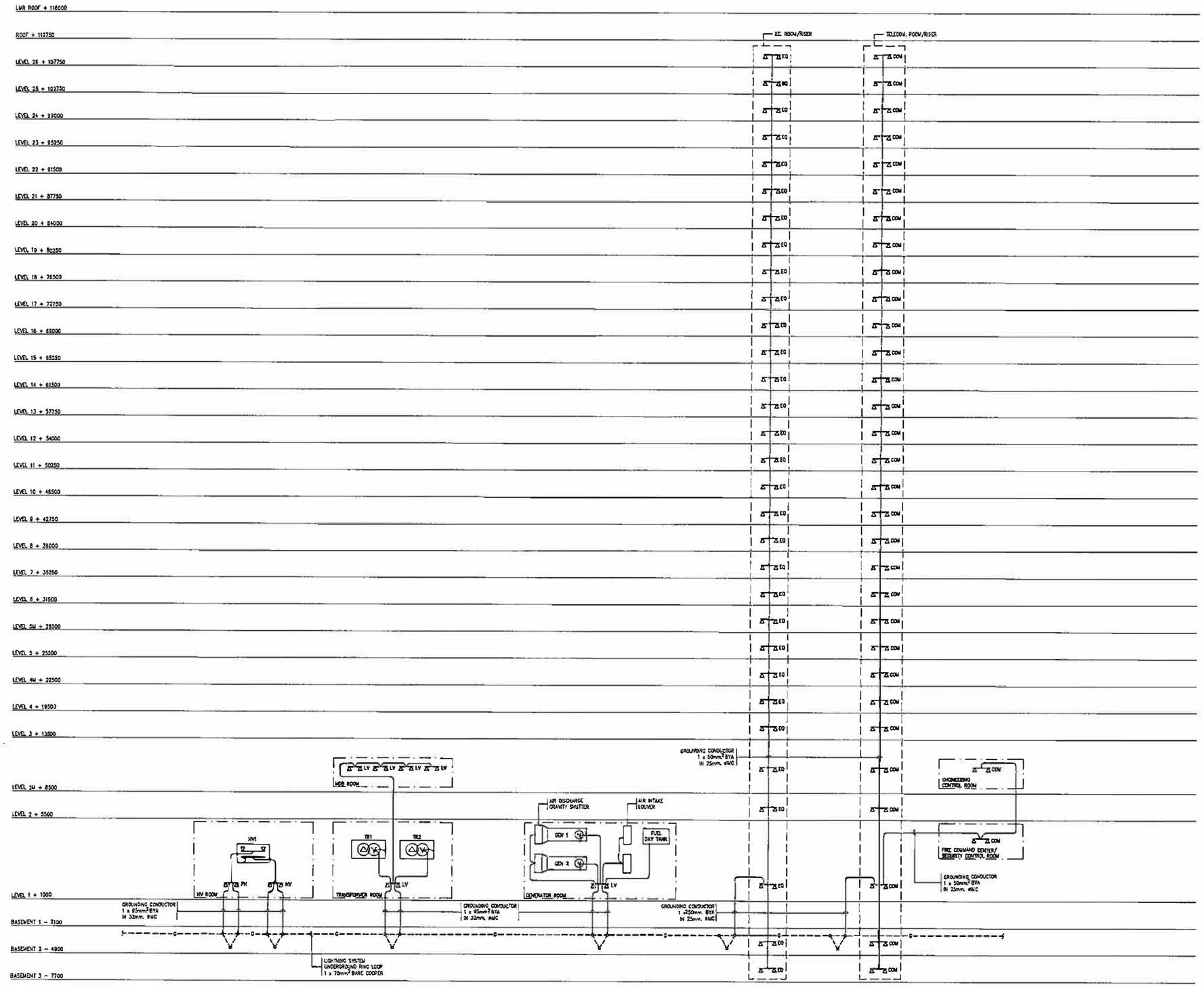
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
ELECTRICAL RISER DIAGRAM

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CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chaninorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	113073
DWG.NO.	MHB-EE-01-011

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EARTHING SYSTEM SCHEMATIC DIAGRAM

NOTE :

- PH = GROUND BAR FOR HV CABLE POT HEAD
- HV = GROUND BAR FOR HV SYSTEM
- LV = GROUND BAR FOR LV SYSTEM
- COM = GROUND BAR FOR TELECOMMUNICATION SYSTEM
- EQ = GROUND BAR FOR EQUIPOTENTIAL

REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC				
B	28-02-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

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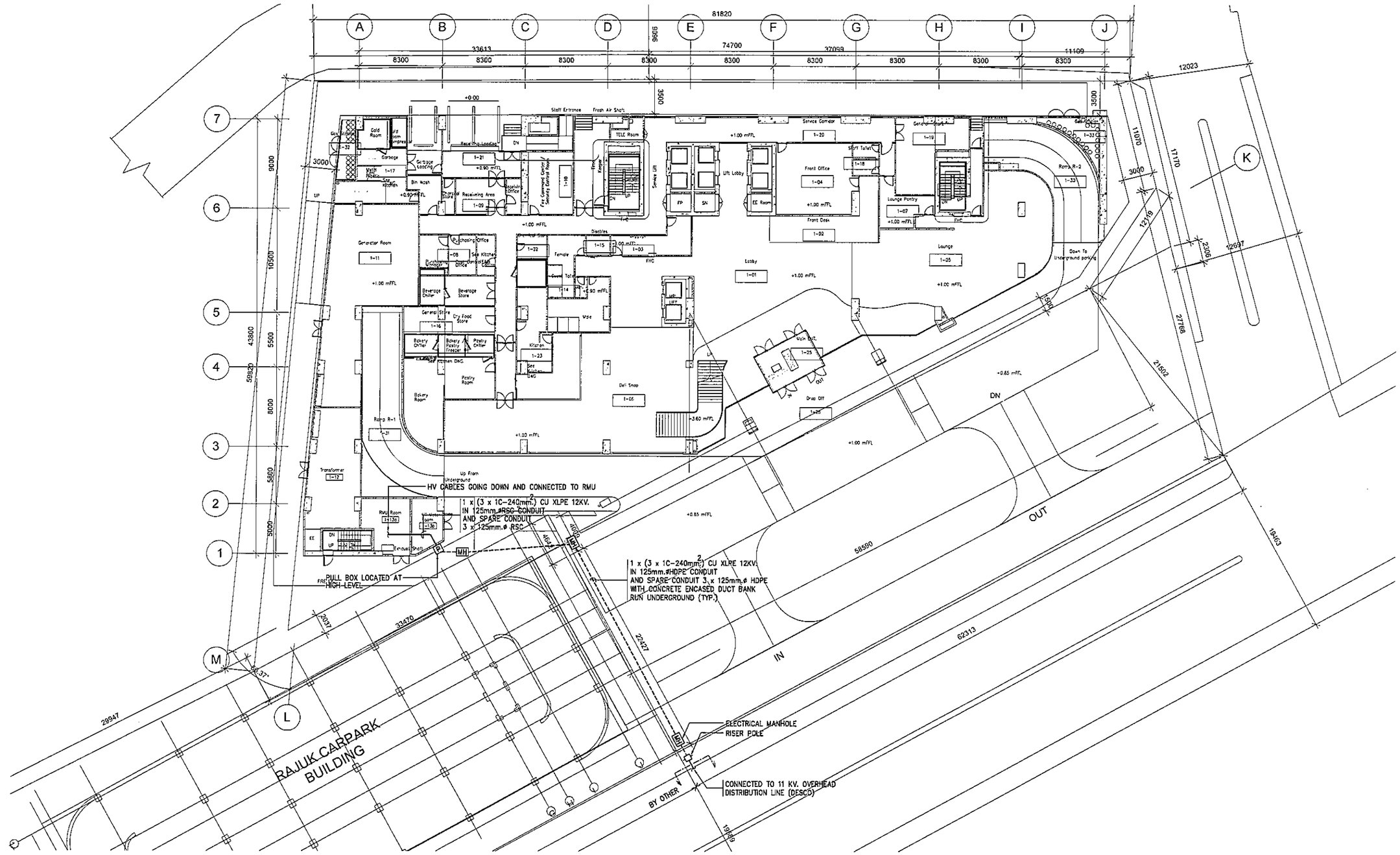
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EARTHING SYSTEM SCHEMATIC DIAGRAM

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT NGR. :	Chonintorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	113073
DWG.NO.	MHB-EE-01-021

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Jul 31, 2020 - 9:35am
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BENGAL HOTEL



MAIN INCOMMING ROUTIING FOR HIGH VOLTAGE SYSTEM

SCALE 1:200

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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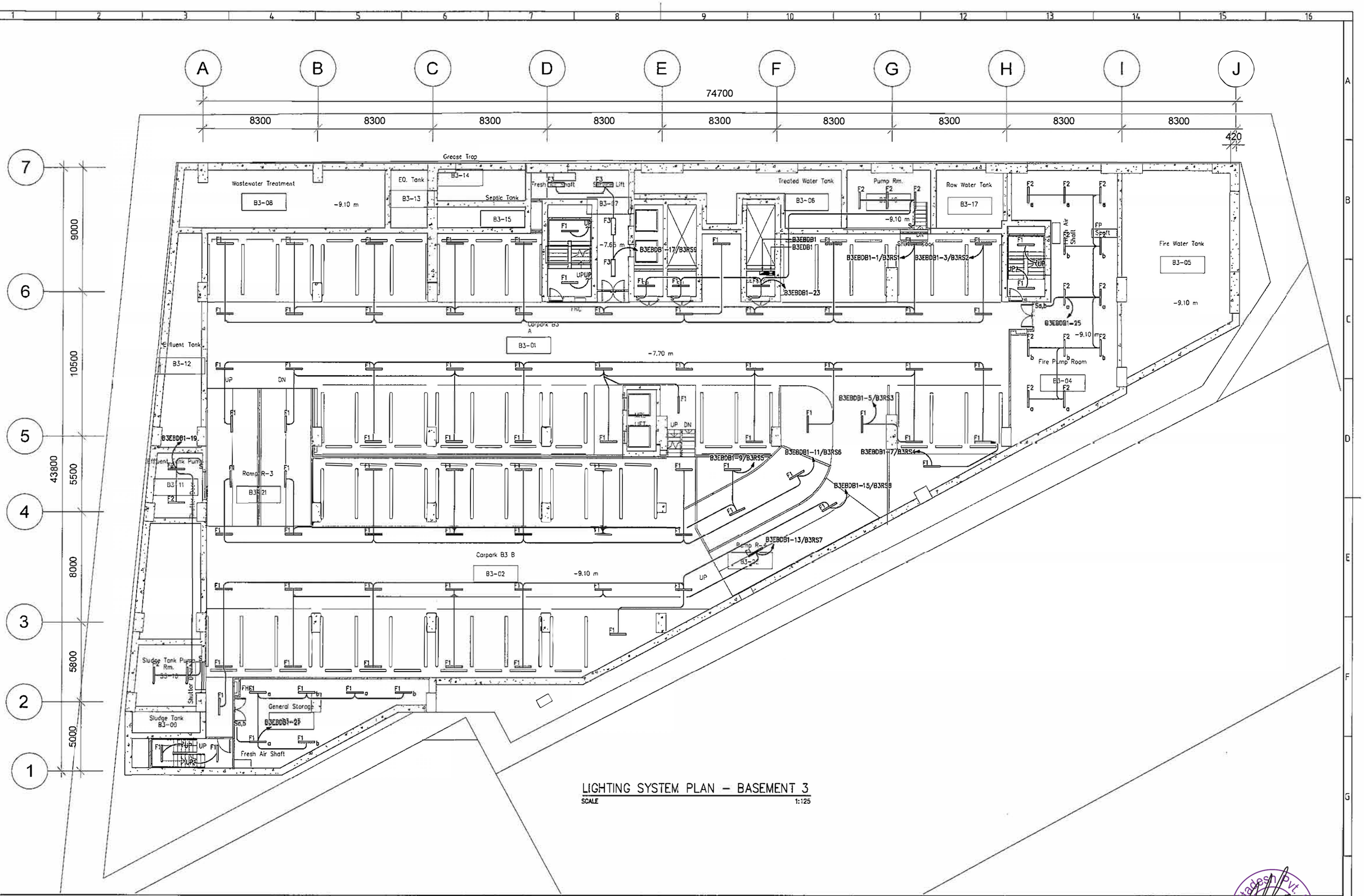
PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: MAIN INCOMMING ROUTING FOR HIGH VOLTAGE SYSTEM

DRAWN BY :	SPH
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DESIGN BY :	WTS
PROJECT MGR. :	Chaninton
DATE :	31-08-2018
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DWG.NO.	MHB-EE-01-031

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LIGHTING SYSTEM PLAN – BASEMENT 3

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC				
B	28-02-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

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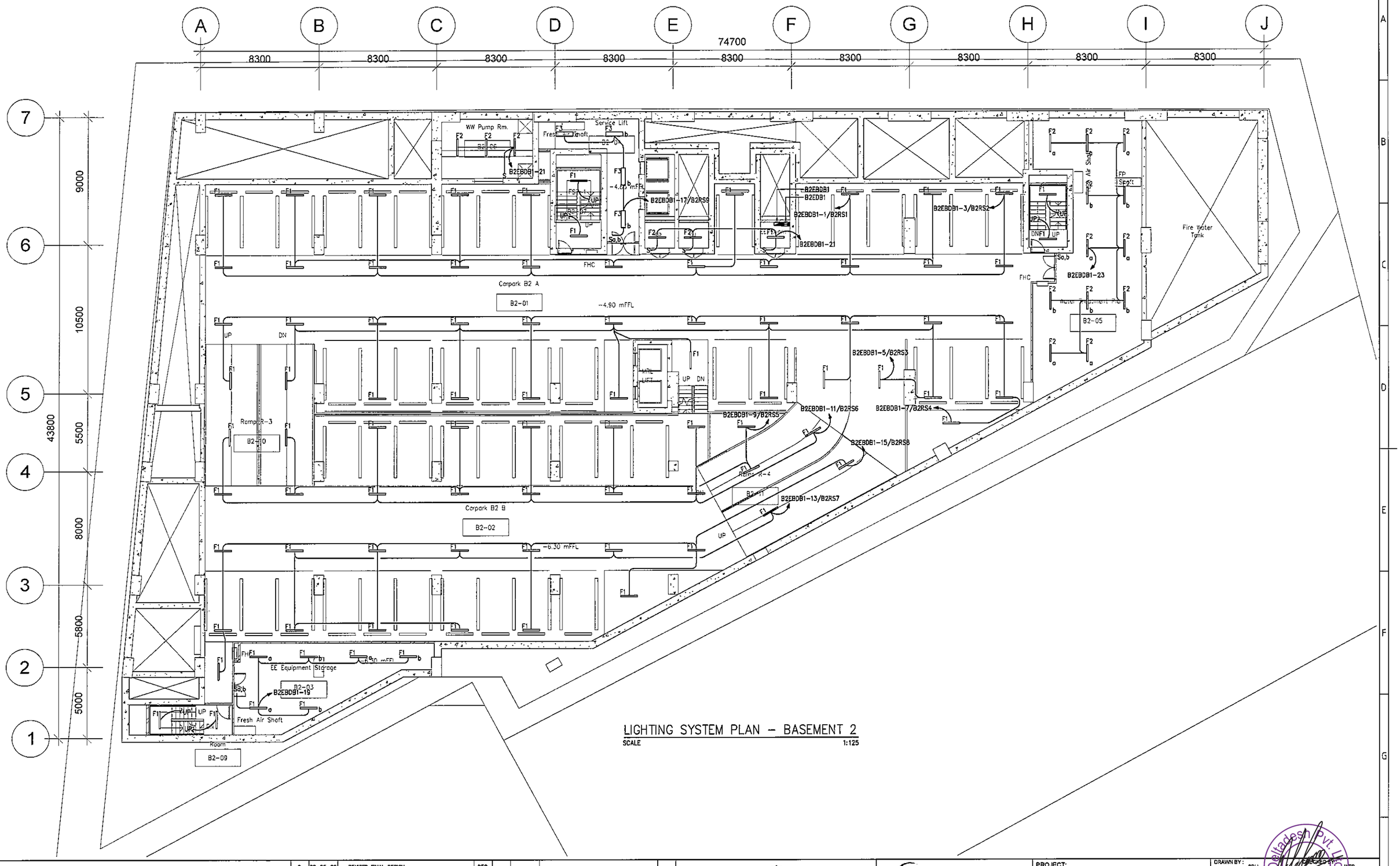
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTING SYSTEM PLAN - BASEMENT 3

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chanintorn
DATE :	31-08-2018
SCALE	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-02-001

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LIGHTING SYSTEM PLAN – BASEMENT 2

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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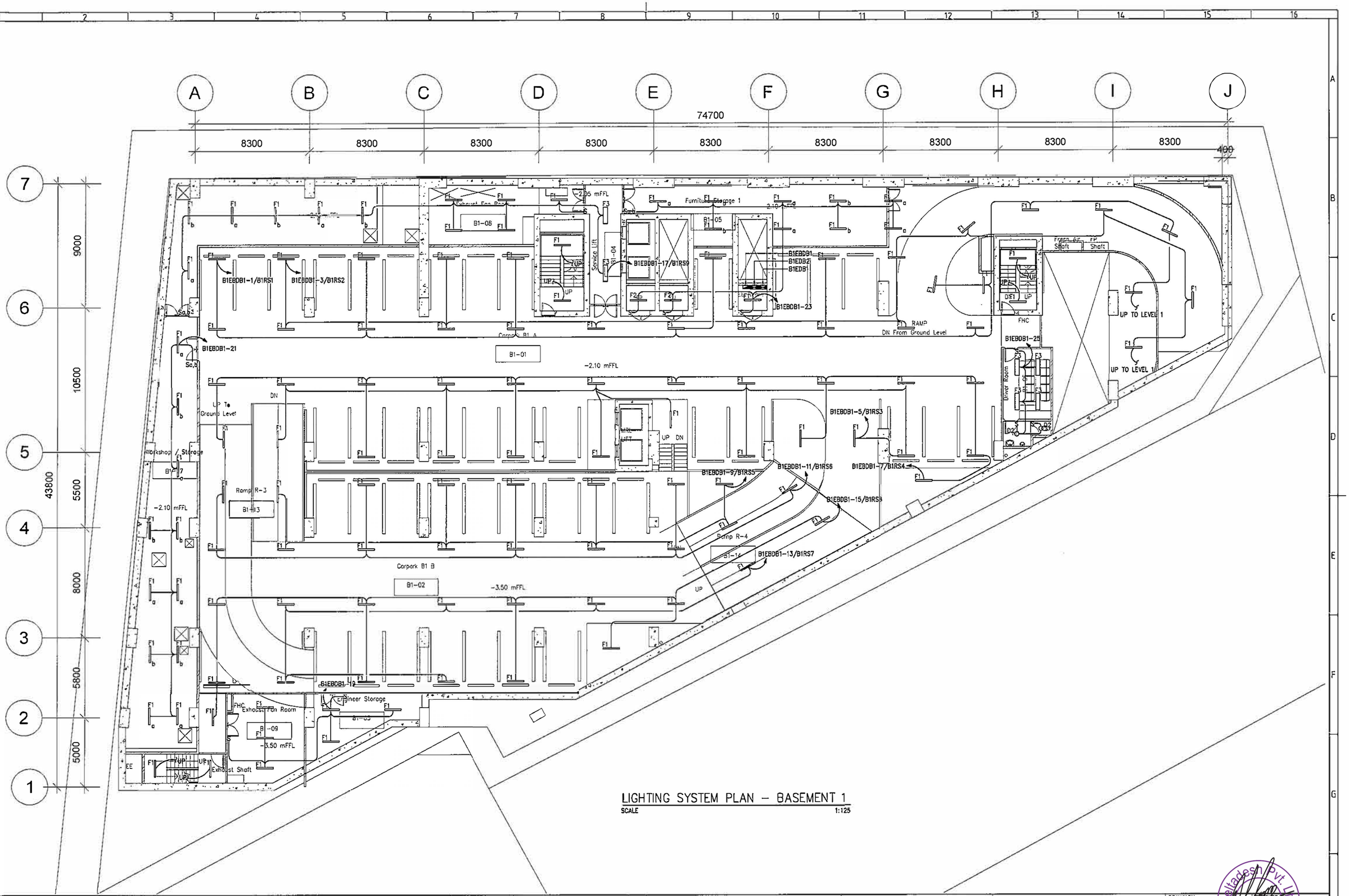
PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: LIGHTING SYSTEM PLAN - BASEMENT 2

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chaninton
DATE :	31-05-2018	SCALE :	AS SHOWN
PROJECT NO.	113073		
DWG.NO.	MHB-EE-02-002		

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LIGHTING SYSTEM PLAN – BASEMENT 1

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
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--	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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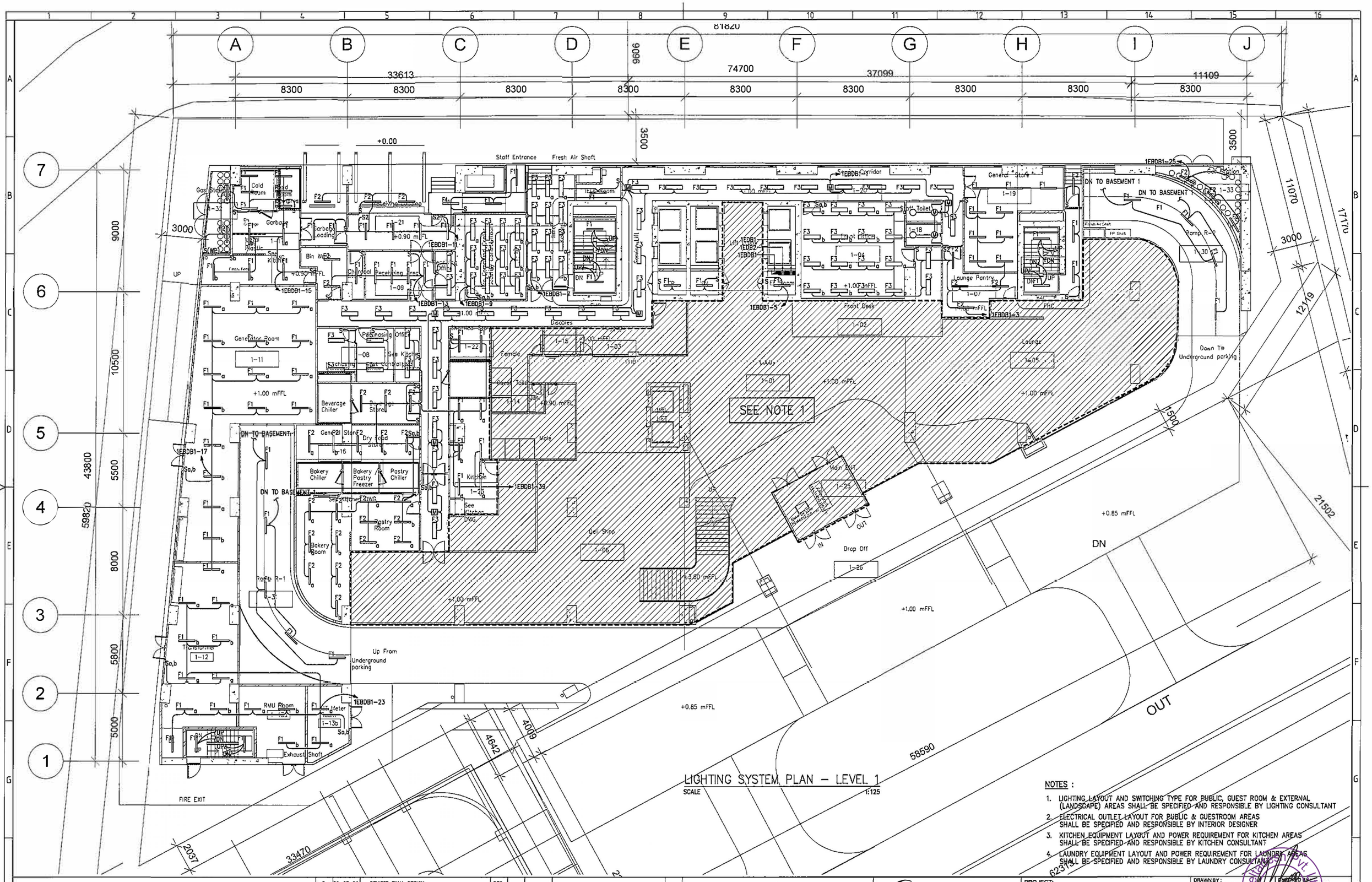
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTING SYSTEM PLAN - BASEMENT 1

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chonintorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1130723		
DWG.NO.	MHB-EE-02-003		

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LIGHTING SYSTEM PLAN – LEVEL 1

SCALE 1:125

NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT
2. ELECTRICAL OUTLET LAYOUT FOR PUBLIC & GUESTROOM AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY INTERIOR DESIGNER
3. KITCHEN EQUIPMENT LAYOUT AND POWER REQUIREMENT FOR KITCHEN AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY KITCHEN CONSULTANT
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A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

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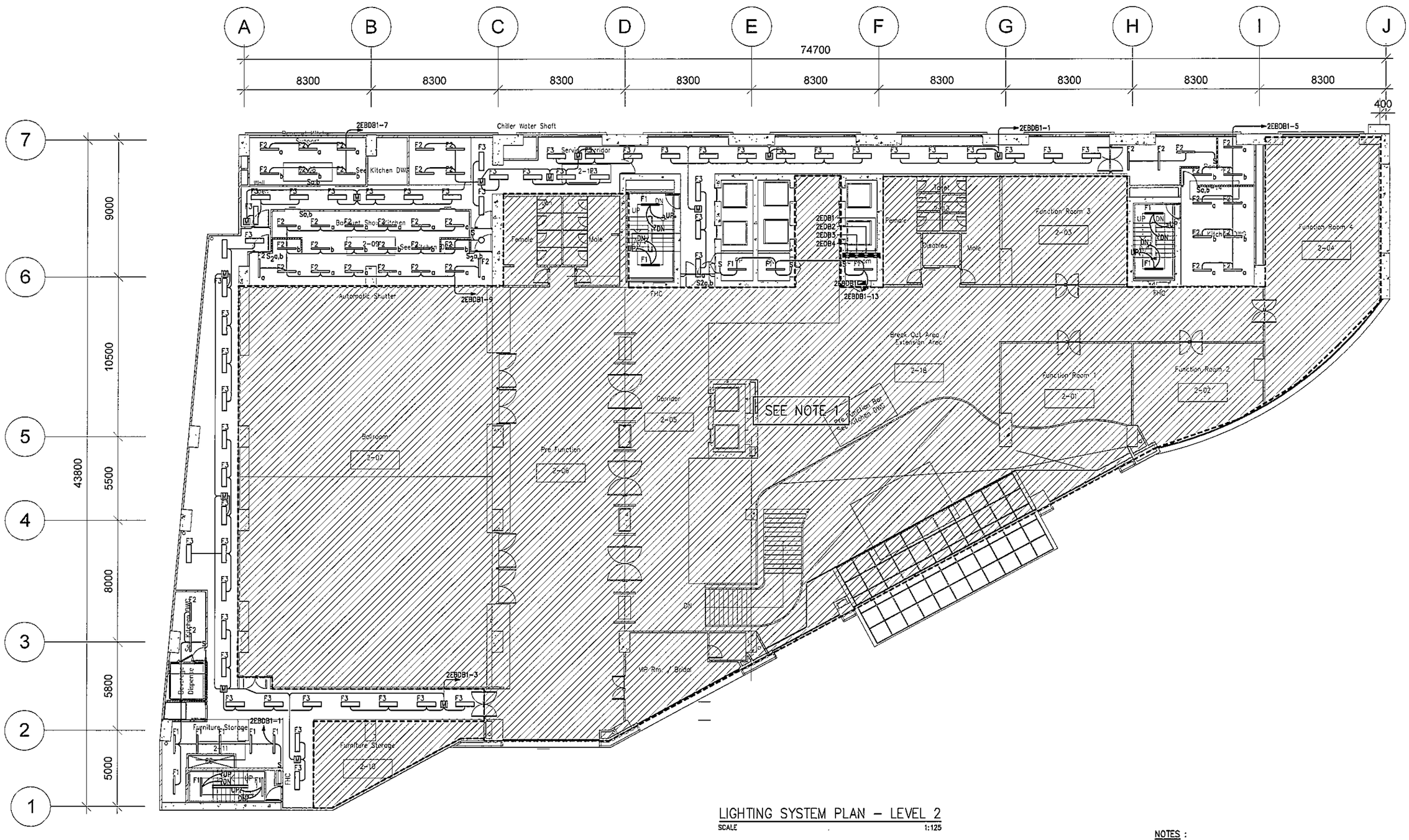
PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: LIGHTING SYSTEM PLAN - LEVEL 1

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Dhonirorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-02-004

Received Dhaka

PLT:Jul 31, 2020 - 1:52pm
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LIGHTING SYSTEM PLAN – LEVEL 2

SCALE 1:125

NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT
2. ELECTRICAL OUTLET LAYOUT FOR PUBLIC & GUESTROOM AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY INTERIOR DESIGNER
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C	29-05-20	REVISED FINAL DESIGN	DEC				
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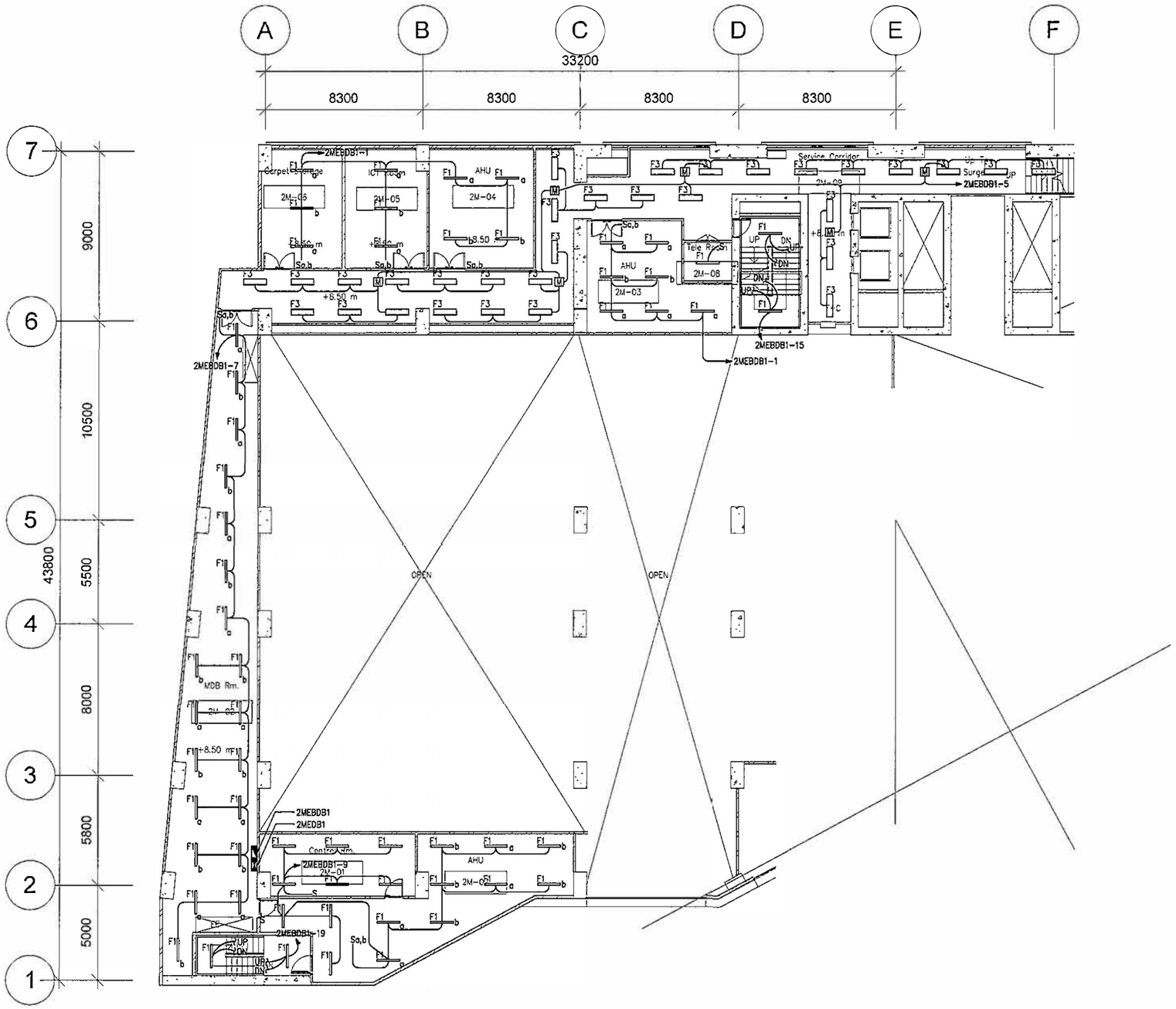
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTING SYSTEM PLAN - LEVEL 2

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Phanitorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-02-005

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LIGHTING SYSTEM PLAN – LEVEL 2M

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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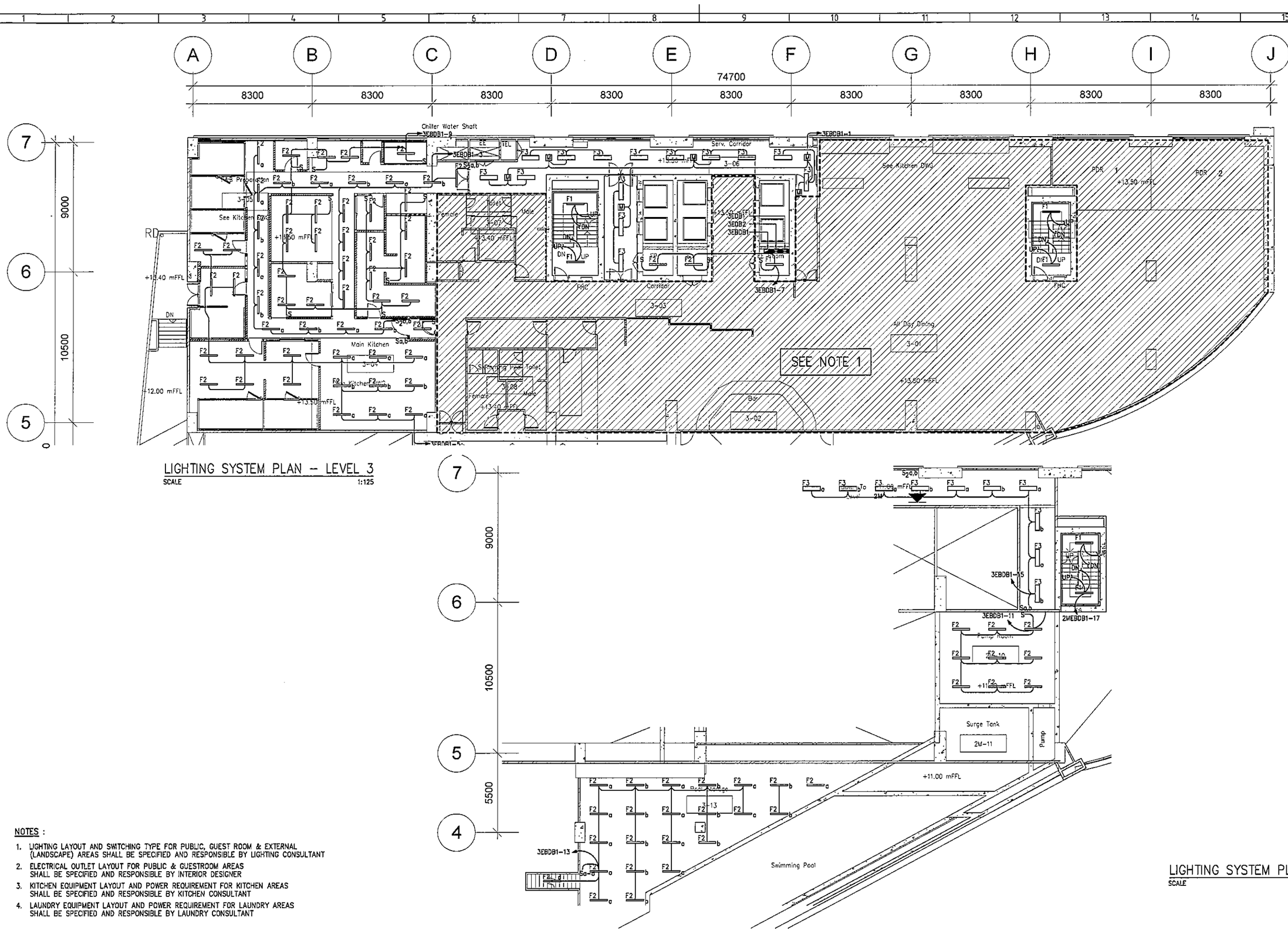
PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: LIGHTING SYSTEM PLAN - LEVEL 2M

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chonintorn
DATE :	31-08-2018	SCALE	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 0 2 - 0 0 6		

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NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT
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C	29-05-20	REVISED FINAL DESIGN	DEC				
B	28-02-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

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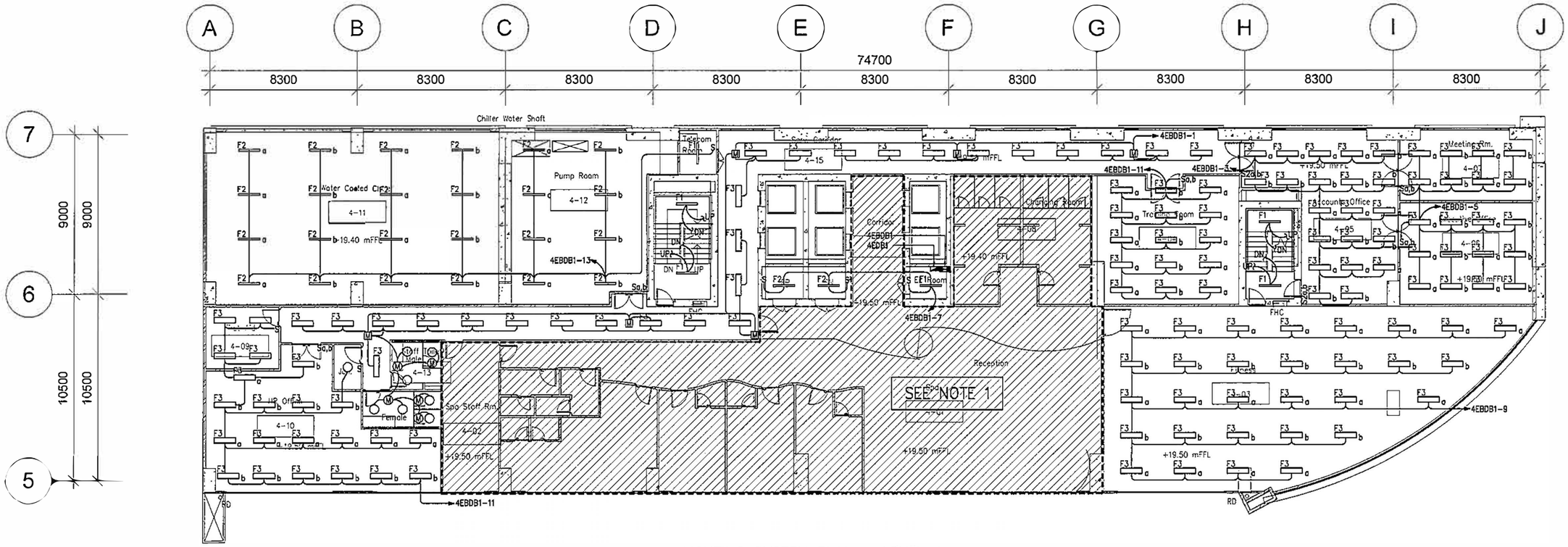
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTING SYSTEM PLAN - LEVEL 3

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chanintorn
DATE :	31-08-2018	SCALE	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 0 2 - 0 0 7		

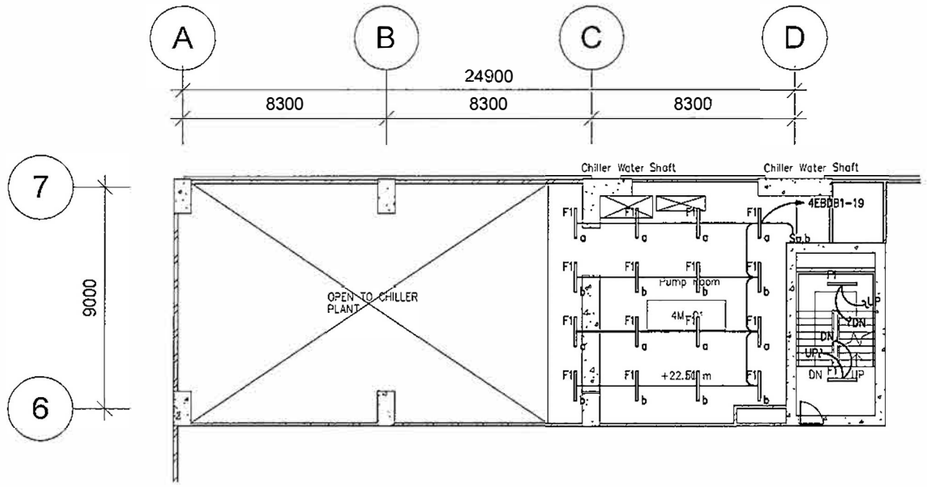
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LIGHTING SYSTEM PLAN – LEVEL 4

SCALE 1:125



LIGHTING SYSTEM PLAN – LEVEL 4M

SCALE 1:125

NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT
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BENGAL hotels & resorts

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C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
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–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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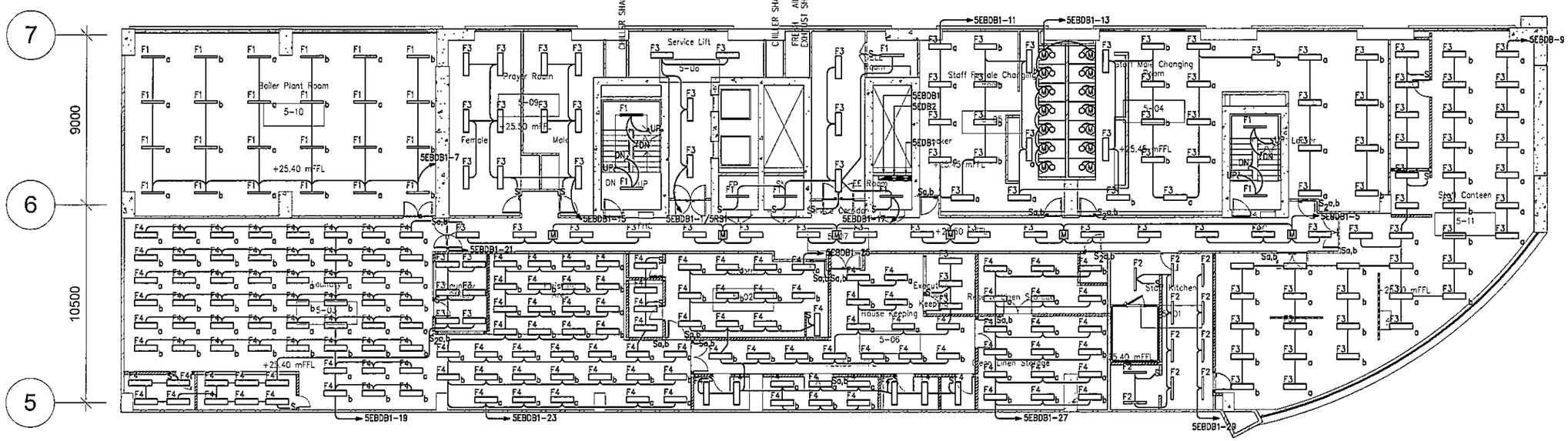
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTING SYSTEM PLAN - LEVEL 4 AND LEVEL 4M

DRAWN BY : SPH
CHECKED BY : WTS
DESIGN BY : WTS
PROJECT MGR. : Chonintorn
DATE : 31-08-2018
SCALE : AS SHOWN
PROJECT NO. 1130737
DWG.NO. MHB-EE-02-008

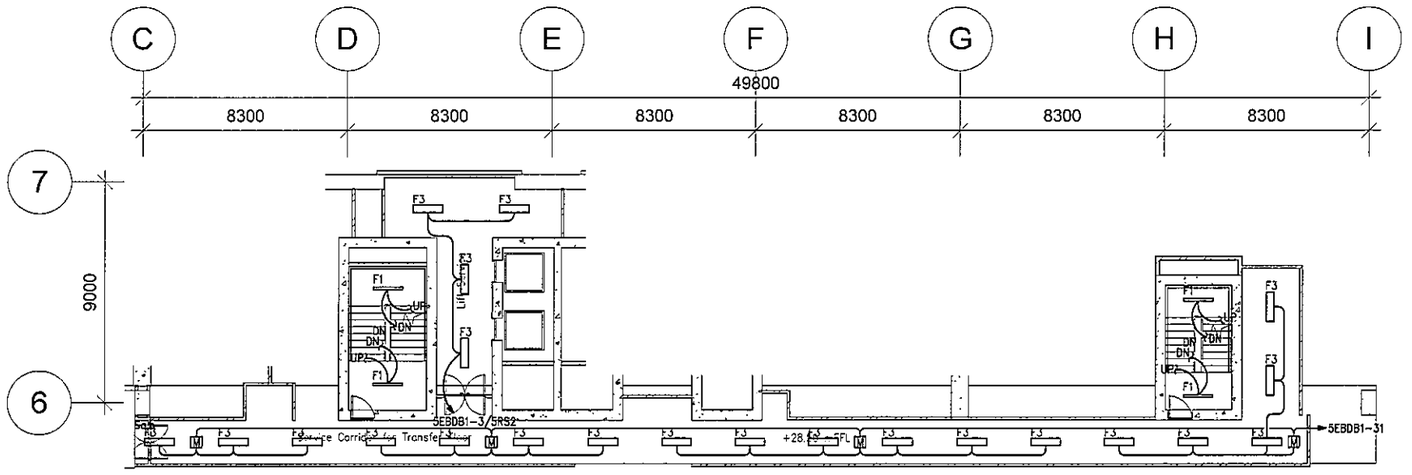
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LIGHTING SYSTEM PLAN – LEVEL 5

SCALE 1:125



LIGHTING SYSTEM PLAN – LEVEL 5M

SCALE 1:125

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BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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A	31-08-18	FINAL DESIGN	DEC				
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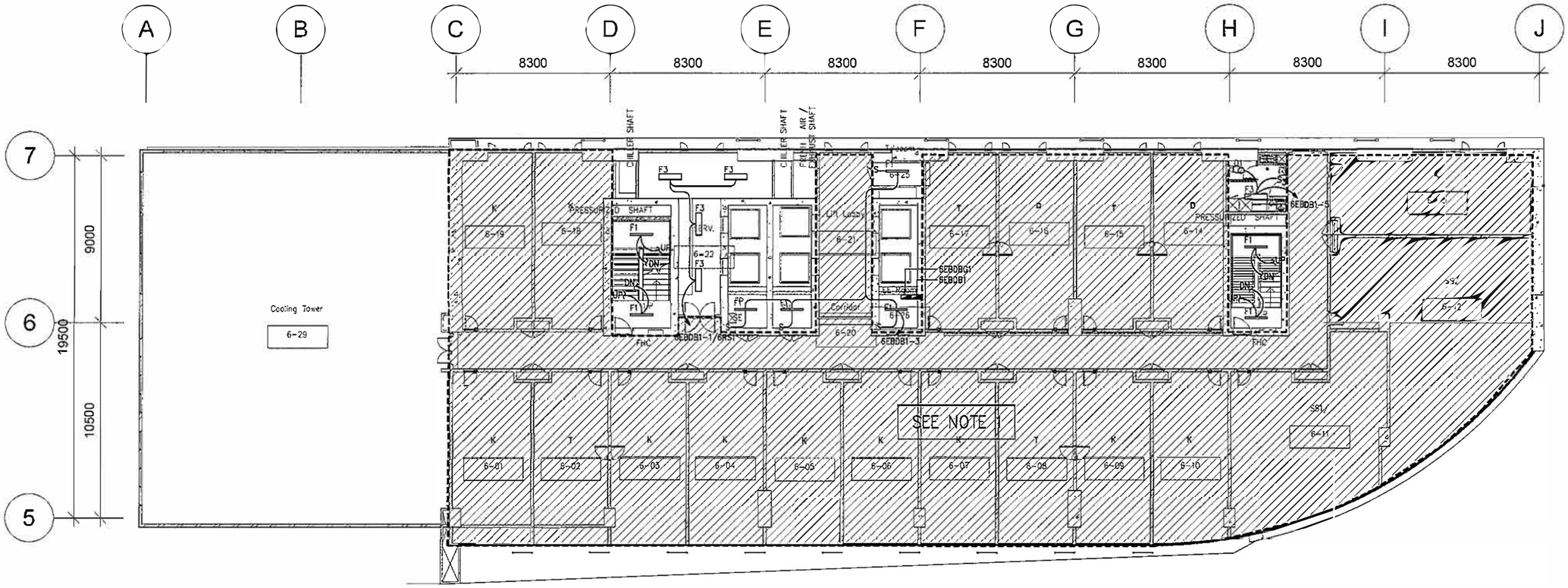
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTING SYSTEM PLAN - LEVEL 5 AND LEVEL 5M

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chanintorn
DATE :	31-08-2018
SCALE :	1:125 AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	M H B - E E - 0 2 - 0 0 9

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LIGHTING SYSTEM PLAN – LEVEL 6

SCALE 1:125

NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT
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BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
--	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
0	31-07-20	REVISED FINAL DESIGN	DEC

DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
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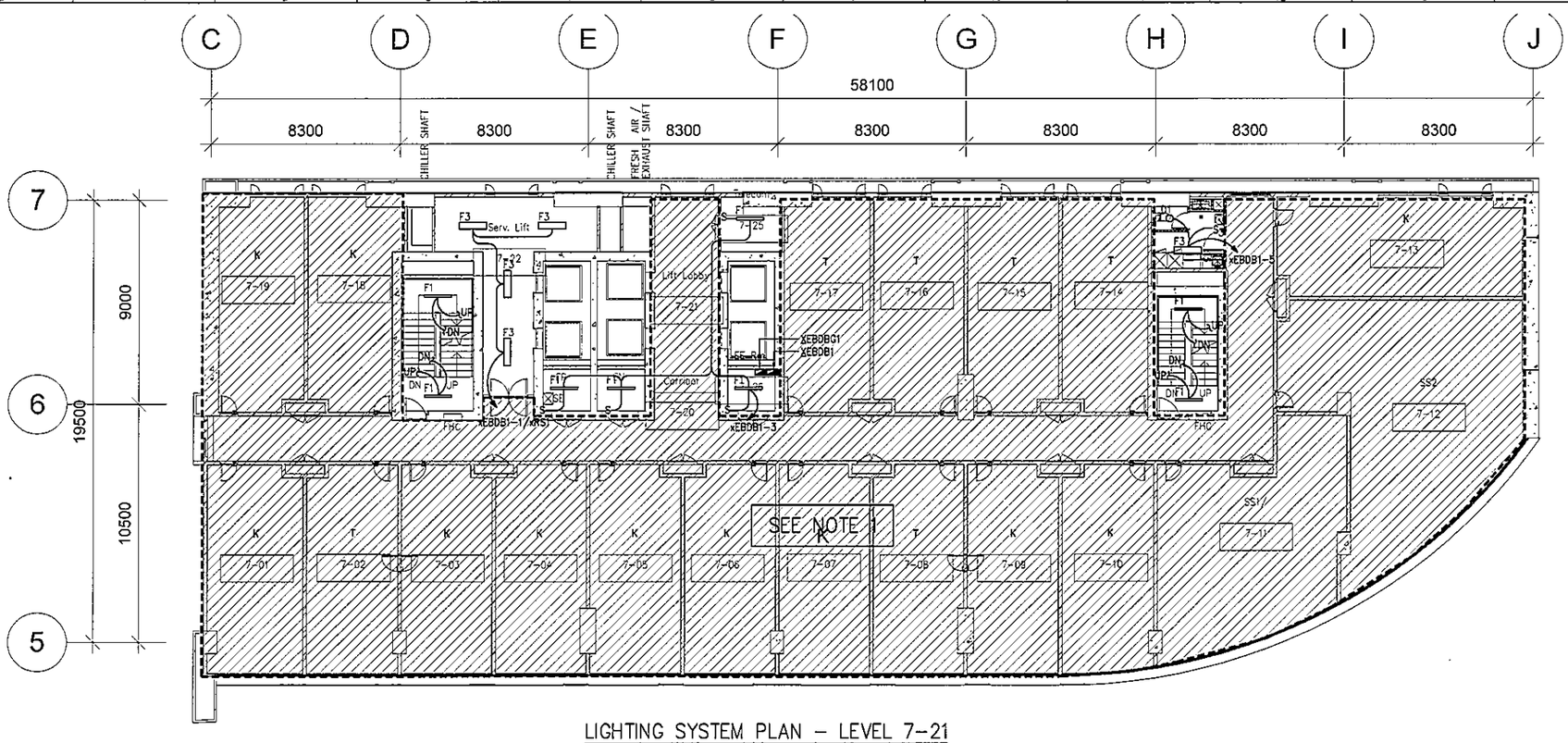
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTING SYSTEM PLAN - LEVEL 6

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT ENGR. :	Chonlatorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 0 2 - 0 1 0		

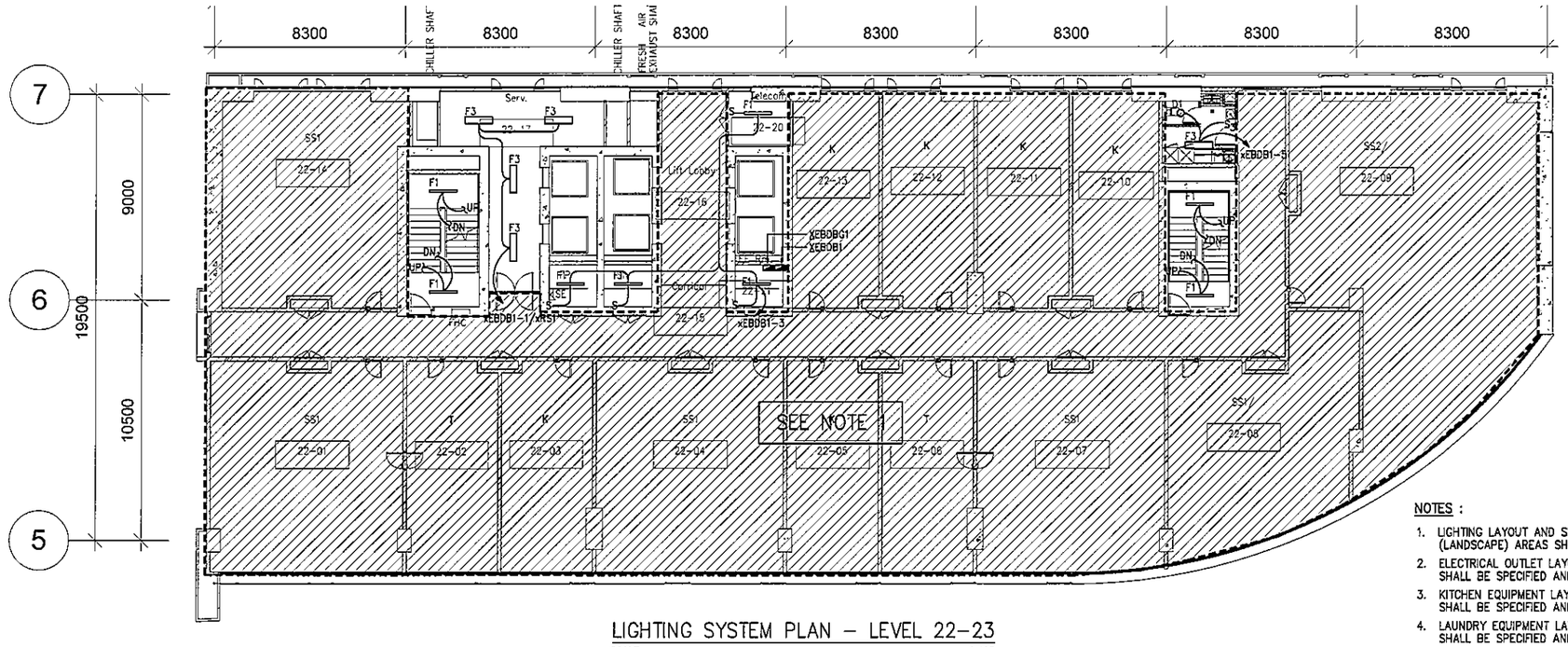
Delta Engineering Co., Ltd. Dhaka

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LIGHTING SYSTEM PLAN – LEVEL 7–21

SCALE 1:125



LIGHTING SYSTEM PLAN – LEVEL 22–23

SCALE 1:125

NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT
2. ELECTRICAL OUTLET LAYOUT FOR PUBLIC & GUESTROOM AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY INTERIOR DESIGNER
3. KITCHEN EQUIPMENT LAYOUT AND POWER REQUIREMENT FOR KITCHEN AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY KITCHEN CONSULTANT
4. LAUNDRY EQUIPMENT LAYOUT AND POWER REQUIREMENT FOR LAUNDRY AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LAUNDRY CONSULTANT

BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DAKHA 1212 BANGLADESH

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B	28-02-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

DEC

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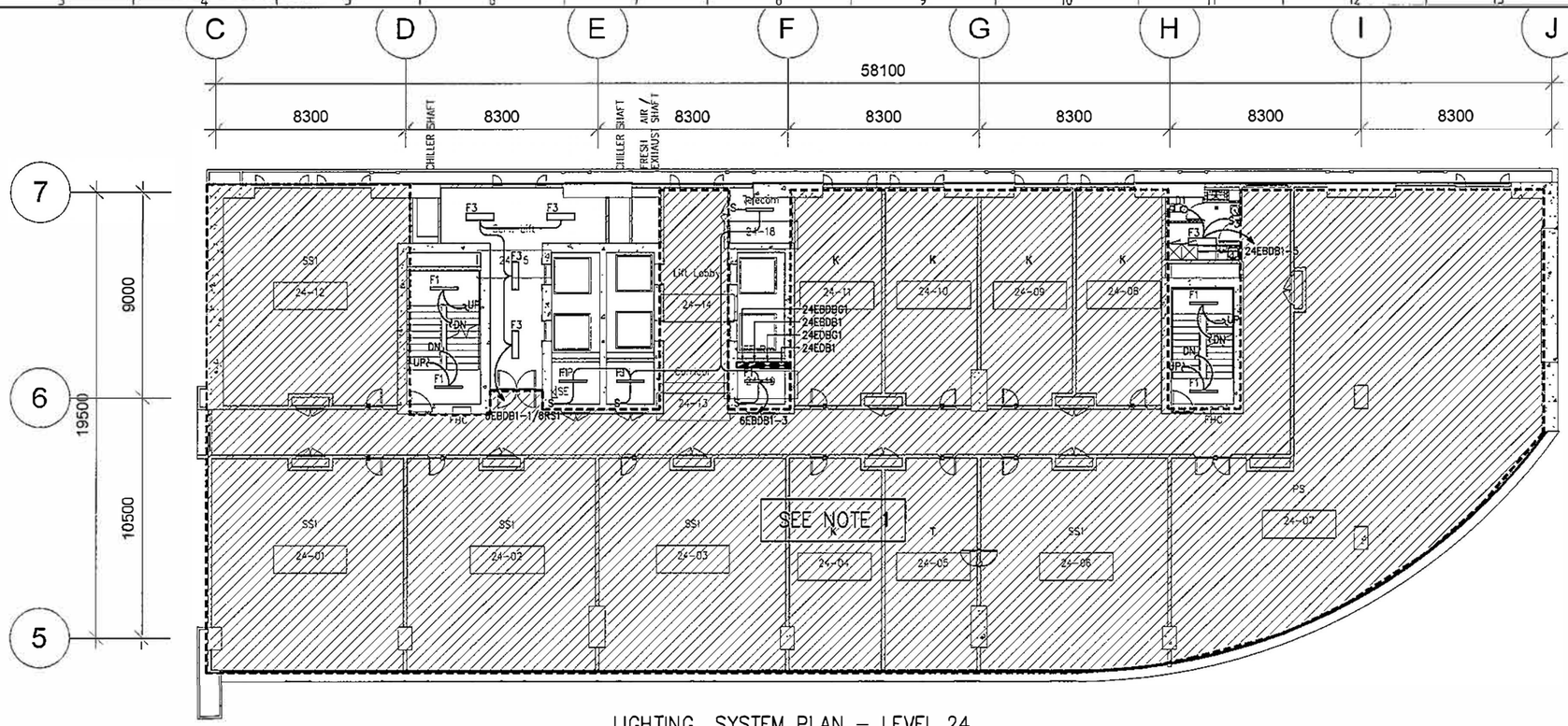
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTING SYSTEM PLAN - LEVEL 7-21 & LEVEL 22-23

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chanintorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	M H B - E E - 0 2 - 0 1 1

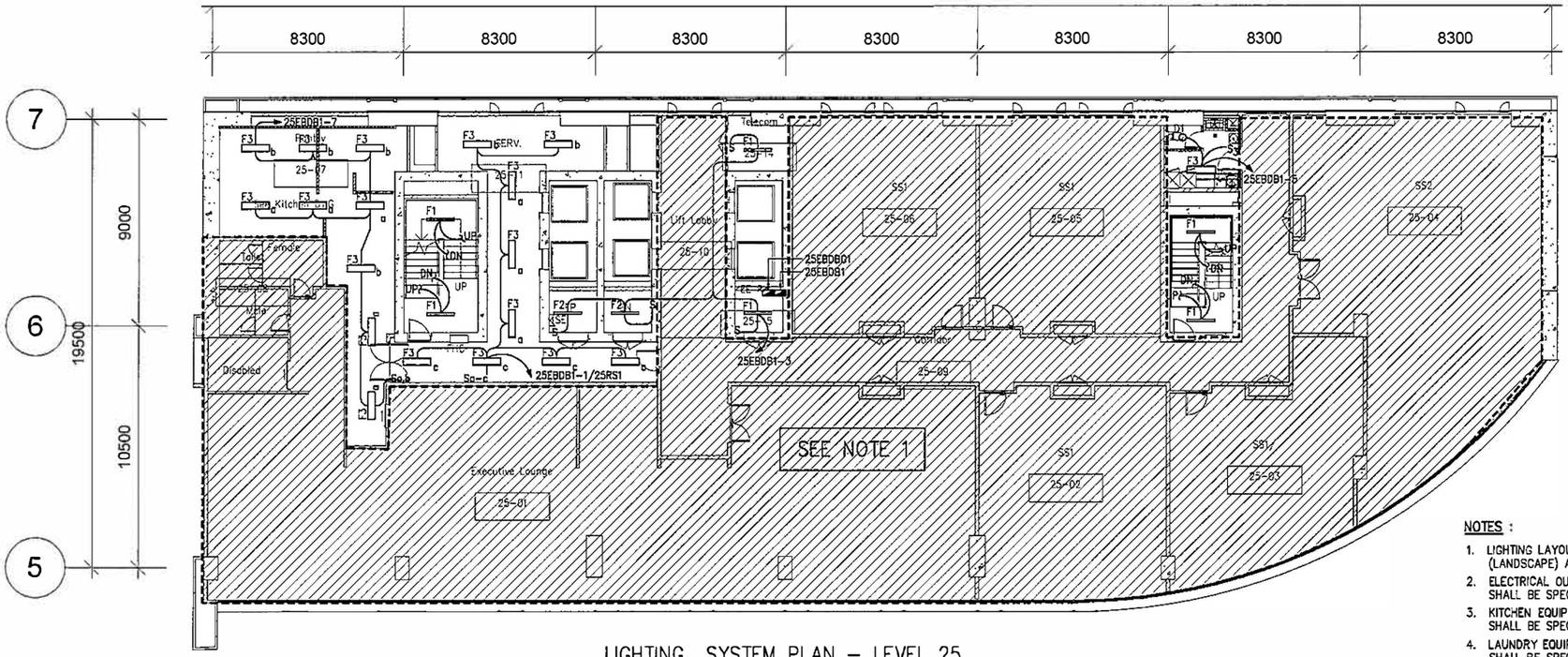
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LIGHTING SYSTEM PLAN – LEVEL 24

SCALE 1:125



LIGHTING SYSTEM PLAN – LEVEL 25

SCALE 1:125

NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT
2. ELECTRICAL OUTLET LAYOUT FOR PUBLIC & GUESTROOM AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY INTERIOR DESIGNER
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BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

DEC

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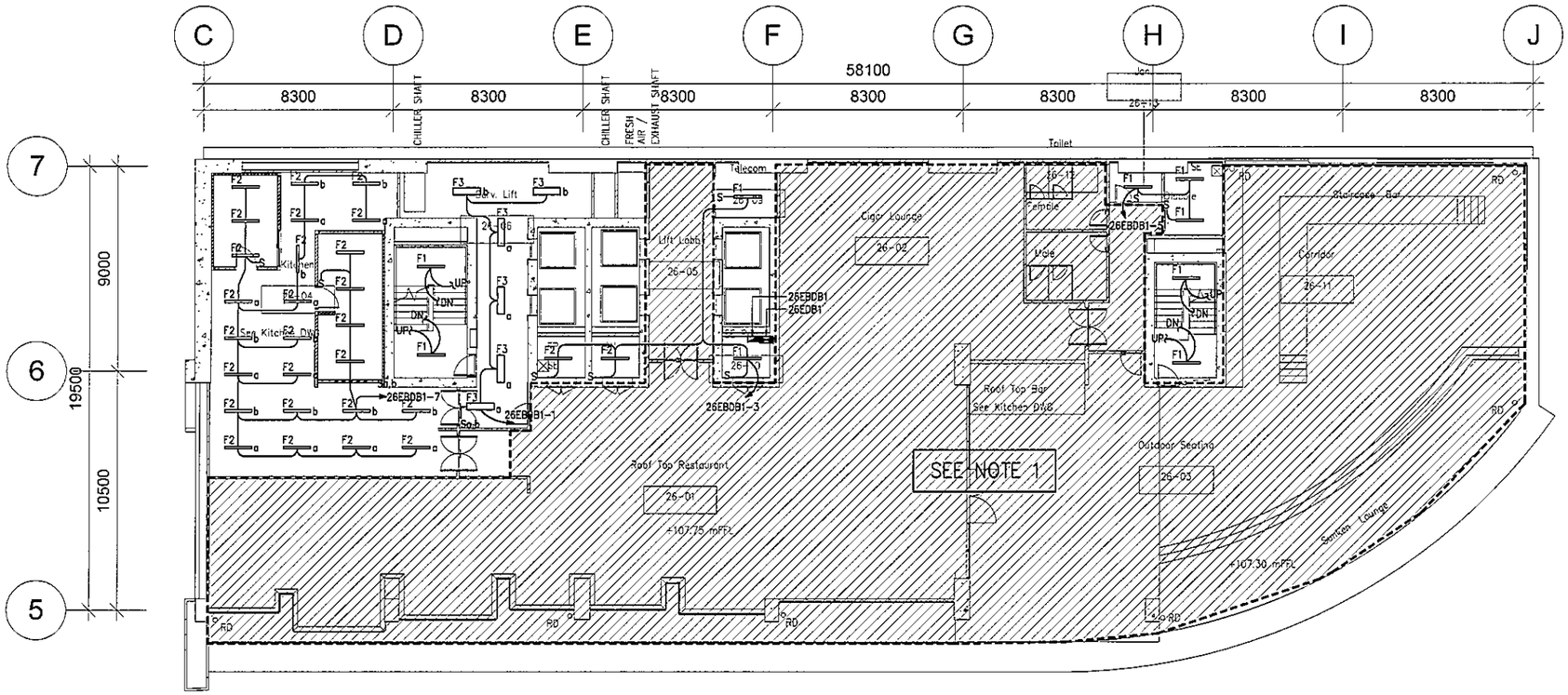
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTING SYSTEM PLAN - LEVEL 24 AND LEVEL 25

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chanintorn
DATE :	31-08-2018
SCALE	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-02-012

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LIGHTING SYSTEM PLAN – LEVEL 26

SCALE 1:125

NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT
2. ELECTRICAL OUTLET LAYOUT FOR PUBLIC & GUESTROOM AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY INTERIOR DESIGNER
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BENGAL hotels & resorts

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BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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B	28-02-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

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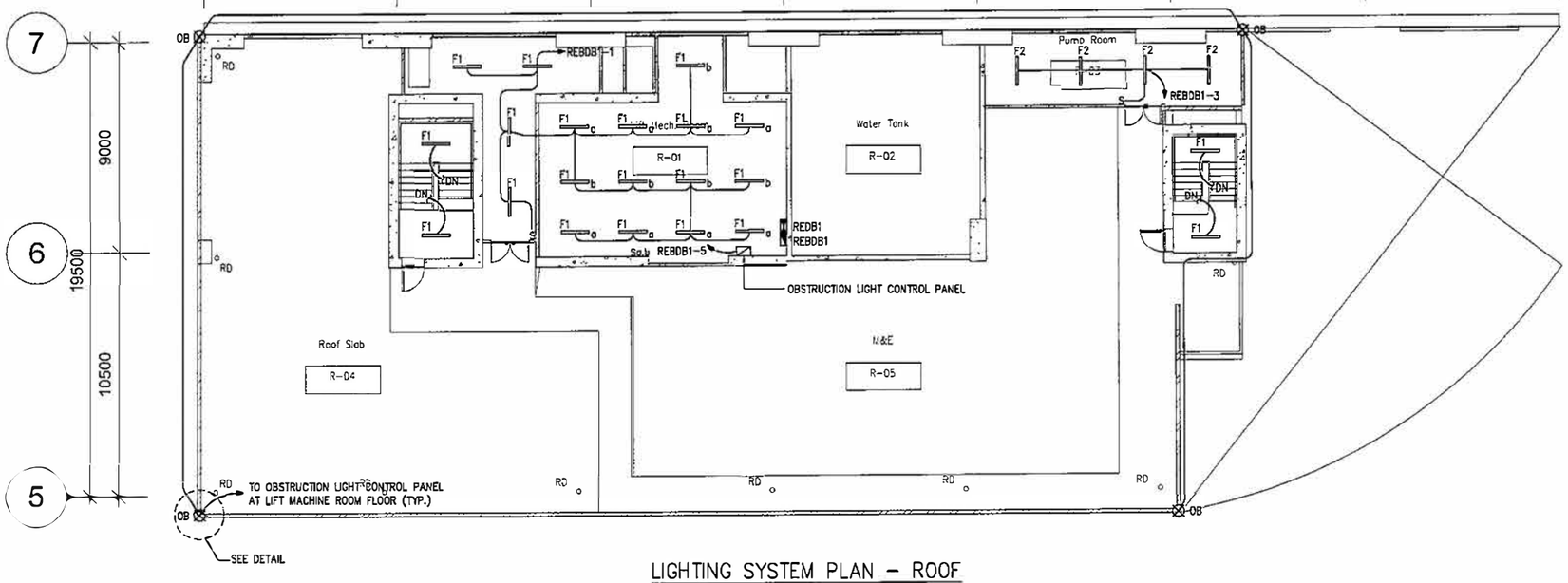
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTING SYSTEM PLAN - LEVEL 26

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chanintorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	M H B - E E - 0 2 - 0 1 3

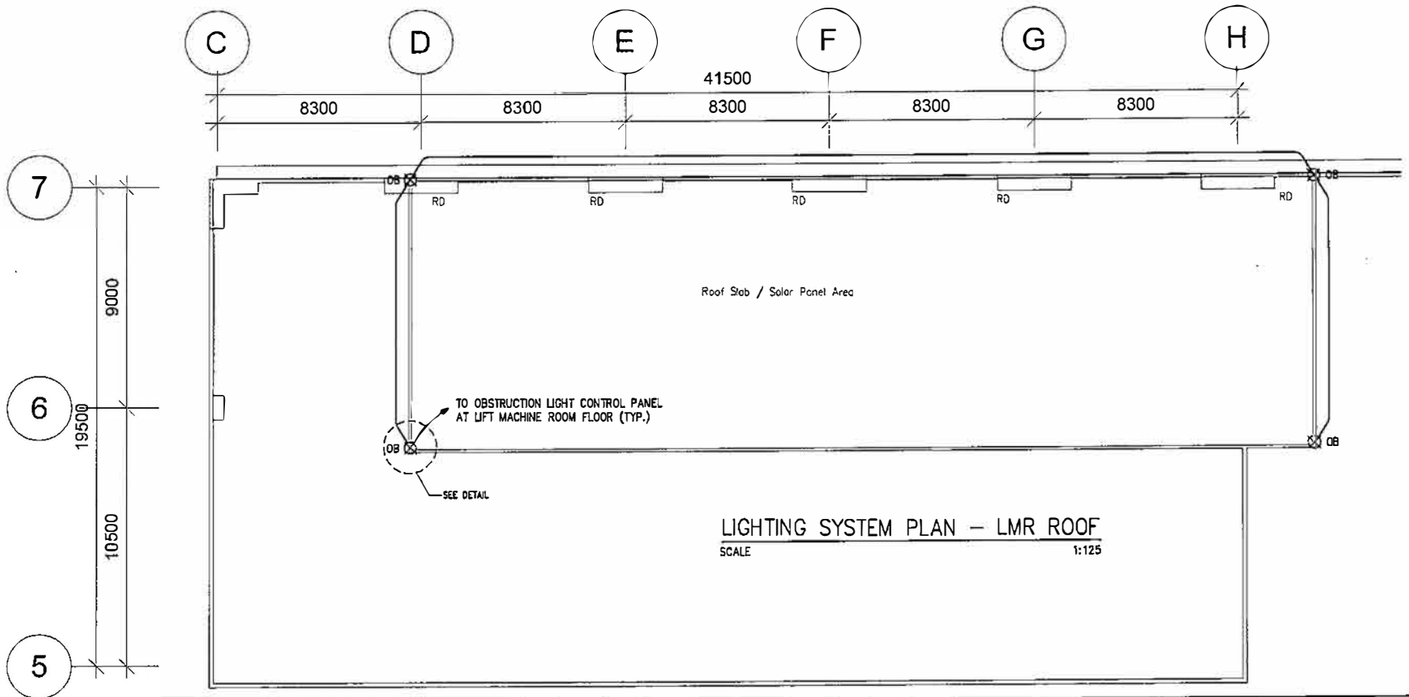
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LIGHTING SYSTEM PLAN – ROOF

SCALE 1:125



LIGHTING SYSTEM PLAN – LMR ROOF

SCALE 1:125

BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHHTING SYSTEM PLAN - ROOF AND LMR ROOF

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chonintorn
DATE :	31-08-2018	SCALE :	1:125 AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 0 2 - 0 1 4		

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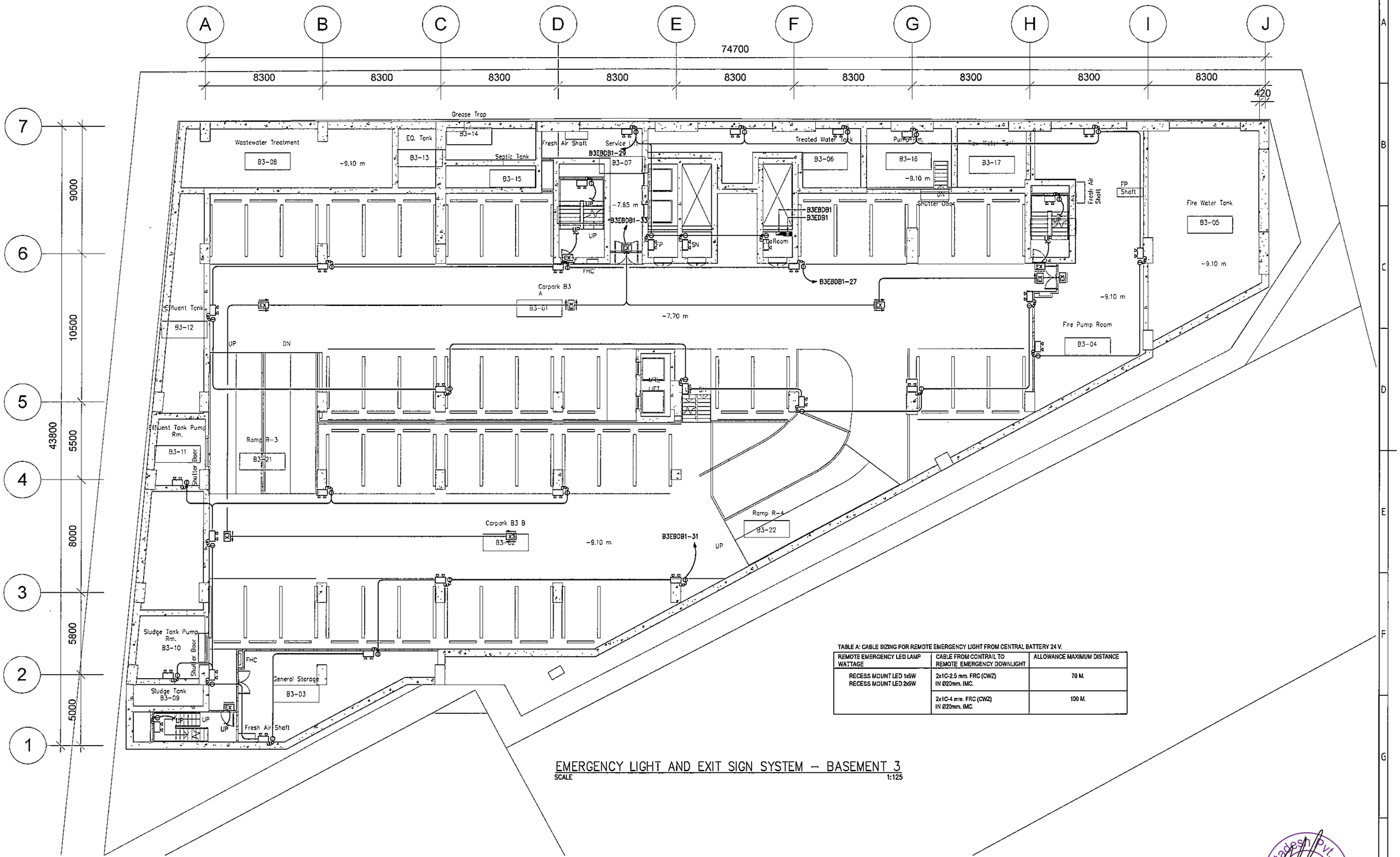


TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm. FRC (CWZ) IN Ø20mm. IMC.	70 M.
	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.

EMERGENCY LIGHT AND EXIT SIGN SYSTEM – BASEMENT 3

SCALE 1:125

BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM - BASEMENT 3

DRAWN BY :	SPH
DESIGN BY :	WTS
DATE :	31-08-2018
CHECKED BY :	WTS
PROJECT NO. :	Chanintorn
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	M H B - E E - 0 3 - 0 0 1

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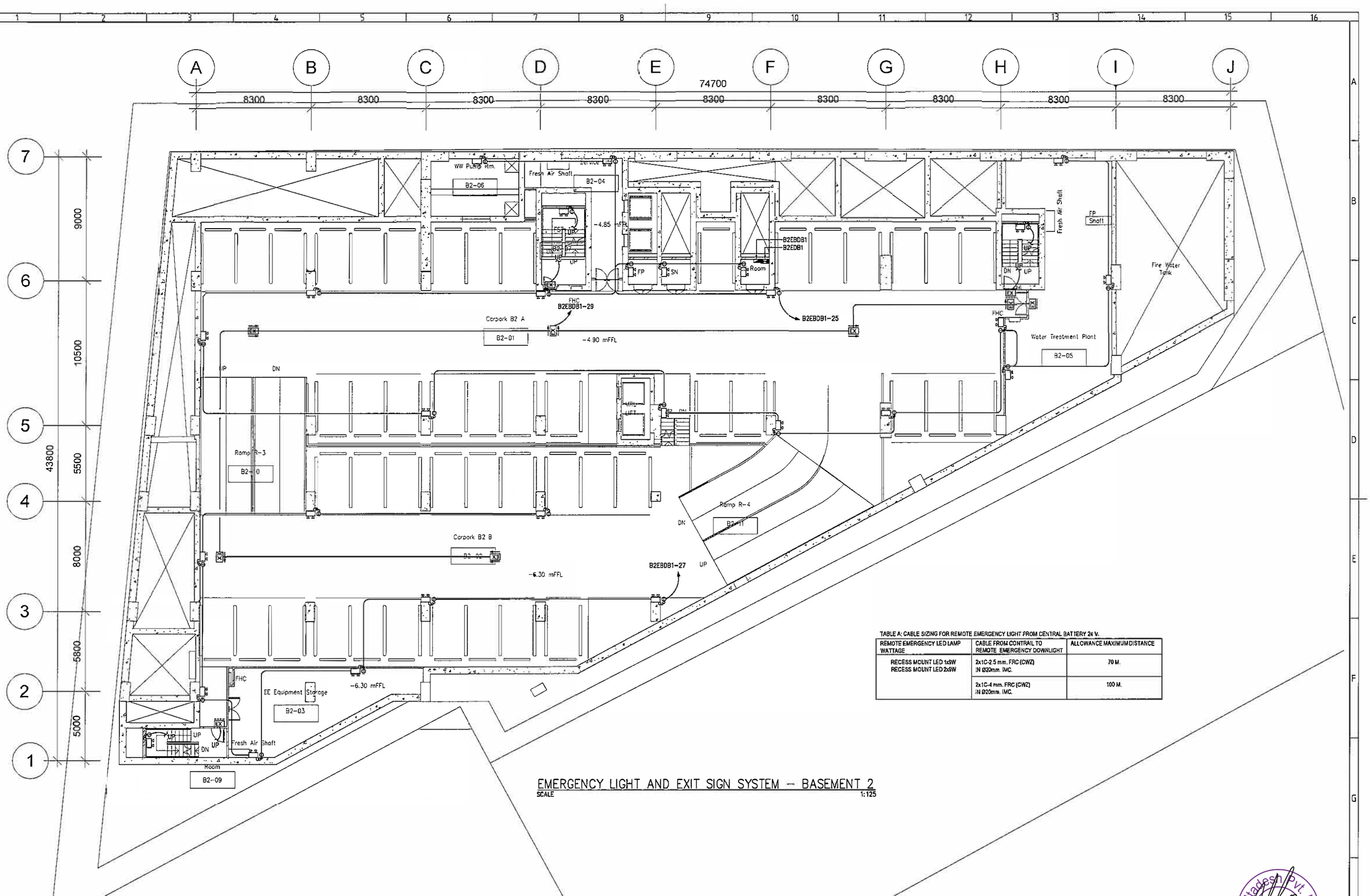


TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm. FRC (CWZ) IN Ø20mm. IMC.	70 M.
	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.

EMERGENCY LIGHT AND EXIT SIGN SYSTEM – BASEMENT 2

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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E-mail : interdes331@gmail.com

PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: EMERGENCY LIGHT AND EXIT SIGN SYSTEM - BASEMENT 2

DRAWN BY:	SPH	CHECKED BY:	WTS
DESIGN BY:	WTS	PROJECT MGR.:	Dhonintern
DATE:	31-08-2018	SCALE:	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 0 3 - 0 0 2		

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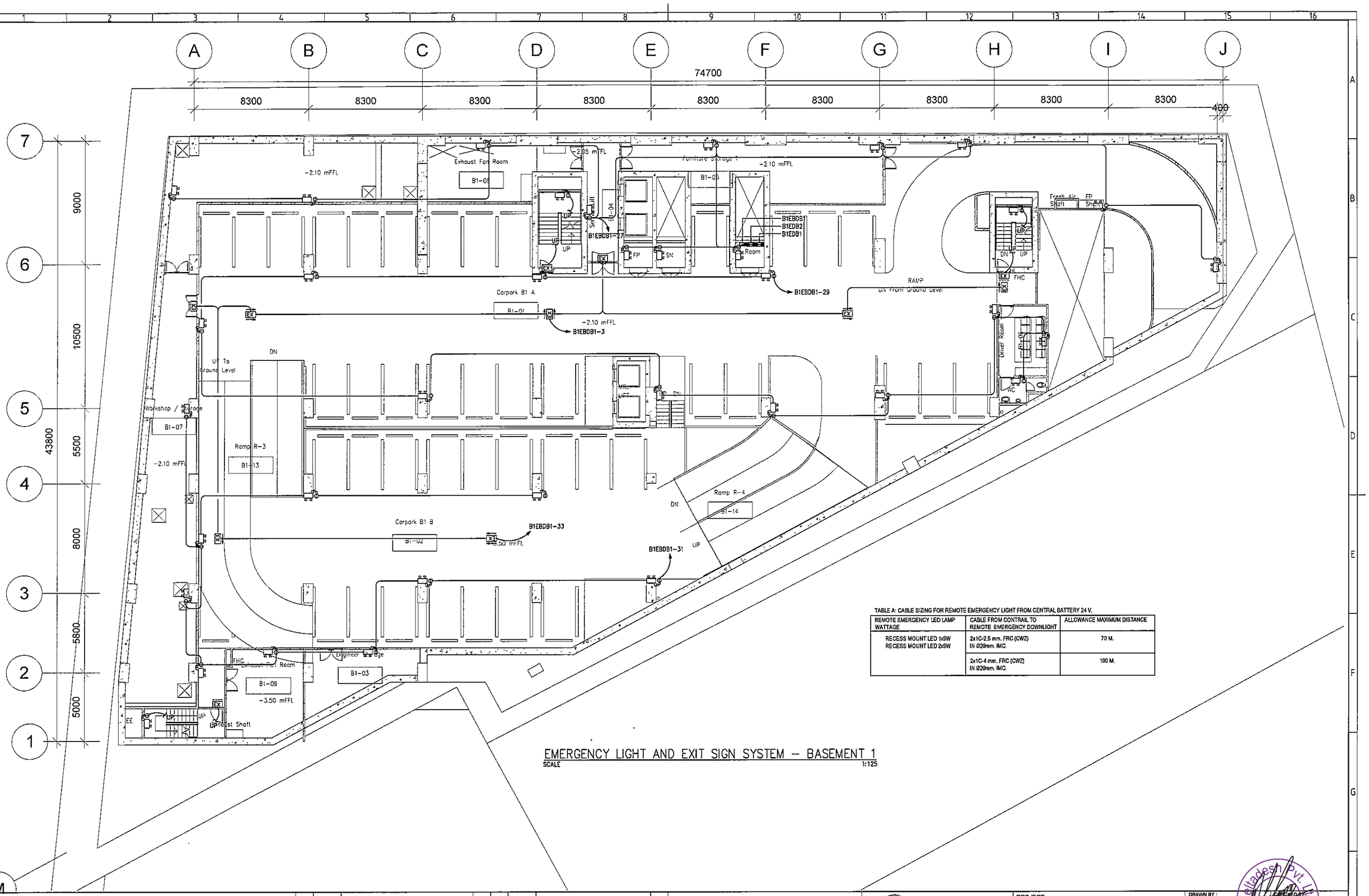


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	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.

EMERGENCY LIGHT AND EXIT SIGN SYSTEM – BASEMENT 1

SCALE 1:125

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BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM - BASEMENT 1

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chanintorn
DATE :	31-08-2018	SCALE	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 0 3 - 0 0 3		

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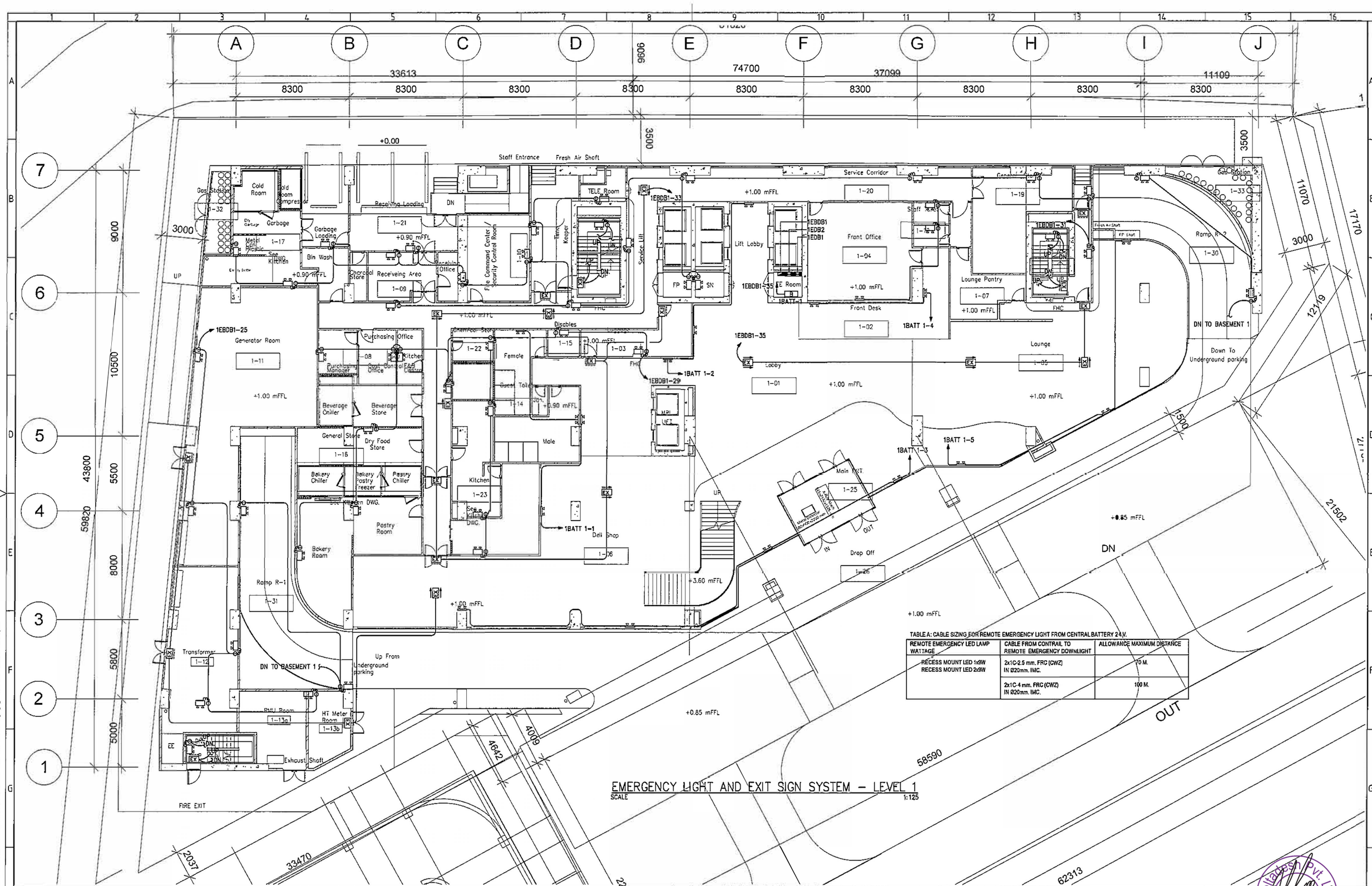


TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm. FRC (CWZ) IN Ø20mm. IMC.	70 M.
	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.

EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 1

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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Tel : (66-2) 252-7790 FAX : (66-2) 252-8492
E-mail : interdes331@gmail.com

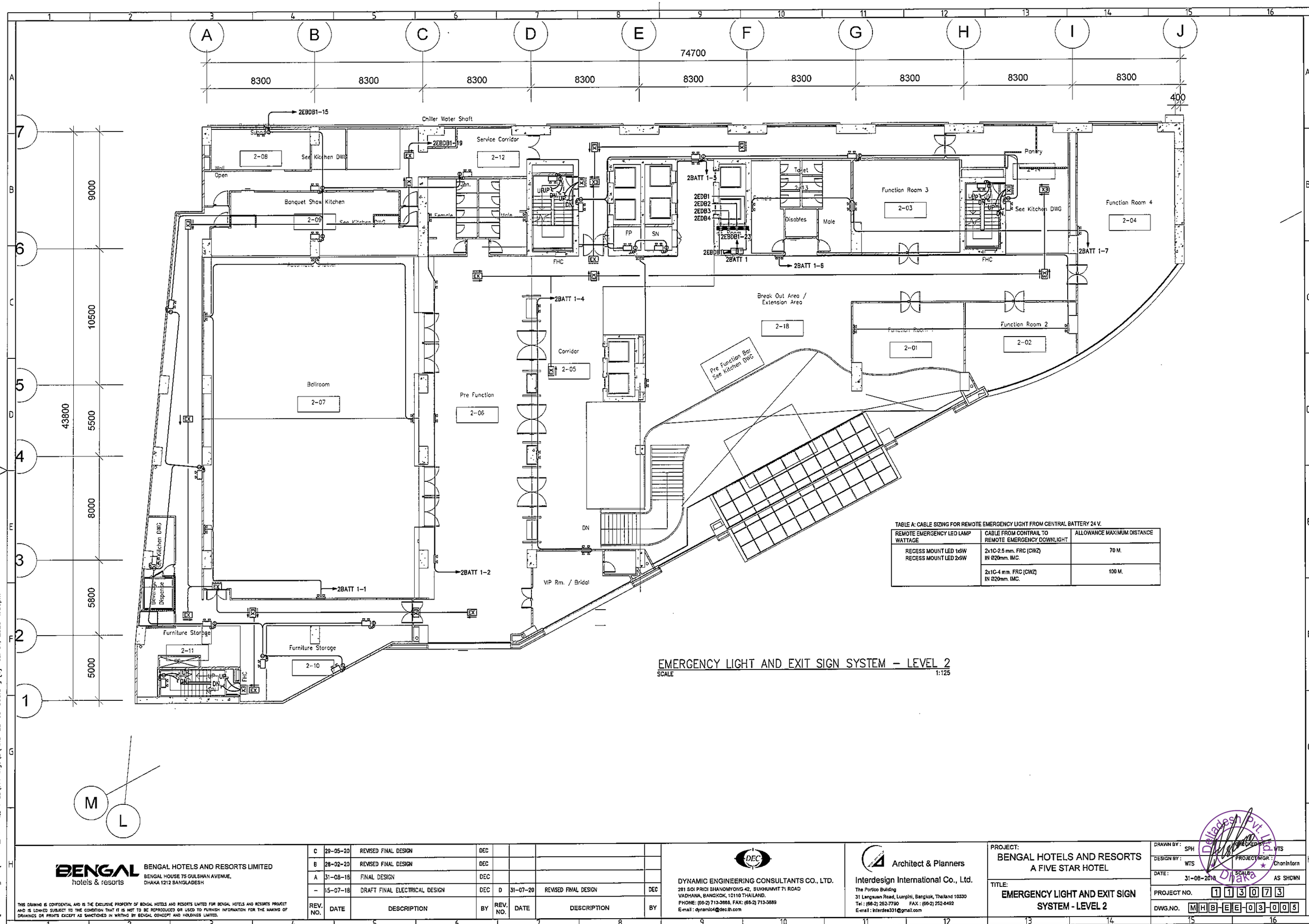
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM - LEVEL 1

DRAWN BY : SPH
DESIGNED BY : WTS
DESIGN BY : WTS
PROJECT MGR. : Chaninton
DATE : 31-08-2018
SCALE : AS SHOWN
PROJECT NO. 1 1 3 0 7 3
DWG.NO. MHB-EE-03-004

Delta Design Pvt. Ltd. Dhaka

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EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 2

SCALE 1:125

TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm. FRC (CWZ) IN Ø20mm. IMC.	70 M.
	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.

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BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC				
B	28-02-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

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Tel : (66-2) 252-7790 FAX : (66-2) 252-8492
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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM - LEVEL 2

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	ChanIntorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-03-005

Deltadesh Pvt. Ltd. Dhaka

CAD FILE: C:\Users\BENGAL_HOTEL\Drawings\EMHB-EE-03-005.dwg [M] Jul 31, 2020 - 1:53pm

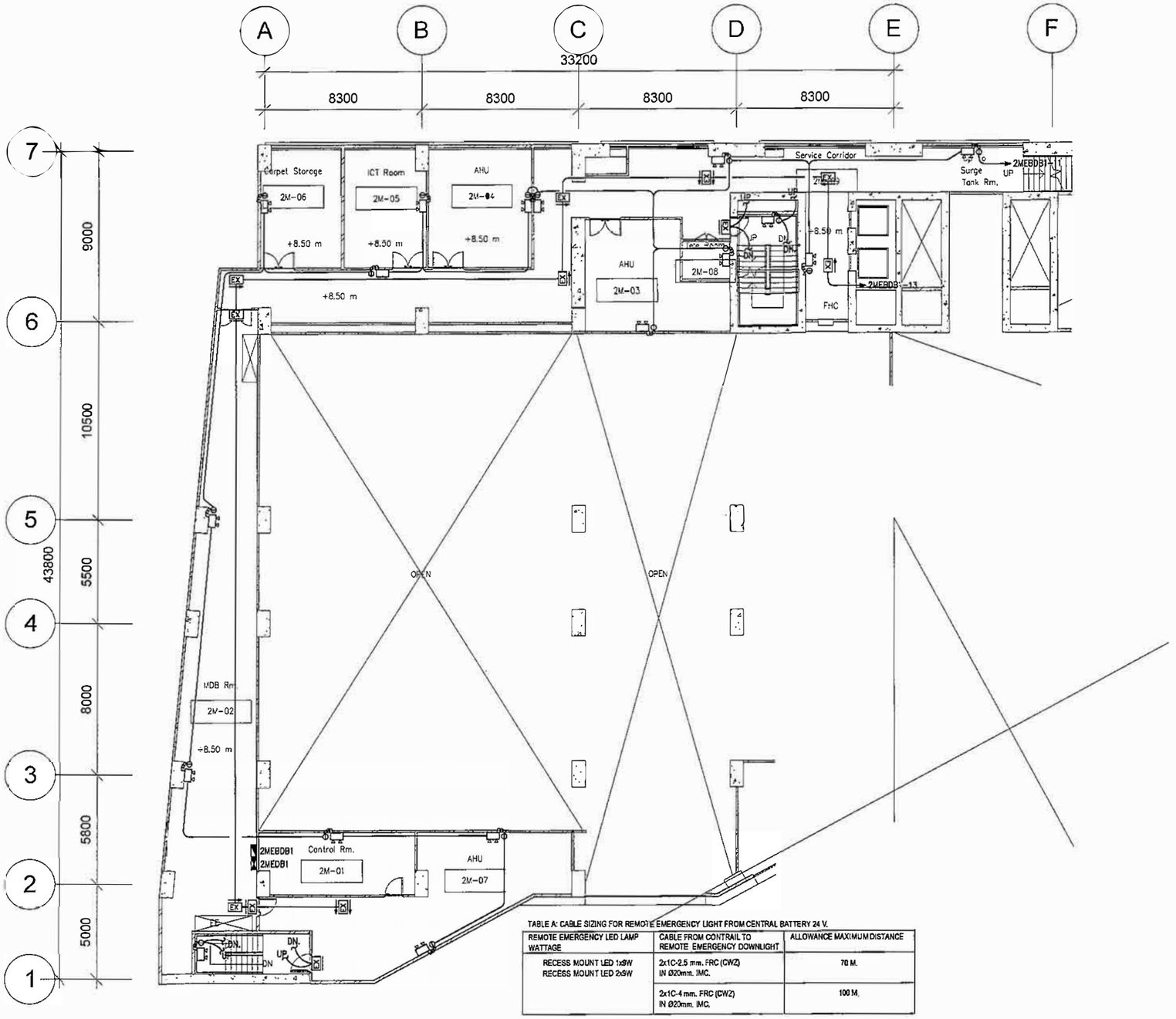


TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm. FRC (CWZ) IN Ø20mm. IMC.	70 M.
	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.

EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 2M

SCALE 1:125

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BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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E-mail : interdes331@gmail.com

PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM - LEVEL 2M

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chanintorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 0 3 - 0 0 6		

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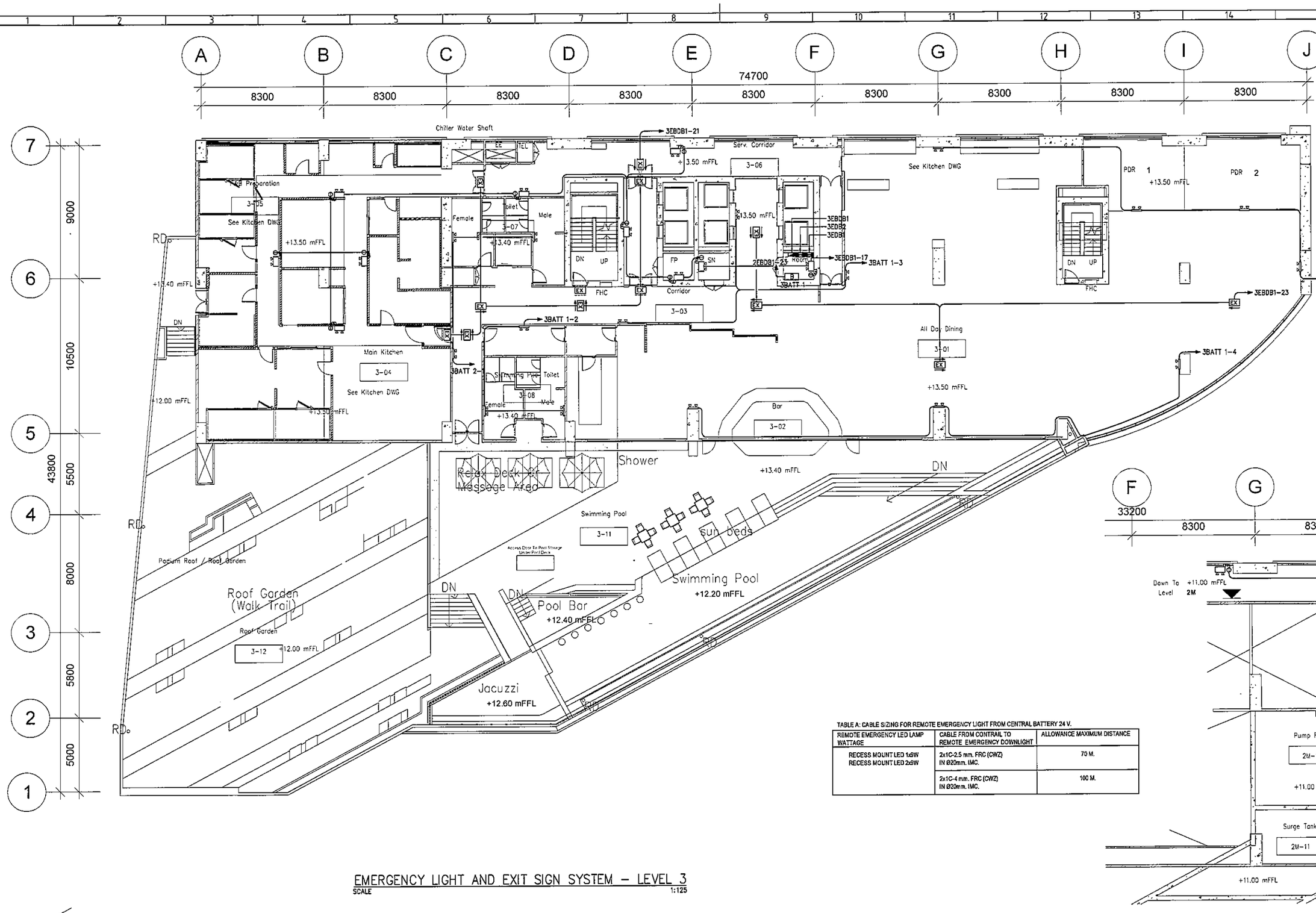


TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x8W RECESS MOUNT LED 2x8W	2x1C-2.5 mm. FRC (CWZ) IN Ø20mm. IMC.	70 M.
	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.

EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 3

SCALE 1:125

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BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM - LEVEL 3

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chanintorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1 1 5 0 7 3
DWG.NO.	MHB-EE-03-007

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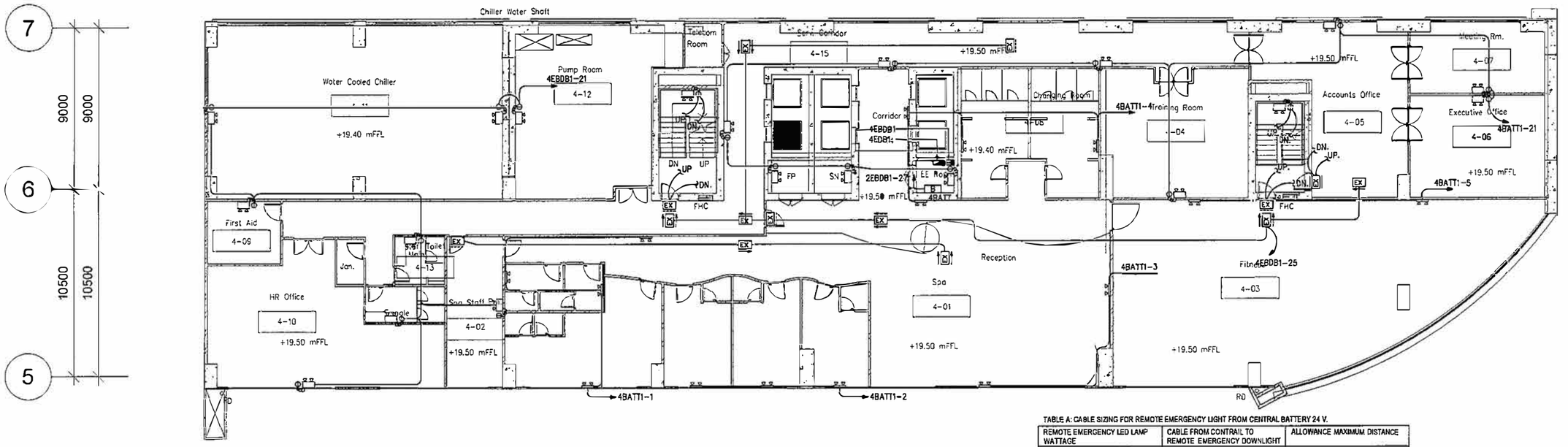
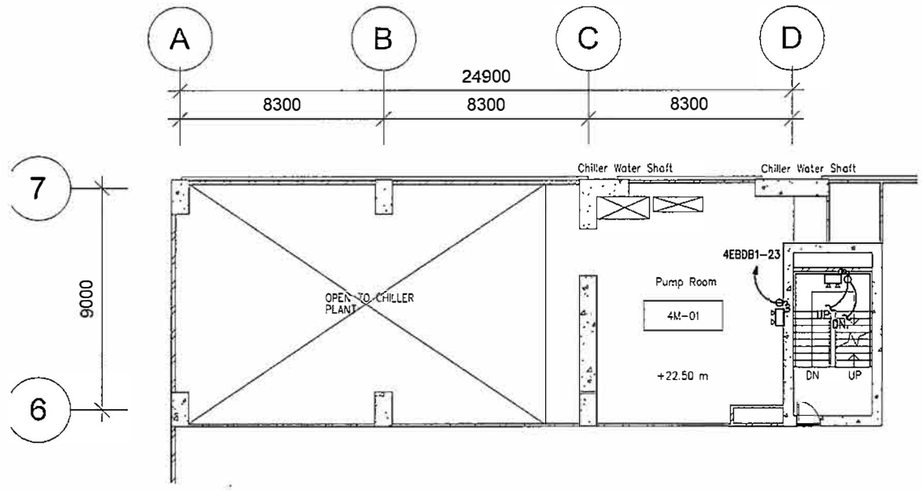


TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm. FRC (CWZ) IN Ø20mm. IMC.	70 M.
	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.

EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 4
SCALE 1:125



EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 4M
SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC				
B	28-02-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

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BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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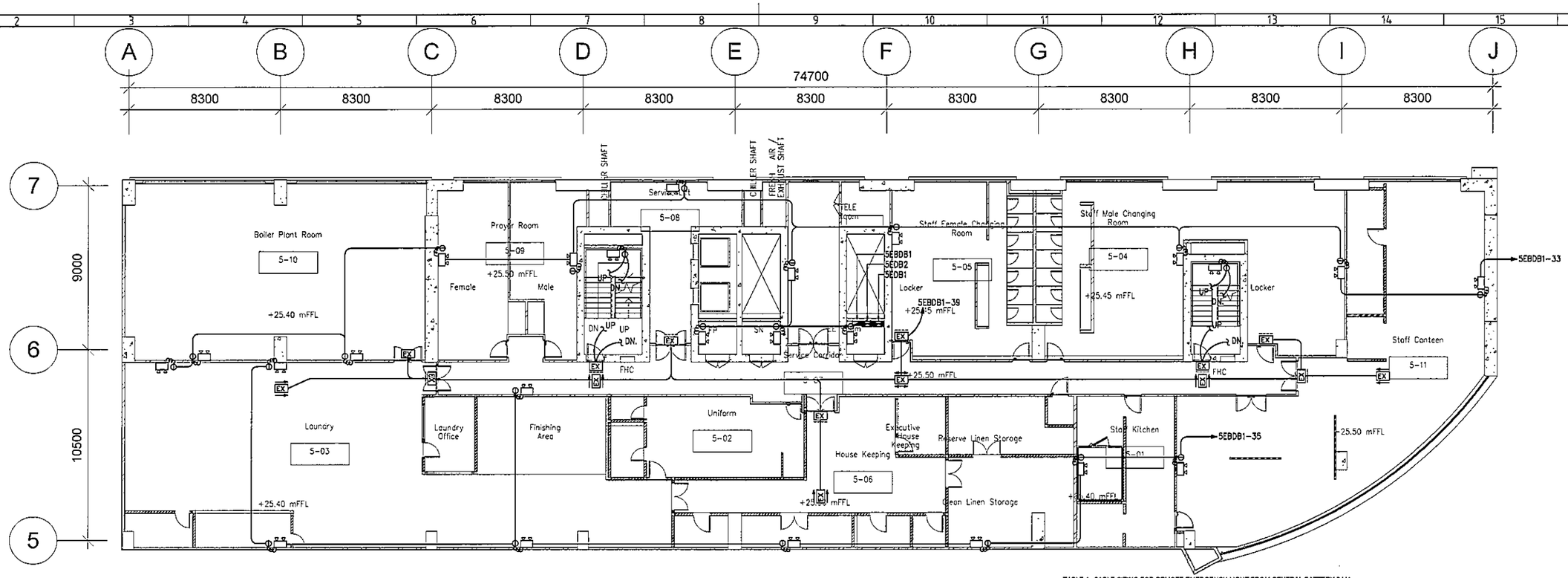
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM - LEVEL 4 AND LEVEL 4M

DRAWN BY :	SPH
DESIGN BY :	WTS
DATE :	31-08-2018
CHECKED BY :	WTS
PROJECT MGR. :	Chanintorn
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	M H B - E E - 0 3 - 0 0 8

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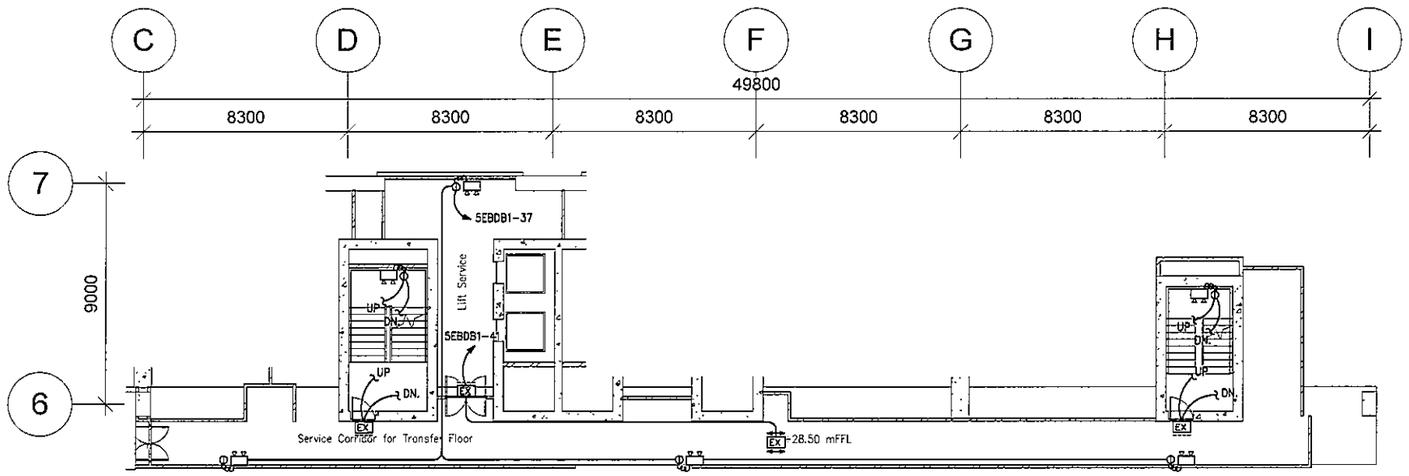


EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 5

SCALE 1:125

TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm. FRC (CWZ) IN Ø20mm. IMC.	70 M.
	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.



EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 5M

SCALE 1:125

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	28-05-20	REVISED FINAL DESIGN	DEC				
B	28-02-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
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Tel : (66-2) 252-7790 FAX : (66-2) 252-8492
E-mail : interdes331@gmail.com

PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM - LEVEL 5 AND LEVEL 5M

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chonintorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	M H B - E E - 0 3 - 0 0 9

Delta Design Pvt. Ltd. Dhaka

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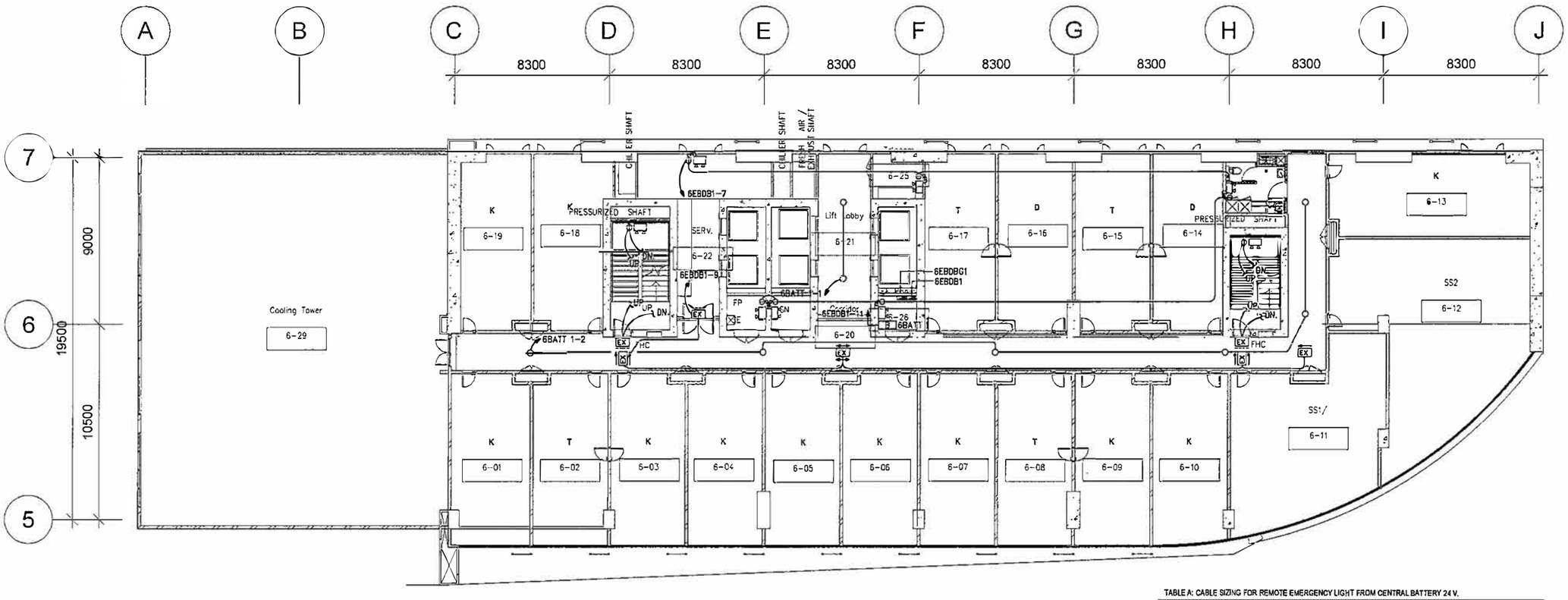


TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm. FRC (CWZ) IN Ø20mm. IMC.	70 M.
	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.

EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 6

SCALE 1:125

BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

REV. NO.	DATE	DESCRIPTION	BY
D	31-07-20	REVISED FINAL DESIGN	DEC

DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
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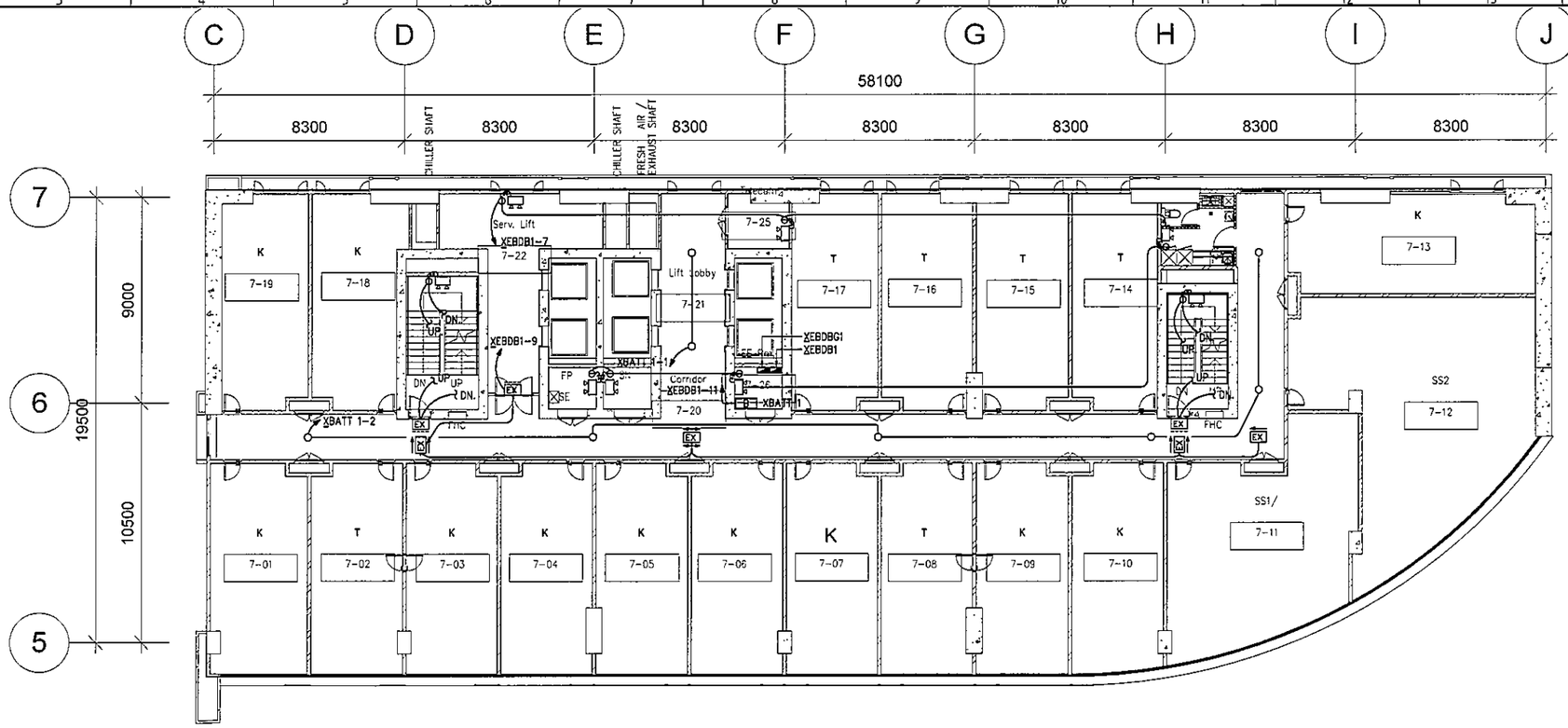
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM - LEVEL 6

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chonintorn
DATE :	31-08-2018	SCALE	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	MHB-EE-03-010		

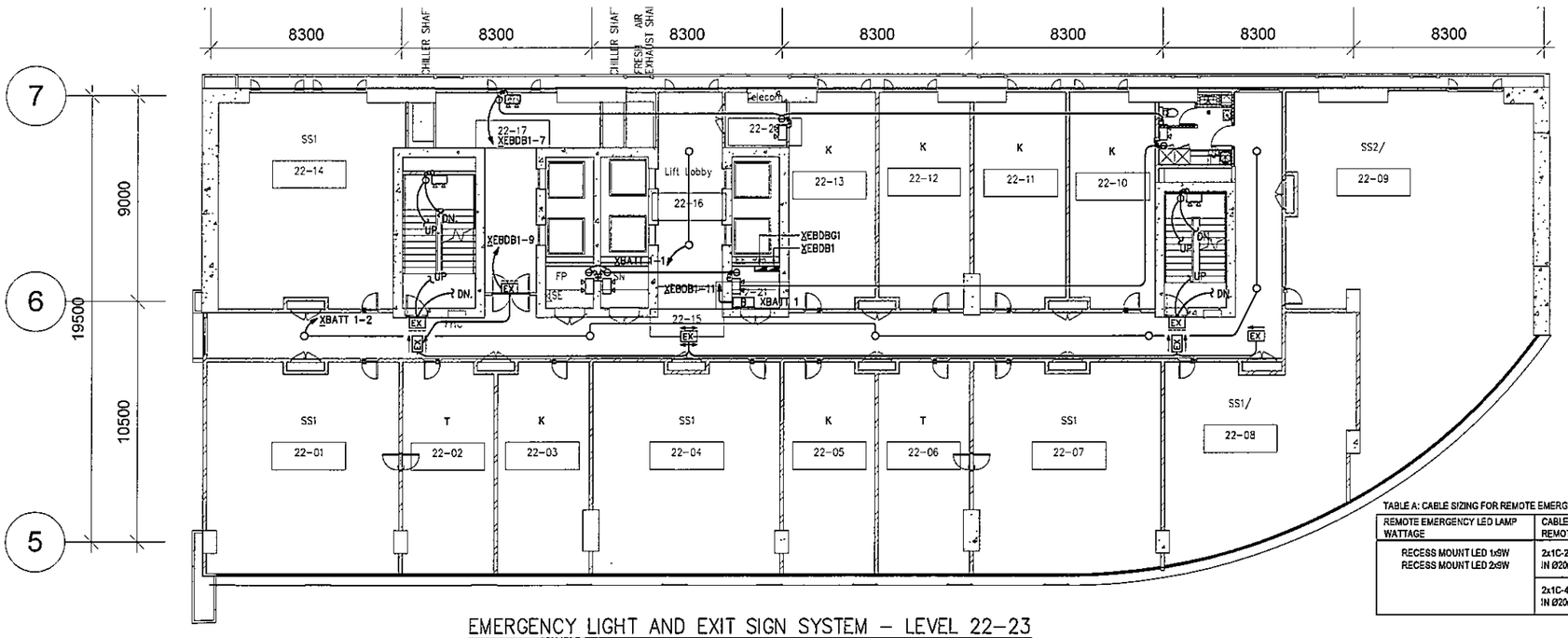
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EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 7-21

SCALE 1:125



EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 22-23

SCALE 1:125

TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
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BENGAL hotels & resorts

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DHAKA 1212 BANGLADESH

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A	31-05-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

DEC
DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
281 SOI PRIDI BHANOMYONG 42, SUKHUMVIT 71 ROAD
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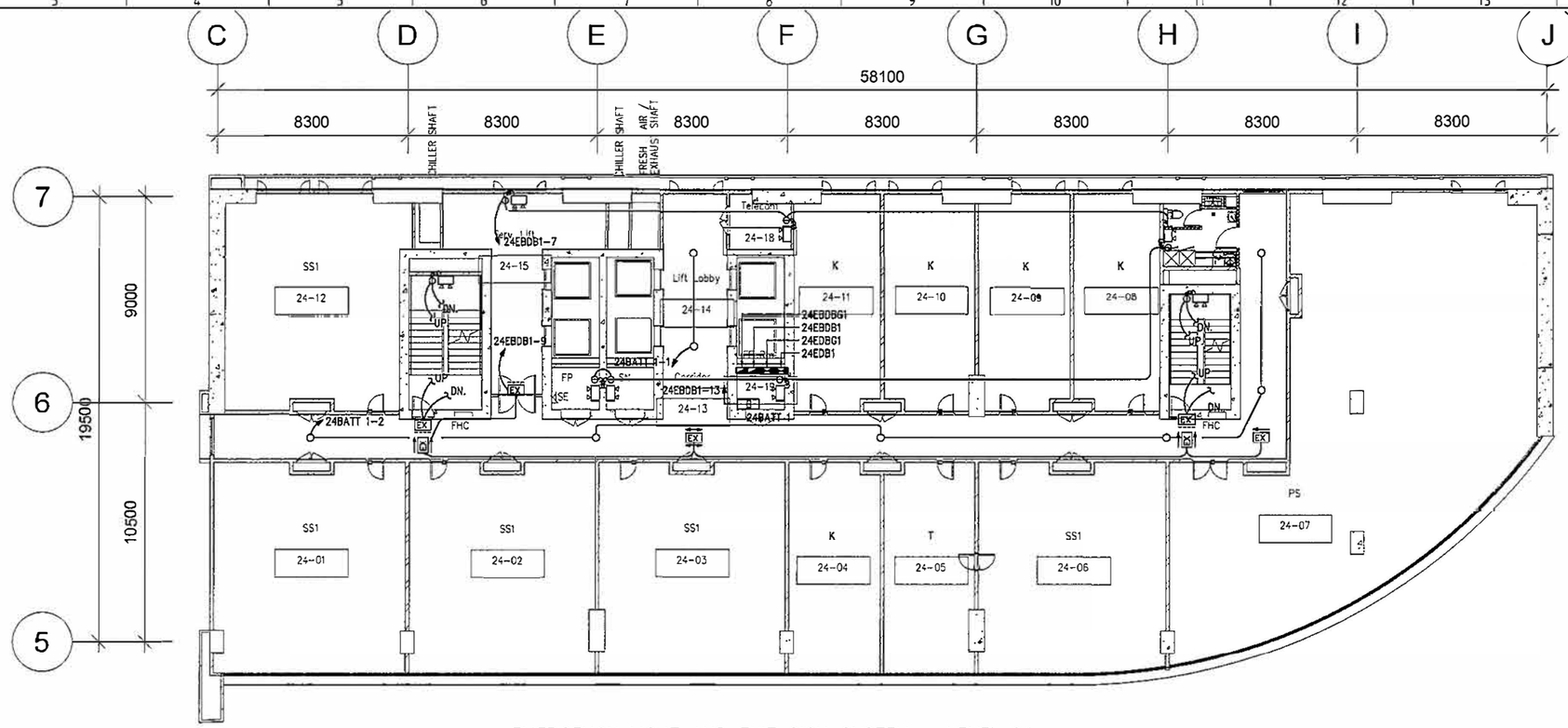
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM - LEVEL 7-21 & LEVEL 22-23

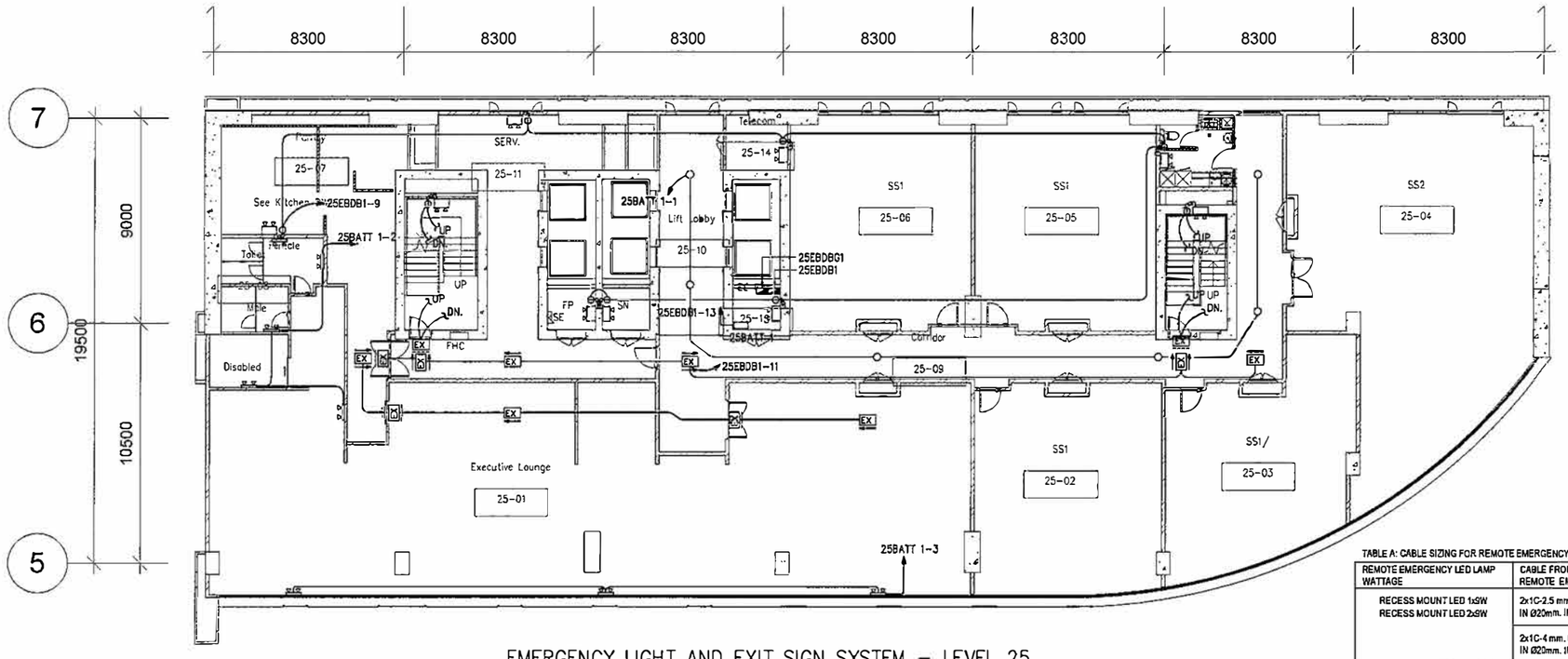
DRAWN BY : SPH
CHECKED BY : WTS
DESIGN BY : WTS
PROJECT MGR. : Dhanintorn
DATE : 31-08-2018
SCALE : AS SHOWN
PROJECT NO. 1 1 3 0 7 3
DWG.NO. MHB-EE-03-011

Oshadesh Pvt. Ltd. Dhaka

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EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 24
SCALE 1:125



EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 25
SCALE 1:125

TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm. FRC (CWZ) IN Ø20mm. IMC.	70 M.
	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC				
B	28-02-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM - LEVEL 24 AND LEVEL 25

DRAWN BY : SPH
DESIGNED BY : WTS
DESIGN BY : WTS
PROJECT MGR. : Chanintorn
DATE : 31-08-2018
SCALE : AS SHOWN
PROJECT NO. 1 1 3 0 7 3
DWG.NO. MHB-EE-03-012

Deltadesk Pvt. Ltd. Dhaka

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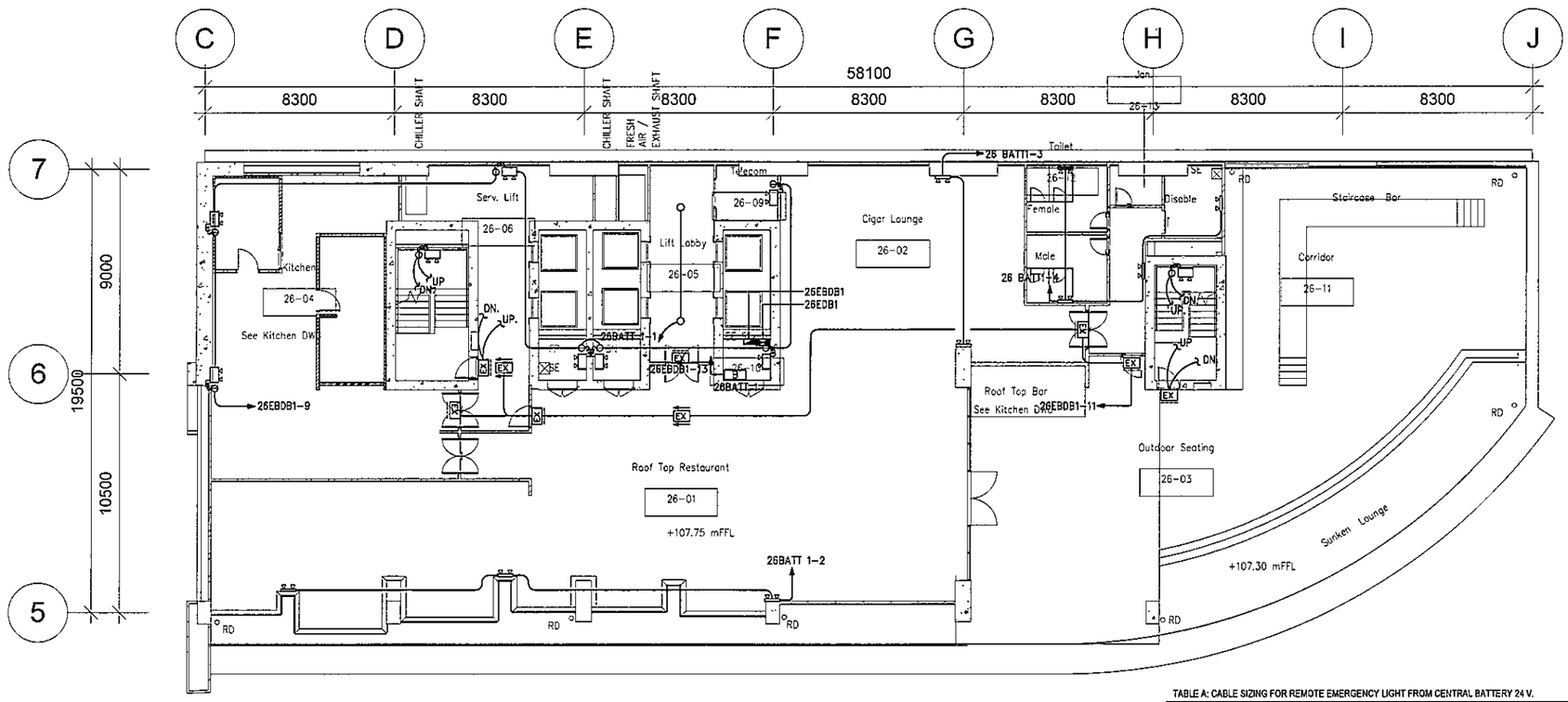


TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm. FRC (CWZ) IN Ø20mm. IMC.	70 M.
	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.

EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 26

SCALE 1:125

BENGAL hotels & resorts

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BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM - LEVEL 26

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	ChanIntern
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 0 3 - 0 1 3		

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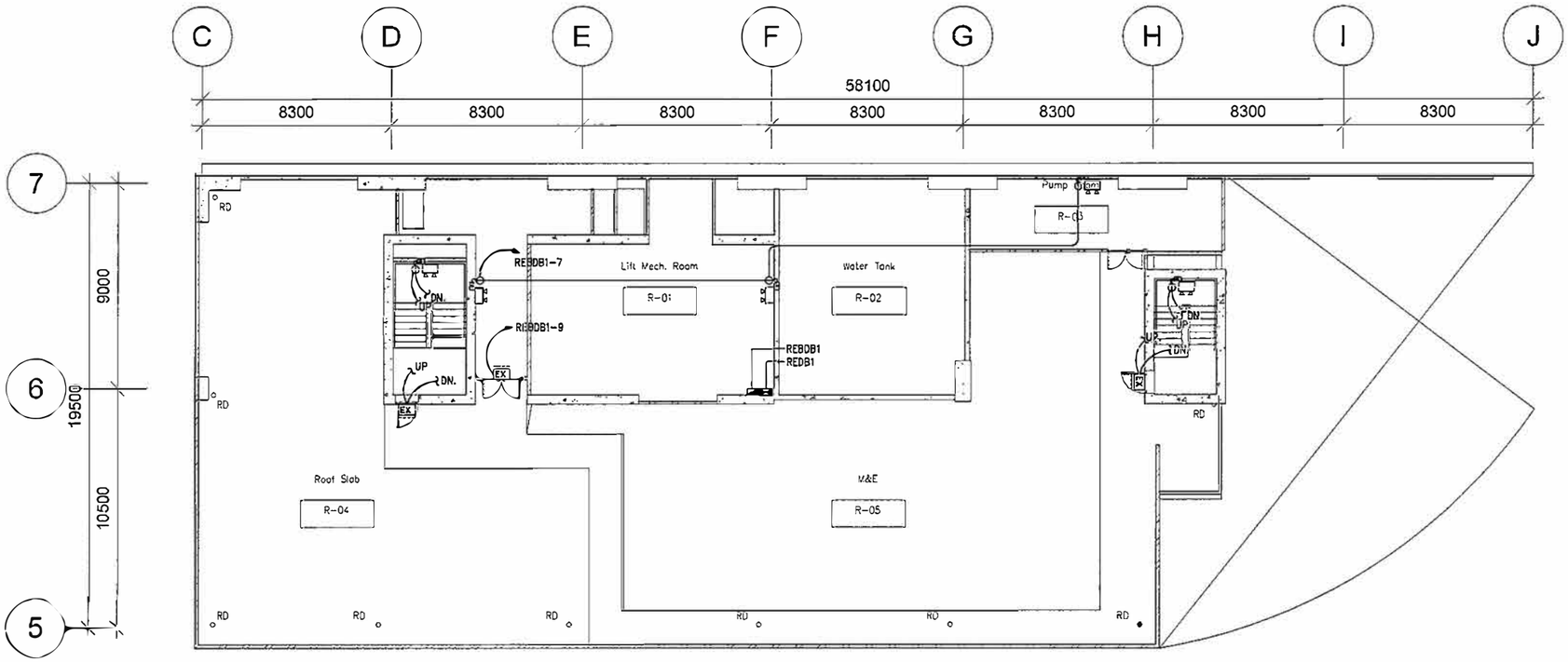


TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm. FRC (CWZ) IN Ø20mm. IMC.	70 M.
	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.

EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – ROOF

SCALE 1:125

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REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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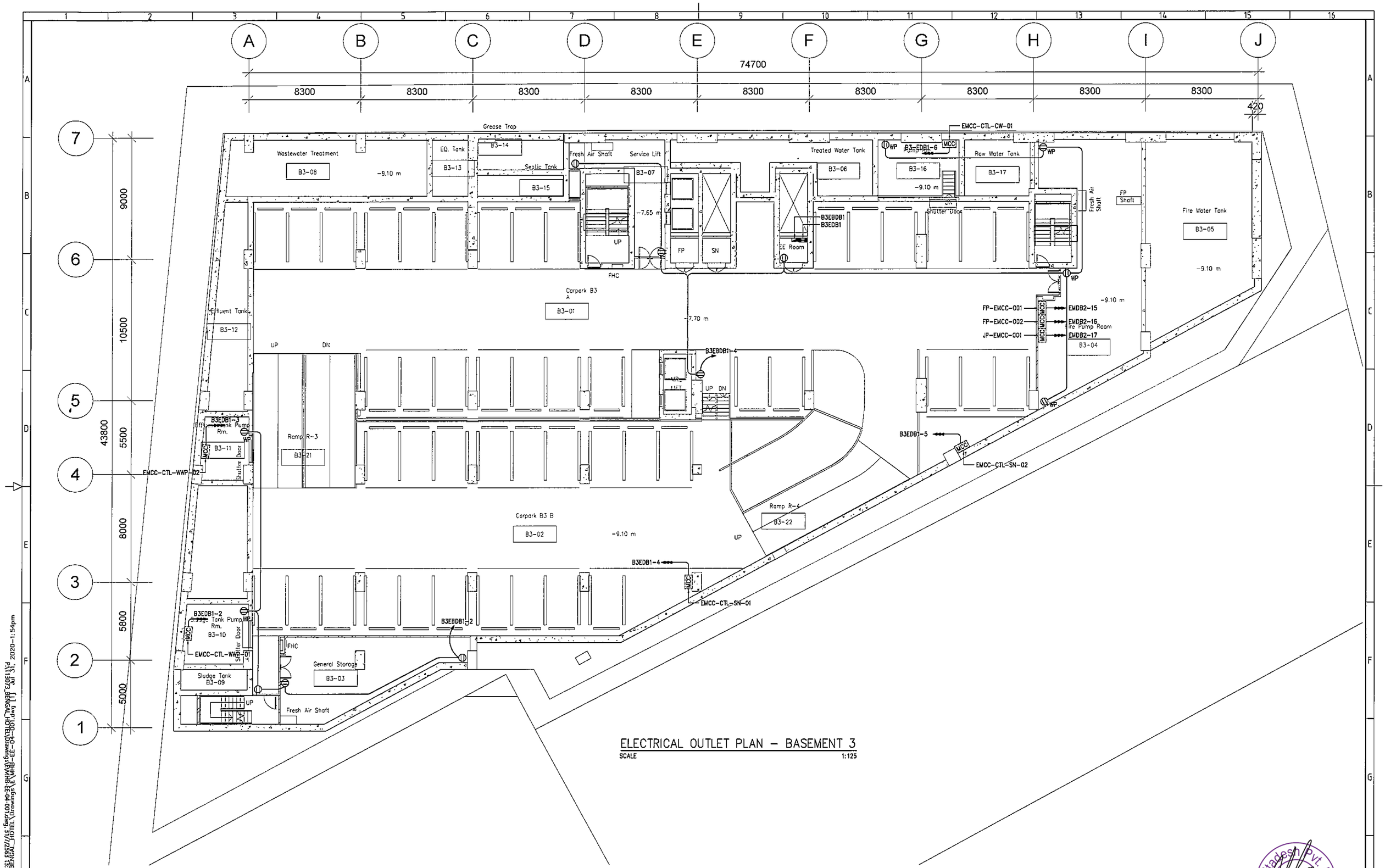
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN - ROOF

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT NGR. :	Chanintorn
DATE :	31-08-2018
SCALE:	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-03-014

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ELECTRICAL OUTLET PLAN – BASEMENT 3

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

BENGAL hotels & resorts

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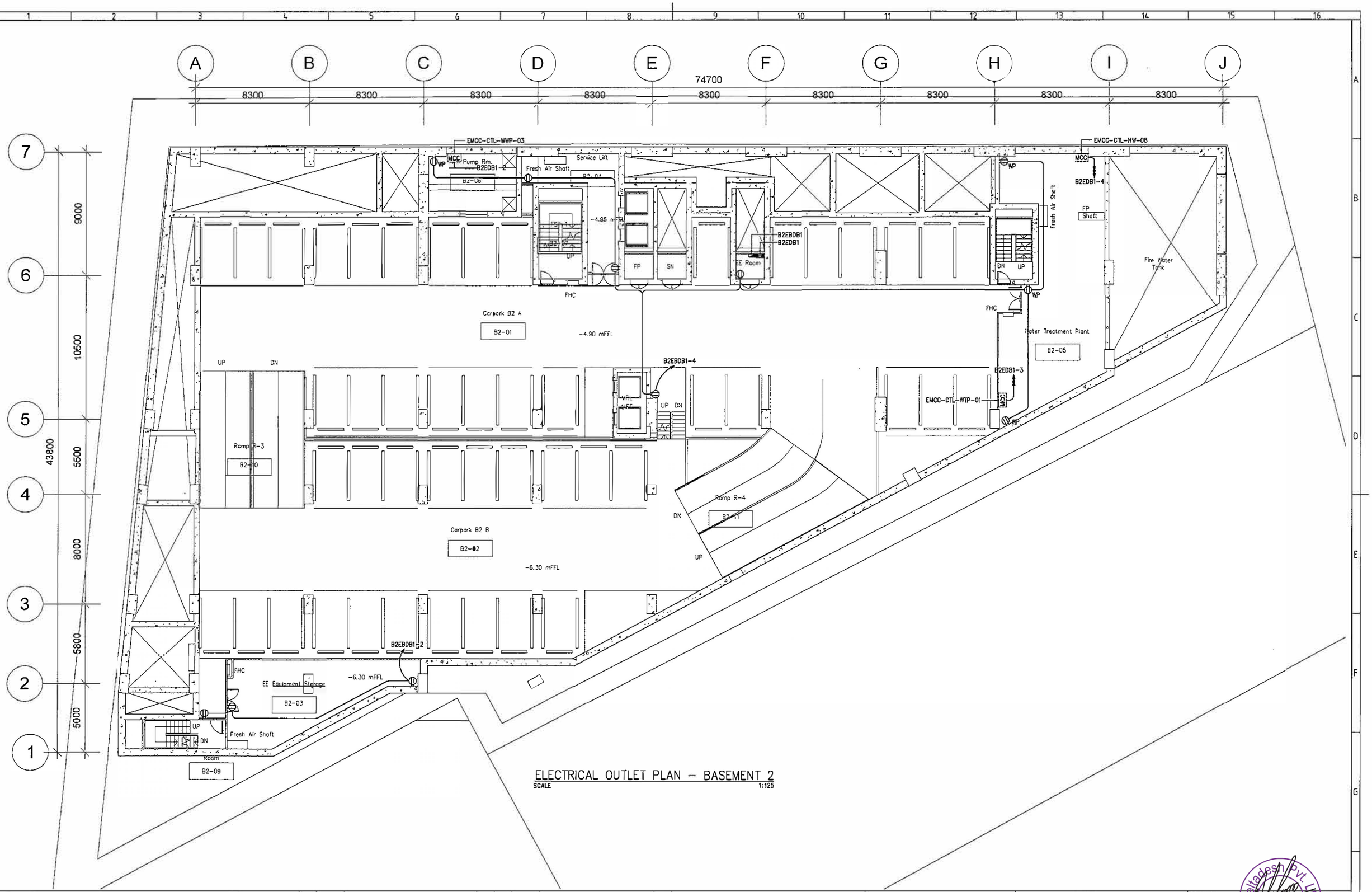
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
ELECTRICAL OUTLET PLAN - BASEMENT 3

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chanintorn
DATE :	31-08-2018	SCALE	AS SHOWN
PROJECT NO.	1130373		
DWG.NO.	MHB-EE-04-001		

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ELECTRICAL OUTLET PLAN – BASEMENT 2

SCALE 1:125

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B	28-02-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

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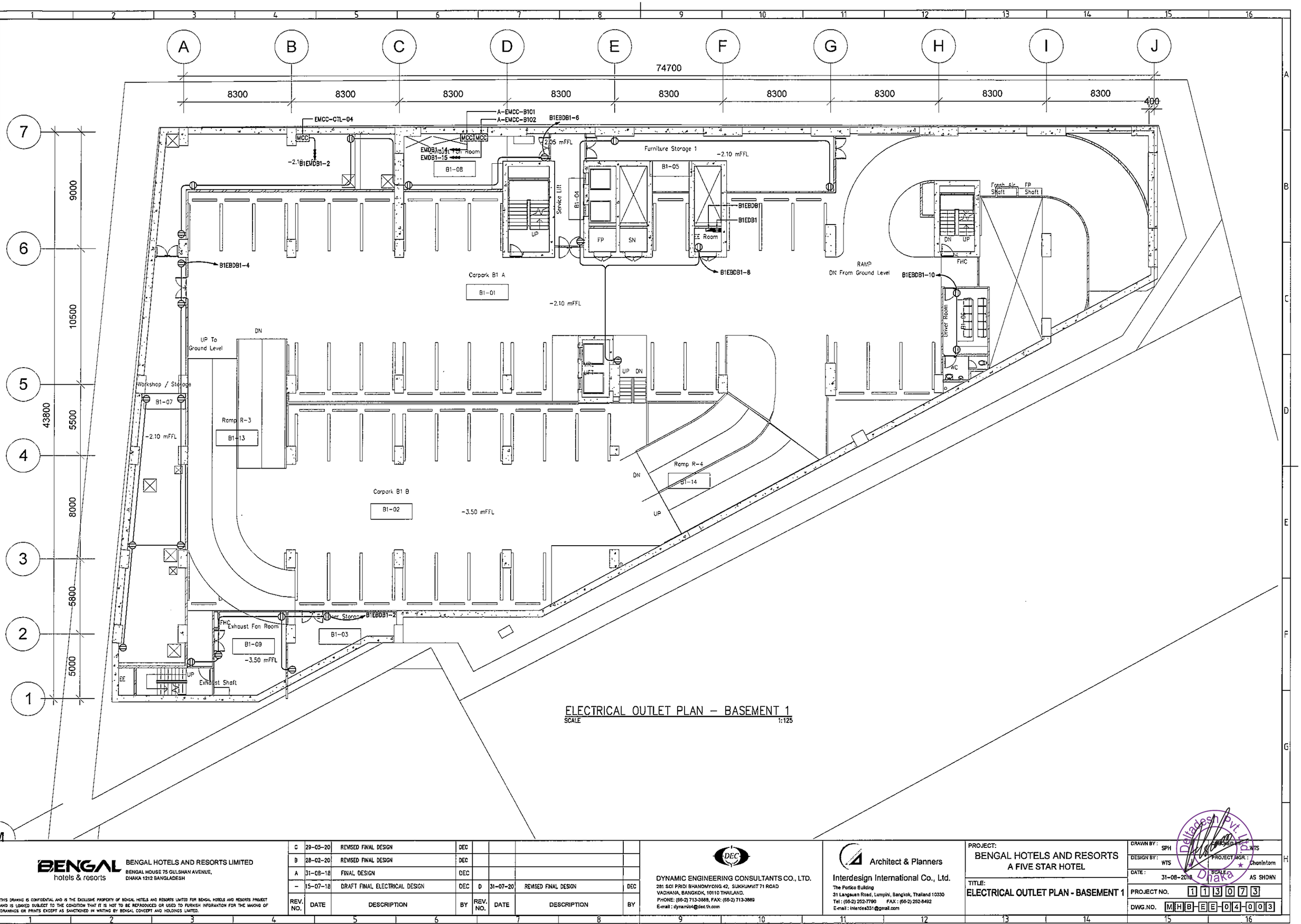
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
ELECTRICAL OUTLET PLAN - BASEMENT 2

DRAWN BY:	SPH
CHECKED BY:	WTS
DESIGN BY:	WTS
PROJECT MGR.:	Chanintorn
DATE:	31-08-2018
SCALE:	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-04-002

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ELECTRICAL OUTLET PLAN – BASEMENT 1

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY
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A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED

BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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E-mail : interdes331@gmail.com

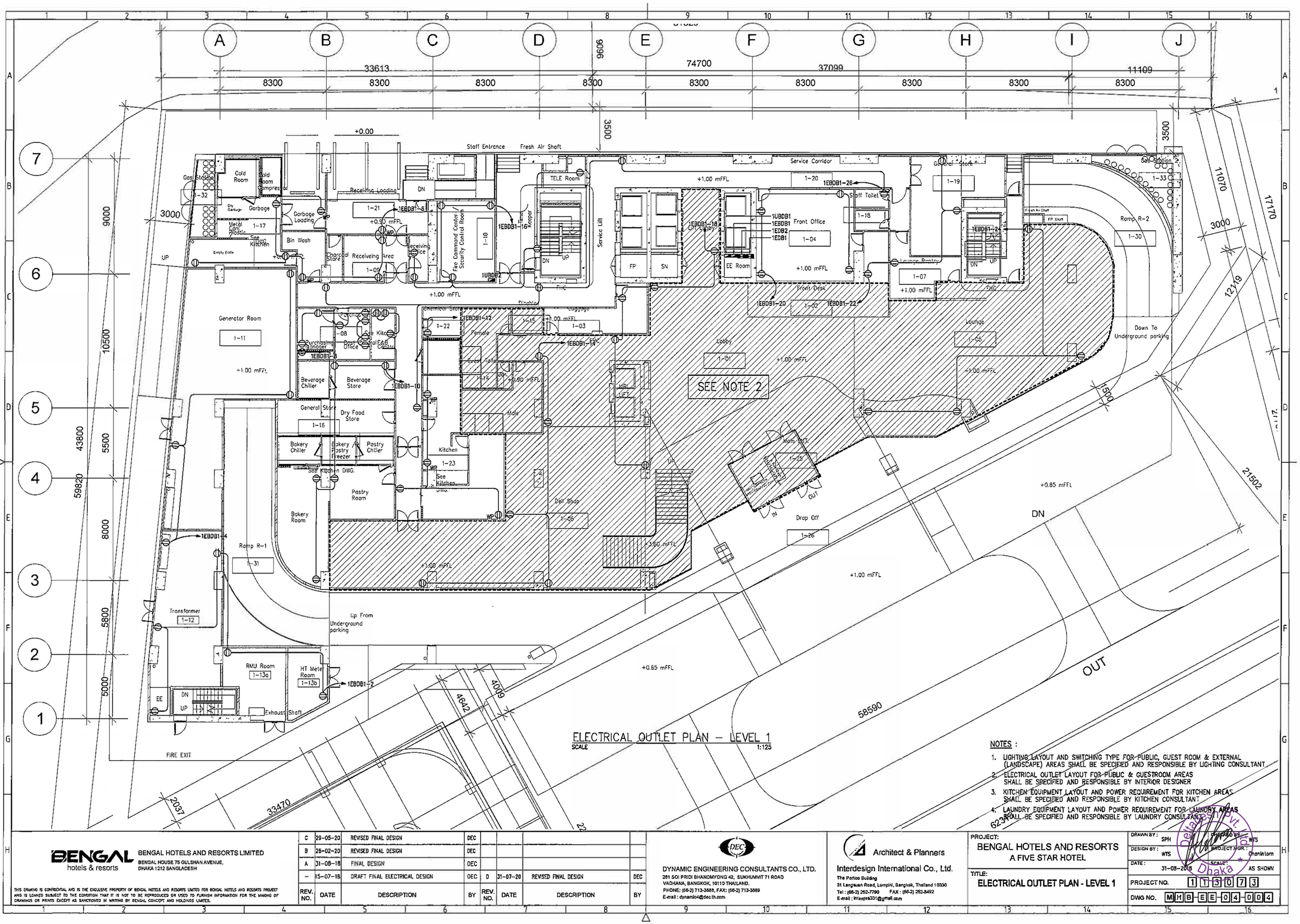
PROJECT: BENGAL HOTELS AND RESORTS A FIVE STAR HOTEL

TITLE: ELECTRICAL OUTLET PLAN - BASEMENT 1

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chonlatorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 0 4 - 0 0 3		

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ELECTRICAL OUTLET PLAN – LEVEL 1

SCALE 1:125

NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT.
2. ELECTRICAL OUTLET LAYOUT FOR PUBLIC & GUESTROOM AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY INTERIOR DESIGNER
3. KITCHEN EQUIPMENT LAYOUT AND POWER REQUIREMENT FOR KITCHEN AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY KITCHEN CONSULTANT.
4. LAUNDRY EQUIPMENT LAYOUT AND POWER REQUIREMENT FOR LAUNDRY AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LAUNDRY CONSULTANT.

BENGAL hotels & resorts

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BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
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A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

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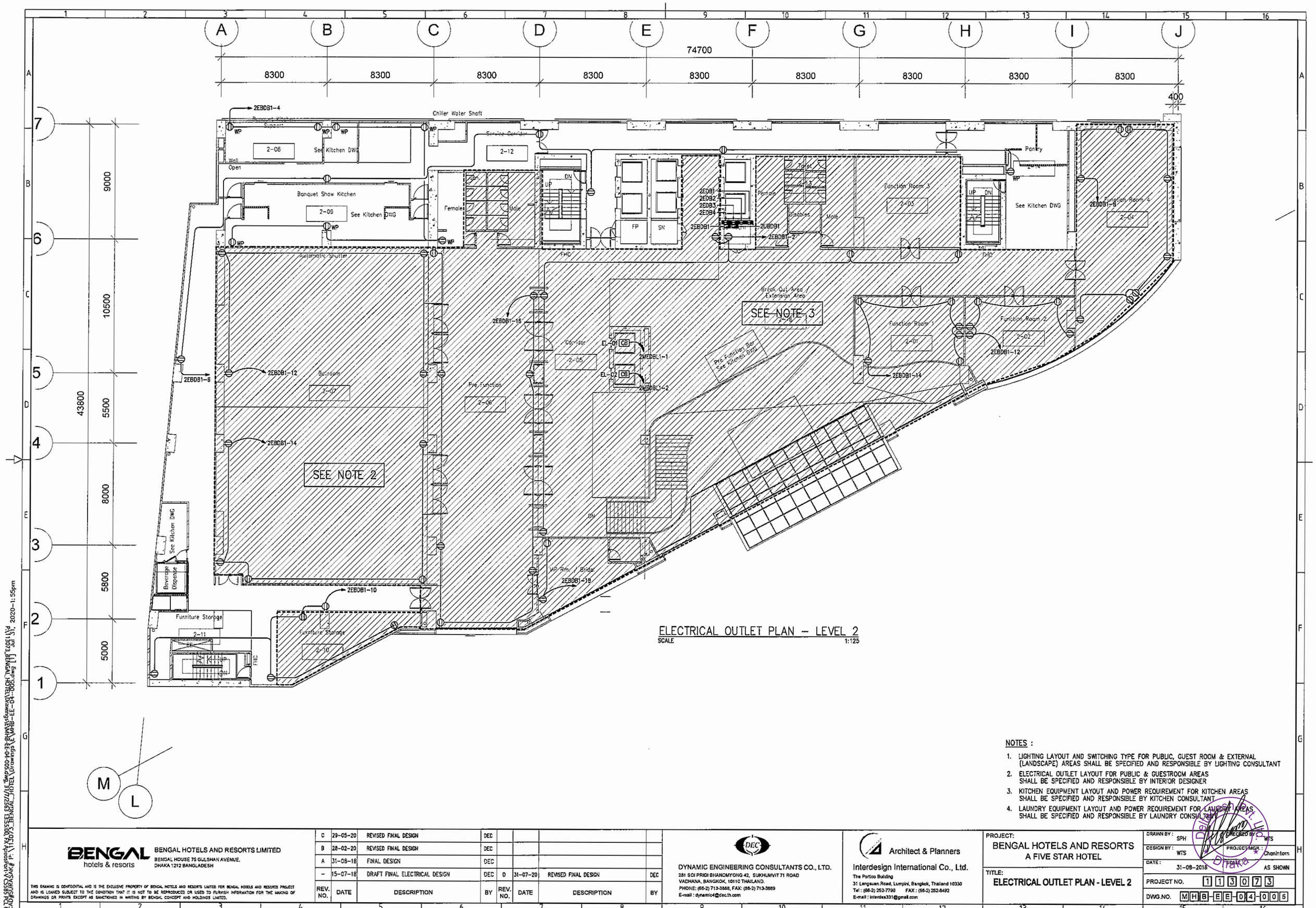
PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: ELECTRICAL OUTLET PLAN - LEVEL 1

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chanintorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG NO.	MHB-EE-04-004

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ELECTRICAL OUTLET PLAN – LEVEL 2

SCALE 1:125

NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT
2. ELECTRICAL OUTLET LAYOUT FOR PUBLIC & GUESTROOM AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY INTERIOR DESIGNER
3. KITCHEN EQUIPMENT LAYOUT AND POWER REQUIREMENT FOR KITCHEN AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY KITCHEN CONSULTANT
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BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
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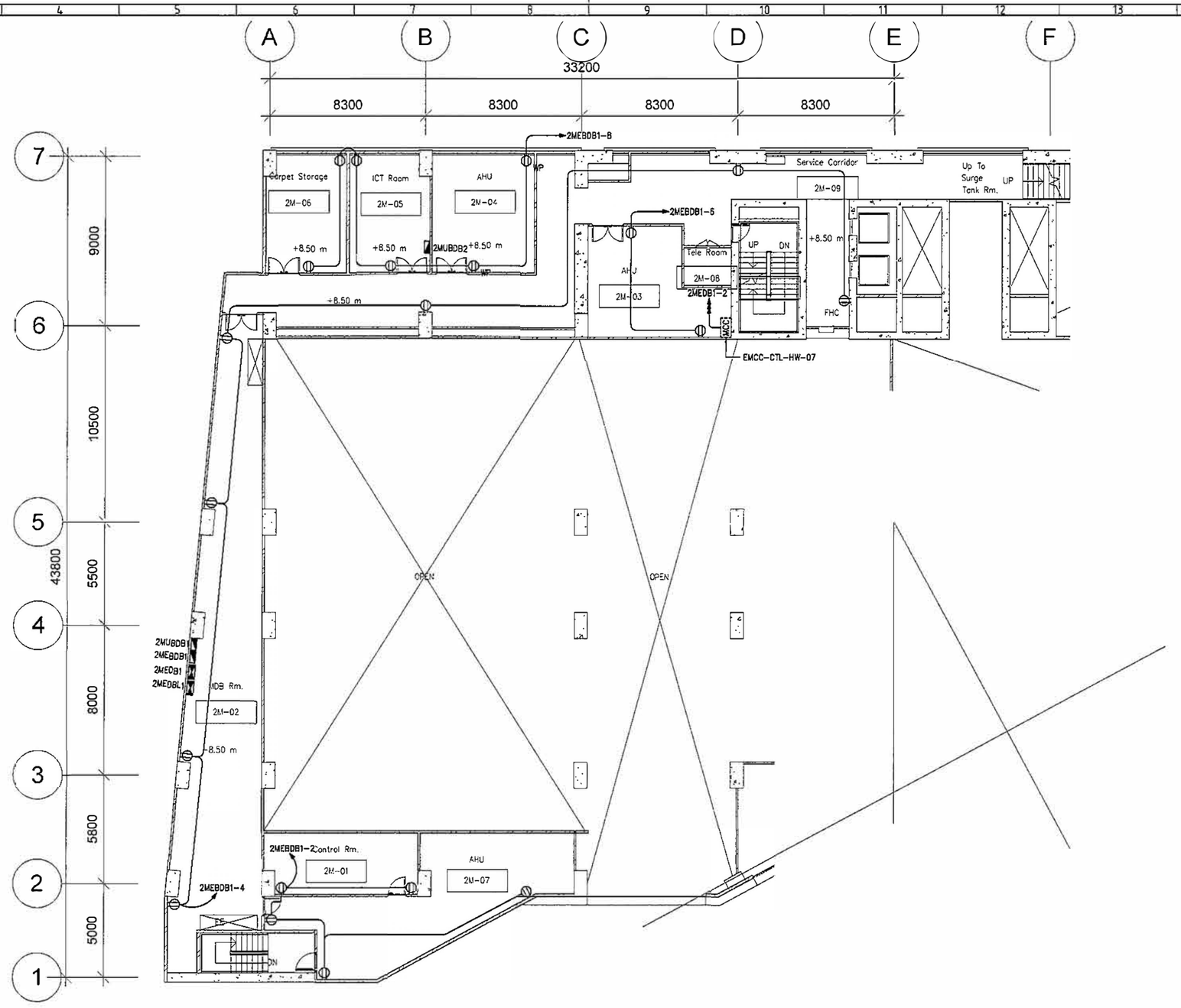
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
ELECTRICAL OUTLET PLAN - LEVEL 2

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chanintorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	MHB-EE-04-005		

Dynamic Engineering Consultants Co., Ltd. Bangkok

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ELECTRICAL OUTLET PLAN – LEVEL 2M

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC				
B	28-02-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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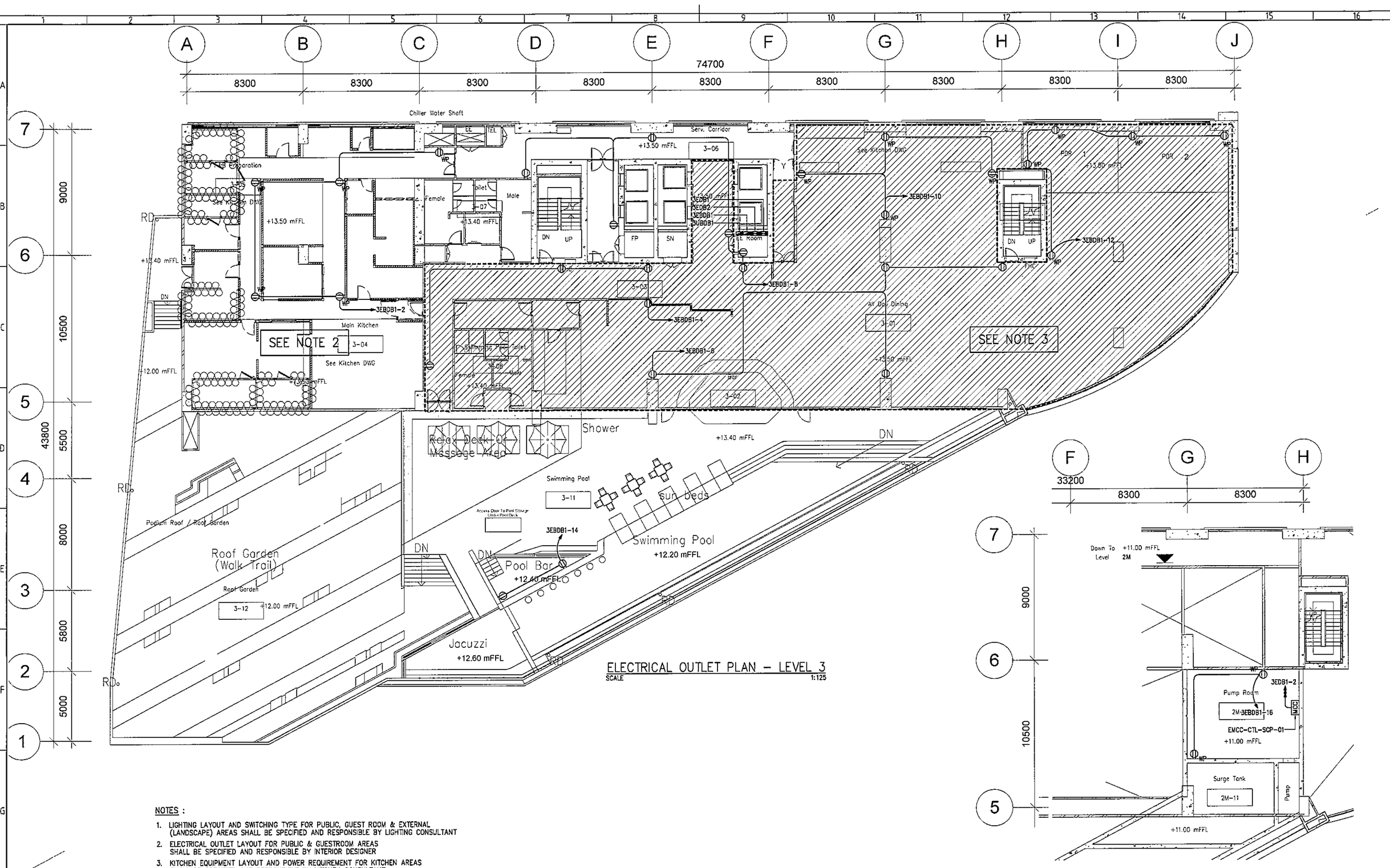
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
ELECTRICAL OUTLET PLAN - LEVEL 2M

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chanintorn
DATE :	31-08-2018	SCALE:	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	MHB-EE-04-006		

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ELECTRICAL OUTLET PLAN – LEVEL 3

SCALE 1:125

NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT
2. ELECTRICAL OUTLET LAYOUT FOR PUBLIC & GUESTROOM AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY INTERIOR DESIGNER
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B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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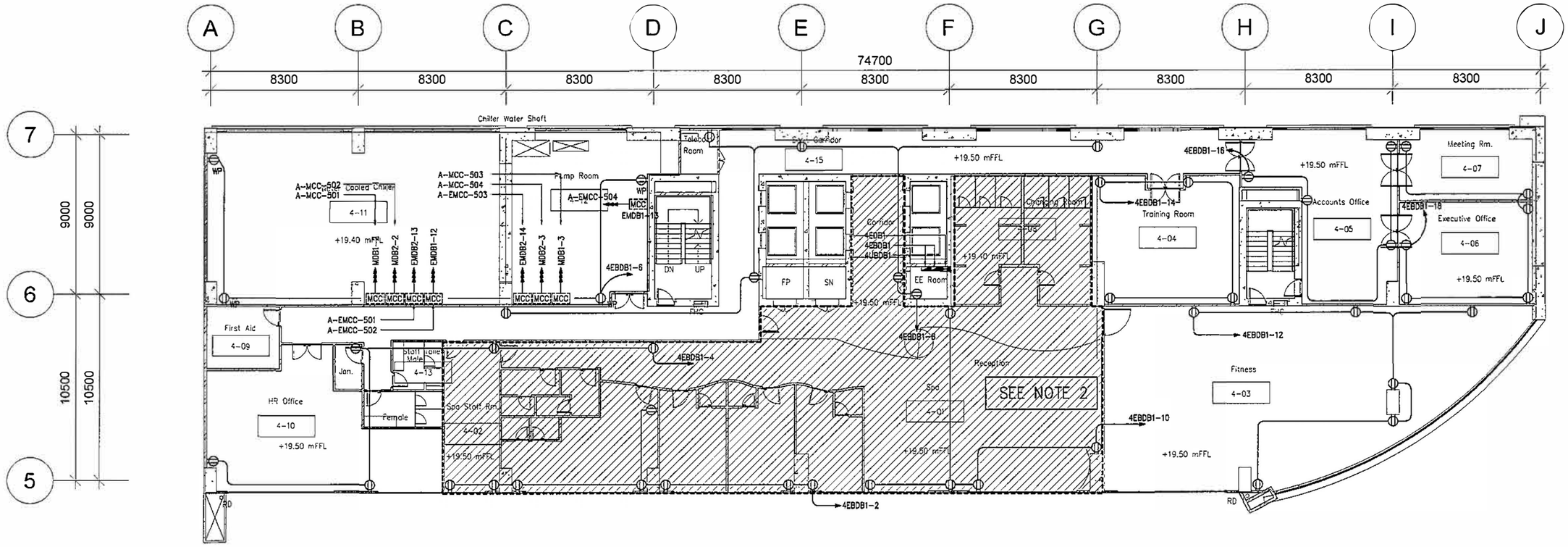
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
ELECTRICAL OUTLET PLAN - LEVEL 3

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chaninton
DATE :	31-08-2018
SCALE	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-04-007

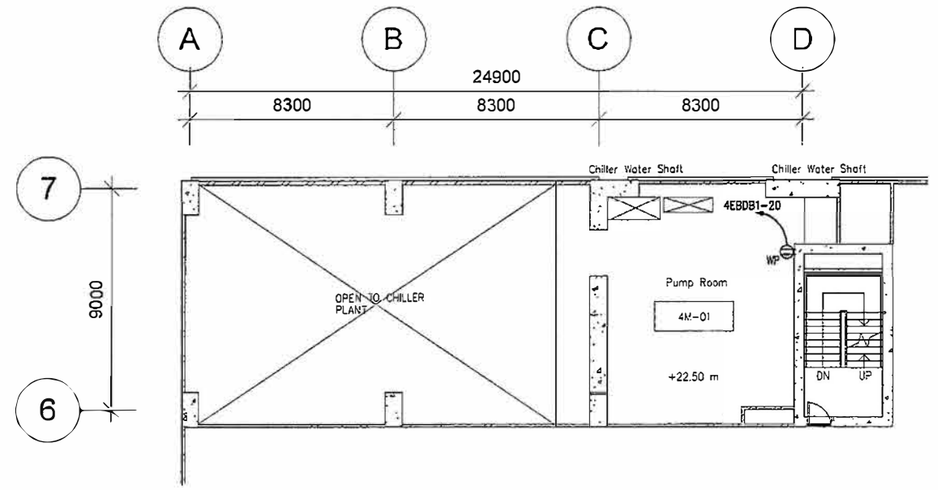
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ELECTRICAL OUTLET PLAN – LEVEL 4

SCALE 1:125



ELECTRICAL OUTLET PLAN – LEVEL 4M

SCALE 1:125

NOTES :

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–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

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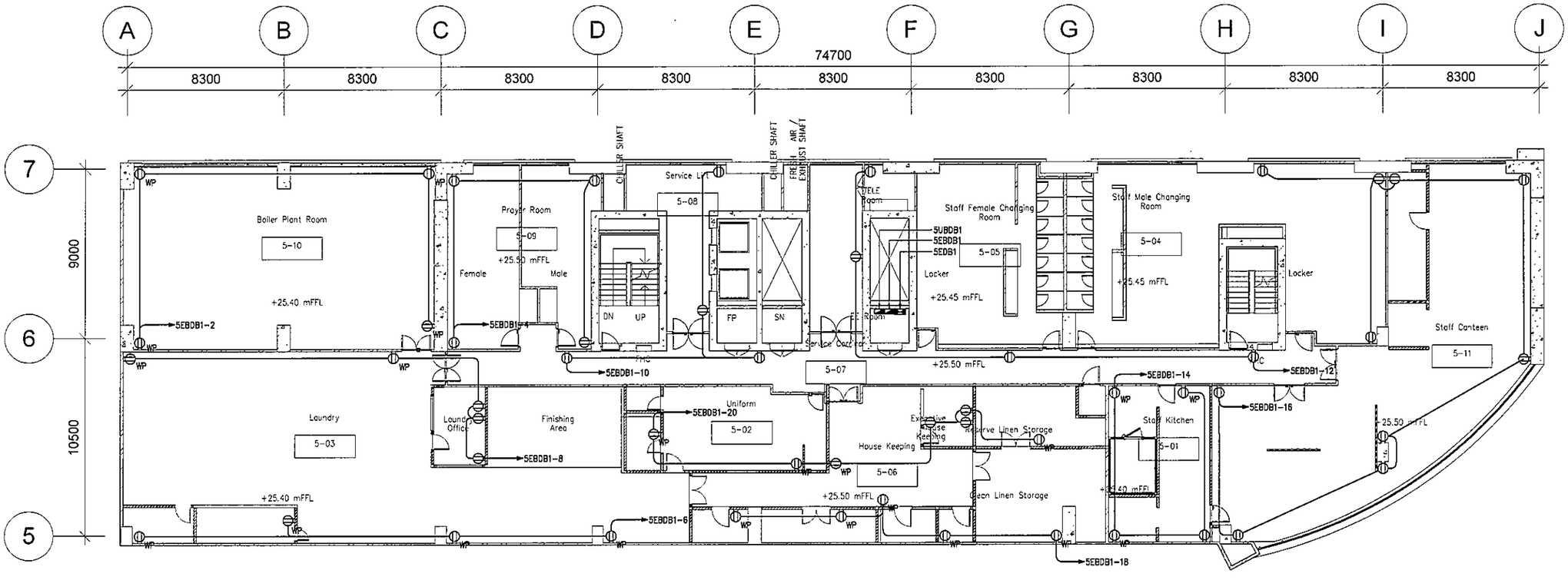
PROJECT: BENGAL HOTELS AND RESORTS A FIVE STAR HOTEL

TITLE: ELECTRICAL OUTLET PLAN - LEVEL 4 AND LEVEL 4M

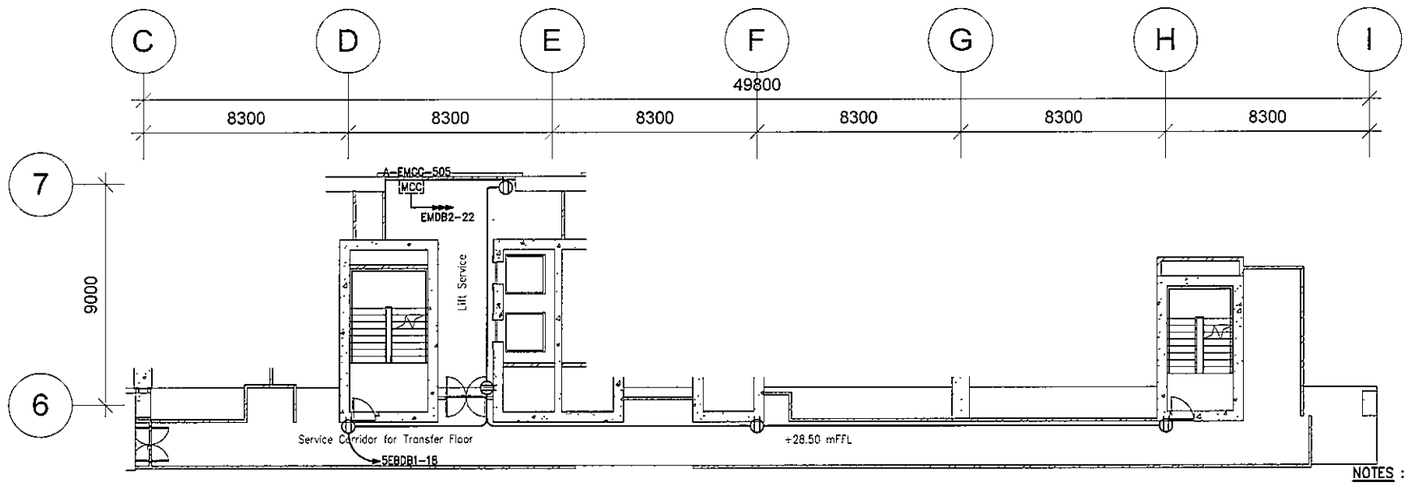
DRAWN BY : SPH
CHECKED BY : WTS
DESIGN BY : WTS
PROJECT MGR. : Onanitorn
DATE : 31-08-2018
SCALE : AS SHOWN
PROJECT NO. 1 1 3 0 7 3
DWG.NO. M H B – E E – 0 4 – 0 0 8

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ELECTRICAL OUTLET PLAN – LEVEL 5
SCALE 1:125



ELECTRICAL OUTLET PLAN – LEVEL 5M
SCALE 1:125

NOTES :

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A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

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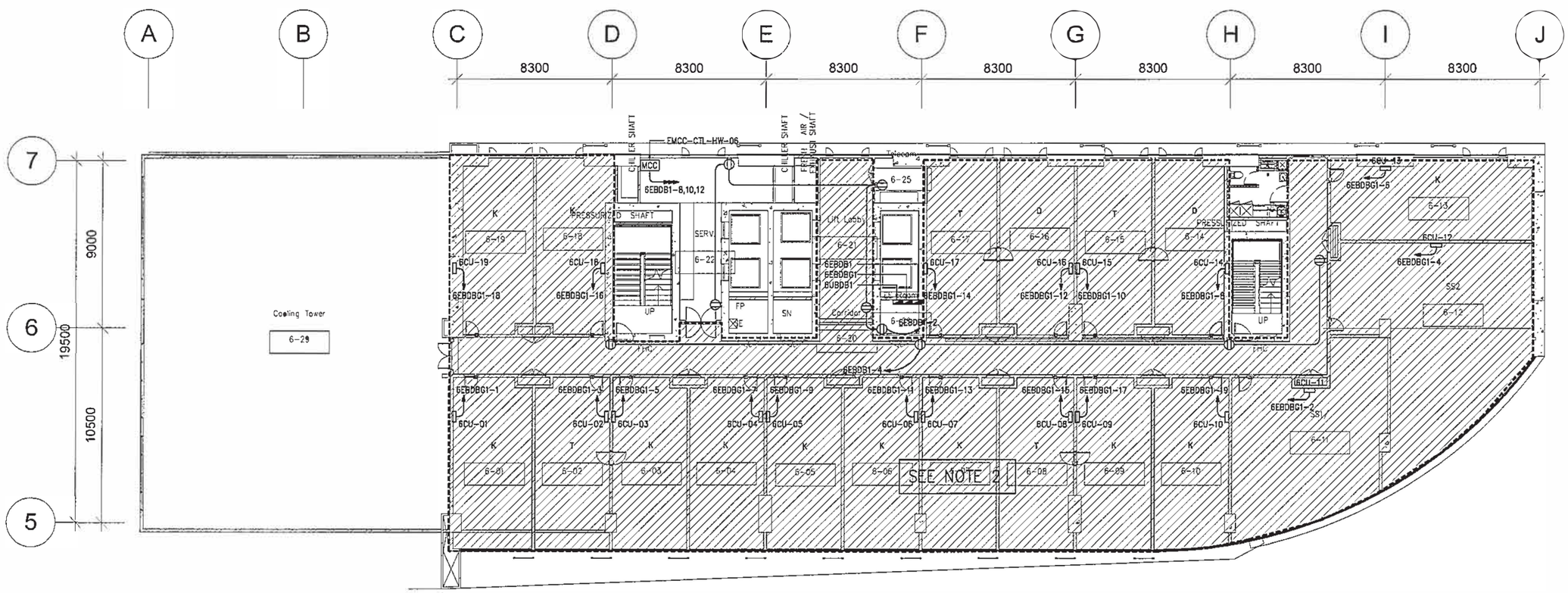
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
ELECTRICAL OUTLET PLAN - LEVEL 5 AND LEVEL 5M

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chonlatorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	MHB-EE-04-009		

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ELECTRICAL OUTLET PLAN – LEVEL 6

SCALE 1:125

NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT
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B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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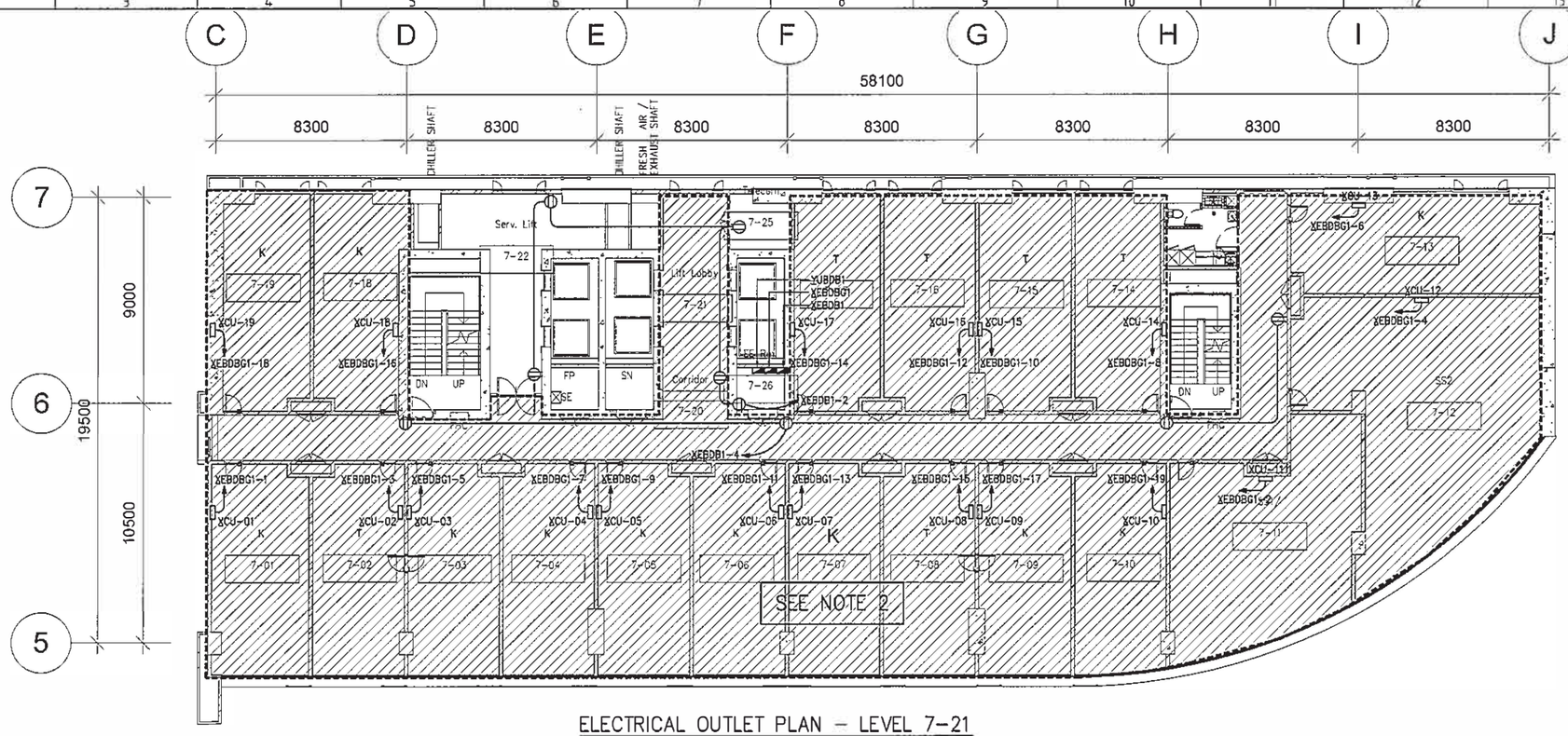
PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: ELECTRICAL OUTLET PLAN - LEVEL 6

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chanintorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1130773		
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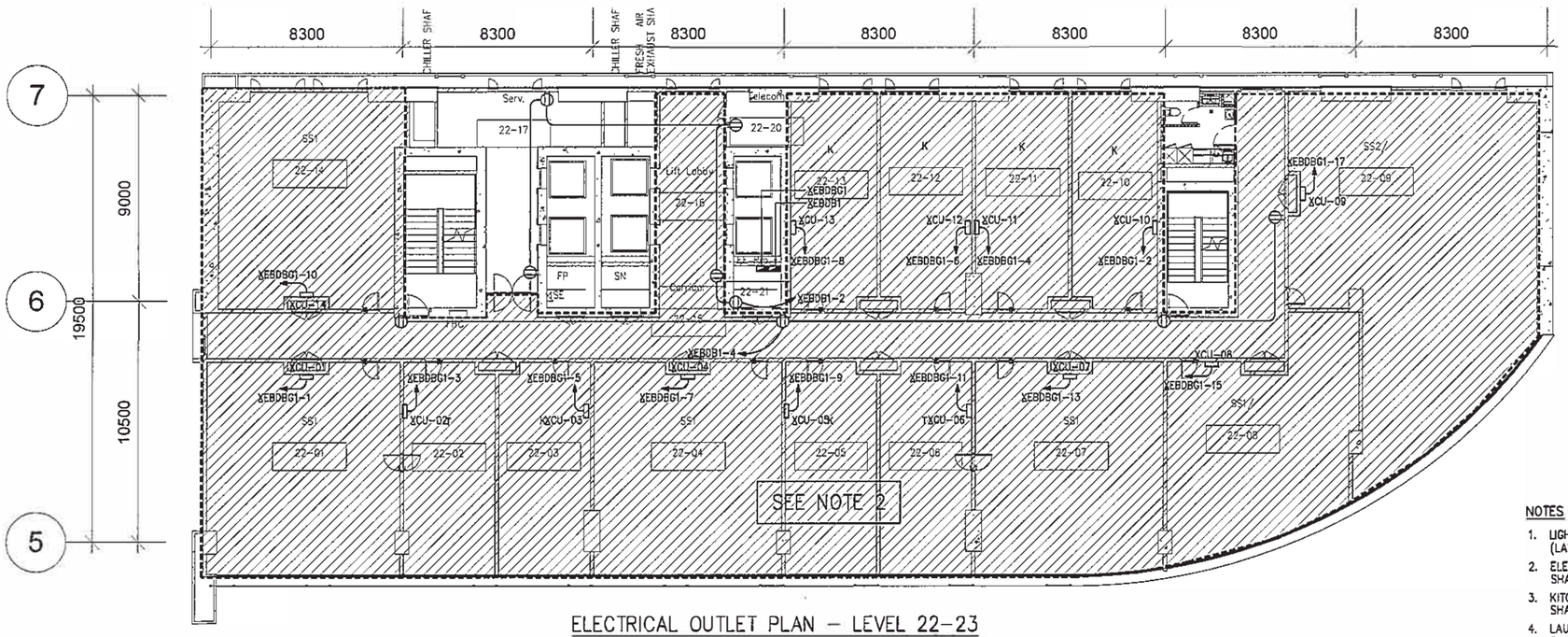
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ELECTRICAL OUTLET PLAN – LEVEL 7-21

SCALE 1:125



ELECTRICAL OUTLET PLAN – LEVEL 22-23

SCALE 1:125

NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT
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C	29-05-20	REVISED FINAL DESIGN	DEC
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–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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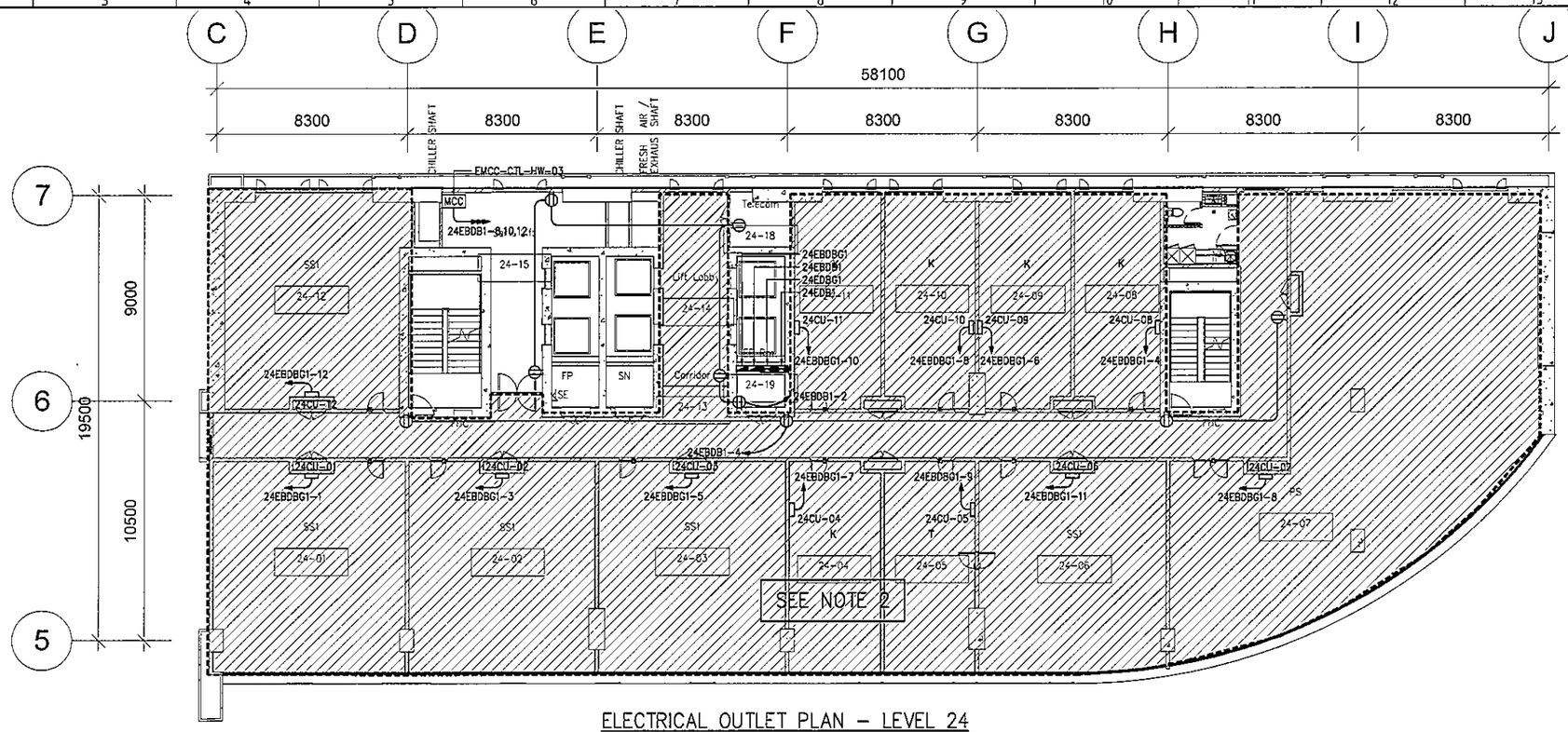
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
ELECTRICAL OUTLET PLAN - LEVEL 7-21 AND LEVEL 22-23

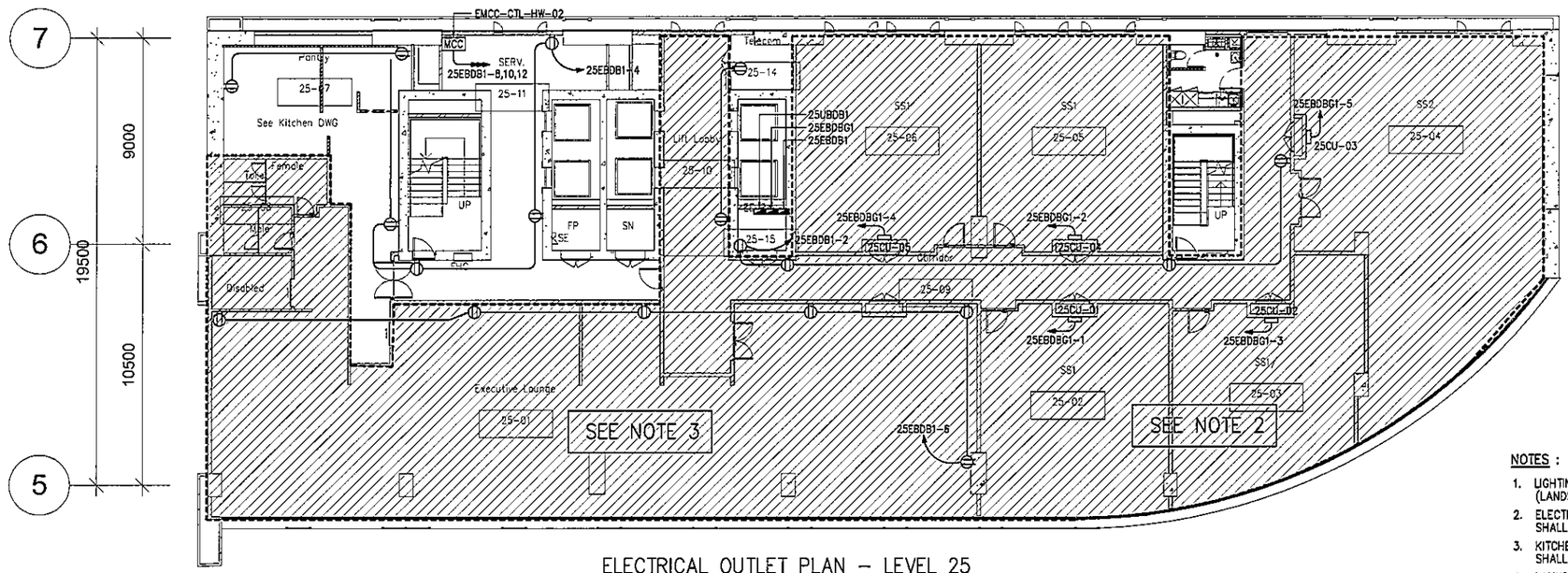
DRAWN BY : SPH
CHECKED BY : WTS
DESIGN BY : WTS
PROJECT MGR. : Chanintorn
DATE : 31-08-2018
SCALE : AS SHOWN
PROJECT NO. 1 1 3 0 7 3
DWG.NO. MHB-EE-04-011

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PLOTTED BY: Surasak Kaewkhiaw



ELECTRICAL OUTLET PLAN – LEVEL 24
SCALE 1:125



ELECTRICAL OUTLET PLAN – LEVEL 25
SCALE 1:125

NOTES :

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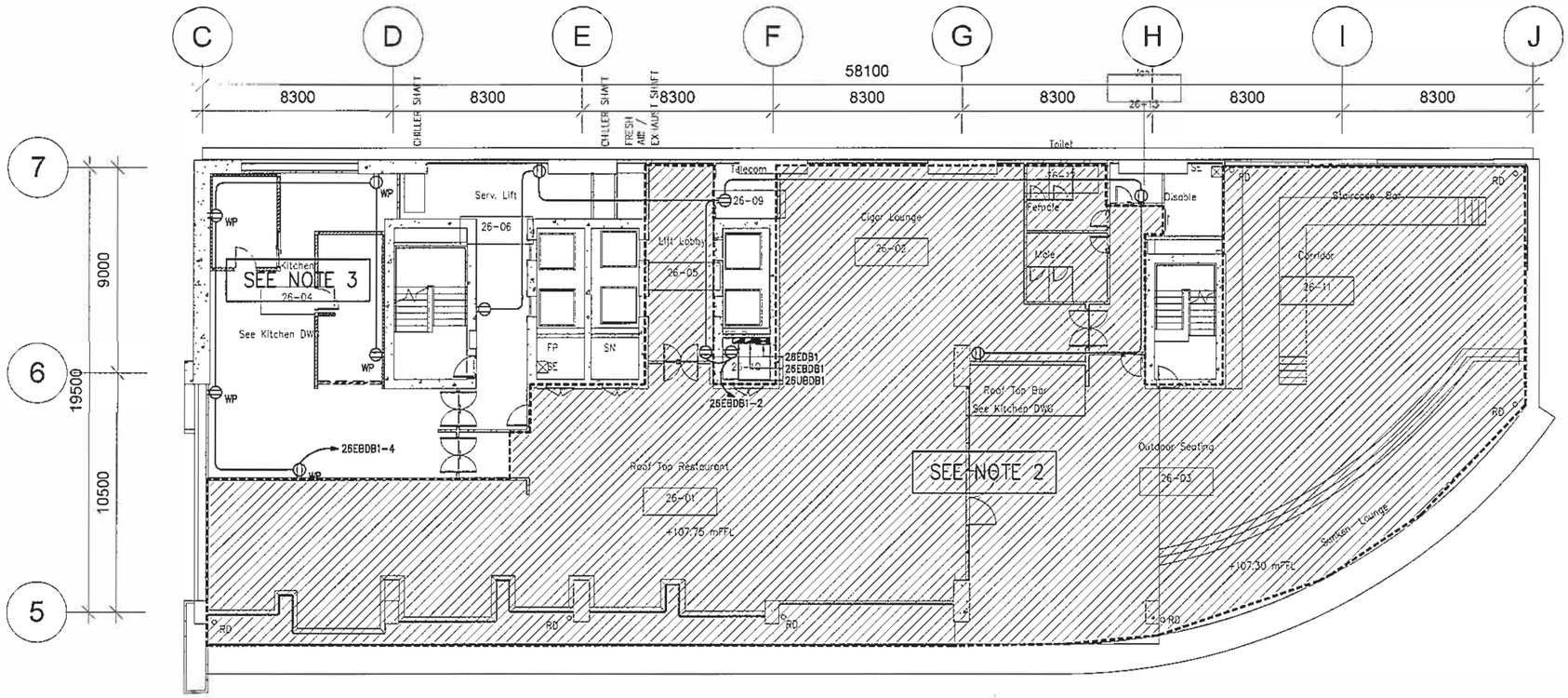
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
ELECTRICAL OUTLET PLAN - LEVEL 24 AND LEVEL 25

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chanintorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 0 4 - 0 1 2		

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ELECTRICAL OUTLET PLAN – LEVEL 26

SCALE 1:125

NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT
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BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

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DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
281 SOI PRIDI BHANOMYONG 42, SUKHUMVIT 71 ROAD
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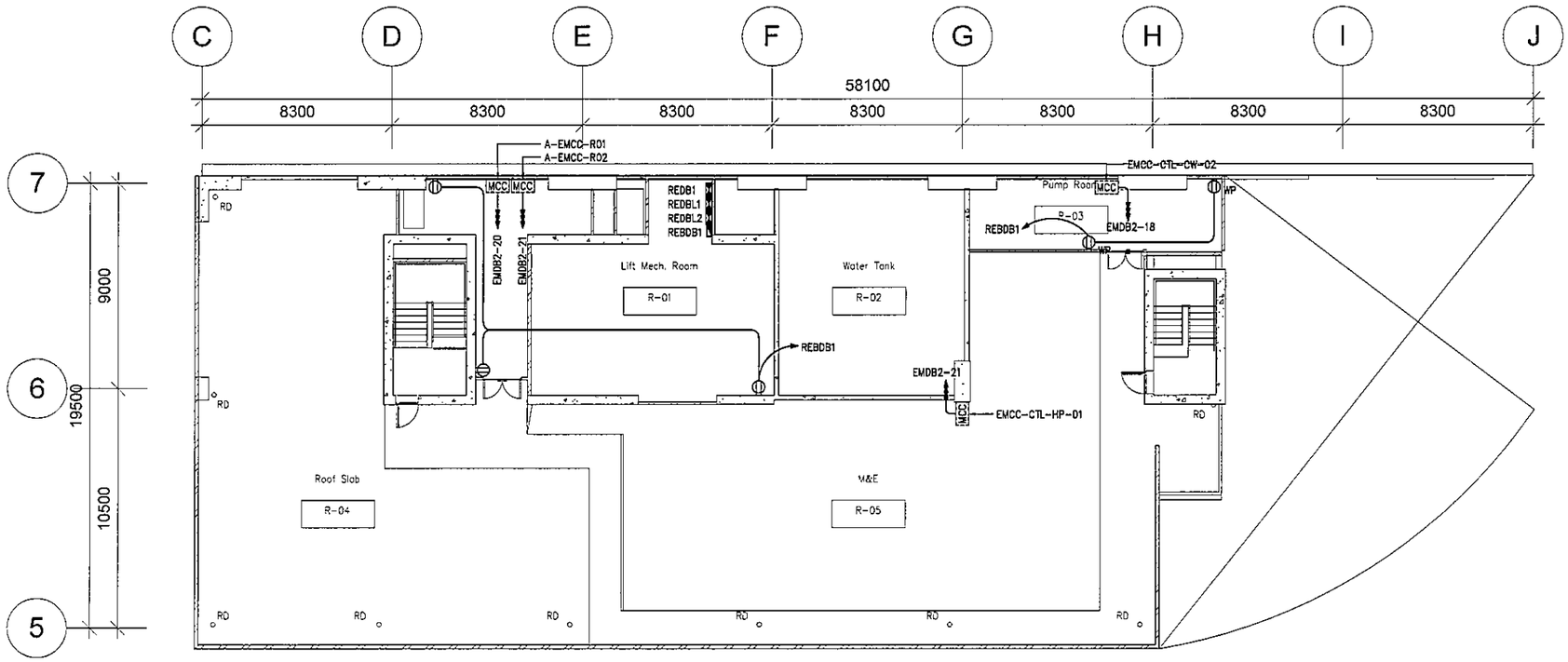
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
ELECTRICAL OUTLET PLAN - LEVEL 26

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chonlatorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 3 0 7 3		
DWG.NO.	MHB-EE-04-013		

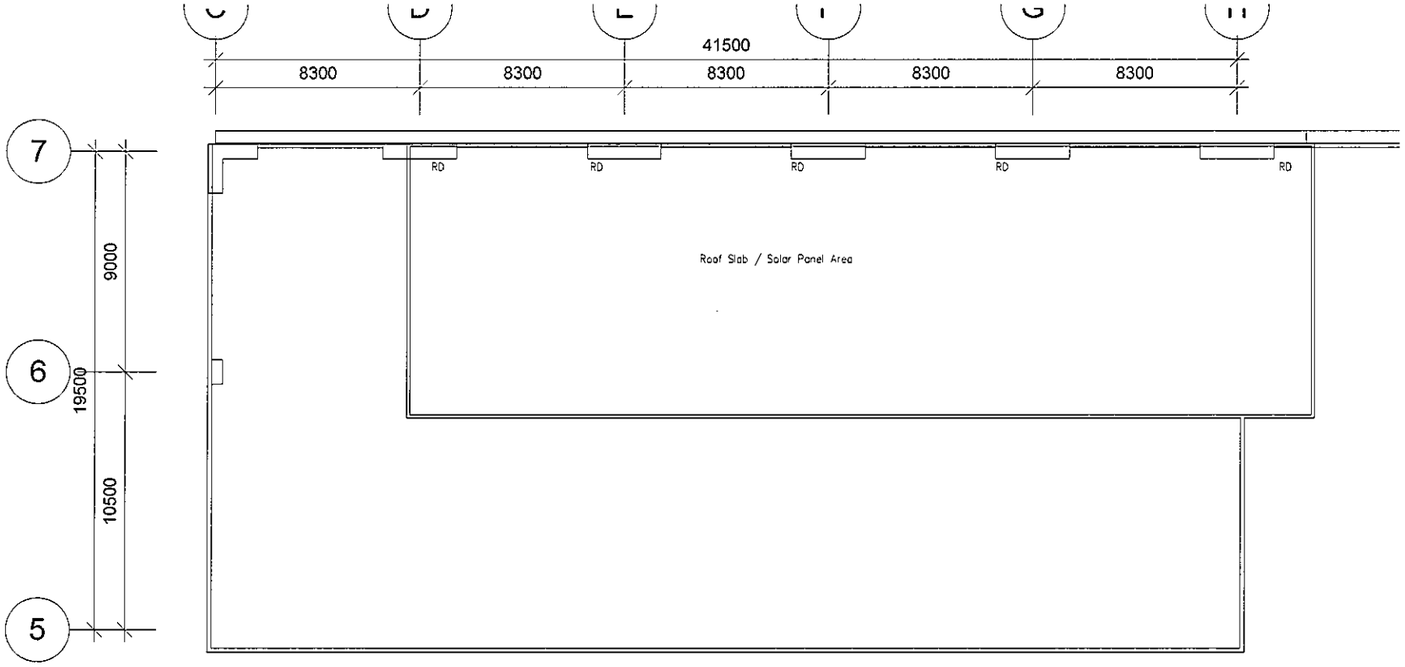
Delta Engineering Dhaka

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ELECTRICAL OUTLET PLAN – ROOF

SCALE 1:125



ELECTRICAL OUTLET PLAN – LMR ROOF

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
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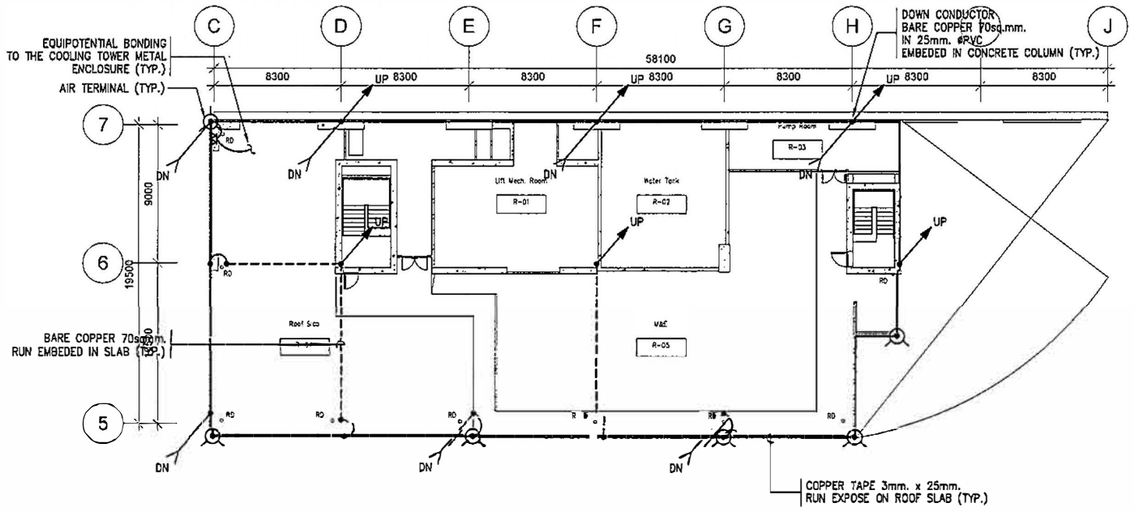
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
ELECTRICAL OUTLET PLAN - ROOF AND LMR ROOF

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chonlatorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 0 4 - 0 1 4		

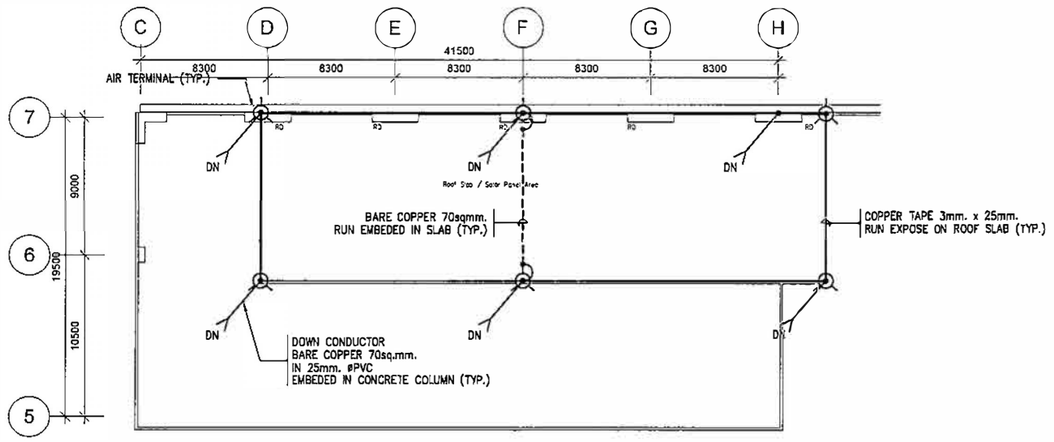
Deltagesh Pvt. Ltd. Dhaka

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LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – ROOF

SCALE 1:200



LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LMR ROOF

SCALE 1:200

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BENGAL HOUSE 75 GULSHAN AVENUE,
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–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

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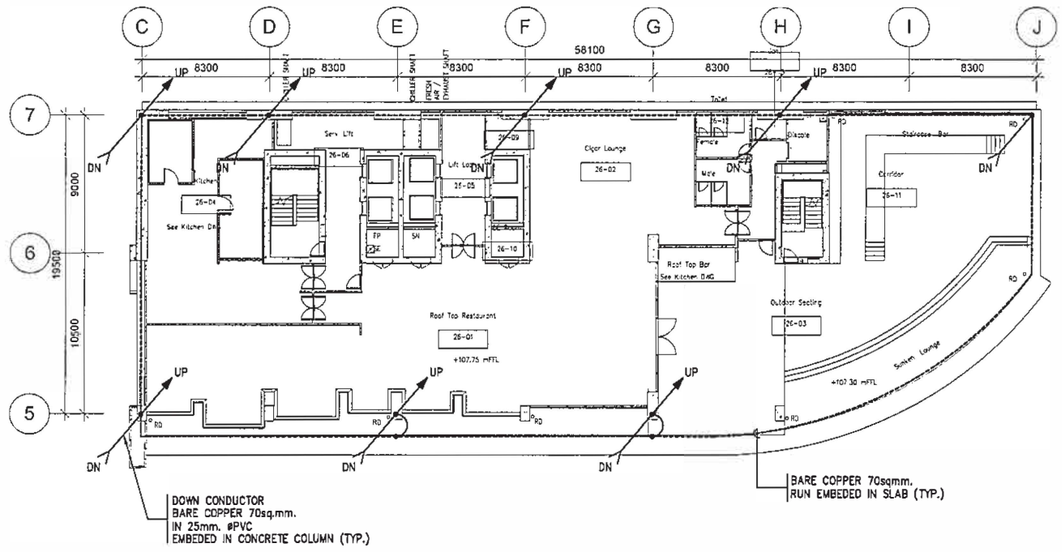
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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN - ROOF AND LMR ROOF

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR :	Chanintorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1130173
DWG.NO.	MHB-EE-06-001

Delta Steel Pvt. Ltd. Dhaka



LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 26

SCALE 1:200

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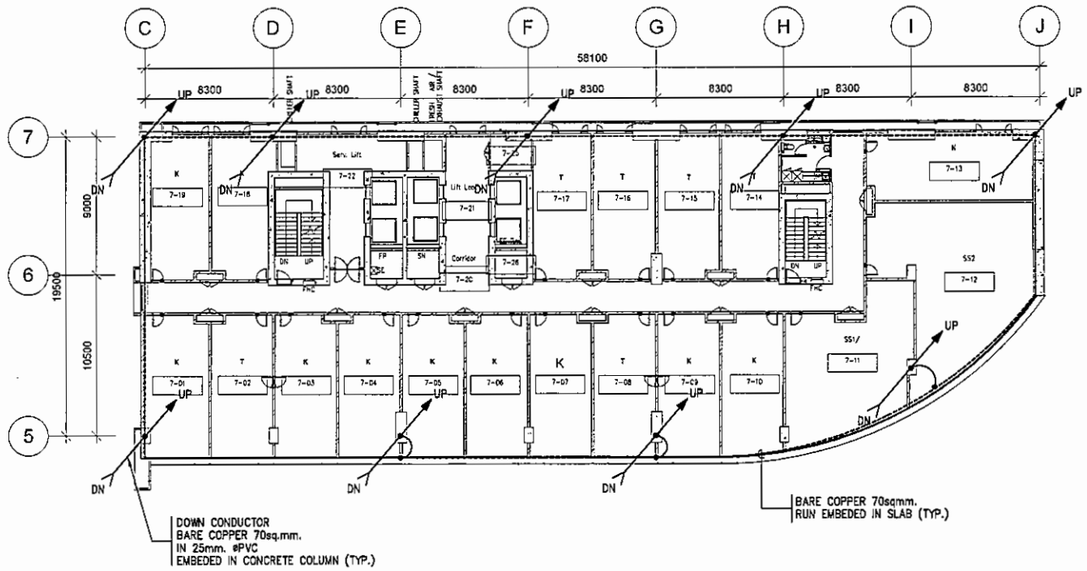
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN - LEVEL 26

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR.	Chonlatorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
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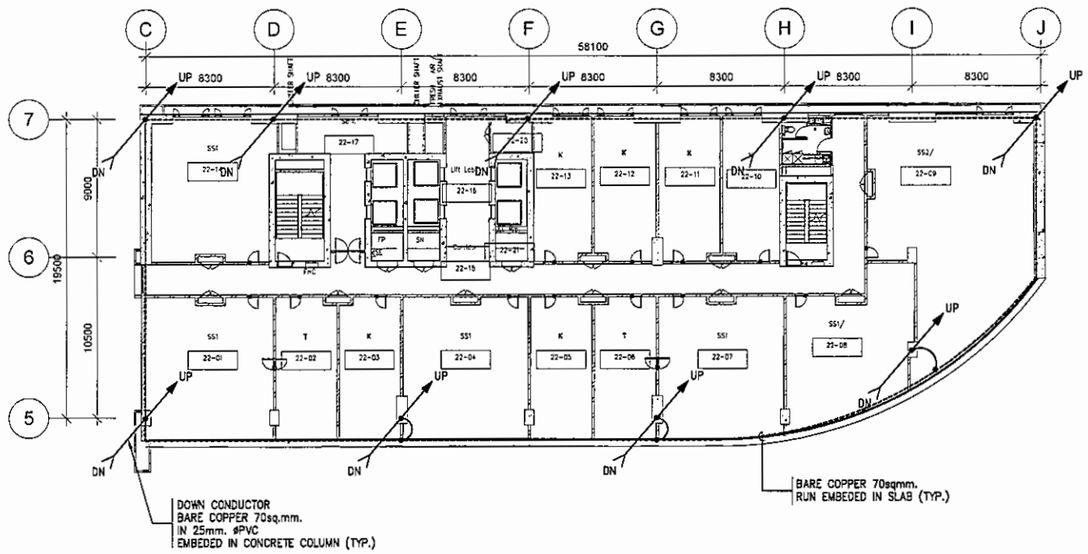
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LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 10, 14, 18

SCALE 1:200



LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 22

SCALE 1:200

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C	29-05-20	REVISED FINAL DESIGN	DEC
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A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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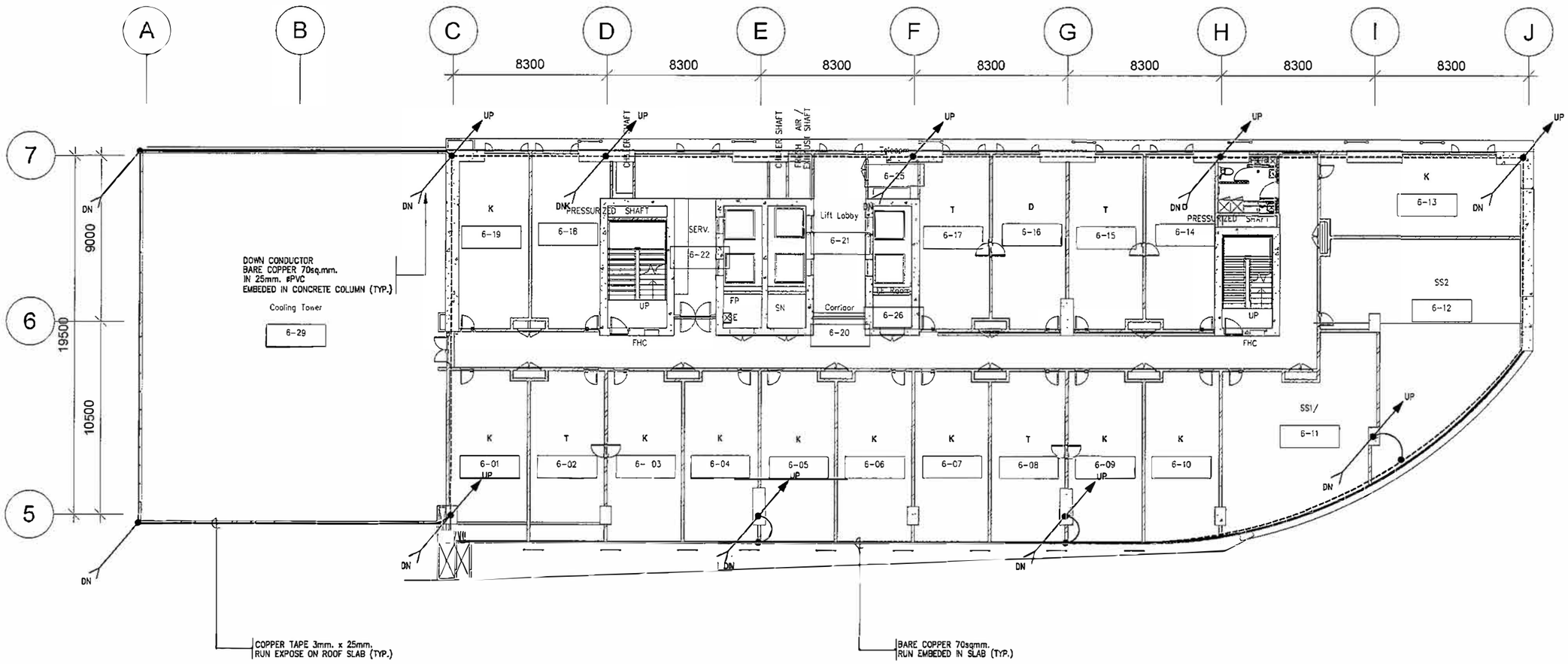
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN - LEVEL 10, 14,18 AND LEVEL 22

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chanitorn
DATE :	31-08-2018
SCALE	AS SHOWN
PROJECT NO.	113073
DWG.NO.	MHB-EE-06-003

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LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 6

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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E-mail : interdes331@gmail.com

PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN - LEVEL 6

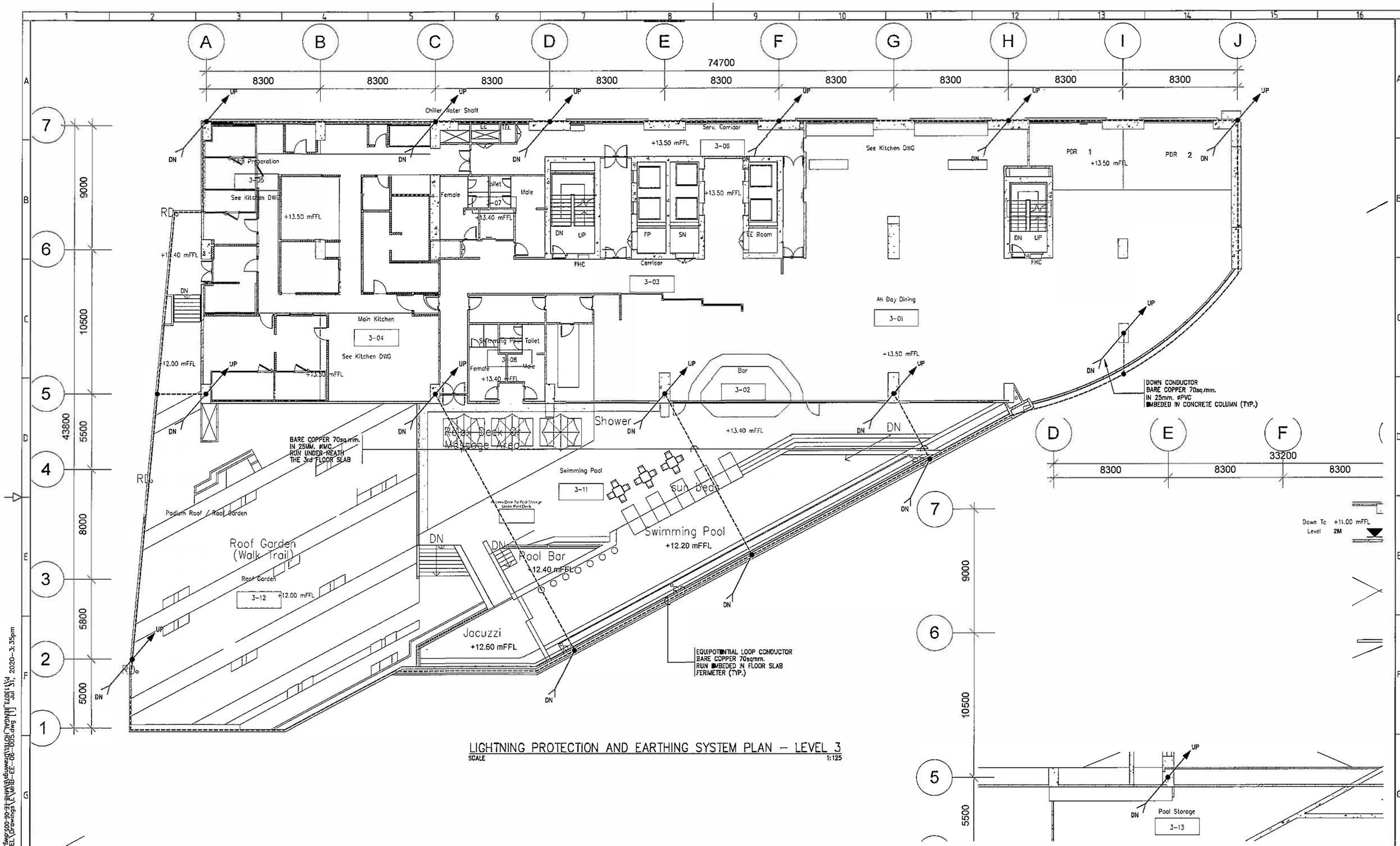
DRAWN BY:	SPH
CHECKED BY:	WTS
DESIGN BY:	WTS
PROJECT MGR.:	Chanintorn
DATE:	31-08-2018
SCALE:	AS SHOWN
PROJECT NO.	113073
DWG.NO.	MHB-EE-06-004

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LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 3

SCALE 1:125



REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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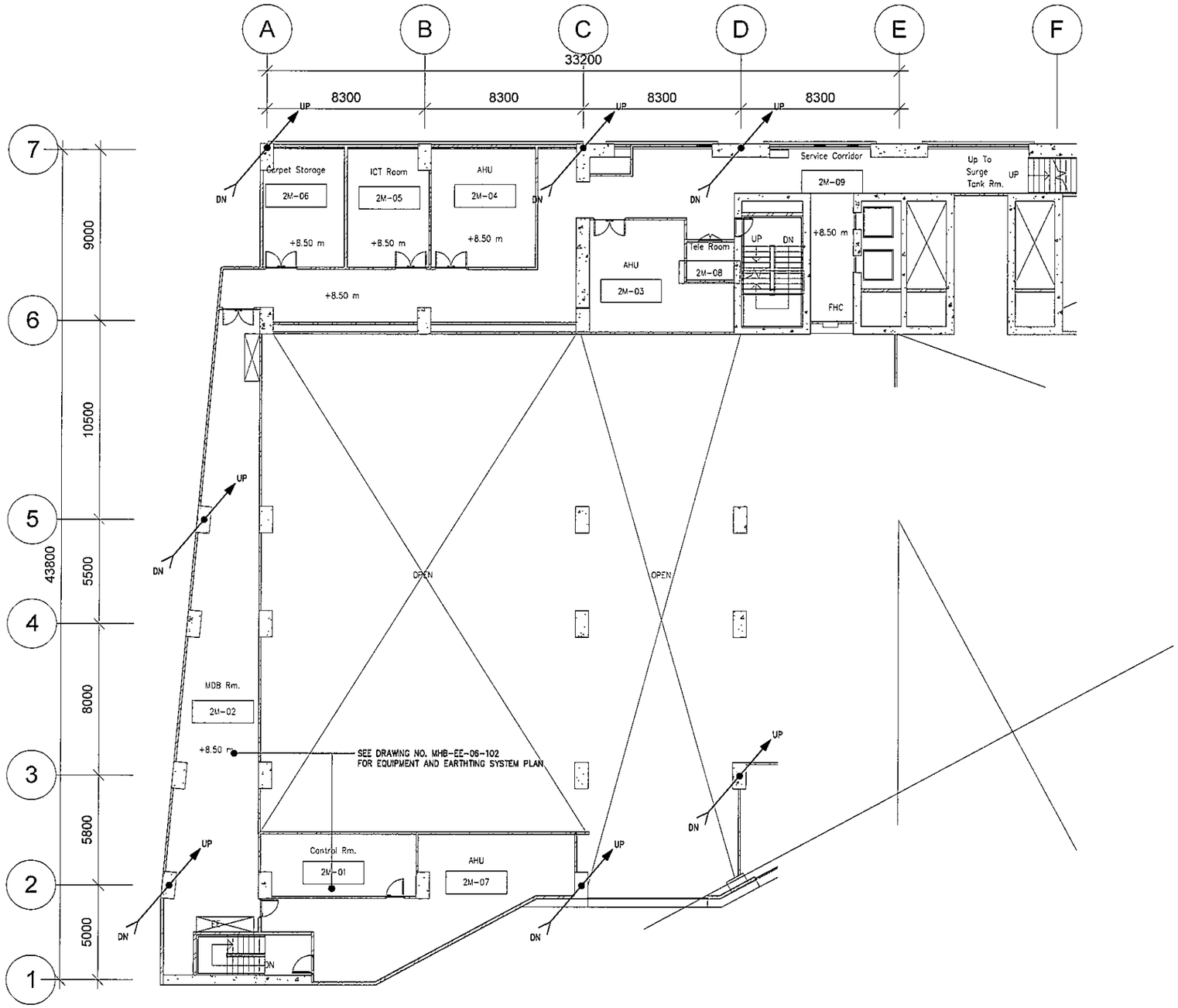
PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN - LEVEL 3

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT NGR. :	Chaninton
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	M H B - E E - 0 6 - 0 0 5

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LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 2M

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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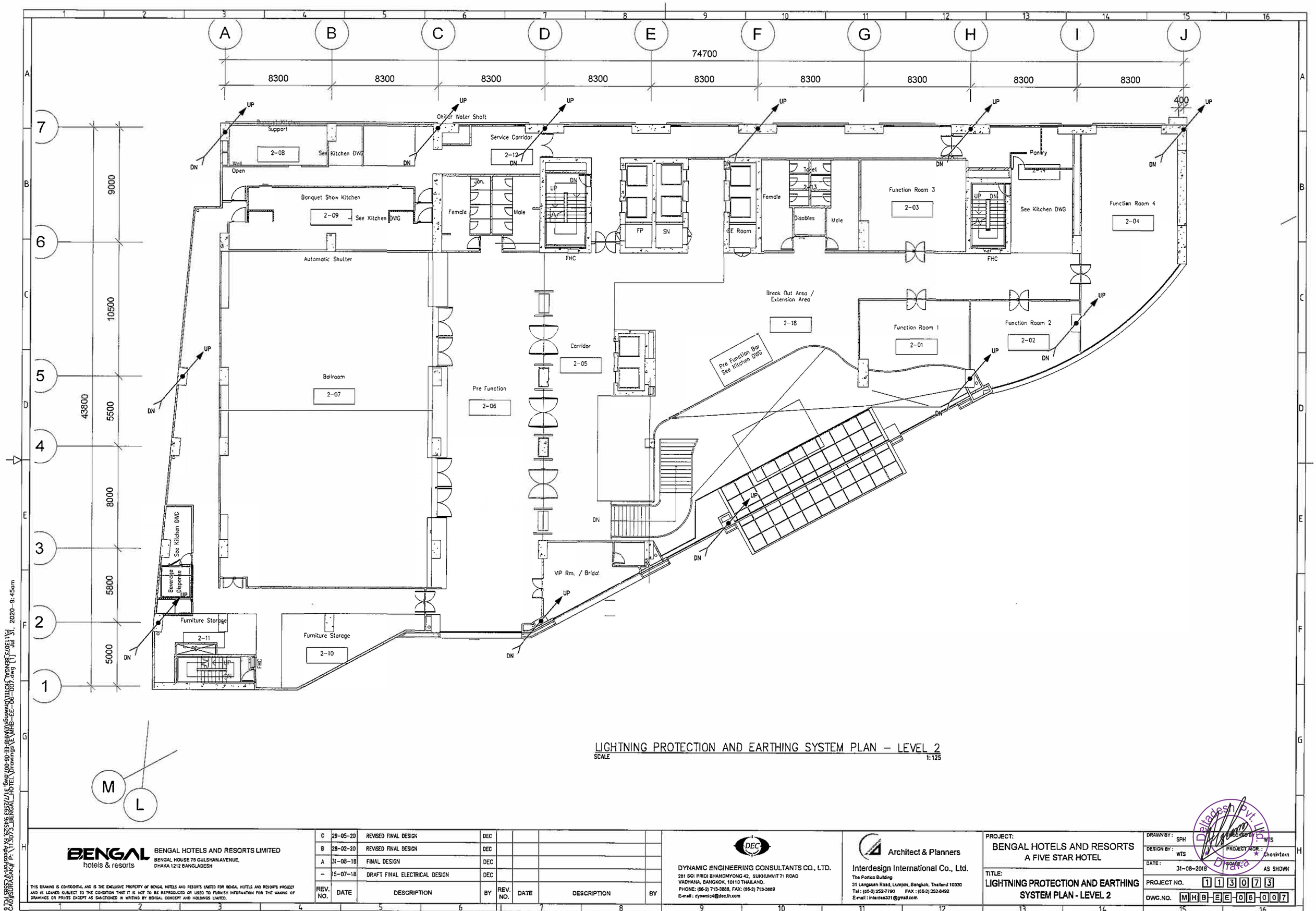
PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN - LEVEL 2M

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chaninton
DATE :	31-08-2018
SCALE:	AS SHOWN
PROJECT NO.	113073
DWG.NO.	MHB-EE-06-006

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LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 2

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN - LEVEL 2

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chonintorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B – E E – 0 6 – 0 0 7		

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LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 1

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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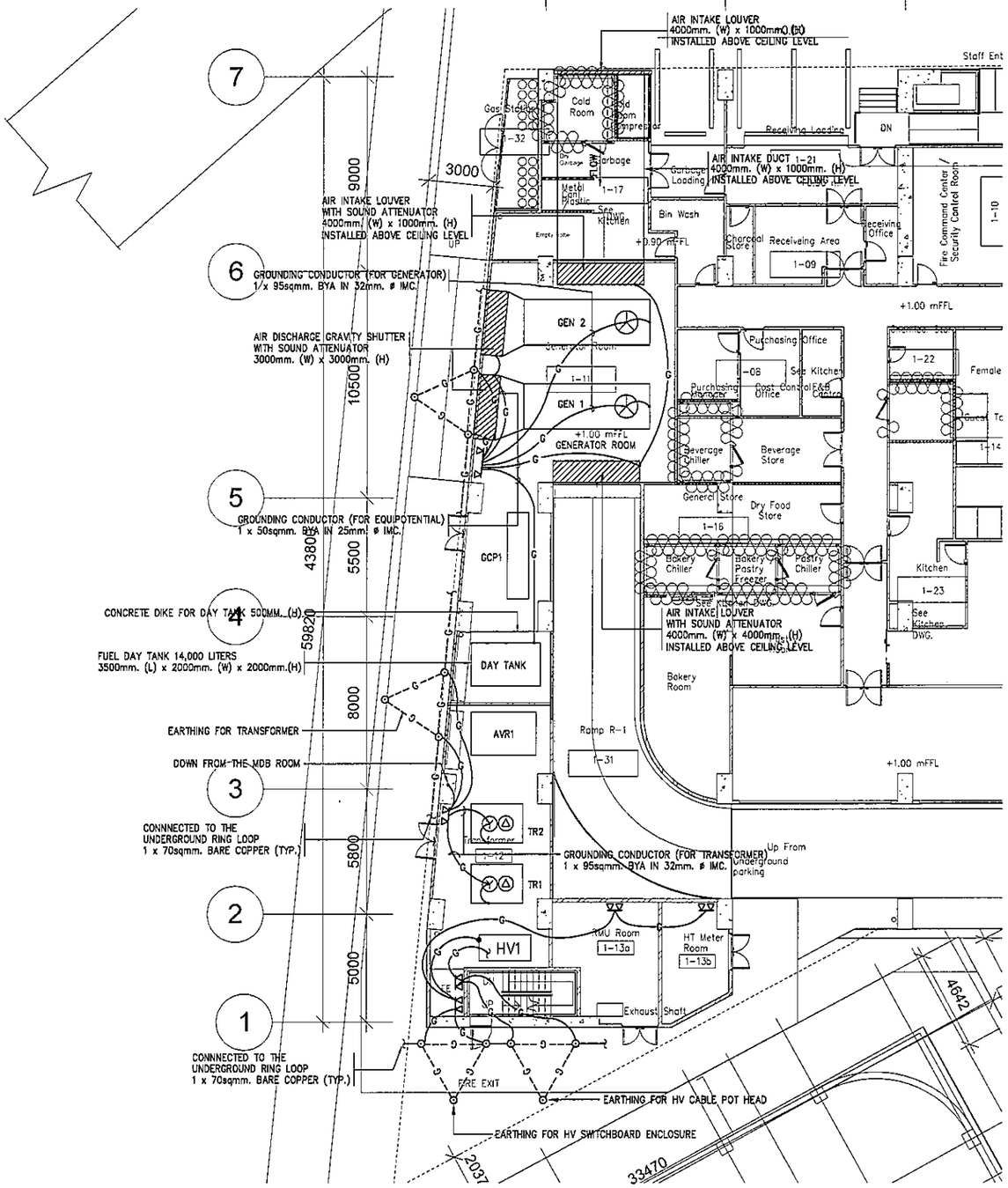
PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN - LEVEL 1

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chaninton
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	113073
DWG.NO.	MHB-EE-06-008

Dynamic Engineering Consultants Co., Ltd. Dhaka

CAD\SURASAK\# P:\113073_BENGAL_HOTEL\Drawings\E\MHB-EE-06-008.dwg [1] Jul 31, 2020 - 9:45am



EQUIPMENT AND EARTHING SYSTEM LAYOUT FOR HV, TRANSFORMER AND GENERATOR ROOM

SCALE 1:125

NOTE :

1. SOUND LEVEL CONTROL FOR GENERATOR ROOM SHALL BE PROVIDED SUCH AS SOUND ATTENUATOR FOR AIR INTAKE/ DISCHARGE LOUVER, EXHAUST SILENCER, SOUND PROOF MATERIAL FOR WALL AND CEILING SLAB

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	28/02/20	REVISED FINAL DESIGN	DEC				
B	4/02/19	FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC	E	31-07-20	REVISED FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	29-05-20	REVISED FINAL DESIGN	DEC

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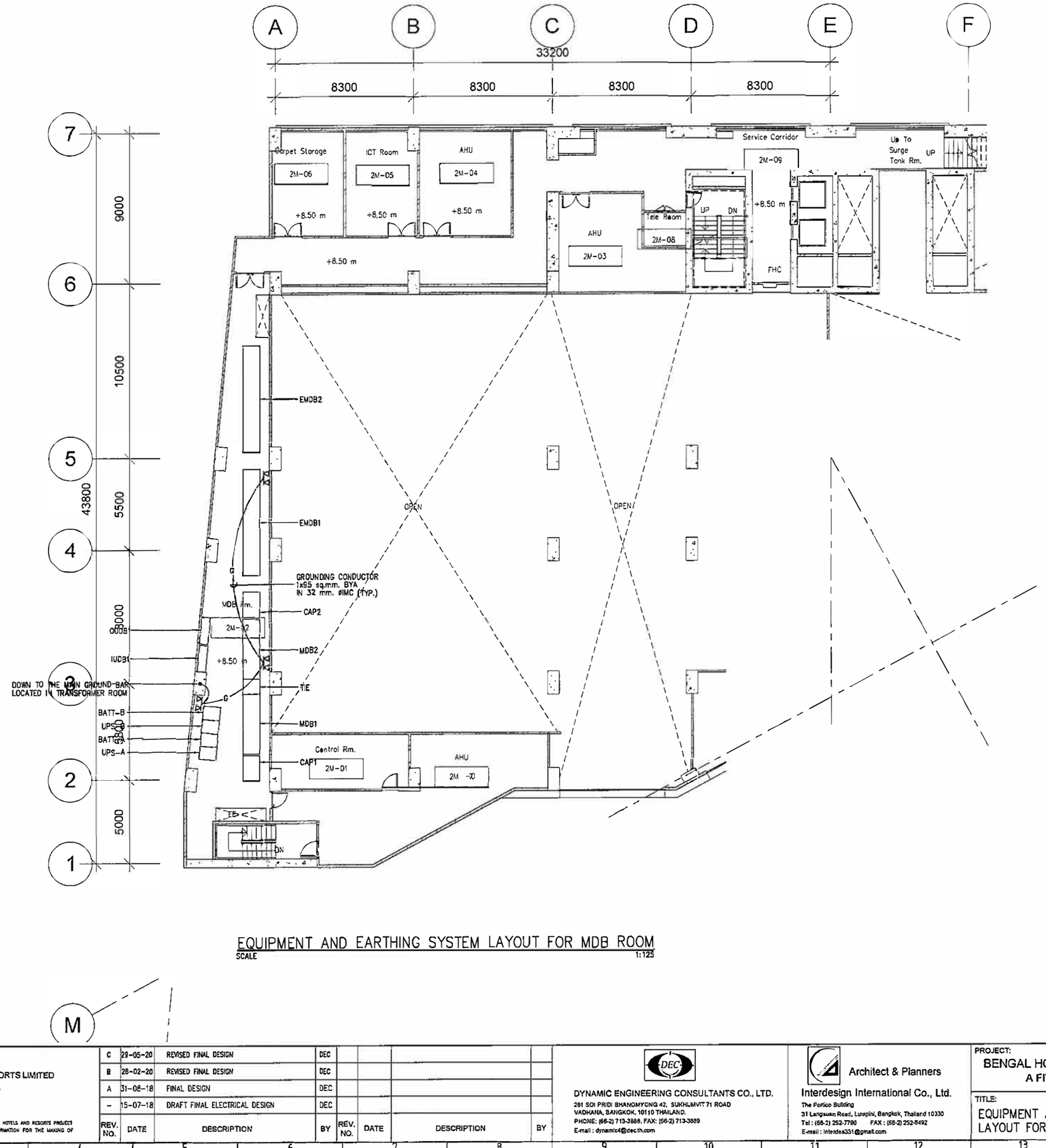
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EQUIPMENT AND EARTHING SYSTEM LAYOUT FOR HV, TRANSFORMER AND GENERATOR ROOM

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chanintorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-06-101

Dekades Pvt. Ltd. Dhaka

CAD#SURASAK# P:\113073_BENGAL_HOTEL\Drawings\MHB-EE-06-101.dwg [ ] Jul 31, 2020-1:56pm
P:\113073_BENGAL_HOTEL\Drawings\MHB-EE-06-101.dwg 31/7/2563 13:55:55 Plotted by: Surasak Jaroonvanichkul



EQUIPMENT AND EARTHING SYSTEM LAYOUT FOR MDB ROOM

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EQUIPMENT AND EARTHING SYSTEM LAYOUT FOR MDB ROOM

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chaninton
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	113073		
DWG.NO.	MHB-EE-06-102		

Deltadesh Pvt. Ltd. Dhaka

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CAD/SURASAK# P:\113073_BENGAL_HOTEL\Drawings\MHB-EE-06-102.dwg, 31/7/2563 13:10:11

MAIN DISTRIBUTION BOARD No. MDB1 — **LOCATION :** 2M FLOOR, TR. & MDB. BOARD RM.
Cu BUSBAR : 4000 A. 400/230 VAC. 50 Hz. — **MOUNTING :** FLOOR MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 25 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	CAP-1	3	1600	65	1600 A. Al. Busduct 3L+PE, IP 54	-	0
2	A-MCC-501	3	1250	65	2 (4-240 NYY/120 BYA ECC)	CABLE TRAY W/ COVER	324,473
3	A-MCC-503	3	400	65	4-240 NYY/120 BYA ECC	CABLE TRAY W/ COVER	145,782
4	EMDB1	3	3000	65	3200 A. Al. Busduct 3L+PE, IP 54	-	2,853,196
5	SPARE	3	160	65			
6	SPARE	3	100	65			
7	SPARE	3	63	65			
8	SPACE						
9	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	4P , 4000AT/4000AF	AL BUSDUCT 4000A	LOAD SUMMARY	3,177,669
TR1	Ic>= 65 kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.7
		-	DEMAND LOAD(VA)	2,224,368

MAIN DISTRIBUTION BOARD No. MDB2 — **LOCATION :** 2M FLOOR, TR. & MDB. BOARD RM.
Cu BUSBAR : 4000 A. 400/230 VAC. 50 Hz. — **MOUNTING :** FLOOR MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 25 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	CAP-2	3	1600	65	1600 A. Al. Busduct 3L+PE, IP 54	-	0
2	A-MCC-502	3	1250	65	2 (4-240 NYY/120 BYA ECC)	CABLE TRAY W/ COVER	324,473
3	A-MCC-504	3	400	65	4-185 NYY/95 BYA ECC	CABLE TRAY W/ COVER	136,239
4	EMDB2	3	3000	65	3200 A. Al. Busduct 3L+PE, IP 54	-	2,758,665
5	SPARE	3	160	65			
6	SPARE	3	100	65			
7	SPARE	3	63	65			
8	SPACE						
9	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	4P , 4000AT/4000AF	AL BUSDUCT 4000A	LOAD SUMMARY	3,083,138
TR2	Ic>= 65 kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.7
		-	DEMAND LOAD(VA)	2,158,196

MAIN DISTRIBUTION BOARD No. EMDB1 — **LOCATION :** 2M FLOOR, TR. & MDB. BOARD RM.
Cu BUSBAR : 3200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** FLOOR MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 25 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	AL BUSDUCT NO.1	3	630	65	630 A. Plug-in Al. Busduct 3L+N+PE, IP 54	-	122,700
2	2EDB1	3	315	65	4-240 NYY/120 BYA ECC	CABLE TRAY W/ COVER	45,295
3	2EDB2	3	630	65	2 (4-240 NYY/120 BYA ECC)	CABLE TRAY W/ COVER	595,250
4	2MEDB1	3	160	65	4-95 NYY/50 BYA ECC	CABLE TRAY W/ COVER	25,001
5	3EDB1	3	630	65	2 (4-240 NYY/120 BYA ECC)	CABLE TRAY W/ COVER	449,228
6	3EDB2	3	630	65	2 (4-240 NYY/120 BYA ECC)	CABLE TRAY W/ COVER	510,630
7	24EDB1	3	315	65	2 (4-185 NYY/95 BYA ECC)	CABLE TRAY W/ COVER	175,742
8	26EDB1	3	400	65	2 (4-240 NYY/120 BYA ECC)	CABLE TRAY W/ COVER	277,615
9	REDB1	3	100	65	4-70 NYY/35 BYA ECC	CABLE TRAY W/ COVER	2,095
10	IUDB1	3	160	65	4-95 NYY/50 BYA ECC	CABLE TRAY W/ COVER	75,000
11	OUDB1	3	125	65	4-70 NYY/35 BYA ECC	CABLE TRAY W/ COVER	-
12	A-EMCC-502	3	1250	65	2 (4-240 NYY/120 BYA ECC)	CABLE TRAY W/ COVER	324,473
13	A-EMCC-504	3	400	65	4-240 NYY/120 BYA ECC	CABLE TRAY W/ COVER	164,869
14	A-EMCC-B101	3	200	65	4-120 BYA/70 BYA ECC	dia. 80 mm. IMC	81,743
15	A-EMCC-B102	3	20	65	4-4 BYA/4 BYA ECC	dia. 20 mm. IMC	3,554
16	SPARE	3	315	65			
17	SPARE	3	100	65			
18	SPARE	3	100	65			
19	SPACE						
20	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	3P , 3000AT/3200AF	AL BUSDUCT 3200A	LOAD SUMMARY	2,853,196
MDB1	Ic>= 65 kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.7
		-	DEMAND LOAD(VA)	1,997,237

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BENGAL hotels & resorts — BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC				
B	04-02-19	FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
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PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: PANEL SCHEDULE (1)

DRAWN BY : SPH — CHECKED BY : WTS
DESIGN BY : WTS — PROJECT MGR. : Phanitorn
DATE : 31-08-2018 — SCALE : AS SHOWN
PROJECT NO. 1 1 3 0 7 3
DWG.NO. MHB-EE-07-001

CAD#SURASAK# P:\11307\3_BENGAL_HOTEL\Drawings\EE\MHB-EE-07-001.dwg [1] Jul 31, 2020-1:57pm

MAIN DISTRIBUTION BOARD No. EMDB2 — **LOCATION :** 2M FLOOR, TR. & MDB. BOARD RM.

Cu BUSBAR : 3200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** FLOOR MOUNTED

NEUTRAL BUS : 100 %

GROUND BUS : 25 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER			CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
		POLE	AT	Ic(KA)			
1	AL BUSDUCT NO.2	3	1000	65	000 A, Plug-in Al. Busduct 3L+N+PE, IP 54	-	492,960
2	B3EDB1	3	400	65	2 (4-120 NYY/70 BYA ECC)	CABLE TRAY W/ COVER	129,271
3	B2EDB1	3	125	65	4-70 NYY/35 BYA ECC	CABLE TRAY W/ COVER	31,645
4	B1EDB1	2	200	65	4-120 NYY/70 BYA ECC	CABLE TRAY W/ COVER	48,606
5	1EDB1	3	200	65	4-240 NYY/120 BYA ECC	CABLE TRAY W/ COVER	51,135
6	1EDB2	3	500	65	2 (4-185 NYY/95 BYA ECC)	CABLE TRAY W/ COVER	338,610
7	4EDB1	3	200	65	4-120 NYY/70 BYA ECC	CABLE TRAY W/ COVER	29,610
8	5EDB1	3	500	65	2 (4-185 NYY/95 BYA ECC)	CABLE TRAY W/ COVER	331,465
9	24EDBG1	3	160	65	4-95 NYY/50 BYA ECC	CABLE TRAY W/ COVER	37,400
10	REDBL1	3	160	65	4-95 BYA/50 BYA ECC	dia. 65 mm. IMC	91,450
11	REDBL2	3	125	65	4-70 FR/35 BYA ECC	dia. 65 mm. IMC	45,725
12	2MEDBL1	3	100	65	4-50 BYA/10 BYA ECC	dia. 50 mm. IMC	27,712
13	A-EMCC-501	3	1250	65	2 (4-240 NYY/120 BYA ECC)	CABLE TRAY W/ COVER	324,473
14	A-EMCC-503	3	400	65	2 (4-120 NYY/70 BYA ECC)	CABLE TRAY W/ COVER	183,956
15	FP-EMCC-01	3	1000	65	2 (4-185 FR/95 BYA ECC)	dia. 2 x 90 mm. IMC	245,494
16	FP-EMCC-02	3	1600	65	3 (4-240 FR/120 BYA ECC)	dia. 3 x 100 mm. IMC	352,116
17	JP-EMCC-01	3	40	65	4-10 BYA/10 BYA ECC	dia. 25 mm. IMC	12,044
18	EMCC-CTL-CW-02	3	40	65	4-16 BYA/16 BYA ECC	dia. 32 mm. IMC	12,044
19	EMCC-CTL-HW-01	3	800	65	3 (4-240 NYY/120 BYA ECC)	CABLE TRAY W/ COVER	366,069
20	A-EMCC-R01	3	200	65	4-185 BYA/95 BYA ECC	dia. 80 mm. IMC	89,970
21	A-EMCC-R02	3	200	65	4-120 BYA/70 BYA ECC	dia. 80 mm. IMC	57,260
22	A-EMCC-505	3	160	65	4-70 BYA/35 BYA ECC	dia. 65 mm. IMC	57,260
23	SPARE	3	315	65			
24	SPARE	3	100	65			
25	SPARE	3	100	65			
26	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	3P , 3000AT/3200AF	AL BUSDUCT 3200A	LOAD SUMMARY	2,758,664.92
MDB2	Ic>= 65 kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.7
		-	DEMAND LOAD(VA)	1,931,065

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BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
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–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	31-07-20	REVISED FINAL DESIGN	DEC

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E-mail : interdes331@gmail.com

PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: PANEL SCHEDULE (2)

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	ChanIntorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-07-002

Deltadesh Pvt. Ltd. Dhaka

Plotted: Jul 31, 2020 - 1:57pm
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DISTRIBUTION BOARD NO. B3EDB1 — **LOCATION :** B3 FLOOR, EE RM.
Cu BUSBAR : 400 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	B3EBDB1	3	63	25	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	8,100
2	EMCC-CTL-WWP-01	3	20	25	4-4 BYA/4 BYA ECC	dia. 20 mm. IMC	5,958
3	EMCC-CTL-WWP-02	3	40	25	4-10 BYA/10 BYA ECC	dia. 25 mm. IMC	12,401
4	EMCC-CTL-SN-01	3	40	25	4-10 BYA/10 BYA ECC	dia. 25 mm. IMC	14,549
5	EMCC-CTL-CW-01	3	250	25	4-95 BYA/50 BYA ECC	dia. 65 mm. IMC	78,000
6	EMCC-CTL-CW-03	3	40	25	4-10 BYA/10 BYA ECC	dia. 25 mm. IMC	10,253
7	SPARE	3	100	25	-	-	-
8	SPARE	3	100	25	-	-	-
9	SPARE	3	63	25	-	-	-
10	SPACE						
CONNECT TO:		MAIN CB :			MAIN CONDUCTOR		
		3P , 400AT/400AF			2 (4-120 NYY/70 BYA ECC)	LOAD SUMMARY	129,271
EMDB2		Ic >= 25kA. at 400 VAC.			RACEWAY:	DEMAND FACTOR	0.8
					CABLE TRAY W/ COVER	DEMAND LOAD(VA)	103,417

DISTRIBUTION BOARD NO. B2EDB2 — **LOCATION :** B2 FLOOR, EE RM.
Cu BUSBAR : 200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	SPARE	3	100	25	-	-	50,000
2	SPARE	3	100	25		-	50,000
3	SPARE	3	63	25		-	-
4	SPACE						
5	SPACE						
6	SPACE						
CONNECT TO:		MAIN CB :			MAIN CONDUCTOR		
		3P , 50AT/100AF			4-16 NYY/16 BYA ECC	LOAD SUMMARY	100,000
EMDB2		Ic >= 25kA. at 400 VAC.			RACEWAY:	DEMAND FACTOR	0.8
					CABLE TRAY W/ COVER	DEMAND LOAD(VA)	80,000

CANCELLE

DISTRIBUTION BOARD NO. B2EDB1 — **LOCATION :** B2 FLOOR, EE RM.
Cu BUSBAR : 200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	B2EBDB1	3	63	18	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	7,390
2	EMCC-CTL-WWP-03	3	40	18	4-10 BYA/10 BYA ECC	dia. 25 mm. IMC	11,916
3	EMCC-CTL-WTP-01	1	32	18	2-6 BYA/6 BYA ECC	dia. 15 mm. IMC	2,640
4	EMCC-CTL-HW-08	3	40	18	4-10 BYA/10 BYA ECC	dia. 25 mm. IMC	9,699
5	SPARE	3	100	18	-	-	-
6	SPARE	3	63	18	-	-	-
7	SPACE						
8	SPACE						
CONNECT TO:		MAIN CB :			MAIN CONDUCTOR		
		3P , 125AT/160AF			4-70 NYY/35 BYA ECC	LOAD SUMMARY	31,645
EMDB2		Ic >= 18kA. at 400 VAC.			RACEWAY:	DEMAND FACTOR	0.8
					CABLE TRAY W/ COVER	DEMAND LOAD(VA)	25,316

DISTRIBUTION BOARD NO. B1EDB1 — **LOCATION :** B1 FLOOR, EE RM.
Cu BUSBAR : 250 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	B1EBDB1	3	63	18	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	12,165
2	EMCC-CTL-WWP-04	3	80	18	4-35 BYA/16 BYA ECC	dia. 40 mm. IMC	36,441
3	SPARE	3	63	18	-	-	-
4	SPARE	3	40	18	-	-	-
5	SPACE						
6	SPACE						
CONNECT TO:		MAIN CB :			MAIN CONDUCTOR		
		3P , 200AT/250AF			4-120 NYY/70 BYA ECC	LOAD SUMMARY	48,606
EMDB2		Ic >= 18kA. at 400 VAC.			RACEWAY:	DEMAND FACTOR	0.8
					CABLE TRAY W/ COVER	DEMAND LOAD(VA)	38,885

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BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC
B	29-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: PANEL SCHEDULE (3)

DRAWN BY :	SPH
CHECKED BY :	WTS
DESIGN BY :	WTS
PROJECT MGR. :	Chanintorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	113073
DWG.NO.	MHB-EE-07-003

Deltadesh Pvt. Ltd. Dhaka

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DISTRIBUTION BOARD NO. B1EDB2 — **LOCATION :** B1 FLOOR, EE RM.
Cu BUSBAR : 200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	SPARE	3	100	25	-	-	50,000
2	SPARE	3	100	25	-	-	50,000
3	SPARE	3	63	25	-	-	20,000
4	SPACE						
5	SPACE						
6	SPACE						

CANCELLE

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	3P, 200AT/250AF	4-120 NYY/70 BYA ECC	LOAD SUMMARY	120,000
EMDB1	Ic >= 25kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.8
		CABLE TRAY W/ COVER	DEMAND LOAD(VA)	96,000

DISTRIBUTION BOARD NO. 1EDB2 — **LOCATION :** 1 FLOOR, EE RM.
Cu BUSBAR : 630 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	Lounge Pantry (1EBDBK1)	3	80	25	4-35 BYA/16 BYA ECC	dia. 40 mm. EMT	25,530
2	Garbage, Receiving Area (1EBD	3	63	25	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	17,720
3	Bakery, Pastry Room (1EDBK1)	3	250	25	4-185 BYA/95 BYA ECC	dia. 80 mm. IMC	147,990
4	Bar/Coffee Shop (1EBDBK5)	3	200	25	4-120 BYA/70 BYA ECC	dia. 80 mm. IMC	147,370
5	SPACE						
6	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	3P, 500AT/630AF	2 (4-185 NYY/95 BYA ECC)	LOAD SUMMARY	338,610
EMDB2	Ic >= 25kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.6
		CABLE TRAY W/ COVER	DEMAND LOAD(VA)	203,166

DISTRIBUTION BOARD NO. 1EDB1 — **LOCATION :** 1 FLOOR, EE RM.
Cu BUSBAR : 400 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	1EBDB1	3	63	18	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	21,135
2	SPARE	3	100	18	-	-	15,000
3	SPARE	3	100	18	-	-	15,000
4	SPACE						
5	SPACE						
6	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	3P, 315AT/400AF	4-240 NYY/120 BYA ECC	LOAD SUMMARY	51,135
EMDB2	Ic >= 18kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.8
		CABLE TRAY W/ COVER	DEMAND LOAD(VA)	40,908

DISTRIBUTION BOARD NO. 2EDB1 — **LOCATION :** 2 FLOOR, EE RM.
Cu BUSBAR : 400 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	2EBDB1	3	63	25	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	15,295
2	SPARE	3	100	25	-	-	15,000
3	SPARE	3	100	25	-	-	15,000
4	SPACE						
5	SPACE						
6	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	3P, 315AT/400AF	4-240 NYY/120 BYA ECC	LOAD SUMMARY	45,295
EMDB1	Ic >= 25kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.8
		CABLE TRAY W/ COVER	DEMAND LOAD(VA)	36,236

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BENGAL hotels & resorts — BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC
B	28-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
-	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
PANEL SCHEDULE (4)

DRAWN BY :	SPH
DESIGN BY :	WTS
DATE :	31-08-2018
PROJECT NO.	113073
DWG.NO.	MHB-EE-07-004
PROCESSED BY :	WTS
PROJECT MGR. :	Chonlatorn
SCALES :	AS SHOWN

Deltades Pvt. Ltd. Dhaka

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DISTRIBUTION BOARD NO. 2EDB2 — **LOCATION :** 2 FLOOR, EE RM.
Cu BUSBAR : 630 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	Banquet Kitchen (2EDBK1)	3	500	25	2 (4-185 BYA/95 BYA ECC)	2 x dia. 80 mm. IMC	382,650
2	Beverage, Coffee Station (2EBD	3	160	25	4-95 BYA/50 BYA ECC	dia. 65 mm. IMC	90,140
3	Break out, Pre Function Bar (2EBDBK2)	3	200	25	4-120 BYA/70 BYA ECC	dia. 80 mm. IMC	122,460
4	SPACE						
5	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
EMDB1	3P , 630AT/630AF Ic >= 25kA. at 400 VAC.	2 (4-240 NYY/120 BYA ECC)	LOAD SUMMARY	595,250
		RACEWAY: CABLE TRAY W/ COVER	DEMAND FACTOR	0.5
			DEMAND LOAD(VA)	297,625

DISTRIBUTION BOARD NO. 2EDB4 — **LOCATION :** 2 FLOOR, EE RM.
Cu BUSBAR : 800 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	SPARE	3	100	25	-	-	50,000
2	SPARE	3	100	25	-	-	50,000
3	SPARE	3	63	25	-	-	20,000
4	SPACE						
5	SPACE						
6	SPACE						

CANCELLE

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
EMDB1	3P , 630AT/630AF Ic >= 25kA. at 400 VAC.	2 (4-240 NYY/120 BYA ECC)	LOAD SUMMARY	120,000
		RACEWAY: CABLE TRAY W/ COVER	DEMAND FACTOR	0.8
			DEMAND LOAD(VA)	96,000

DISTRIBUTION BOARD NO. 2EDB3 — **LOCATION :** 2 FLOOR, EE RM.
Cu BUSBAR : 600 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	SPARE	3	100	25	-	-	50,000
2	SPARE	3	100	25	-	-	50,000
3	SPARE	3	63	25	-	-	20,000
4	SPACE						
5	SPACE						
6	SPACE						

CANCELLE

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
EMDB1	3P , 500AT/630AF Ic >= 25kA. at 400 VAC.	2 (4-185 NYY/95 BYA ECC)	LOAD SUMMARY	120,000
		RACEWAY: CABLE TRAY W/ COVER	DEMAND FACTOR	0.8
			DEMAND LOAD(VA)	96,000

DISTRIBUTION BOARD NO. 2MEDB1 — **LOCATION :** 2M FLOOR, MDB RM.
Cu BUSBAR : 200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	2MEBDB1	3	63	42	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	16,965
2	EMCC-CTL-HW-07	3	40	42	4-10 BYA/10 BYA ECC	dia. 25 mm. EMT	8,036
3	SPARE	3	63	42	-	-	-
4	SPACE						
5	SPACE						
6	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
EMDB1	3P , 160AT/160AF Ic >= 42kA. at 400 VAC.	4-95 NYY/50 BYA ECC	LOAD SUMMARY	25,001
		RACEWAY: CABLE TRAY W/ COVER	DEMAND FACTOR	0.8
			DEMAND LOAD(VA)	20,001

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BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC
B	29-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: PANEL SCHEDULE (5)

DRAWN BY :	SPH
CHECKED BY :	VTS
DESIGN BY :	WTS
PROJECT MGR. :	Ghanintorn
DATE :	31-08-2018
SCALE :	AS SHOWN
PROJECT NO.	113073
DWG.NO.	MHB-EE-07-005

Dehadesh Pvt. Limited Dhaka

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DISTRIBUTION BOARD NO. 3EDB1
Cu BUSBAR : 630 A. 400/230 VAC. 50 Hz.
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

LOCATION : 3 FLOOR, EE RM.
MOUNTING : WALL MOUNTED

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	3EBDB1	3	63	25	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	12,915
2	EMCC-CTL-SCP-01	3	100	25	4-50 BYA/25 BYA ECC	dia. 50 mm. IMC	40,598
3	All Day Dinning (3EDBK3)	3	400	25	2 (4-120 BYA/70 BYA ECC)	2 x dia. 80 mm. IMC	233,810
4	All Day Dinning (3EDBK4)	3	315	25	2 (4-95 BYA/50 BYA ECC)	2 x dia. 65 mm. IMC	161,905
5	SPARE	3	100	25	-	-	-
6	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	3P , 630AT/630AF	2 (4-240 NYY/120 BYA ECC)	LOAD SUMMARY	449,228
EMDB1	Ic >= 25kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.6
		CABLE TRAY W/ COVER	DEMAND LOAD(VA)	269,537

DISTRIBUTION BOARD NO. 4EDB1
Cu BUSBAR : 250 A. 400/230 VAC. 50 Hz.
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

LOCATION : 4 FLOOR, EE RM.
MOUNTING : WALL MOUNTED

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	4EBDB1	3	63	18	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	19,610
2	SPARE	3	63	18	-	-	10,000
3	SPARE	3	63	18	-	-	-
4	SPACE						
5	SPACE						
6	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	3P , 200AT/250AF	4-120 NYY/70 BYA ECC	LOAD SUMMARY	29,610
EMDB2	Ic >= 18kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.8
		CABLE TRAY W/ COVER	DEMAND LOAD(VA)	23,688

DISTRIBUTION BOARD NO. 3EDB2
Cu BUSBAR : 630 A. 400/230 VAC. 50 Hz.
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

LOCATION : 3 FLOOR, EE RM.
MOUNTING : WALL MOUNTED

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	Food Storage, Preparation	3	160	25	4-95 BYA/50 BYA ECC	dia. 65 mm. IMC	104,265
2	Main Kitchen (3EDBK2)	3	500	25	2 (4-185 BYA/95 BYA ECC)	2 x dia. 80 mm. IMC	406,365
3	SPARE	3	100	25	-	-	-
4	SPACE						
5	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	3P , 630AT/630AF	2 (4-240 NYY/120 BYA ECC)	LOAD SUMMARY	510,630
EMDB1	Ic >= 25kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.5
		CABLE TRAY W/ COVER	DEMAND LOAD(VA)	255,315

DISTRIBUTION BOARD NO. 5EDB1
Cu BUSBAR : 630 A. 400/230 VAC. 50 Hz.
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

LOCATION : 5 FLOOR, EE RM.
MOUNTING : WALL MOUNTED

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	5EBDB1	3	63	25	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	23,930
2	Staff Kitchen (5EDBK1)	3	250	25	4-185 BYA/95 BYA ECC	dia. 80 mm. IMC	144,100
3	Laundry (5EDBLD1)	3	315	25	2 (4-95 BYA/50 BYA ECC)	2 x dia. 65 mm. IMC	163,435
4	SPARE	3	100	25	-	-	-
5	SPACE						
6	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	3P , 500AT/630AF	2 (4-185 NYY/95 BYA ECC)	LOAD SUMMARY	331,465
EMDB2	Ic >= 25kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.6
		CABLE TRAY W/ COVER	DEMAND LOAD(VA)	198,879

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REV. NO.	DATE	DESCRIPTION	BY
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A	31-08-18	FINAL DESIGN	DEC
-	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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E-mail : interdes331@gmail.com

PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
PANEL SCHEDULE (6)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : Chonintorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-07-006

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DISTRIBUTION BOARD NO. 5EDB2 — **LOCATION :** 5 FLOOR, EE RM.
Cu BUSBAR : 200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	SPARE	3	100	25	-	-	50,000
2	SPARE	3	100	25	-	-	50,000
3	SPARE	3	63	25	-	-	20,000
4	SPACE						
5	SPACE						
6	SPACE						

CANCELLE

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	3P , 100AT/160AF	4-50 NYY/25 BYA ECC	LOAD SUMMARY	120,000
EMDB2	Ic >= 25kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.8
		CABLE TRAY W/ COVER	DEMAND LOAD(VA)	96,000

DISTRIBUTION BOARD NO. 26EDB1 — **LOCATION :** 26 FLOOR, EE RM.
Cu BUSBAR : 400 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	26EBDB1	3	63	25	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	4,235
2	Roof Top Restaurant (26EDBK1)	3	400	25	2 (4-120 BYA/70 BYA ECC)	2 x dia. 80 mm. IMC	263,380
3	SPARE	3	63	25	-	-	10,000
4	SPACE						
5	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	3P , 400AT/400AF	2 (4-240 NYY/120 BYA ECC)	LOAD SUMMARY	277,615
EMDB1	Ic >= 25kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.7
		CABLE TRAY W/ COVER	DEMAND LOAD(VA)	194,331

DISTRIBUTION BOARD NO. 24EDB1 — **LOCATION :** 24 FLOOR, EE RM.
Cu BUSBAR : 400 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	24EBDB1	3	40	18	4-10 BYA/10 BYA ECC	dia. 25 mm. EMT	3,390
2	25EBDB1	3	63	18	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	16,780
3	Executive Lounge (25EDBK1)	3	250	18	4-185 BYA/95 BYA ECC	dia. 80 mm. IMC	145,572
4	SPARE	3	63	18	-	-	10,000
5	SPACE						
6	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	3P , 315AT/400AF	2 (4-185 NYY/95 BYA ECC)	LOAD SUMMARY	175,742
EMDB1	Ic >= 18kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.7
		CABLE TRAY W/ COVER	DEMAND LOAD(VA)	123,019

DISTRIBUTION BOARD NO. REDB1 — **LOCATION :** ROOF FLOOR, LIFT RM.
Cu BUSBAR : 200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	REBDB1	3	63	18	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	2,095
2	SPARE	3	63	18	-	-	-
3	SPARE	3	63	18	-	-	-
4	SPACE						
5	SPACE						
6	SPACE						

CONNECT TO:	MAIN CB :	MAIN CONDUCTOR		
	3P , 100AT/100AF	4-70 NYY/35 BYA ECC	LOAD SUMMARY	2,095
EMDB2	Ic >= 18kA. at 400 VAC.	RACEWAY:	DEMAND FACTOR	0.8
		CABLE TRAY W/ COVER	DEMAND LOAD(VA)	1,676

Deltadesh Pvt. Ltd. Dhaka

REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC
B	29-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
PANEL SCHEDULE (7)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : Chanintorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-07-007

CAD FILE: \11307S_BENGAL_HOTEL\Drawings\EE\MHB-EE-07-007_010.dwg [ ] Jul 31, 2020 - 1:57pm
CAD USER: Supreme Kay

DISTRIBUTION BOARD NO. 2MEDBL1 — **LOCATION :** 2M FLOOR, MDB RM.
Cu BUSBAR : 200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	EL-01	3	63	42	4-25 BYA/16 BYA ECC	dia. 40 mm. IMC	13,856
2	EL-02	3	63	42	4-25 BYA/16 BYA ECC	dia. 40 mm. IMC	13,856
3	SPARE	3	63	42	-	-	-
4	SPACE						
CONNECT TO:		MAIN CB :			MAIN CONDUCTOR		
		3P, 100AT/160AF			4-50 BYA/10 BYA ECC	LOAD SUMMARY	27,712
EMDB2		Ic >= 42kA. at 400 VAC.			RACEWAY:	DEMAND FACTOR	0.8
					dia. 50 mm. IMC	DEMAND LOAD(VA)	22,170

DISTRIBUTION BOARD NO. REDBL2 — **LOCATION :** ROOF FLOOR, LIFT RM.
Cu BUSBAR : 200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	EL-03	3	80	18	4-35 BYA/16 BYA ECC	dia. 40 mm. IMC	22,862
2	EL-04	3	80	18	4-35 BYA/16 BYA ECC	dia. 40 mm. IMC	22,862
3	SPARE	3	80	18	-	-	-
4	SPACE						
CONNECT TO:		MAIN CB :			MAIN CONDUCTOR		
		3P, 125AT/160AF			4-70 FR/35 BYA ECC	LOAD SUMMARY	45,725
EMDB2		Ic >= 18kA. at 400 VAC.			RACEWAY:	DEMAND FACTOR	0.8
					dia. 65 mm. IMC	DEMAND LOAD(VA)	36,580

DISTRIBUTION BOARD NO. REDBL1 — **LOCATION :** ROOF FLOOR, LIFT RM.
Cu BUSBAR : 200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	EL-05	3	80	18	4-35 BYA/16 BYA ECC	dia. 40 mm. IMC	22,862
2	EL-06	3	80	18	4-35 BYA/16 BYA ECC	dia. 40 mm. IMC	22,862
3	EL-07	3	80	18	4-35 BYA/16 BYA ECC	dia. 40 mm. IMC	22,862
4	EL-08	3	80	18	4-35 BYA/16 BYA ECC	dia. 40 mm. IMC	22,862
5	SPARE	3	80	18	-	-	-
6	SPACE						
CONNECT TO:		MAIN CB :			MAIN CONDUCTOR		
		3P, 160AT/160AF			4-95 BYA/50 BYA ECC	LOAD SUMMARY	91,450
EMDB2		Ic >= 18kA. at 400 VAC.			RACEWAY:	DEMAND FACTOR	0.8
					dia. 65 mm. IMC	DEMAND LOAD(VA)	73,160

Dellades Pvt. Ltd. Dhaka

BENGAL hotels & resorts — BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC
B	29-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
-	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: PANEL SCHEDULE (8)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR : Chonintorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-07-008

Jul 31, 2020 - 1:57pm [8] Ewp P:\00_00-07-22-BHR\EWP\Engineering\Drawing\ARCHITECTURAL\HOTEL\ENGINEERING\2020\07_001_010.dwg 31/7/2563 13:57:24 PA\Nipaporn C.3585 PCL6

DISTRIBUTION BOARD NO. 24EDBG1 — **LOCATION :** 24 FLOOR, EE RM.

Cu BUSBAR : 200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED

NEUTRAL BUS : 100 %

GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	24EBDBG1	3	63	18	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	23,900
2	25EBDBG1	3	40	18	4-10 BYA/10 BYA ECC	dia. 25 mm. EMT	13,500
3	SPARE	3	63	18	-	-	-
4	SPACE						
5	SPACE						

CONNECT TO:	**MAIN CB :**	**MAIN CONDUCTOR**	
	3P , 100AT/100AF	4-95 NYY/50 BYA ECC	**LOAD SUMMARY** 37,400
EMDB2	Ic >= 18kA. at 400 VAC.	**RACEWAY:**	**DEMAND FACTOR** 0.8
		CABLE TRAY W/ COVER	**DEMAND LOAD(VA)** 29,920

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BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

REV. NO.	DATE	DESCRIPTION	BY
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B	29-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
PANEL SCHEDULE (9)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : Chonlatorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO. 1 1 3 0 7 3	
DWG.NO. MHB-EE-07-009	

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DISTRIBUTION BOARD NO. 1UDB1 — **LOCATION :** 2M FLOOR, MDB RM.
Cu BUSBAR : 200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	UPS-A (RECTIFIER)	3	160	42	4-95 BYA/50 BYA ECC	dia. 65 mm IMC	37,500
2	UPS-A (STATIC BYPAS	3	125	42	4-70 BYA/35 BYA ECC	dia. 65 mm IMC	-
3	UPS-B (RECTIFIER)	3	160	42	4-95 BYA/50 BYA ECC	dia. 65 mm IMC	37,500
4	UPS-B (STATIC BYPAS	3	125	42	4-70 BYA/35 BYA ECC	dia. 65 mm IMC	-
CONNECT TO:		MAIN CB :			MAIN CONDUCTOR		
		3P, 160AT/160AF			4-95 BYA/50 BYA ECC	LOAD SUMMARY	75,000
EMDB1		Ic >= 42kA. at 400 VAC.			RACEWAY:	DEMAND FACTOR	0.8
					dia. 65 mm. IMC	DEMAND LOAD(VA)	60,000

DISTRIBUTION BOARD NO. 2MUDB1 — **LOCATION :** 2M FLOOR, MDB RM.
Cu BUSBAR : 200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	1UBDB1	3	20	25	4-4 BYA/4 BYA ECC	dia. 20 mm. EMT	6,000
2	2UBDB1	3	20	25	4-4 BYA/4 BYA ECC	dia. 20 mm. EMT	6,000
3	2MUBDB1	3	20	25	4-4 BYA/4 BYA ECC	dia. 20 mm. EMT	3,000
4	3UBDB1	3	20	25	4-4 BYA/4 BYA ECC	dia. 20 mm. EMT	6,000
5	4UBDB1	3	20	25	4-4 BYA/4 BYA ECC	dia. 20 mm. EMT	6,000
6	5UBDB1	3	20	25	4-4 BYA/4 BYA ECC	dia. 20 mm. EMT	6,000
7	6UBDB1	3	20	25	4-4 BYA/4 BYA ECC	dia. 20 mm. EMT	1,500
8	9UBDB1	3	20	25	4-4 BYA/4 BYA ECC	dia. 20 mm. EMT	1,500
9	12UBDB1	3	20	25	4-4 BYA/4 BYA ECC	dia. 20 mm. EMT	1,500
10	15UBDB1	3	20	25	4-4 BYA/4 BYA ECC	dia. 20 mm. EMT	1,500
11	18UBDB1	3	20	25	4-4 BYA/4 BYA ECC	dia. 20 mm. EMT	1,500
12	21UBDB1	3	20	25	4-4 BYA/4 BYA ECC	dia. 20 mm. EMT	1,500
13	SPARE	3	20	25	-	-	-
14	SPACE						
15	SPACE						
CONNECT TO:		MAIN CB :			MAIN CONDUCTOR		
		3P, 80AT/100AF			4-35 BYA/16 BYA ECC	LOAD SUMMARY	42,000
OUDB1		Ic >= 42kA. at 400 VAC.			RACEWAY:	DEMAND FACTOR	0.8
					dia. 40 mm. EMT	DEMAND LOAD(VA)	33,600

DISTRIBUTION BOARD NO. OUDB1 — **LOCATION :** 2M FLOOR, MDB RM.
Cu BUSBAR : 200 A. 400/230 VAC. 50 Hz. — **MOUNTING :** WALL MOUNTED
NEUTRAL BUS : 100 %
GROUND BUS : 50 %

FEEDER NO.	DISCRIPTION	CIRCUIT BREAKER POLE	AT	Ic(KA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	2MUDB1	3	80	42	4-35 BYA/16 BYA ECC	dia. 40 mm. EMT	42,000
2	1UBDB2	3	32	42	4-10 BYA/10 BYA ECC	dia. 25 mm. EMT	6,000
3	2MUBDB2	3	63	42	4-25 BYA/16 BYA ECC	dia. 40 mm. EMT	12,000
4	SPARE	3	32	42	-	-	
5	SPACE						
CONNECT TO:		MAIN CB :			MAIN CONDUCTOR		
		3P, 125AT/160AF			4-70 BYA/35 BYA ECC	LOAD SUMMARY	60,000
EMDB1		Ic >= 42kA. at 400 VAC.			RACEWAY:	DEMAND FACTOR	0.8
					dia. 65 mm. IMC	DEMAND LOAD(VA)	48,000

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BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC
B	29-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
PANEL SCHEDULE (10)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : Chonlatorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-07-010

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P:\113073_BENGAL_HOTEL\Drawings\E\MHB-EE-07-001_010.dwg 31/7/2563 15:57:14 SAK

PANEL NO. : B3EBDB1 | LOCATION : B3 FL, EE RM.
CAPACITY : 100 A. 36 CIRCUITS AS , 400/230 VAC. 50 Hz. | MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING	b/B3RS1	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	360		
3	LIGHTING	b/B3RS2	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		540	
5	LIGHTING	b/B3RS3	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			540
7	LIGHTING	b/B3RS4	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	540		
9	LIGHTING	b/B3RS5	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		360	
11	LIGHTING	b/B3RS6	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			405
13	LIGHTING	b/B3RS7	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	315		
15	LIGHTING	b/B3RS8	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		450	
17	LIGHTING	b/B3RS9	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			180
19	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	180		
21	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		270	
23	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			270
25	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	540		
27	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		225	
29	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			175
31	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	250		
33	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		160	
35	SPARE		1	16	6	-	-			-
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	900		
4	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,440	
6	SPARE		1	16	6	-	-			-
8	SPARE		1	16	6	-	-	-		
10	SPARE		1	16	6	-	-		-	
12	SPARE		1	16	6	-	-			-
14	SPACE									
16	SPACE									
18	SPACE									
20	SPACE									
22	SPACE									
24	SPACE									
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									
CONNECT TO :		MAIN CB :				MAIN CONDUCTOR :	CONNECTED LOAD	3,085	3,445	1,570
		3P, 63AT/100AF				4-25 BYA/16 BYA ECC	(VA)			8,100
B3EDB1		Ic ≥ 25 kA at 400VAC. 50Hz.				RACEWAY :	DEMAND FACTOR			0.80
						dia. 40 mm. EMT	DEMAND LOAD (VA)			6,480

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : B2EBDB1 | LOCATION : B2 FL, EE RM.
CAPACITY : 100 A. 36 CIRCUITS AS , 400/230 VAC. 50 Hz. | MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING	b/B2RS1	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	360		
3	LIGHTING	b/B2RS2	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		540	
5	LIGHTING	b/B2RS3	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			540
7	LIGHTING	b/B2RS4	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	540		
9	LIGHTING	b/B2RS5	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		360	
11	LIGHTING	b/B2RS6	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			405
13	LIGHTING	b/B2RS7	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	315		
15	LIGHTING	b/B2RS8	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		450	
17	LIGHTING	b/B2RS9	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			180
19	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	270		
21	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		270	
23	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			540
25	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	300		
27	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		200	
29	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			140
31	SPARE		1	16	6	-	-	-		
33	SPARE		1	16	6	-	-		-	
35	SPARE		1	16	6	-	-			-
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	540		
4	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,440	
6	SPARE		1	20	6	-	-			-
8	SPARE		1	20	6	-	-	-		
10	SPARE		1	20	6	-	-		-	
12	SPARE		1	20	6	-	-			-
14	SPACE									
16	SPACE									
18	SPACE									
20	SPACE									
22	SPACE									
24	SPACE									
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									
CONNECT TO :		MAIN CB :				MAIN CONDUCTOR :	CONNECTED LOAD	2,325	3,260	1,805
		3P, 63AT/100AF				4-25 BYA/16 BYA ECC	(VA)			7,390
B2EDB1		Ic ≥ 25 kA at 400VAC. 50Hz.				RACEWAY :	DEMAND FACTOR			0.80
						dia. 40 mm. EMT	DEMAND LOAD (VA)			5,912

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Deltadesh Pvt. Ltd. Dhaka

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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B	29-05-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
PANEL SCHEDULE (11)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : Chonlatorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	M H B - E E - 0 7 - 0 1 1

Plotted By: CAD/SURASAK# P:\113073_BENGAL_HOTEL\Drawings\E\MHB-EE-07-011_1019.dwg [1] 31 Jul, 2020 - 1:58pm

PANEL NO. : B1EBDB1 — LOCATION : B1 FL, EE RM.
CAPACITY : 100 A. 36 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING	b/B1RS1	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	810		
3	LIGHTING	b/B1RS2	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		630	
5	LIGHTING	b/B1RS3	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			540
7	LIGHTING	b/B1RS4	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	540		
9	LIGHTING	b/B1RS5	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		360	
11	LIGHTING	b/B1RS6	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			405
13	LIGHTING	b/B1RS7	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	405		
15	LIGHTING	b/B1RS8	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		540	
17	LIGHTING	b/B1RS9	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			585
19	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	270		
21	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		495	
23	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			495
25	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	220		
27	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		275	
29	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			275
31	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	300		
33	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		160	
35	SPARE		1	16	6	-	-			-
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	900		
4	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,260	
6	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			900
8	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,440		
10	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		360	
12	SPARE		1	20	6	-	-			-
14	SPARE		1	20	6	-	-	-		
16	SPARE		1	20	6	-	-		-	
18	SPARE		1	20	6	-	-			-
20	SPACE									
22	SPACE									
24	SPACE									
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									

CONNECT TO :	MAIN CB :	MAIN CONDUCTOR :	CONNECTED LOAD	4,885	4,080	3,200
	3P, 63AT/100AF	4-25 BYA/16 BYA ECC	(VA)			12,165
B1EDB1	Ic ≥ 25 kA at 400VAC. 50Hz.	RACEWAY :	DEMAND FACTOR			0.80
		dia. 40 mm. EMT	DEMAND LOAD (VA)			9,732

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 1EBDB1 — LOCATION : 1 FL, EE RM.
CAPACITY : 100 A. 42 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,305		
3	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		495	
5	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			305
7	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	585		
9	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		540	
11	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			405
13	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	405		
15	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		585	
17	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			765
19	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	450		
21	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		765	
23	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			630
25	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	135		
27	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		125	
29	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			300
31	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	425		
33	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		140	
35	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			160
37	1BATT1		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	375		
39	SPARE		1	16	6	-	-		-	
41	SPARE		1	16	6	-	-			-
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	900		
4	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		720	
6	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			1,440
8	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	720		
10	RECEPTACAL	a	1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		720	
12	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			720
14	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	900		
16	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,260	
18	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			1,800
20	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	900		
22	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		720	
24	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			720
26	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	720		
28	SPARE		1	20	6	-	-		-	
30	SPARE		1	20	6	-	-			-
32	SPACE									
34	SPACE									
36	SPACE									
38	SPACE									
40	SPACE									
42	SPACE									

CONNECT TO :	MAIN CB :	MAIN CONDUCTOR :	CONNECTED LOAD	7,820	6,070	7,245
	3P, 63AT/100AF	4-25 BYA/16 BYA ECC	(VA)			21,135
1EDB1	Ic ≥ 25 kA at 400VAC. 50Hz.	RACEWAY :	DEMAND FACTOR			0.80
		dia. 40 mm. EMT	DEMAND LOAD (VA)			16,908

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Deltades Pvt. Ltd. Dhaka

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC
B	29-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
-	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL
TITLE: PANEL SCHEDULE (12)

DRAWN BY : SPH	CHECKED BY : WTS		
DESIGN BY : WTS	PROJECT MGR. : Chonlatorn		
DATE : 31-08-2018	SCALE : AS SHOWN		
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	MHB-EE-07-012		

CAD\BASAK\P: \11307_BENGAL HOTELS\Drawings\MHB-EE-07-011-019.dwg, 31/7/2563 13:58:12, Jul 31, 2020 - 1:58pm, [2] 6 dwg

PANEL NO. : 2EBDB1 — LOCATION : 2 FL, EE RM.
CAPACITY : 100 A. 42 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,035		
3	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		945	
5	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			1,665
7	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	675		
9	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		540	
11	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			450
13	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	135		
15	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		250	
17	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			150
19	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	140		
21	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		120	
23	2BATT1		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			550
25	SPARE		1	16	6	-	-	-		
27	SPARE		1	16	6	-	-		-	
29	SPARE		1	16	6	-	-			-
31	SPACE									
33	SPACE									
35	SPACE									
37	SPACE									
39	SPACE									
41	SPACE									
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,260		
4	RECEPTACAL	a	1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		900	
6	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			900
8	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,080		
10	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		900	
12	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			900
14	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	900		
16	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,260	
18	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			540
20	SPARE		1	20	6	-	-	-		
22	SPARE		1	20	6	-	-		-	
24	SPARE		1	20	6	-	-			-
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									
38	SPACE									
40	SPACE									
42	SPACE									

CONNECT TO :	MAIN CB :	MAIN CONDUCTOR :	CONNECTED LOAD	PHASE A	PHASE B	PHASE C
	3P, 63AT/100AF	4-25 BYA/16 BYA ECC	(VA)	5,225	4,915	5,155
2EDB1	Ic ≥ 25 kA at 400VAC. 50Hz.	RACEWAY :	DEMAND FACTOR			15,295
		dia. 40 mm. EMT	DEMAND LOAD (VA)			0.80
						12,236

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 2MEBDB1 — LOCATION : 2M FL, MDB RM.
CAPACITY : 100 A. 42 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	360		
3	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		630	
5	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			990
7	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	900		
9	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		810	
11	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			325
13	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	120		
15	LIGHTING (ST.1)		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,440	
17	LIGHTING (ST.1)		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			1,440
19	LIGHTING (ST.2)		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,485		
21	LIGHTING (ST.2)		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		825	
23	LIGHTING (ST.3)		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			150
25	LIGHTING (ST.3)		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	150		
27	EMERGENCY LIGHT (ST.1)		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		640	
29	EMERGENCY LIGHT (ST.2)		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			660
31	EMERGENCY LIGHT (ST.3)		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	120		
33	EXIT SIGN (ST.1)		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		640	
35	EXIT SIGN (ST.2)		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			660
37	EXIT SIGN (ST.3)		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	120		
39	SPARE		1	16	6	-	-		-	
41	SPARE		1	16	6	-	-			-
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,080		
4	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,260	
6	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			720
8	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,440		
10	SPARE		1	16	6	-	-		-	
12	SPARE		1	16	6	-	-			-
14	SPACE									
16	SPACE									
18	SPACE									
20	SPACE									
22	SPACE									
24	SPACE									
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									
38	SPACE									
40	SPACE									
42	SPACE									

CONNECT TO :	MAIN CB :	MAIN CONDUCTOR :	CONNECTED LOAD	PHASE A	PHASE B	PHASE C
	3P, 63AT/100AF	4-25 BYA/16 BYA ECC	(VA)	5, 75	6,245	4,945
2EDB1	Ic ≥ 25 kA at 400VAC. 50Hz.	RACEWAY :	DEMAND FACTOR			16,965
		dia. 40 mm. EMT	DEMAND LOAD (VA)			0.80
						13,572

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Deltadesh Pvt. Ltd. Dhaka

BENGAL hotels & resorts — BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC				
B	29-05-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

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PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: PANEL SCHEDULE (13)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : Chonintorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-07-013

C:\Users\SURASAK\Appdata\Local\Temp\AcPublish_5855\2020-07-31 13:58:19 — C:\Users\SURASAK\Desktop\BENGAL_HOTEL\Drawings\EE\MHB-EE-07-01_013.dwg [3] — Jul 31, 2020 - 1:58pm

PANEL NO. : 3EBDB1 — LOCATION : 3 FL, EE RM.
CAPACITY : 100 A, 42 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	855		
3	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		720	
5	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			1,080
7	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	135		
9	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		270	
11	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			405
13	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,260		
15	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		450	
17	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			225
19	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	75		
21	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		150	
23	3BATT1		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			450
25	SPARE		1	16	6	-	-	-		
27	SPARE		1	16	6	-	-		-	
29	SPARE		1	16	6	-	-			-
31	SPACE									
33	SPACE									
35	SPACE									
37	SPACE									
39	SPACE									
41	SPACE									
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,080		
4	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		900	
6	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			1,260
8	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,260		
10	RECEPTACAL	a	1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		900	
12	RECEPTACAL	a	1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			720
14	RECEPTACAL	a	1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	360		
16	RECEPTACAL	a	1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		360	
18	SPARE		1	20	6	-	-			-
20	SPARE		1	20	6	-	-	-		
22	SPARE		1	20	6	-	-		-	
24	SPARE		1	20	6	-	-			-
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									
38	SPACE									
40	SPACE									
42	SPACE									
CONNECT TO :		MAIN CB :				MAIN CONDUCTOR :	CONNECTED LOAD	5,025	3,750	4,140
3EDB1		3P, 63AT/100AF				4-25 BYA/16 BYA ECC	(VA)			12,915
		Ic ≥ 25 kA at 400VAC. 50Hz.				RACEWAY :	DEMAND FACTOR			0.80
						dia. 40 mm. EMT	DEMAND LOAD (VA)			10,332

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 4EBDB1 — LOCATION : 4 FL, EE RM.
CAPACITY : 100 A, 42 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,260		
3	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,080	
5	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			900
7	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	135		
9	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		675	
11	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			675
13	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,080		
15	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		630	
17	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			920
19	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	720		
21	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		300	
23	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			325
25	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	120		
27	4BATT1		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		350	
29	SPARE		1	16	6	-	-			-
31	SPARE		1	16	6	-	-	-		
33	SPARE		1	16	6	-	-		-	
35	SPARE		1	16	6	-	-			-
37	SPACE									
39	SPACE									
41	SPACE									
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,260		
4	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		720	
6	RECEPTACAL	a	1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			720
8	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,440		
10	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		900	
12	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			900
14	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,440		
16	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,440	
18	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			1,440
20	RECEPTACAL	a	1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	180		
22	SPARE		1	20	6	-	-		-	
24	SPARE		1	20	6	-	-			-
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									
38	SPACE									
40	SPACE									
42	SPACE									
CONNECT TO :		MAIN CB :				MAIN CONDUCTOR :	CONNECTED LOAD	7,635	6,095	5,880
4EDB1		3P, 63AT/100AF				4-25 BYA/16 BYA ECC	(VA)			19,610
		Ic ≥ 25 kA at 400VAC. 50Hz.				RACEWAY :	DEMAND FACTOR			0.80
						dia. 40 mm. EMT	DEMAND LOAD (VA)			15,688

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Deltadesk Pvt. Ltd. Dhaka

BENGAL hotels & resorts — BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC
B	29-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
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VADHANA, BANGKOK, 10110 THAILAND.
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E-mail : interdes331@gmail.com

PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL
TITLE: PANEL SCHEDULE (14)

DRAWN BY : SPH — CHECKED BY : WTS
DESIGN BY : WTS — PROJECT MGR. : Chonlatorn
DATE : 31-08-2018 — SCALE : AS SHOWN
PROJECT NO. 113073
DWG.NO. MHB-EE-07-014

C:\Users\SURAS\AK\Desktop\CAD\BENGAL_HOTEL\Drawings\EE\MHB-EE-07-011_2018.dwg [4] Jul 30, 2020 - 1:58pm
P:\113073_BENGAL_HOTEL\Drawings\EE\MHB-EE-07-011_2018.dwg [4] Jul 30, 2020 - 1:58pm

PANEL NO. : 5EBDB1 — LOCATION : 5 FL, EE RM.
CAPACITY : 100 A. 42 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING	b/5RS1	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	180		
3	LIGHTING	b/5RS2	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		585	
5	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			585
7	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,080		
9	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		495	
11	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			1,350
13	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	180		
15	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		450	
17	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			315
19	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	900		
21	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,125	
23	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			405
25	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,575		
27	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,530	
29	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			1,620
31	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	810		
33	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		275	
35	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			250
37	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	100		
39	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		180	
41	EXIT SIGN		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			40
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,440		
4	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,440	
6	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			900
8	RECEPTACAL	a	1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,080		
10	RECEPTACAL	a	1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,080	
12	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			1,260
14	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,080		
16	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		720	
18	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			900
20	SPARE		1	20	6	-	-	-		
22	SPARE		1	20	6	-	-		-	
24	SPARE		1	20	6	-	-			-
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									
38	SPACE									
40	SPACE									
42	SPACE									
CONNECT TO :		MAIN CB :	MAIN CONDUCTOR :			CONNECTED LOAD		8,425	7,880	7,625
		3P, 63AT/100AF	4-25 BYA/16 BYA ECC			(VA)				23,930
5EDB1		Ic ≥ 25 kA at 400VAC. 50Hz.	RACEWAY :			DEMAND FACTOR				0.80
			dia. 40 mm. EMT			DEMAND LOAD (VA)				19,144

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 6EBDB1 — LOCATION : 6 FL, EE RM.
CAPACITY : 100 A. 36 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING	b/xRS1	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	180		
3	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		180	
5	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			90
7	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	50		
9	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		100	
11	6BATT1		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			120
13	SPARE		1	16	6	-	-	-		
15	SPARE		1	16	6	-	-		-	
17	SPARE		1	16	6	-	-			-
19	SPACE									
21	SPACE									
23	SPACE									
25	SPACE									
27	SPACE									
29	SPACE									
31	SPACE									
33	SPACE									
35	SPACE									
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	900		
4	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		900	
6	Insect Trap		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			126
8								1,950		
10	MCC-CTL-HW-06		3	32	6	4-10 BYA/10 BYA ECC	dia. 25mm EMT		1,950	
12										1,950
14	SPARE		1	20	6	-	-	-		
16	SPARE		1	20	6	-	-		-	
18	SPARE		1	20	6	-	-			-
20	SPACE									
22	SPACE									
24	SPACE									
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									
CONNECT TO :		MAIN CB :	MAIN CONDUCTOR :			CONNECTED LOAD		3,080	3,130	2,280
		3P, 63AT/100AF	4-25 BYA/16 BYA ECC			(VA)				8,490
AL BUSDUCT		Ic ≥ 25 kA at 400VAC. 50Hz.	RACEWAY :			DEMAND FACTOR				0.80
			dia. 40 mm. EMT			DEMAND LOAD (VA)				6,792

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Deltadesign Pvt. Ltd. Dhaka

BENGAL hotels & resorts — BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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C	31-07-20	REVISED FINAL DESIGN	DEC
B	29-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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PROJECT: BENGAL HOTELS AND RESORTS A FIVE STAR HOTEL
TITLE: PANEL SCHEDULE (15)

DRAWN BY : SPH	CHECKED BY : WTS		
DESIGN BY : WTS	PROJECT MGR. : Chaninton		
DATE : 31-08-2018	SCALE : AS SHOWN		
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	MHB-EE-07-015		

CAD FILE: P:\13073_BENGAL_HOTEL\Drawings\EE\MHB-EE-07-015.dwg [5] Jul 31, 2020 - 1:58pm

PANEL NO. : 12EBDB1 — LOCATION : 12 FL, EE RM.
CAPACITY : 100 A. 36 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING	b/xRS1	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	180		
3	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		180	
5	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			90
7	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	50		
9	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		100	
11	12BATT1		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			120
13	SPARE		1	16	6	-	-	-		
15	SPARE		1	16	6	-	-		-	
17	SPARE		1	16	6	-	-			-
19	SPACE									
21	SPACE									
23	SPACE									
25	SPACE									
27	SPACE									
29	SPACE									
31	SPACE									
33	SPACE									
35	SPACE									
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	900		
~~4~~	~~RECEPTACAL~~		~~1~~	~~20~~	~~6~~	~~2-4 BYA/4 BYA ECC~~	~~dia. 15mm EMT~~		900	
6	Insect Trap		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			120
~~8~~								1,500		
10	MCC-CTL-HW-05		3	20	6	4-4 BYA/4 BYA ECC	dia. 20mm EMT		1,500	
12										1,500
14	SPARE		1	20	6	-	-	-		
16	SPARE		1	20	6	-	-		-	
18	SPARE		1	20	6	-	-			-
20	SPACE									
22	SPACE									
24	SPACE									
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									

CONNECT TO :	MAIN CB :	MAIN CONDUCTOR :	CONNECTED LOAD	2,630	2,680	1,830
	3P, 63AT/100AF	4-25 BYA/16 BYA ECC	(VA)			7,140
AL BUSDUCT	Ic ≥ 25 kA at 400VAC. 50Hz.	RACEWAY :	DEMAND FACTOR			0.80
		dia. 40 mm. EMT	DEMAND LOAD (VA)			5,712

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 17EBDB1 — LOCATION : 12 FL, EE RM.
CAPACITY : 100 A. 36 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING	b/xRS1	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	180		
3	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		180	
5	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			90
7	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	50		
9	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		100	
11	17BATT1		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			120
13	SPARE		1	16	6	-	-	-		
15	SPARE		1	16	6	-	-		-	
17	SPARE		1	16	6	-	-			-
19	SPACE									
21	SPACE									
23	SPACE									
25	SPACE									
27	SPACE									
29	SPACE									
31	SPACE									
33	SPACE									
35	SPACE									
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	900		
~~4~~	~~RECEPTACAL~~		~~1~~	~~20~~	~~6~~	~~2-4 BYA/4 BYA ECC~~	~~dia. 15mm EMT~~		900	
6	Insect Trap		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			120
~~8~~								1,250		
10	MCC-CTL-HW-04		3	20	6	4-4 BYA/4 BYA ECC	dia. 20mm EMT		1,250	
12										1,250
14	SPARE		1	20	6	-	-	-		
16	SPARE		1	20	6	-	-		-	
18	SPARE		1	20	6	-	-			-
20	SPACE									
22	SPACE									
24	SPACE									
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									

CONNECT TO :	MAIN CB :	MAIN CONDUCTOR :	CONNECTED LOAD	2,380	2,430	1,580
	3P, 63AT/100AF	4-25 BYA/16 BYA ECC	(VA)			6,390
AL BUSDUCT	Ic ≥ 25 kA at 400VAC. 50Hz.	RACEWAY :	DEMAND FACTOR			0.80
		dia. 40 mm. EMT	DEMAND LOAD (VA)			5,112

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Dellades Pvt. Ltd. Dhaka

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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C	31-07-20	REVISED FINAL DESIGN	DEC
B	29-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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E-mail : interdes331@gmail.com

PROJECT: BENGAL HOTELS AND RESORTS A FIVE STAR HOTEL
TITLE: PANEL SCHEDULE (16)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : Chonlnorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-07-016

CAD/SURASAK# P:\113073_BENGAL_HOTEL\Drawings\EE\MHB-EE-07-016.dwg [6] Jul 31, 2020 - 1:56pm
PLOTTED BY: Surasak Kaewsiri 2020/07/31 13:55:53 P:\113073_BENGAL_HOTEL\Drawings\EE\MHB-EE-07-016.dwg

PANEL NO. : xEBDB1 ; (x=7,10,13,16,19,22) | LOCATION : x FL, EE RM.
CAPACITY : 100 A. 30 CIRCUITS AS , 400/230 VAC. 50 Hz. | MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING	b/xRS1	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	180		
3	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		180	
5	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			90
7	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	50		
9	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		100	
11	xBATT1		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			120
13	SPARE		1	16	6	-	-	-		
15	SPARE		1	16	6	-	-		-	
17	SPARE		1	16	6	-	-			-
19	SPACE									
21	SPACE									
23	SPACE									
25	SPACE									
27	SPACE									
29	SPACE									
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	900		
4	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		900	
6	Undercounter Ice Cube, Water Filter, Inse		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			1,300
8								3,000		
10	Undercounter Glass Washer		3	30	6	4-6 BYA/6 BYA ECC	dia. 20mm EMT		3,000	
12										3,000
14	SPARE		1	20	6	-	-	-		
16	SPARE		1	20	6	-	-		-	
18	SPARE		1	20	6	-	-			-
20	SPACE									
22	SPACE									
24	SPACE									
26	SPACE									
28	SPACE									
30	SPACE									
	CONNECT TO :	MAIN CB :	MAIN CONDUCTOR :	CONNECTED LOAD				4,130	4,180	4,510
	AL BUSDUCT	3P, 63AT/100AF	4-25 BYA/16 BYA ECC	(VA)						12,820
		Ic ≥ 25 kA at 400VAC. 50Hz.	RACEWAY :	DEMAND FACTOR						0.80
			dia. 40 mm. EMT	DEMAND LOAD (VA)						10,256

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : xEBDB1 ; (x=8,9,11,14,15,18,20,21,23) | LOCATION : x FL, EE RM.
CAPACITY : 100 A. 30 CIRCUITS AS , 400/230 VAC. 50 Hz. | MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING	b/xRS1	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	180		
3	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		180	
5	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			90
7	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	50		
9	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		100	
11	xBATT1		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			120
13	SPARE		1	16	6	-	-	-		
15	SPARE		1	16	6	-	-		-	
17	SPARE		1	16	6	-	-			-
19	SPACE									
21	SPACE									
23	SPACE									
25	SPACE									
27	SPACE									
29	SPACE									
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	900		
4	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		900	
6	Insect Trap		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			120
8	SPARE		1	20	6	-	-	-		
10	SPARE		1	20	6	-	-		-	
12	SPARE		1	20	6	-	-			-
14	SPACE									
16	SPACE									
18	SPACE									
20	SPACE									
22	SPACE									
24	SPACE									
26	SPACE									
28	SPACE									
30	SPACE									
	CONNECT TO :	MAIN CB :	MAIN CONDUCTOR :	CONNECTED LOAD				1,130	1,180	330
	AL BUSDUCT	3P, 40AT/100AF	4-10 BYA/10 BYA ECC	(VA)						2,640
		Ic ≥ 25 kA at 400VAC. 50Hz.	RACEWAY :	DEMAND FACTOR						0.80
			dia. 25 mm. EMT	DEMAND LOAD (VA)						2,112

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Deltadesh Pvt. Ltd. Dhaka

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

THIS DRAWING IS CONFIDENTIAL AND IS THE EXCLUSIVE PROPERTY OF BENGAL HOTELS AND RESORTS LIMITED FOR BENGAL HOTELS AND RESORTS PROJECT AND IS LOANED SUBJECT TO THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR USED TO FURNISH INFORMATION FOR THE MAKING OF DRAWINGS OR PRINTS EXCEPT AS SANCTIONED IN WRITING BY BENGAL CONCEPT AND HOLDINGS LIMITED.

REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC				
B	29-05-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
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E-mail : interdes331@gmail.com

PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
PANEL SCHEDULE (17)

DRAWN BY : SPH	CHECKED BY : WTS		
DESIGN BY : WTS	PROJECT MGR. : Choninton		
DATE : 31-08-2018	SCALE : AS SHOWN		
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	MH8-EE-07-017		

P:\113073_BENGAL_HOTEL\Drawings\MH8-EE-07-017_0194.dwg, 31/7/2020 1:58:58 pm, [ ], dwg, 1:1, SPH, ACAD-Part V 15.0s (LMS Tech)

PANEL NO. : 24EBDB1 | LOCATION : 24 FL, EE RM.
CAPACITY : 100 A. 36 CIRCUITS AS, 400/230 VAC. 50 Hz. | MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING	b/24RS1	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	180		
3	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		180	
5	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			90
7	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	50		
9	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		100	
11	24BATT1		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			120
13	SPARE		1	16	6	-	-	-		
15	SPARE		1	16	6	-	-		-	
17	SPARE		1	16	6	-	-			-
19	SPACE									
21	SPACE									
23	SPACE									
25	SPACE									
27	SPACE									
29	SPACE									
31	SPACE									
33	SPACE									
35	SPACE									
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	900		
4	~~RECEPTACAL~~		~~1~~	~~20~~	~~6~~	~~2-4 BYA/4 BYA ECC~~	~~dia. 15mm EMT~~		~~900~~	
6	Insect Trap		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			120
8								250		
10	MCC-CTL-HW-03		3	20	6	4-4 BYA/4 BYA ECC	dia. 20mm EMT		250	
12										250
14	SPARE		1	20	6	-	-	-		
16	SPARE		1	20	6	-	-		-	
18	SPARE		1	20	6	-	-			-
20	SPACE									
22	SPACE									
24	SPACE									
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									
CONNECT TO:	MAIN CB:		MAIN CONDUCTOR:		CONNECTED LOAD			1,380	1,430	580
	3P, 40AT/100AF		4-10 BYA/10 BYA ECC		(VA)					3,390
24EDB1	Ic ≥ 25 kA at 400VAC. 50Hz.		RACEWAY:		DEMAND FACTOR					0.80
			dia. 25 mm. EMT		DEMAND LOAD (VA)					2,712

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 25EBDB1 | LOCATION : 25 FL, EE RM.
CAPACITY : 100 A. 36 CIRCUITS AS, 400/230 VAC. 50 Hz. | MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING	b/25RS1	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	405		
3	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		180	
5	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			90
7	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	360		
9	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		100	
11	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			160
13	25BATT1		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	265		
15	SPARE		1	16	6	-	-		-	
17	SPARE		1	16	6	-	-			-
19	SPARE		1	16	6	-	-	-		
21	SPARE		1	16	6	-	-		-	
23	SPARE		1	16	6	-	-			-
25	SPACE									
27	SPACE									
29	SPACE									
31	SPACE									
33	SPACE									
35	SPACE									
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,260		
4	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,080	
6	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			1,080
8								500		
10	MCC-CTL-HW-02		3	20	6	4-4 BYA/4 BYA ECC	dia. 20mm EMT		500	
12										500
14								3,000		
16	Undercounter Glass Washer		3	30	6	4-6 BYA/6 BYA ECC	dia. 20mm EMT		3,000	
18										3,000
20	Undercounter Ice Cube, Water Filter, Inse		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,300		
22	SPARE		1	20	6	-	-		-	
24	SPARE		1	20	6					
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									
CONNECT TO:	MAIN CB:		MAIN CONDUCTOR:		CONNECTED LOAD			7,090	4,860	4,830
	3P, 63AT/100AF		4-25 BYA/16 BYA ECC		(VA)					16,780
24EDB1	Ic ≥ 25 kA at 400VAC. 50Hz.		RACEWAY:		DEMAND FACTOR					0.80
			dia. 40 mm. EMT		DEMAND LOAD (VA)					13,424

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Deltadesign Pvt. Ltd. Dhaka

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC				
B	29-05-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
-	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

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E-mail : interdes331@gmail.com

PROJECT: BENGAL HOTELS AND RESORTS A FIVE STAR HOTEL
TITLE: PANEL SCHEDULE (18)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : Chonlatorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-07-018

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PANEL NO. : 26EBDB1 **LOCATION :** 26 FL, EE RM.
CAPACITY : 100 A. 36 CIRCUITS AS , 400/230 VAC. 50 Hz. **MOUNTING :** WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING	b/25RS1	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	270		
3	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		180	
5	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			135
7	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	945		
9	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		100	
11	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			140
13	25BATT1		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	305		
15	SPARE		1	16	6	-	-		-	
17	SPARE		1	16	6	-	-			-
19	SPACE									
21	SPACE									
23	SPACE									
25	SPACE									
27	SPACE									
29	SPACE									
31	SPACE									
33	SPACE									
35	SPACE									
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,260		
4	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		900	
6	SPARE		1	20	6	-	-			-
8	SPARE		1	20	6	-	-	-		
10	SPARE		1	20	6	-	-		-	
12	SPARE		1	20	6	-	-			-
14	SPACE									
16	SPACE									
18	SPACE									
20	SPACE									
22	SPACE									
24	SPACE									
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									
CONNECT TO :	**MAIN CB :**		**MAIN CONDUCTOR :**		**CONNECTED LOAD**			2,780	1,180	275
	3P, 63AT/100AF		4-25 BYA/16 BYA ECC		**(VA)**					4,235
26EDB1	Ic ≥ 25 kA at 400VAC. 50Hz.		**RACEWAY :**		**DEMAND FACTOR**					0.80
			dia. 40 mm. EMT		**DEMAND LOAD (VA)**					3,388

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : REBDB1 **LOCATION :** ROOF FL, LIFT RM.
CAPACITY : 100 A. 36 CIRCUITS AS , 400/230 VAC. 50 Hz. **MOUNTING :** WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	LIGHTING	b/25RS1	1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	720		
3	LIGHTING		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		180	
5	Obstruction Light Control Box		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			160
7	EMERGENCY LIGHT		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	75		
9	EXIT SIGN		1	16	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		60	
11	SPARE		1	16	6	-	-			-
13	SPARE		1	16	6	-	-	-		
15	SPARE		1	16	6	-	-		-	
17	SPARE		1	16	6	-	-			-
19	SPACE									
21	SPACE									
23	SPACE									
25	SPACE									
27	SPACE									
29	SPACE									
31	SPACE									
33	SPACE									
35	SPACE									
2	RECEPTACAL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	540		
4	RECEPTACAL	a	1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		360	
6	SPARE		1	20	6	-	-			-
8	SPARE		1	20	6	-	-	-		
10	SPARE		1	20	6	-	-		-	
12	SPARE		1	20	6	-	-			-
14	SPACE									
16	SPACE									
18	SPACE									
20	SPACE									
22	SPACE									
24	SPACE									
26	SPACE									
28	SPACE									
30	SPACE									
32	SPACE									
34	SPACE									
36	SPACE									
CONNECT TO :	**MAIN CB :**		**MAIN CONDUCTOR :**		**CONNECTED LOAD**			1,335	600	160
	3P, 63AT/100AF		4-25 BYA/16 BYA ECC		**(VA)**					2,095
26EDB1	Ic ≥ 25 kA at 400VAC. 50Hz.		**RACEWAY :**		**DEMAND FACTOR**					0.80
			dia. 40 mm. EMT		**DEMAND LOAD (VA)**					1,676

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Deltades Pvt. Ltd. Dhaka

REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC
B	29-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
--	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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E-mail : interdes331@gmail.com

PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
PANEL SCHEDULE (19)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR : Chaninton
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-07-019

CAD/SURASAK# P: \11307J_BENGAL_HOTEL\Drawings\E\MHB-EE-07-011_019.dwg [9] Jul 31, 2020-1:58pm

PANEL NO. : xEBDBG1 ; (x=6-21) | LOCATION : x FL, EE RM.
CAPACITY : 100 A. 24 CIRCUITS AS , 400/230 VAC. 50 Hz. | MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	xCU-01		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	1,330		
3	xCU-02		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		1,330	
5	xCU-03		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT			1,330
7	xCU-04		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	1,330		
9	xCU-05		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		1,330	
11	xCU-06		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT			1,330
13	xCU-07		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	1,330		
15	xCU-08		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		1,330	
17	xCU-09		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT			1,330
19	xCU-10		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	1,330		
21	SPACE		-	-	-	-	-		-	
23	SPACE		-	-	-	-				-
2	xCU-11		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	2,420		
4	xCU-12		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		2,420	
6	xCU-13		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT			1,330
8	xCU-14		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	1,330		
10	xCU-15		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		1,330	
12	xCU-16		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT			1,330
14	xCU-17		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	1,330		
16	xCU-18		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		1,330	
18	xCU-19		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT			1,330
20	SPACE		-	-	-	-	-	-		
22	SPACE		-	-	-	-	-		-	
24	SPACE		-	-	-	-	-			-
CONNECT TO :		MAIN CB :				MAIN CONDUCTOR :	CONNECTED LOAD	10,400	9,070	7,980
AL BUSDUCT		3P, 63AT/100AF				4-25 BYA/16 BYA ECC	(VA)			27,450
		Ic ≥ 36 kA at 400VAC. 50Hz.				RACEWAY :	DEMAND FACTOR			0.80
EMDB2						dia. 40 mm. EMT	DEMAND LOAD (VA)			21,960

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : xEBDBG1 ; (x=22-23) | LOCATION : x FL, EE RM.
CAPACITY : 100 A. 24 CIRCUITS AS , 400/230 VAC. 50 Hz. | MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	xCU-01		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	2,420		
3	xCU-02		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		1,330	
5	xCU-03		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT			1,330
7	xCU-04		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	2,420		
9	xCU-05		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		1,330	
11	xCU-06		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT			1,330
13	xCU-07		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	2,420		
15	xCU-08		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		2,420	
17	xCU-09		1	32	6	2-6 BYA/6 BYA ECC	dia. 15 mm. EMT			3,050
19	SPACE									
21	SPACE									
23	SPACE									
2	xCU-10		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	1,330		
4	xCU-11		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		2,420	
6	xCU-12		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT			1,330
8	xCU-13		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	1,330		
10	xCU-14		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		2,420	
12	SPARE		1	20	6	-	-			-
14	SPACE									
16	SPACE									
18	SPACE									
20	SPACE									
22	SPACE									
24	SPACE									
CONNECT TO :		MAIN CB :				MAIN CONDUCTOR :	CONNECTED LOAD	9,920	9,920	7,040
AL BUSDUCT		3P, 63AT/100AF				4-25 BYA/16 BYA ECC	(VA)			26,880
		Ic ≥ 36 kA at 400VAC. 50Hz.				RACEWAY :	DEMAND FACTOR			0.80
EMDB2						dia. 40 mm. EMT	DEMAND LOAD (VA)			21,504

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Deltadesh Pvt. Ltd. Dhaka

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC				
B	29-05-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
-	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

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E-mail : interdes331@gmail.com

PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
PANEL SCHEDULE (20)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : Chanintorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-07-020

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PANEL NO. : 24EBDBG1 — LOCATION : 24 FL, EE RM.
CAPACITY : 100 A. 24 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	24CU-01		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	2,420		
3	24CU-02		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		2,420	
5	24CU-03		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT			2,420
7	24CU-04		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	1,330		
9	24CU-05		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		1,330	
11	24CU-06		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT			2,420
13	SPACE									
15	SPACE									
17	SPACE									
19	SPACE									
21	SPACE									
23	SPACE									
2	24CU-07		1	32	6	2-6 BYA/6 BYA ECC	dia. 15 mm. EMT	3,820		
4	24CU-08		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		1,330	
6	24CU-09		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT			1,330
8	24CU-10		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	1,330		
10	24CU-11		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		1,330	
12	24CU-12		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT			2,420
14	SPACE									
16	SPACE									
18	SPACE									
20	SPACE									
22	SPACE									
24	SPACE									
CONNECT TO :		MAIN CB :	MAIN CONDUCTOR :	CONNECTED LOAD				8,900	6,410	8,590
		3P, 63AT/100AF	4-25 BYA/16 BYA ECC	(VA)						23,900
24EDBG1		Ic ≥ 25 kA at 400VAC. 50Hz.	RACEWAY :	DEMAND FACTOR						0.80
			dia. 40 mm. EMT	DEMAND LOAD (VA)						19,120

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 25EBDBG1 — LOCATION : 25 FL, EE RM.
CAPACITY : 100 A. 24 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	25CU-01		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	2,420		
3	25CU-02		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		2,420	
5	25CU-03		1	32	6	2-6 BYA/6 BYA ECC	dia. 15 mm. EMT			3,820
7	SPACE									
9	SPACE									
11	SPACE									
13	SPACE									
15	SPACE									
17	SPACE									
19	SPACE									
21	SPACE									
23	SPACE									
2	25CU-04		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT	2,420		
4	25CU-05		1	20	6	2-4 BYA/4 BYA ECC	dia. 15 mm. EMT		2,420	
6	SPARE		1	20	6	-	-			-
8	SPACE									
10	SPACE									
12	SPACE									
14	SPACE									
16	SPACE									
18	SPACE									
20	SPACE									
22	SPACE									
24	SPACE									
CONNECT TO :		MAIN CB :	MAIN CONDUCTOR :	CONNECTED LOAD				4,840	4,840	3,820
		3P, 40AT/100AF	4-10 BYA/10 BYA ECC	(VA)						13,500
24EDBG1		Ic ≥ 25 kA at 400VAC. 50Hz.	RACEWAY :	DEMAND FACTOR						0.80
			dia. 25 mm. EMT	DEMAND LOAD (VA)						10,800

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Deltadesh Pvt. Ltd. Dhaka

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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B	28-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
-	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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E-mail : interdes331@gmail.com

PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
PANEL SCHEDULE (21)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : ChanIntorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MH B-E E-0 7-0 2 1

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PANEL NO. : 1UBDB1 — LOCATION : 1 FL, EE RM.
CAPACITY : 100 A. 12 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	SPARE		1	20	6	-	-	1,000		
3	SPARE		1	20	6	-	-		1,000	
5	SPARE		1	20	6	-	-			1,000
7	SPACE									
9	SPACE									
11	SPACE									
2	SPARE		1	20	6	-	-	1,000		
4	SPARE		1	20	6	-	-		1,000	
6	SPARE		1	20	6	-	-			1,000
8	SPACE									
10	SPACE									
12	SPACE									
CONNECT TO : 2UDB1		MAIN CB : 3P, 20AT/100AF Ic ≥ 25 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 4-4 BYA/4 BYA ECC	CONNECTED LOAD (VA)	2,000	2,000	2,000
						RACEWAY : dia. 20 mm. EMT				6,000
							DEMAND FACTOR			0.80
							DEMAND LOAD (VA)			4,800

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 2UBDB1 — LOCATION : 2 FL, EE RM.
CAPACITY : 100 A. 12 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	SPARE		1	20	6	-	-	1,000		
3	SPARE		1	20	6	-	-		1,000	
5	SPARE		1	20	6	-	-			1,000
7	SPACE									
9	SPACE									
11	SPACE									
2	SPARE		1	20	6	-	-	1,000		
4	SPARE		1	20	6	-	-		1,000	
6	SPARE		1	20	6	-	-			1,000
8	SPACE									
10	SPACE									
12	SPACE									
CONNECT TO : 2UDB1		MAIN CB : 3P, 20AT/100AF Ic ≥ 25 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 4-4 BYA/4 BYA ECC	CONNECTED LOAD (VA)	2,000	2,000	2,000
						RACEWAY : dia. 20 mm. EMT				6,000
							DEMAND FACTOR			0.80
							DEMAND LOAD (VA)			4,800

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 1UBDB2 — LOCATION : 1 FL, Security Control RM.
CAPACITY : 100 A. 12 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	CCTV SEVER		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,000		
3	ACCESS SEVER		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,000	
5	BAS SERVER		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT			1,000
7	SPACE									
9	SPACE									
11	SPACE									
2	FACP PANEL		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT	1,000		
4	IPTV GATEWAY		1	20	6	2-4 BYA/4 BYA ECC	dia. 15mm EMT		1,000	
6	SPARE		1	20	6	-	-			1,000
8	SPACE									
10	SPACE									
12	SPACE									
CONNECT TO : OUDB1		MAIN CB : 3P, 32AT/100AF Ic ≥ 25 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 4-10 BYA/10 BYA ECC	CONNECTED LOAD (VA)	2,000	2,000	2,000
						RACEWAY : dia. 25 mm. EMT				6,000
							DEMAND FACTOR			0.80
							DEMAND LOAD (VA)			4,800

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 2MUBDB1 — LOCATION : 2M FL, MDB RM.
CAPACITY : 100 A. 12 CIRCUITS AS , 400/230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	SPARE		1	20	6	-	-	1,000		
3	SPARE		1	20	6	-	-		1,000	
5	SPARE		1	20	6	-	-			1,000
7	SPACE									
9	SPACE									
11	SPACE									
2	SPACE									
4	SPACE									
6	SPACE									
8	SPACE									
10	SPACE									
12	SPACE									
CONNECT TO : 2UDB1		MAIN CB : 3P, 20AT/100AF Ic ≥ 25 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 4-4 BYA/4 BYA ECC	CONNECTED LOAD (VA)	1,000	1,000	1,000
						RACEWAY : dia. 20 mm. EMT				3,000
							DEMAND FACTOR			0.80
							DEMAND LOAD (VA)			2,400

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Deltades Pvt. Ltd. Dhaka

BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC
B	29-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
--	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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E-mail : dynamic4@dec.ih.com

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The Portico Building
31 Langsuan Road, Lumpini, Bangkok, Thailand 10330
Tel : (66-2) 252-7790 FAX : (66-2) 252-8492
E-mail : interdes331@gmail.com

PROJECT: BENGAL HOTELS AND RESORTS A FIVE STAR HOTEL
TITLE: PANEL SCHEDULE (22)

DRAWN BY : SPH	CHECKED BY : WTS		
DESIGN BY : WTS	PROJECT MGR. : Chonlatorn		
DATE : 31-08-2018	SCALE : AS SHOWN		
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 0 7 - 0 2 2		

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PANEL NO. : 2MUBDB2							LOCATION : 2M FL, IT/Telephone RM.		
CAPACITY : 100 A. 12 CIRCUITS AS , 400/230 VAC. 50 Hz.							MOUNTING : WALL MOUNTED		
MAIN : CB									
CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	SPARE		1	32	6	-	-	2,000		
3	SPARE		1	32	6	-	-		2,000	
5	SPARE		1	32	6	-	-			2,000
7	SPACE									
9	SPACE									
11	SPACE									
2	SPARE		1	32	6	-	-	2,000		
4	SPARE		1	32	6	-	-		2,000	
6	SPARE		1	32	6	-	-			2,000
8	SPACE									
10	SPACE									
12	SPACE									
CONNECT TO : OUDB1		MAIN CB : 3P, 63AT/100AF Ic ≥ 25 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 4-25 BYA/16 BYA ECC RACEWAY : dia. 40 mm. EMT	CONNECTED LOAD (VA)	4,000	4,000	4,000
										12,000
							DEMAND FACTOR			0.80
							DEMAND LOAD (VA)			9,600

NOTE:

a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.

b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 4UBDB1							LOCATION : 4 FL, EE RM.		
CAPACITY : 100 A. 12 CIRCUITS AS , 400/230 VAC. 50 Hz.							MOUNTING : WALL MOUNTED		
MAIN : CB									
CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	SPARE		1	20	6	-	-	1,000		
3	SPARE		1	20	6	-	-		1,000	
5	SPARE		1	20	6	-	-			1,000
7	SPACE									
9	SPACE									
11	SPACE									
2	SPARE		1	20	6	-	-	1,000		
4	SPARE		1	20	6	-	-		1,000	
6	SPARE		1	20	6	-	-			1,000
8	SPACE									
10	SPACE									
12	SPACE									
CONNECT TO : 2UDB1		MAIN CB : 3P, 20AT/100AF Ic ≥ 25 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 4-4 BYA/4 BYA ECC RACEWAY : dia. 20 mm. EMT	CONNECTED LOAD (VA)	2,000	2,000	2,000
										6,000
							DEMAND FACTOR			0.80
							DEMAND LOAD (VA)			4,800

NOTE:

a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.

b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 3UBDB1							LOCATION : 3 FL, EE RM.		
CAPACITY : 100 A. 12 CIRCUITS AS , 400/230 VAC. 50 Hz.							MOUNTING : WALL MOUNTED		
MAIN : CB									
CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	SPARE		1	20	6	-	-	1,000		
3	SPARE		1	20	6	-	-		1,000	
5	SPARE		1	20	6	-	-			1,000
7	SPACE									
9	SPACE									
11	SPACE									
2	SPARE		1	20	6	-	-	1,000		
4	SPARE		1	20	6	-	-		1,000	
6	SPARE		1	20	6	-	-			1,000
8	SPACE									
10	SPACE									
12	SPACE									
CONNECT TO : 2UDB1		MAIN CB : 3P, 20AT/100AF Ic ≥ 25 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 4-4 BYA/4 BYA ECC RACEWAY : dia. 20 mm. EMT	CONNECTED LOAD (VA)	2,000	2,000	2,000
										6,000
							DEMAND FACTOR			0.80
							DEMAND LOAD (VA)			4,800

NOTE:

a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.

b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 5UBDB1							LOCATION : 4 FL, EE RM.		
CAPACITY : 100 A. 12 CIRCUITS AS , 400/230 VAC. 50 Hz.							MOUNTING : WALL MOUNTED		
MAIN : CB									
CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD IN VA PHASE A	PHASE B	PHASE C
1	SPARE		1	20	6	-	-	1,000		
3	SPARE		1	20	6	-	-		1,000	
5	SPARE		1	20	6	-	-			1,000
7	SPACE									
9	SPACE									
11	SPACE									
2	SPARE		1	20	6	-	-	1,000		
4	SPARE		1	20	6	-	-		1,000	
6	SPARE		1	20	6	-	-			1,000
8	SPACE									
10	SPACE									
12	SPACE									
CONNECT TO : 2UDB1		MAIN CB : 3P, 20AT/100AF Ic ≥ 25 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 4-4 BYA/4 BYA ECC RACEWAY : dia. 20 mm. EMT	CONNECTED LOAD (VA)	2,000	2,000	2,000
										6,000
							DEMAND FACTOR			0.80
							DEMAND LOAD (VA)			4,800

NOTE:

a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.

b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Deltatech Pvt. Ltd. Dhaka

BENGAL hotels & resorts — BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC				
B	29-05-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
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PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: PANEL SCHEDULE (23)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : Chanintorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-07-023

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PANEL NO. :	yUBDBG ; (y=6, 9, 12, 15, 18, 21)						**LOCATION :**	x FL, EE RM.			
CAPACITY :	100 A. 12 CIRCUITS AS , 400/230 VAC. 50 Hz.						**MOUNTING :**	WALL MOUNTED			
MAIN :	CB										
CCT. No.	**DESCRIPTION**	**SEE NOTE**	**CIRCUIT BREAKER**			**CONDUCTOR**	**RACEWAY**	**CONNECTED LOAD IN VA**			
			POLE	**AT**	**Ic(kA)**			**PHASE A**	**PHASE B**	**PHASE C**	
1	SPARE		1	20	6	-	-	500			
3	SPARE		1	20	6	-	-		500		
5	SPARE		1	20	6	-	-			500	
7	SPACE										
9	SPACE										
11	SPACE										
2	SPACE										
4	SPACE										
6	SPACE										
8	SPACE										
10	SPACE										
12	SPACE										
CONNECT TO :		**MAIN CB :**				**MAIN CONDUCTOR :**	**CONNECTED LOAD**	500	500	500	
2UDB1		3P, 20AT/100AF Ic ≥ 25 kA at 400VAC. 50Hz.				4-4 BYA/4 BYA ECC	**(VA)**			1,500	
						RACEWAY :	**DEMAND FACTOR**			0.80	
						dia. 20 mm. EMT	**DEMAND LOAD (VA)**			1,200	

NOTE:

a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.

b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Delladesh Pvt. Ltd. Dhaka

BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC				
B	29-05-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

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E-mail : interdes331@gmail.com

PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
PANEL SCHEDULE (24)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : Chanintorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-07-024

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P:\113073_BENGAL_HOTEL\Drawing\MHB-EE-07-020_027.dwg 31/07/2020 15:55:25 PM

PANEL NO. : xCUy ; (x=6-21), (y=1-10,13-19)							LOCATION :	Guest RM.
CAPACITY : 100 A. 6 CIRCUITS AS , 230 VAC. 50 Hz.							MOUNTING :	WALL MOUNTED
MAIN : CB								
CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
2	MINI BARS		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	600
3	RECEPTACAL		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	360
4	FCU		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	220
5	SPARE		1	10	6	-	-	-
6	SPARE		1	10	6	-	-	-
CONNECT TO : xEBDBG1 ; (x=6-21)		MAIN CB : 2P, 20AT/100AF Ic ≥ 10 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 2-4 BYA/4 BYA ECC	CONNECTED LOAD (VA)	1,330
						RACEWAY : dia. 15 mm. EMT	DEMAND FACTOR	0.80
							DEMAND LOAD (VA	1,064

NOTE

a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.

b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : xCU12 ; (x=6-21)							LOCATION :	Guest RM.
CAPACITY : 100 A. 6 CIRCUITS AS , 230 VAC. 50 Hz.							MOUNTING :	WALL MOUNTED
MAIN : CB								
CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
2	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
3	MINI BARS		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	600
4	RECEPTACAL		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	1,080
5	FCU		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	440
6	SPARE		1	10	6	-	-	-
CONNECT TO : xEBDBG1 ; (x=6-21)		MAIN CB : 2P, 20AT/100AF Ic > 10 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 2-4 BYA/4 BYA ECC	CONNECTED LOAD (VA)	2,420
						RACEWAY : dia. 15 mm. EMT	DEMAND FACTOR	0.80
							DEMAND LOAD (VA	1,936

NOTE

a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.

b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : xCU11 ; (x=6-21)							LOCATION :	Guest RM.
CAPACITY : 100 A. 6 CIRCUITS AS , 230 VAC. 50 Hz.							MOUNTING :	WALL MOUNTED
MAIN : CB								
CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
2	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
3	MINI BARS		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	600
4	RECEPTACAL		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	1,080
5	FCU		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	440
6	SPARE		1	10	6	-	-	-
CONNECT TO : xEBDBG1 ; (x=6-21)		MAIN CB : 2P, 20AT/100AF Ic > 10 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 2-4 BYA/4 BYA ECC	CONNECTED LOAD (VA)	2,420
						RACEWAY : dia. 15 mm. EMT	DEMAND FACTOR	0.80
							DEMAND LOAD (VA	1,936

NOTE

a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.

b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : xCUy ; (x=22-23), (y=1,4 ,7, 8, 14)							LOCATION :	Guest RM.
CAPACITY : 100 A. 6 CIRCUITS AS , 230 VAC. 50 Hz.							MOUNTING :	WALL MOUNTED
MAIN : CB								
CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
2	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
3	MINI BARS		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	600
4	RECEPTACAL		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	1,080
5	FCU		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	440
6	SPARE		1	10	6	-	-	-
CONNECT TO : xEBDBG1 ; (x=22-23)		MAIN CB : 2P, 20AT/100AF Ic > 10 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 2-4 BYA/4 BYA ECC	CONNECTED LOAD (VA)	2,420
						RACEWAY : dia. 15 mm. EMT	DEMAND FACTOR	0.80
							DEMAND LOAD (VA	1,936

NOTE

a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.

b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Deltadesh Pvt. Ltd. Dhaka

BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC				
B	29-05-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC				

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Tel : (66-2) 252-7790 FAX : (66-2) 252-8492
E-mail : interdes331@gmail.com

PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
PANEL SCHEDULE (25)

DRAWN BY : SPH	CHECKED BY : WTS		
DESIGN BY : WTS	PROJECT MGR. : Chonlatern		
DATE : 31-08-2018	SCALE : AS SHOWN		
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	MH8-EE-07-025		

Plotted: Jul 31, 2020 - 1:59pm
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PANEL NO. : xCUy ; (x=22-23), (y=2-3, 5-6, 10-13)							LOCATION :	Guest RM.
CAPACITY : 100 A. 6 CIRCUITS AS , 230 VAC. 50 Hz.							MOUNTING :	WALL MOUNTED
MAIN : CB								
CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER			CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
			POLE	AT	Ic(kA)			
1	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
2	MINI BARS		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	600
3	RECEPTACAL		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	360
4	FCU		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	220
5	SPARE		1	10	6	-	-	-
6	SPARE		1	10	6	-	-	-
CONNECT TO : xEBDBG1 ; (x=22-23)		MAIN CB : 2P, 20AT/100AF Ic > 10 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 2-4 BYA/4 BYA ECC	CONNECTED LOAD (VA)	1,330
						RACEWAY : dia. 15 mm. EMT	DEMAND FACTOR	0.80
							DEMAND LOAD (VA	1,064

NOTE

a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.

b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 24CUy ; (y=1-3,6,12)							LOCATION :	Guest RM.
CAPACITY : 100 A. 6 CIRCUITS AS , 230 VAC. 50 Hz.							MOUNTING :	WALL MOUNTED
MAIN : CB								
CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER			CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
			POLE	AT	Ic(kA)			
1	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
2	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
3	MINI BARS		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	600
4	RECEPTACAL		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	1,080
5	FCU		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	440
6	SPARE		1	10	6	-	-	-
CONNECT TO : 24EBDBG1		MAIN CB : 2P, 20AT/100AF Ic > 10 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 2-4 BYA/4 BYA ECC	CONNECTED LOAD (VA)	2,420
						RACEWAY : dia. 15 mm. EMT	DEMAND FACTOR	0.80
							DEMAND LOAD (VA	1,936

NOTE

a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.

b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : xCU9 ; (x=22-23)							LOCATION :	Guest RM.
CAPACITY : 100 A. 10 CIRCUITS AS , 230 VAC. 50 Hz.							MOUNTING :	WALL MOUNTED
MAIN : CB								
CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER			CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
			POLE	AT	Ic(kA)			
1	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	200
2	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
3	MINI BARS		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	600
4	RECEPTACAL		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	1,080
5	RECEPTACAL		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	360
6	FCU		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	660
7	SPARE		1	10	6	-	-	-
8	SPARE		1	10	6	-	-	-
9	SPACE		-	-	-	-	-	-
10	SPACE		-	-	-	-	-	-
CONNECT TO : xEBDBG1 ; (x=22-23)		MAIN CB : 2P, 32AT/100AF Ic > 10 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 2-6 BYA/6 BYA ECC	CONNECTED LOAD (VA)	3,050
						RACEWAY : dia. 15 mm. EMT	DEMAND FACTOR	0.80
							DEMAND LOAD (VA	2,440

NOTE

a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.

b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 24CUy ; (y=4-5, 8-11)							LOCATION :	Guest RM.
CAPACITY : 100 A. 6 CIRCUITS AS , 230 VAC. 50 Hz.							MOUNTING :	WALL MOUNTED
MAIN : CB								
CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER			CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
			POLE	AT	Ic(kA)			
1	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
2	MINI BARS		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	600
3	RECEPTACAL		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	360
4	FCU		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	220
5	SPARE		1	10	6	-	-	-
6	SPARE		1	10	6	-	-	-
CONNECT TO : 24EBDBG1		MAIN CB : 2P, 20AT/100AF Ic > 10 kA at 400VAC. 50Hz.				MAIN CONDUCTOR : 2-4 BYA/4 BYA ECC	CONNECTED LOAD (VA)	1,330
						RACEWAY : dia. 15 mm. EMT	DEMAND FACTOR	0.80
							DEMAND LOAD (VA	1,064

NOTE

a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.

b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

Deltadesk Pvt. Ltd. Dhaka

BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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C	31-07-20	REVISED FINAL DESIGN	DEC				
B	29-05-20	REVISED FINAL DESIGN	DEC				
A	31-08-18	FINAL DESIGN	DEC				
-	15-07-16	DRAFT FINAL ELECTRICAL DESIGN	DEC				

DEC

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
PANEL SCHEDULE (26)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : Chonintorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-07-026

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PANEL NO. : 24CU7 — LOCATION : Guest RM.
CAPACITY : 100 A. 10 CIRCUITS AS , 230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	200
2	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
3	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	100
4	MINI BARS		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	600
5	RECEPTACAL		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	1,080
6	RECEPTACAL		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	360
7	FCU		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	880
8	SPARE		1	10	6	-	-	-
9	SPACE		-	-	-	-	-	-
10	SPACE		-	-	-	-	-	-

CONNECT TO : 24EBDBG1 — MAIN CB : 2P, 32AT/100AF, Ic > 10 kA at 400VAC. 50Hz. — MAIN CONDUCTOR : 2-6 BYA/6 BYA ECC — RACEWAY : dia. 15 mm. EMT — CONNECTED LOAD (VA) : 3,820 — DEMAND FACTOR : 0.80 — DEMAND LOAD (VA) : 3,056

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 25CU3 — LOCATION : Guest RM.
CAPACITY : 100 A. 10 CIRCUITS AS , 230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	200
2	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
3	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	100
4	MINI BARS		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	600
5	RECEPTACAL		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	1,080
6	RECEPTACAL		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	360
7	FCU		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	880
8	SPARE		1	10	6	-	-	-
9	SPACE		-	-	-	-	-	-
10	SPACE		-	-	-	-	-	-

CONNECT TO : 25EBDBG1 — MAIN CB : 2P, 32AT/100AF, Ic > 10 kA at 400VAC. 50Hz. — MAIN CONDUCTOR : 2-6 BYA/6 BYA ECC — RACEWAY : dia. 15 mm. EMT — CONNECTED LOAD (VA) : 3,820 — DEMAND FACTOR : 0.80 — DEMAND LOAD (VA) : 3,056

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

PANEL NO. : 25CUy ; (y=1-2, 4-5) — LOCATION : Guest RM.
CAPACITY : 100 A. 6 CIRCUITS AS , 230 VAC. 50 Hz. — MOUNTING : WALL MOUNTED
MAIN : CB

CCT. No.	DESCRIPTION	SEE NOTE	CIRCUIT BREAKER POLE	AT	Ic(kA)	CONDUCTOR	RACEWAY	CONNECTED LOAD (VA)
1	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
2	LIGHTING		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	150
3	MINI BARS		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	600
4	RECEPTACAL		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	1,080
5	FCU		1	10	6	2-2.5 BYA/2.5 BYA ECC	dia. 15mm EMT	440
6	SPARE		1	10	6	-	-	-

CONNECT TO : 25EBDBG1 — MAIN CB : 2P, 20AT/100AF, Ic > 10 kA at 400VAC. 50Hz. — MAIN CONDUCTOR : 2-4 BYA/4 BYA ECC — RACEWAY : dia. 15 mm. EMT — CONNECTED LOAD (VA) : 2,420 — DEMAND FACTOR : 0.80 — DEMAND LOAD (VA) : 1,936

NOTE:
a CB FOR THIS CIRCUIT SHALL BE ELCB WITH 30mA SENSIBILITY.
b LIGHTING FOR THIS CIRCUIT SHALL BE CONTROLLED VIA BAS.

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BENGAL hotels & resorts — BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE, DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY
C	31-07-20	REVISED FINAL DESIGN	DEC
B	29-05-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
-	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC

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PROJECT: BENGAL HOTELS AND RESORTS A FIVE STAR HOTEL
TITLE: PANEL SCHEDULE (27)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : Chonlnton
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MH8-EE-07-027

C:\Users\SURASAK\Desktop\BENGAL_HOTEL\Drawings\EE\MH8-EE-07-027.dwg [8] Jul 31, 2020-1:59pm
CAD/SURASAK P: \11306\BENGAL_HOTEL\Drawings\EE\MH8-EE-07-027.dwg

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE, GULSHAN AVENUE,
DHAKA 1212, BANGLADESH

BENGAL HOTELS AND RESORTS LIMITED

NIKETON, GULHAN-1, DHAKA, BANGLADESH

UPDATED FINAL ELECTRICAL DESIGN DRAWINGS -LEVEL 01 & LEVEL 02

22 SEPTEMBER 2023

DYNAMIC ENGINEERING CONSULTANTS CO., LTD.
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Deltadesh Pvt. Ltd. Dhaka

LIST OF ELECTRICAL DRAWINGS (1)

NO.	DRAWING NO.	DESCRIPTION	REV.	REMARK
		GENERAL		
1	MHB-EE-00-001	LIST OF ELECTRICAL DRAWINGS (1)	F	15/09/2023
2	MHB-EE-00-002	LIST OF ELECTRICAL DRAWINGS (2)	E	03/09/2021
3	MHB-EE-00-003	LIST OF ELECTRICAL DRAWINGS (3)	B	15/09/2023
4	MHB-EE-00-004	SYMBOL & ABBREVIATION	B	31/08/2018
5	MHB-EE-00-005	GENERAL NOTE	A	31/08/2018
6	MHB-EE-00-006	LIGHTING FIXTURE SCHEDULE	A	31/08/2018
		STANADARD		
7	MHB-EE-00-007	TYPICAL DETAIL (1)	A	31/08/2018
8	MHB-EE-00-008	TYPICAL DETAIL (2)	A	31/08/2018
9	MHB-EE-00-009	TYPICAL DETAIL (3)	A	31/08/2018
10	MHB-EE-00-010	TYPICAL DETAIL (4)	A	31/08/2018
11	MHB-EE-00-011	TYPICAL DETAIL (5)	A	31/08/2018
12	MHB-EE-00-012	TYPICAL DETAIL (6)	A	31/08/2018
13	MHB-EE-00-013	TYPICAL DETAIL (7)	A	31/08/2018
14	MHB-EE-00-014	TYPICAL DETAIL (8)	A	31/08/2018
15	MHB-EE-00-015	TYPICAL DETAIL (9)	A	31/08/2018
16	MHB-EE-00-016	TYPICAL DETAIL (10)	A	31/08/2018
		HOTEL BUILDING		
17	MHB-EE-01-001	ELECTRICAL SINGLE LINE DIAGRAM (1)	E	31/07/2020
18	MHB-EE-01-002	ELECTRICAL SINGLE LINE DIAGRAM (2)	E	31/07/2020
19	MHB-EE-01-003	ELECTRICAL SINGLE LINE DIAGRAM (3)	E	31/07/2020
20	MHB-EE-01-004	ELECTRICAL SINGLE LINE DIAGRAM (4)	E	31/07/2020
21	MHB-EE-01-005	ELECTRICAL SINGLE LINE DIAGRAM (5)	A	31/07/2020
22	MHB-EE-01-006	ELECTRICAL SINGLE LINE DIAGRAM (6)	A	31/07/2020
23	MHB-EE-01-007	ELECTRICAL SINGLE LINE DIAGRAM (7)	A	31/07/2020
24	MHB-EE-01-008	ELECTRICAL SINGLE LINE DIAGRAM (8)	A	31/07/2020
25	MHB-EE-01-009	ELECTRICAL SINGLE LINE DIAGRAM (9)	A	15/10/2021
26	MHB-EE-01-010	ELECTRICAL SINGLE LINE DIAGRAM (10)	A	15/10/2021
27	MHB-EE-01-011	ELECTRICAL RISER DIAGRAM	D	31/07/2020
28	MHB-EE-01-021	EARTHING SYSTEM SCHEMATIC DIAGRAM	C	29/05/2020
29	MHB-EE-01-031	MAIN INCOMMING ROUTING FOR HIGH VOLTAGE SYSTEM	C	29/05/2020
30	MHB-EE-02-001	LIGHTING SYSTEM PLAN – BASEMENT 3	D	31/07/2020
31	MHB-EE-02-002	LIGHTING SYSTEM PLAN – BASEMENT 2	D	31/07/2020
32	MHB-EE-02-003	LIGHTING SYSTEM PLAN – BASEMENT 1	D	31/07/2020

NO.	DRAWING NO.	DESCRIPTION	REV.	REMARK
		HOTEL BUILDING		
33	MHB-EE-02-004	LIGHTING SYSTEM PLAN – LEVEL 1	E	15/10/2021
34	MHB-EE-02-005	LIGHTING SYSTEM PLAN – LEVEL 2	D	31/07/2020
35	MHB-EE-02-006	LIGHTING SYSTEM PLAN – LEVEL 2M	E	15/10/2021
36	MHB-EE-02-007	LIGHTING SYSTEM PLAN – LEVEL 3	E	15/10/2021
37	MHB-EE-02-008	LIGHTING SYSTEM PLAN – LEVEL 4 AND LEVEL 4M	E	15/10/2021
38	MHB-EE-02-009	LIGHTING SYSTEM PLAN – LEVEL 5 AND LEVEL 5M	D	31/07/2020
39	MHB-EE-02-010	LIGHTING SYSTEM PLAN – LEVEL 6	D	31/07/2020
40	MHB-EE-02-011	LIGHTING SYSTEM PLAN – LEVEL 7–21 AND LEVEL 22–23	D	31/07/2020
41	MHB-EE-02-012	LIGHTING SYSTEM PLAN – LEVEL 24 AND LEVEL 25	D	31/07/2020
42	MHB-EE-02-013	LIGHTING SYSTEM PLAN – LEVEL 26	D	31/07/2020
43	MHB-EE-02-014	LIGHTING SYSTEM PLAN – ROOF AND LMR ROOF	D	31/07/2020
44	MHB-EE-03-001	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – BASEMENT 3	D	31/07/2020
45	MHB-EE-03-002	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – BASEMENT 2	D	31/07/2020
46	MHB-EE-03-003	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – BASEMENT 1	D	31/07/2020
47	MHB-EE-03-004	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 1	F	15/09/2023
48	MHB-EE-03-005	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 2	E	15/09/2023
49	MHB-EE-03-006	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 2M	E	15/10/2021
50	MHB-EE-03-007	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 3	D	31/07/2020
51	MHB-EE-03-008	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 4 AND LEVEL 4M	E	15/10/2021
52	MHB-EE-03-009	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 5 AND LEVEL 5M	D	31/07/2020
53	MHB-EE-03-010	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 6	D	31/07/2020
54	MHB-EE-03-011	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 7–21 AND LEVEL 22–23	D	31/07/2020
55	MHB-EE-03-012	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 24 AND LEVEL 25	D	31/07/2020
56	MHB-EE-03-013	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – LEVEL 26	E	15/10/2021
57	MHB-EE-03-014	EMERGENCY LIGHT AND EXIT SIGN SYSTEM PLAN – ROOF	D	31/07/2020
58	MHB-EE-04-001	ELECTRICAL OUTLET PLAN – BASEMENT 3	D	31/07/2020
59	MHB-EE-04-002	ELECTRICAL OUTLET PLAN – BASEMENT 2	D	31/07/2020
60	MHB-EE-04-003	ELECTRICAL OUTLET PLAN – BASEMENT 1	D	31/07/2020
61	MHB-EE-04-004	ELECTRICAL OUTLET PLAN – LEVEL 1	F	15/09/2023
62	MHB-EE-04-005	ELECTRICAL OUTLET PLAN – LEVEL 2	E	15/09/2023
63	MHB-EE-04-006	ELECTRICAL OUTLET PLAN – LEVEL 2M	E	15/10/2021
64	MHB-EE-04-007	ELECTRICAL OUTLET PLAN – LEVEL 3	E	15/10/2021
65	MHB-EE-04-008	ELECTRICAL OUTLET PLAN – LEVEL 4 AND LEVEL 4M	E	15/10/2021
66	MHB-EE-04-009	ELECTRICAL OUTLET PLAN – LEVEL 5 AND LEVEL 5M	D	31/07/2020

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BENGAL hotels & resorts
BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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C	31-07-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
F	15/09/23	REVISED FINAL DESIGN	DEC
E	15/10/21	REVISED FINAL DESIGN	DEC
0	03/09/21	REVISED FINAL DESIGN	DEC

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PROJECT
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE
LIST OF ELECTRICAL DRAWINGS (1)

DRAWN BY	SPH	CHECKED BY	WTS
DESIGN BY	WTS	PROJECT MGR	Chanintorn
DATE	31-08-2018	SCALE	AS SHOWN
PROJECT NO	1 1 3 0 7 3		
DWG NO	MHB-EE-00-001		

CAD\Administrator\ P: \11_3073_BENGAL_HOTEL\Drawings\E\MHB-EE-00-001_002.dwg [1] Sep 20, 2023 - 1:37pm

LIST OF ELECTRICAL DRAWINGS (2)

NO.	DRAWING NO.	DESCRIPTION	REV.	REMARK
		HOTEL BUILDING		
67	MHB-EE-04-010	ELECTRICAL OUTLET PLAN – LEVEL 6	E	03/09/2021
68	MHB-EE-04-011	ELECTRICAL OUTLET PLAN – LEVEL 7-21 AND LEVEL 22-23	E	03/09/2021
69	MHB-EE-04-012	ELECTRICAL OUTLET PLAN – LEVEL 24 AND LEVEL 25	E	03/09/2021
70	MHB-EE-04-013	ELECTRICAL OUTLET PLAN – LEVEL 26	D	31/07/2020
71	MHB-EE-04-014	ELECTRICAL OUTLET PLAN – ROOF	D	31/07/2020
72	MHB-EE-06-001	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – ROOF AND LMR ROOF	C	29/05/2020
73	MHB-EE-06-002	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 26	C	29/05/2020
74	MHB-EE-06-003	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 10, 14,18 AND LEVEL 22	C	29/05/2020
75	MHB-EE-06-004	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 6	C	29/05/2020
76	MHB-EE-06-005	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 3	C	29/05/2020
77	MHB-EE-06-006	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 2M	C	29/05/2020
78	MHB-EE-06-007	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 2	C	29/05/2020
79	MHB-EE-06-008	LIGHTNING PROTECTION AND EARTHING SYSTEM PLAN – LEVEL 1	C	29/05/2020
80	MHB-EE-06-101	EQUIPMENT AND EARTHING SYSTEM LAYOUT FOR HV, TRANSFORMER AND GENERATOR ROOM	E	31/07/2020
81	MHB-EE-06-102	EQUIPMENT AND EARTHING SYSTEM LAYOUT FOR MDB ROOM	C	29/05/2020
82	MHB-EE-07-001	PANEL SCHEDULE (1)	D	31/07/2020
83	MHB-EE-07-002	PANEL SCHEDULE (2)	D	31/07/2020
84	MHB-EE-07-003	PANEL SCHEDULE (3)	C	31/07/2020
85	MHB-EE-07-004	PANEL SCHEDULE (4)	C	31/07/2020
86	MHB-EE-07-005	PANEL SCHEDULE (5)	C	31/07/2020
87	MHB-EE-07-006	PANEL SCHEDULE (6)	C	31/07/2020
88	MHB-EE-07-007	PANEL SCHEDULE (7)	C	31/07/2020
89	MHB-EE-07-008	PANEL SCHEDULE (8)	C	31/07/2020
90	MHB-EE-07-009	PANEL SCHEDULE (9)	C	31/07/2020
91	MHB-EE-07-010	PANEL SCHEDULE (10)	C	31/07/2020
92	MHB-EE-07-011	PANEL SCHEDULE (11)	C	31/07/2020
93	MHB-EE-07-012	PANEL SCHEDULE (12)	C	31/07/2020
94	MHB-EE-07-013	PANEL SCHEDULE (13)	C	31/07/2020
95	MHB-EE-07-014	PANEL SCHEDULE (14)	C	31/07/2020
96	MHB-EE-07-015	PANEL SCHEDULE (15)	C	31/07/2020
97	MHB-EE-07-016	PANEL SCHEDULE (16)	C	31/07/2020
98	MHB-EE-07-017	PANEL SCHEDULE (17)	C	31/07/2020
99	MHB-EE-07-018	PANEL SCHEDULE (18)	C	31/07/2020
100	MHB-EE-07-019	PANEL SCHEDULE (19)	C	31/07/2020

NO.	DRAWING NO.	DESCRIPTION	REV.	REMARK
		HOTEL BUILDING		
101	MHB-EE-07-020	PANEL SCHEDULE (20)	C	31/07/2020
102	MHB-EE-07-021	PANEL SCHEDULE (21)	C	31/07/2020
103	MHB-EE-07-022	PANEL SCHEDULE (22)	C	31/07/2020
104	MHB-EE-07-023	PANEL SCHEDULE (23)	C	31/07/2020
105	MHB-EE-07-024	PANEL SCHEDULE (24)	C	31/07/2020
106	MHB-EE-07-025	PANEL SCHEDULE (25)	D	03/09/2021
107	MHB-EE-07-026	PANEL SCHEDULE (26)	D	03/09/2021
108	MHB-EE-07-027	PANEL SCHEDULE (27)	C	31/07/2020
109	MHB-EE-07-028	PANEL SCHEDULE (28)	A	15/10/2021
110	MHB-EE-07-029	PANEL SCHEDULE (29)	A	15/10/2021
111	MHB-EE-07-030	PANEL SCHEDULE (30)	A	15/10/2021
112	MHB-EE-07-031	PANEL SCHEDULE (31)	A	15/10/2021
113	MHB-EE-07-032	PANEL SCHEDULE (32)	A	15/10/2021
114	MHB-EE-07-033	PANEL SCHEDULE (33)	A	15/10/2021
115	MHB-EE-07-034	PANEL SCHEDULE (34)	A	15/10/2021
116	MHB-EE-07-035	PANEL SCHEDULE (35)	A	15/10/2021
117	MHB-EE-07-036	PANEL SCHEDULE (36)	A	15/10/2021
118	MHB-EE-07-037	PANEL SCHEDULE (37)	A	15/10/2021
119	MHB-EE-07-038	PANEL SCHEDULE (38)	A	15/10/2021
120	MHB-EE-07-039	PANEL SCHEDULE (39)	A	15/10/2021
121	MHB-EE-07-040	PANEL SCHEDULE (40)	A	15/10/2021
122	MHB-EE-07-041	PANEL SCHEDULE (41)	A	15/10/2021
123	MHB-EE-07-042	PANEL SCHEDULE (42)	A	15/10/2021
124	MHB-EE-07-043	PANEL SCHEDULE (43)	A	15/10/2021
125	MHB-EE-07-044	PANEL SCHEDULE (44)	A	15/10/2021
126	MHB-EE-08-001	POWER SYSTEM PLAN FOR RECEIVING, F & B STORE & LOUNGE BAR – LEVEL 1 (PART 1)	A	15/10/2021
127	MHB-EE-08-002	POWER SYSTEM PLAN FOR RECEIVING, F & B STORE & LOUNGE BAR – LEVEL 1 (PART 2)	A	15/10/2021
128	MHB-EE-08-003	POWER SYSTEM PLAN FOR RECEIVING, F & B STORE & LOUNGE BAR – LEVEL 1 (PART 3)	A	15/10/2021
129	MHB-EE-08-004	POWER SYSTEM PLAN FOR BANQUET KITCHEN & BREAK OUT – LEVEL 2 (PART 1)	A	15/10/2021
130	MHB-EE-08-005	POWER SYSTEM PLAN FOR BANQUET KITCHEN & BREAK OUT – LEVEL 2 (PART 2)	A	15/10/2021
131	MHB-EE-08-006	POWER SYSTEM PLAN FOR BANQUET KITCHEN & BREAK OUT – LEVEL 2 (PART 3)	A	15/10/2021
132	MHB-EE-08-007	POWER SYSTEM PLAN FOR COMMISSARY, MAIN KITCHEN & ALL DAY DINING – LEVEL 3 (PART 1)	A	15/10/2021
133	MHB-EE-08-008	POWER SYSTEM PLAN FOR COMMISSARY, MAIN KITCHEN & ALL DAY DINING – LEVEL 3 (PART 1)	A	15/10/2021
134	MHB-EE-08-009	POWER SYSTEM PLAN FOR COMMISSARY, MAIN KITCHEN & ALL DAY DINING – LEVEL 3 (PART 1)	A	15/10/2021

BENGAL hotels & resorts
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BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
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B	28-02-20	REVISED FINAL DESIGN	DEC	F	03/09/21	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC	E	13/09/21	REVISED FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC	D	03/09/21	REVISED FINAL DESIGN	DEC

Dekdesh Pvt. Ltd. Dhaka

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E-mail : interdes331@gmail.com

PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: LIST OF ELECTRICAL DRAWINGS (2)

DRAWN BY : SPH		CHECKED BY : WTS	
DESIGN BY : WTS		PROJECT MGR. : Chanintorn	
DATE : 31-08-2018		SCALE : AS SHOWN	
PROJECT NO.	1 1 3 0 7 3		
DWG NO.	MHB-EE-00-002		

CAD\Administrator# P:\11307_3_BENGAL_HOTEL\Drawings\E\MHB-EE-00-001_002.dwg [2] Sep 20, 2023-1:37pm

LIST OF ELECTRICAL DRAWINGS (3)

NO.	DRAWING NO.	DESCRIPTION	REV.	REMARK
		HOTEL BUILDING		
135	MHB-EE-08-010	POWER SYSTEM PLAN FOR LAUNDRY, HOUSEKEEPING & STAFF KITCHEN – LEVEL 5 (PART 1)	A	15/10/2021
136	MHB-EE-08-011	POWER SYSTEM PLAN FOR LAUNDRY, HOUSEKEEPING & STAFF KITCHEN – LEVEL 5 (PART 2)	A	15/10/2021
137	MHB-EE-08-012	POWER SYSTEM PLAN FOR LAUNDRY, HOUSEKEEPING & STAFF KITCHEN – LEVEL 5 (PART 3)	A	15/10/2021
138	MHB-EE-08-013	POWER SYSTEM PLAN FOR LAUNDRY, HOUSEKEEPING & STAFF KITCHEN – LEVEL 5 (PART 4)	A	15/10/2021
139	MHB-EE-08-014	POWER SYSTEM PLAN FOR EXECUTIVE LOUNGE – LEVEL 25	A	15/10/2021
140	MHB-EE-08-015	POWER SYSTEM PLAN FOR ROOF TOP RESTAURANT 7 BAR – LEVEL 26	A	15/10/2021
141	MHB-EE-08-016	POWER SYSTEM PLAN FOR MAID SERVICE PANTRY	A	15/10/2021
142	MHB-EE-09-001	LIGHTING SYSTEM PLAN FOR TYPICAL GUEST ROOM TYPE KING BEDROOM	A	03/09/2021
143	MHB-EE-09-002	OUTLET PLAN FOR TYPICAL GUEST ROOM TYPE KING BEDROOM	A	03/09/2021
144	MHB-EE-09-003	LIGHTING SYSTEM PLAN FOR TYPICAL GUEST ROOM TYPE TWIN BEDROOM	A	03/09/2021
145	MHB-EE-09-004	OUTLET PLAN FOR TYPICAL GUEST ROOM TYPE TWIN BEDROOM	A	03/09/2021
146	MHB-EE-09-005	LIGHTING SYSTEM PLAN FOR TYPICAL GUEST ROOM CORRIDOR	A	13/09/2021
147	MHB-EE-10-001	ROOM CONTROL UNIT DIAGRAM (TYPE KING&TWIN BED ROOM)	A	03/09/2021
148	MHB-EE-12-001	EMERGENCY LIGHT AND EXIT SIGN PLAN – LEVEL 1 (MAIN LOBBY)	A	15/09/2023
149	MHB-EE-12-002	EMERGENCY LIGHT AND EXIT SIGN PLAN – LEVEL 2 (BALLROOM & PRE – FUNCTION)	A	15/09/2023
150	MHB-EE-12-003	EMERGENCY LIGHT AND EXIT SIGN PLAN – LEVEL 2 (FUNCTION ROOM)	A	15/09/2023
151	MHB-EE-13-001	ELECTRICAL OUTLET PLAN – LEVEL 1 (MAIN LOBBY)	A	15/09/2023
152	MHB-EE-13-002	ELECTRICAL OUTLET PLAN – LEVEL 2 (BALLROOM & PRE – FUNCTION)	A	15/09/2023
153	MHB-EE-13-003	ELECTRICAL OUTLET PLAN – LEVEL 2 (FUNCTION ROOM)	A	15/09/2023

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BENGAL hotels & resorts

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BENGAL HOUSE 75 GULSHAN AVENUE
DHAKA 1212 BANGLADESH

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REV NO.	DATE	DESCRIPTION	BY	REV NO.	DATE	DESCRIPTION	BY
B	15/09/23	FINAL DESIGN	DEC				
A	15/10/21	FINAL DESIGN	DEC				

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE.
LIST OF ELECTRICAL DRAWINGS (3)

DRAWN BY	SPH	CHECKED BY	WTS
DESIGN BY	WTS	PROJECT MGR	Chanintorn
DATE	31-08-2018	SCALE	AS SHOWN
PROJECT NO.	113073		
DWG NO.	MHB-EE-00-003		

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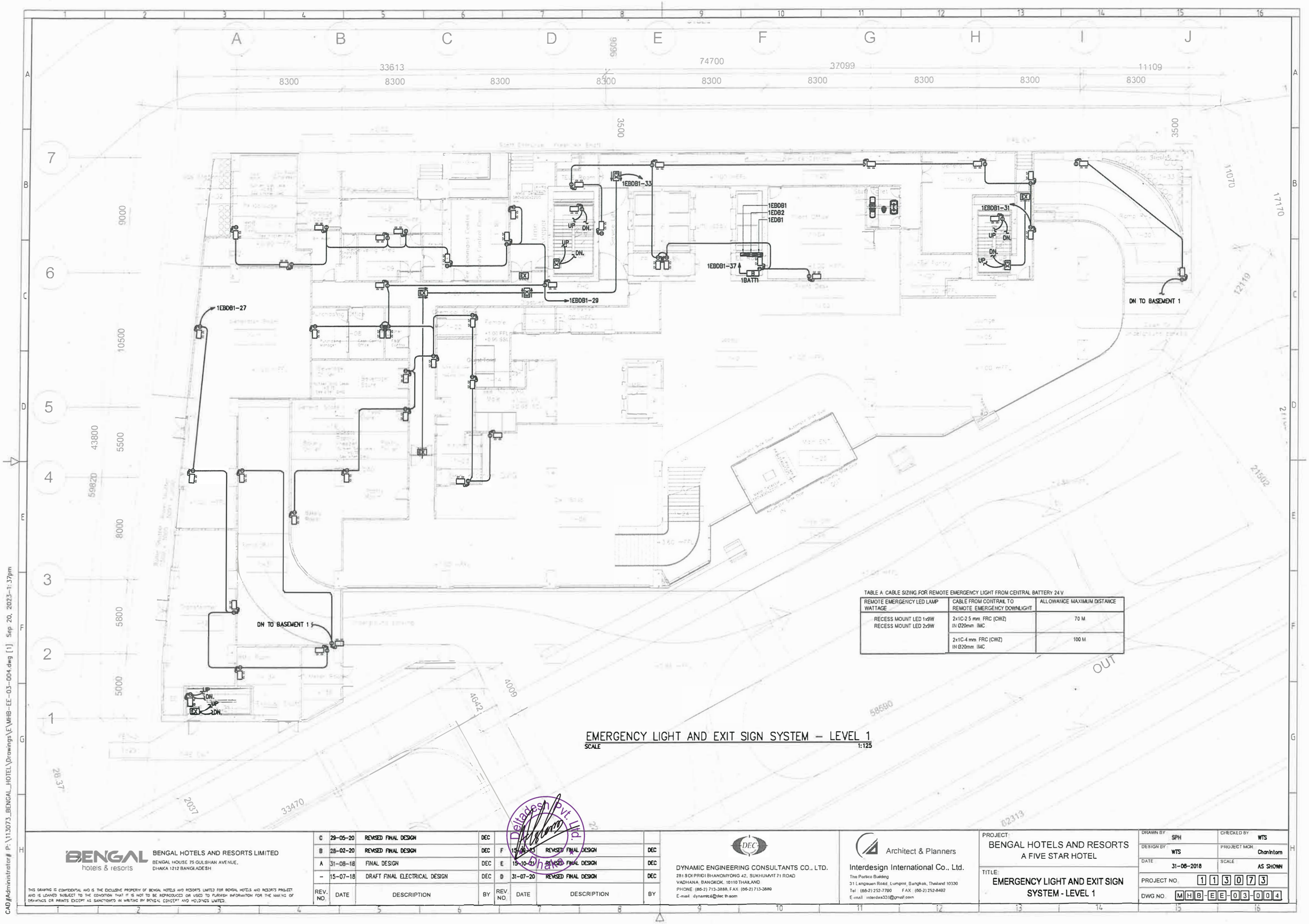


TABLE A CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm FRC (CWZ) IN Ø20mm IMC	70 M
	2x1C-4 mm FRC (CWZ) IN Ø20mm IMC	100 M

EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 1

SCALE 1:125

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BENGAL HOUSE 75 GULSHAN AVENUE,
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REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
F	15-11-21	REVISED FINAL DESIGN	DEC
E	15-10-21	REVISED FINAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM - LEVEL 1

DRAWN BY: SPH	CHECKED BY: WTS
DESIGN BY: WTS	PROJECT MGR: Chanitorn
DATE: 31-08-2018	SCALE: AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG NO.	M H B - E E - 0 3 - 0 0 4

CAD@Administrator# P:\113073_BENGAL_HOTEL\Drawings\E\MHB-EE-03-004.dwg [1] Sep 20, 2023-1:37pm

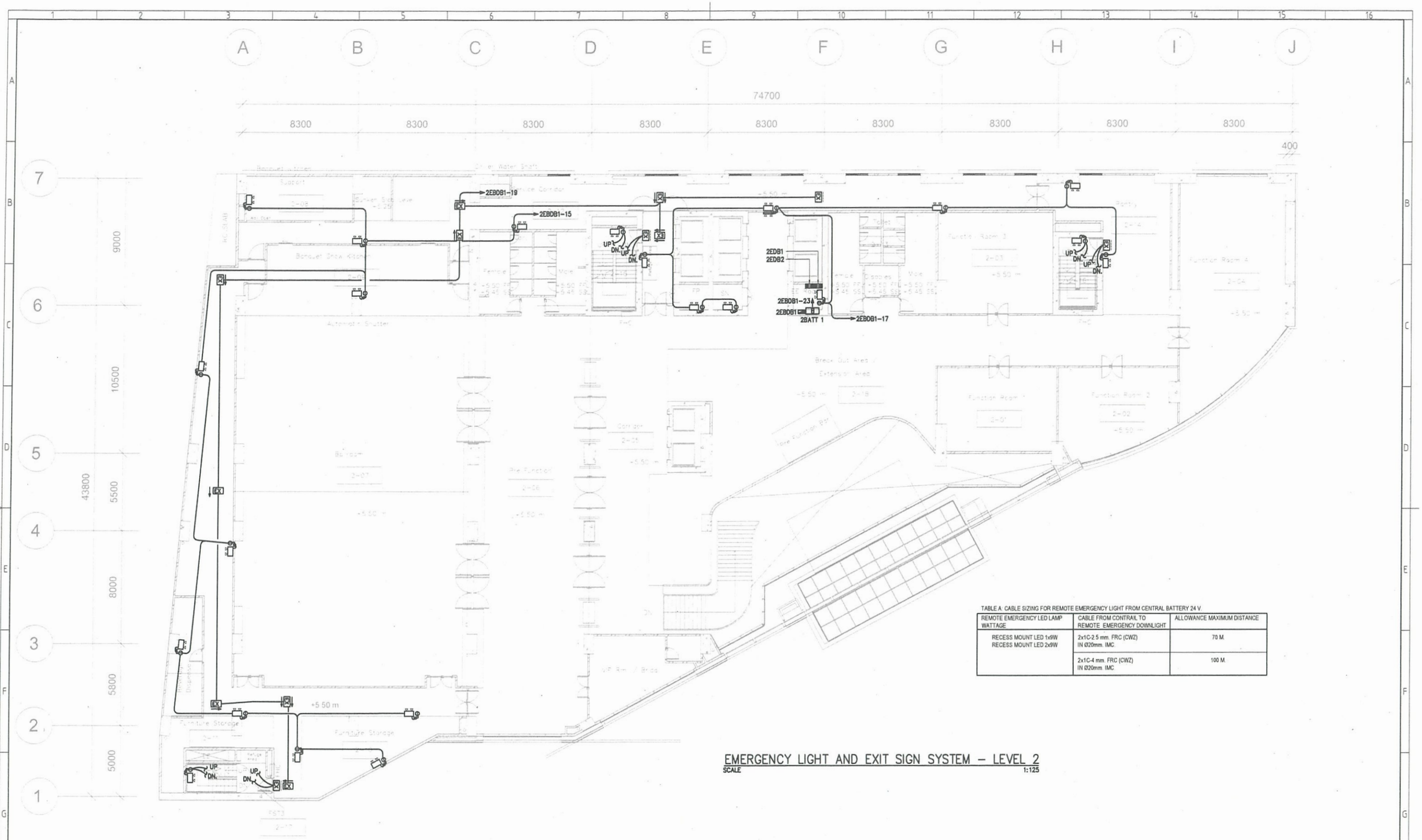


TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm. FRC (CWZ) IN Ø20mm. IMC.	70 M.
	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.

EMERGENCY LIGHT AND EXIT SIGN SYSTEM – LEVEL 2

SCALE 1:125

REV. NO.	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
E	15-09-21	REVISED FINAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

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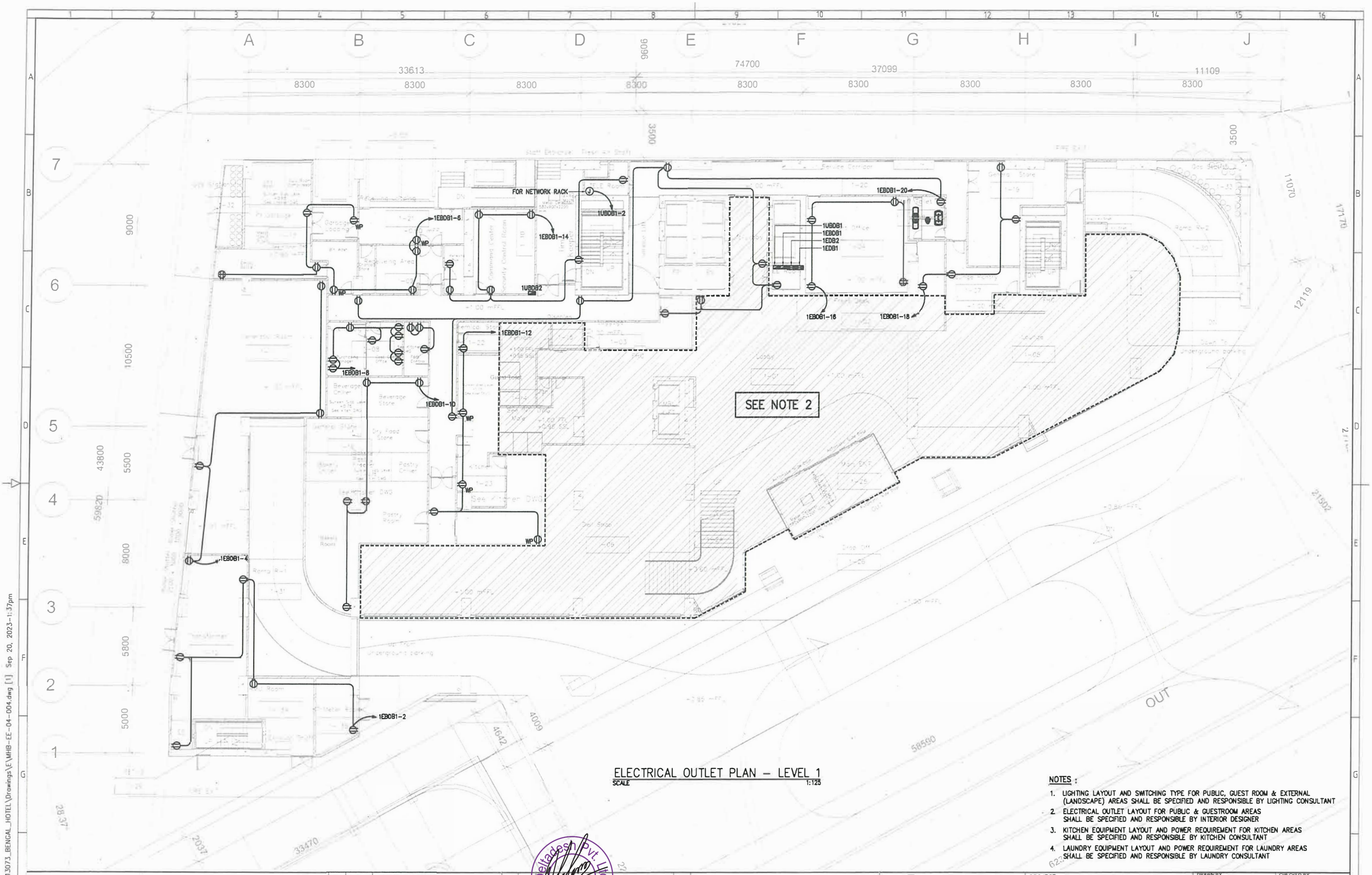
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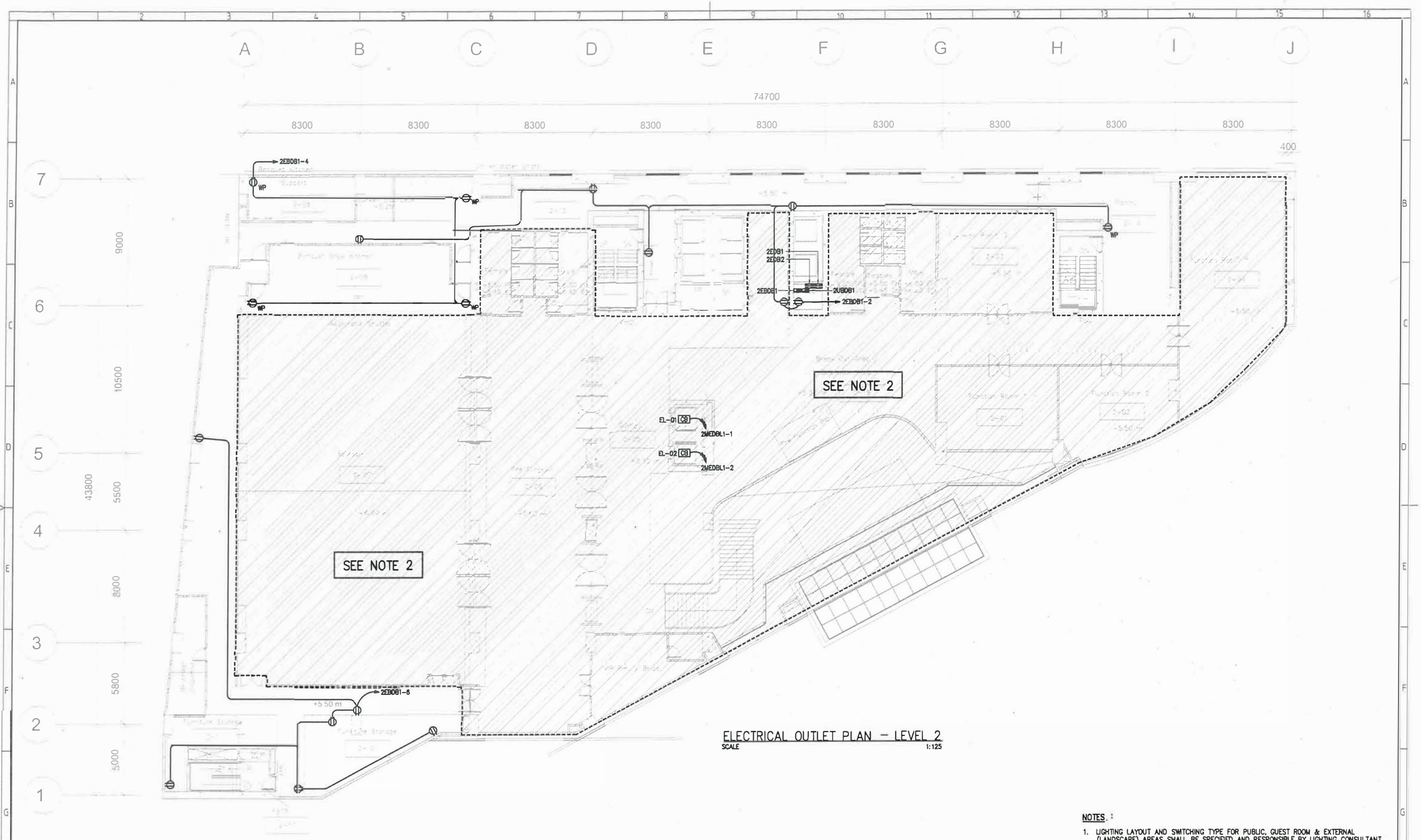
PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN SYSTEM - LEVEL 2

DRAWN BY :	SPH	CHECKED BY :	WTS
DESIGN BY :	WTS	PROJECT MGR. :	Chanitorn
DATE :	31-08-2018	SCALE :	AS SHOWN
PROJECT NO.	1130773		
DWG.NO.	MHB-EE-03-005		

CAD\Administrator\ P: \1130773_BENGAL_HOTEL\Drawings\E\MHB-EE-03-005.dwg [1] Sep 20, 2023-1:37pm


FOR NETWORK RACK
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1EBDB1-14
1UBDB1-2
1UBDB2
1UBDB1
1EBDB1
1EDB2
1EDB1
1EBDB1-16
1EBDB1-18
1EBDB1-12
1EBDB1-8
1EBDB1-10
1EBDB1-4
1EBDB1-2
WP
SEE NOTE 2
OUT
Underground parking
Service Corridor
Security Control Room
Beverage Store
Dry Food Store
Pastry Chef
Sous Chef
Room Service
Laundry
Linen Store
Housekeeping Area
Gym
Lobby
Guest Lift
Service Lift
Staff Entrance, Firefighter Shaft
Beverage Cellar
Kitchen Store
Bakery Room
Pastry Room
Hot Kitchen
Cold Kitchen
Main Kitchen
Steward Room
Dry Store
Cool Room
Freezer
Pre Function
Banquet Area
Ballroom
Function Room
Meeting Room
Executive Office
Office
Guest Room
Corridor
Lobby
Lift
Staff Lift
Service Lift
Fire Exit
Fire Lift
Toilet
Shaft
Duct
Void
Ramp
Slope Down
Slope Up
Open to Below
Pantry
Store
Room
Area
Bar
Lounge
Terrace
Deck
Garden
Pool
Spa
Gym
Sauna
Steam
Massage
Treatment
Reception
Waiting
Changing
Shower
Locker
Toilet
Male
Female
Unisex
Disabled
Baby Change
Cleaner
Plant
Electrical
Telecom
Fire Alarm
Security
CCTV
Access Control
Intercom
Public Address
Sound System
Lighting
Power
Data
Network
Wireless
Antenna
Satellite
Cable TV
Internet
Phone
Fax
Modem
Router
Switch
Hub
Server
Rack
Cabinet
Panel
Board
Meter
Sensor
Detector
Alarm
Sprinkler
Hose Reel
Extinguisher
Emergency
Exit
Sign
Light
Switch
Socket
Plug
Cable
Wire
Conduit
Tray
Duct
Pipe
Valve
Pump
Tank
Boiler
Chiller
Cooling Tower
AHU
FCU
VAV
VRF
Split
Window
Wall
Door
Floor
Ceiling
Roof
Column
Beam
Slab
Foundation
Basement
Ground
Level
Grid
Axis
Dimension
Note
Section
Detail
Elevation
Plan
Drawing
Scale
North
Arrow
Title
Block
Frame
Border
Revision
Date
Author
Checked
Approved
Issued
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Schedule
Quantity
Unit
Rate
Amount
Total
Grand
Sub
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VAT
Invoice
Payment
Client
Consultant
Contractor
Supplier
Vendor
Manufacturer
Model
Serial
Number
Code
Reference
Project
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Location
Address
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Email
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Witness
Notary
Power of Attorney
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Terms
Conditions
Warranty
Guarantee
Insurance
Liability
Indemnity
Force Majeure
Arbitration
Jurisdiction
Governing Law
Dispute
Resolution
Mediation
Litigation
Court
Judge
Lawyer
Attorney
Barrister
Solicitor
Advocate
Counsel
Plaintiff
Defendant
Claim
Counterclaim
Settlement
Judgment
Order
Decree
Appeal
Review
Revision
Amendment
Addendum
Corrigendum
Errata
Omission
Inclusion
Exclusion
Deletion
Addition
Modification
Alteration
Change
Variation
Extra
Deduction
Credit
Debit
Balance
Outstanding
Due
Overdue
Interest
Penalty
Late
Fee
Charge
Cost
Expense
Budget
Forecast
Actual
Variance
Profit
Loss
Margin
Markup
Discount
Rebate
Commission
Brokerage
Agent
Representative
Distributor
Dealer
Retailer
Wholesaler
Manufacturer
Producer
Supplier
Vendor
Customer
Buyer
Seller
Purchaser
Vendor
Tenant
Landlord
Lessee
Lessor
Owner
Occupier
Resident
Visitor
Guest
Staff
Employee
Worker
Labour
Union
Association
Society
Club
Group
Team
Department
Division
Unit
Section
Branch
Office
Headquarters
Factory
Plant
Mill
Workshop
Yard
Warehouse
Storage
Depot
Terminal
Port
Airport
Station
Road
Highway
Bridge
Tunnel
Railway
Track
Vehicle
Car
Truck
Bus
Van
Motorcycle
Bicycle
Boat
Ship
Aircraft
Helicopter
Drone
Satellite
Spacecraft
Rocket
Missile
Weapon
Gun
Rifle
Pistol
Ammunition
Bullet
Shell
Bomb
Grenade
Explosive
Detonator
Fuse
Timer
Trigger
Safety
Catch
Magazine
Clip
Holster
Sheath
Knife
Sword
Dagger
Axe
Hammer
Saw
Drill
Screwdriver
Wrench
Pliers
Tool
Kit
Box
Bag
Case
Container
Pallet
Crate
Barrel
Drum
Bottle
Can
Jar
Tube
Pipe
Hose
Valve
Tap
Faucet
Nozzle
Sprinkler
Shower
Bath
Sink
Basin
Toilet
Urinal
Bidet
Cistern
Flush
Drain
Trap
Vent
Soil
Waste
Water
Supply
Hot
Cold
Mixer
Thermostat
Heater
Geyser
Boiler
Chiller
Cooling
Tower
Pump
Motor
Generator
Transformer
Switchgear
Panel
Board
Meter
Sensor
Detector
Alarm
Sprinkler
Hose



ELECTRICAL OUTLET PLAN – LEVEL 2

SCALE 1:125

NOTES :

1. LIGHTING LAYOUT AND SWITCHING TYPE FOR PUBLIC, GUEST ROOM & EXTERNAL (LANDSCAPE) AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LIGHTING CONSULTANT
2. ELECTRICAL OUTLET LAYOUT FOR PUBLIC & GUESTROOM AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY INTERIOR DESIGNER
3. KITCHEN EQUIPMENT LAYOUT AND POWER REQUIREMENT FOR KITCHEN AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY KITCHEN CONSULTANT
4. LAUNDRY EQUIPMENT LAYOUT AND POWER REQUIREMENT FOR LAUNDRY AREAS SHALL BE SPECIFIED AND RESPONSIBLE BY LAUNDRY CONSULTANT

BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE 76 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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REV NO	DATE	DESCRIPTION	BY
C	29-05-20	REVISED FINAL DESIGN	DEC
B	28-02-20	REVISED FINAL DESIGN	DEC
A	31-08-18	FINAL DESIGN	DEC
–	15-07-18	DRAFT FINAL ELECTRICAL DESIGN	DEC
E	15-09-20	REVISED FINAL DESIGN	DEC
D	31-07-20	REVISED FINAL DESIGN	DEC

Deltadesign Pvt. Ltd. Dhaka

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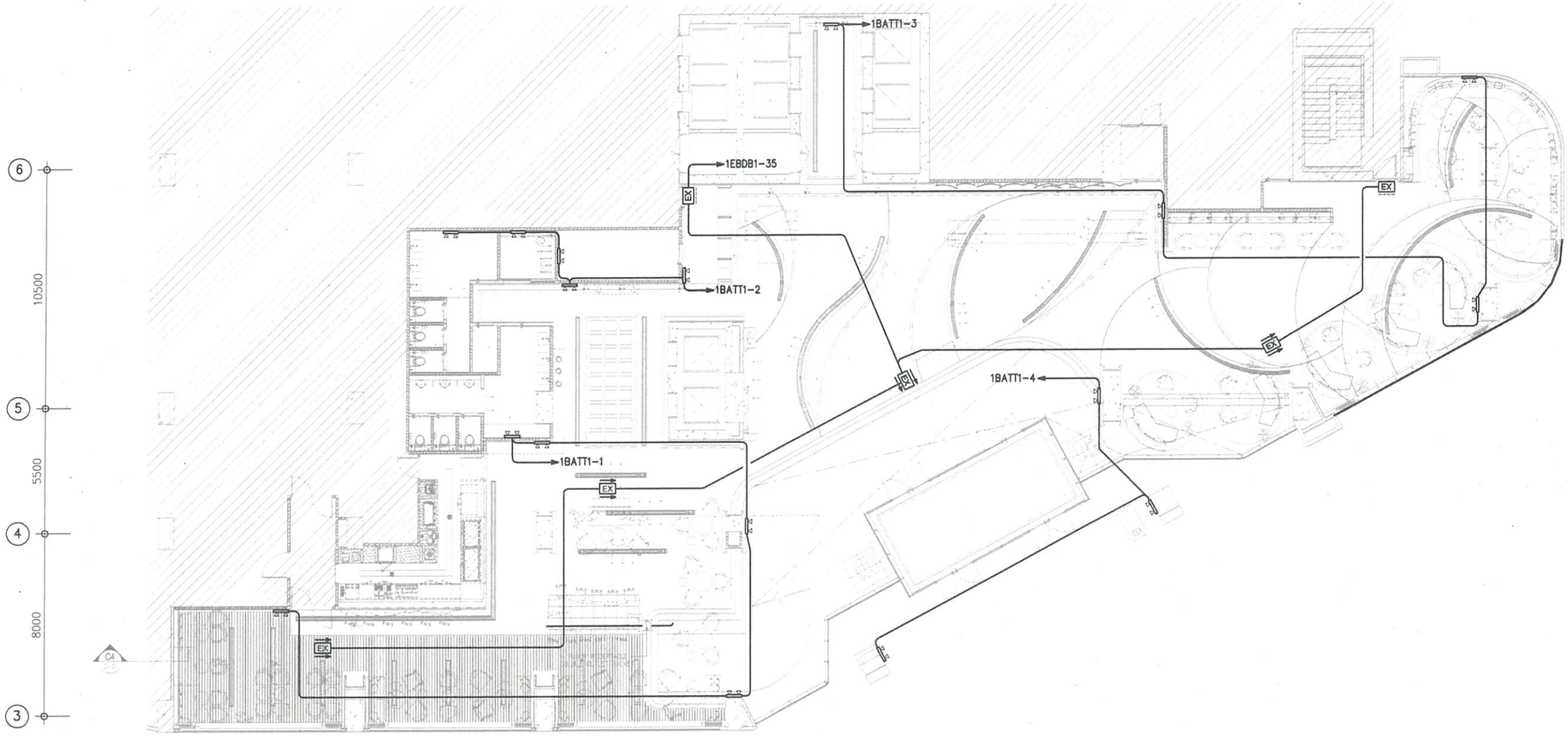
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PROJECT
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE
ELECTRICAL OUTLET PLAN - LEVEL 2

DRAWN BY	SPH
CHECKED BY	WTS
DESIGN BY	WTS
PROJECT MGR	Chanintorn
DATE	31-08-2018
SCALE	AS SHOWN
PROJECT NO	1130723
DWG NO	MHB-EE-04-005

CAD/Administrator# P:\113073_BENGAL_HOTEL\Drawings\E\MHB-EE-04-005.dwg [1] Sep 20, 2023-1:37pm



EMERGENCY LIGHT AND EXIT SIGN PLAN – LEVEL 1 (MAIN LOBBY)

SCALE 1 : 100

TABLE A: CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V.

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm. FRC (CWZ) IN Ø20mm. IMC.	70 M.
	2x1C-4 mm. FRC (CWZ) IN Ø20mm. IMC.	100 M.

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BENGAL hotels & resorts

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BENGAL HOUSE 75 GULSHAN AVENUE,
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REV. NO.	DATE	DESCRIPTION	BY	REV. NO.	DATE	DESCRIPTION	BY
A	15-09-23	FINAL DESIGN	DEC				

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E-mail : dynamic4@dec.th.com

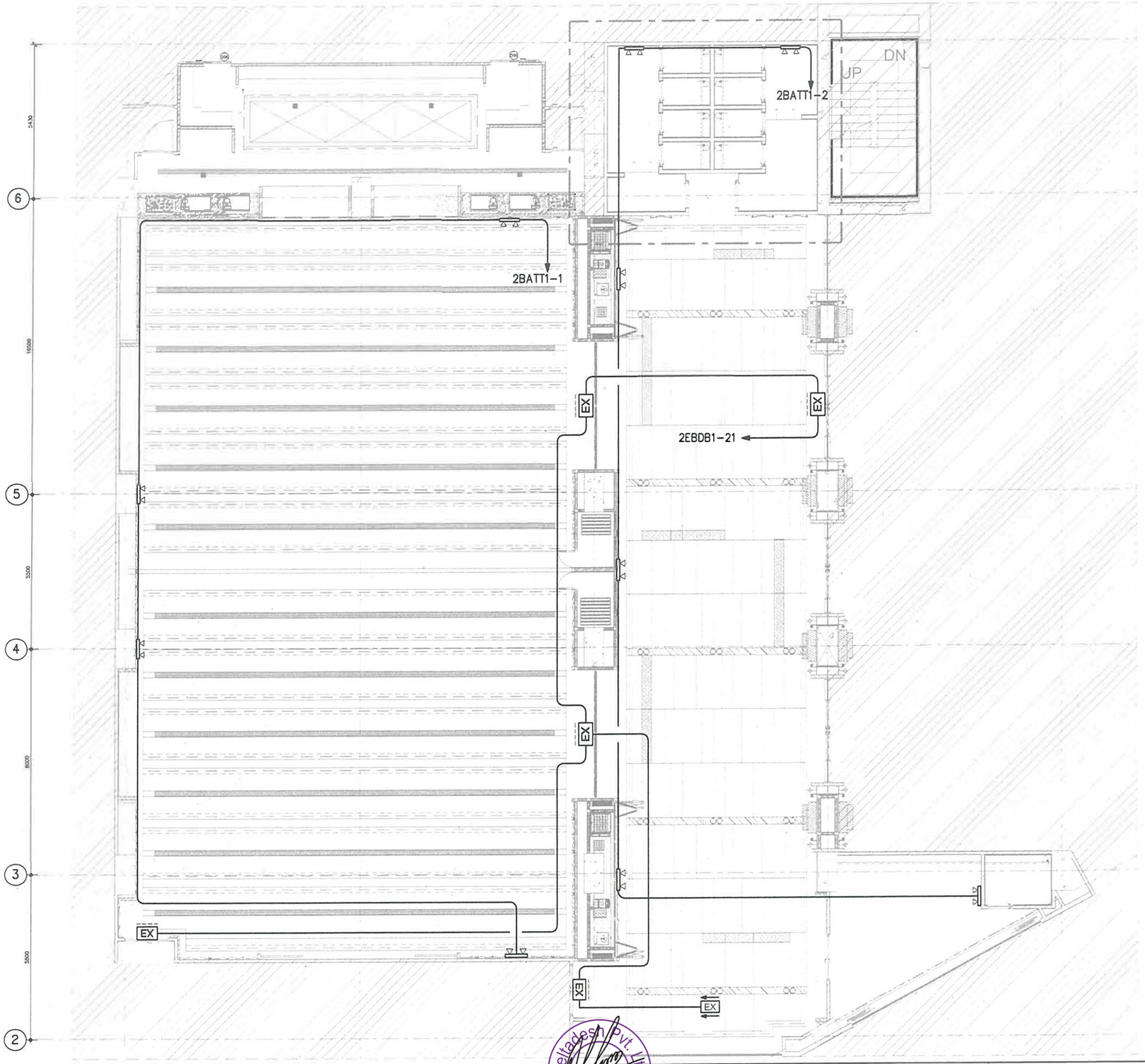
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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN PLAN – LEVEL 1 (MAIN LOBBY)

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR : Chanintorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	MHB-EE-12-001

CAD@Administrator# P:\113073_BENGAL_HOTEL\Drawings\E\MHB-EE-12-001.dwg [1] Sep 20, 2023-1:37pm



EMERGENCY LIGHT AND EXIT SIGN PLAN – LEVEL 2
(BALLROOM & PRE-FUNCTION)

SCALE 1 : 100

TABLE A CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x9W RECESS MOUNT LED 2x9W	2x1C-2.5 mm FRC (CWZ) IN Ø20mm IMC	70 M
	2x1C-4 mm FRC (CWZ) IN Ø20mm IMC	100 M

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BENGAL HOUSE 75 GULSHAN AVENUE,
DHAKA 1212 BANGLADESH

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E-mail : dynamic4@dec.th.com

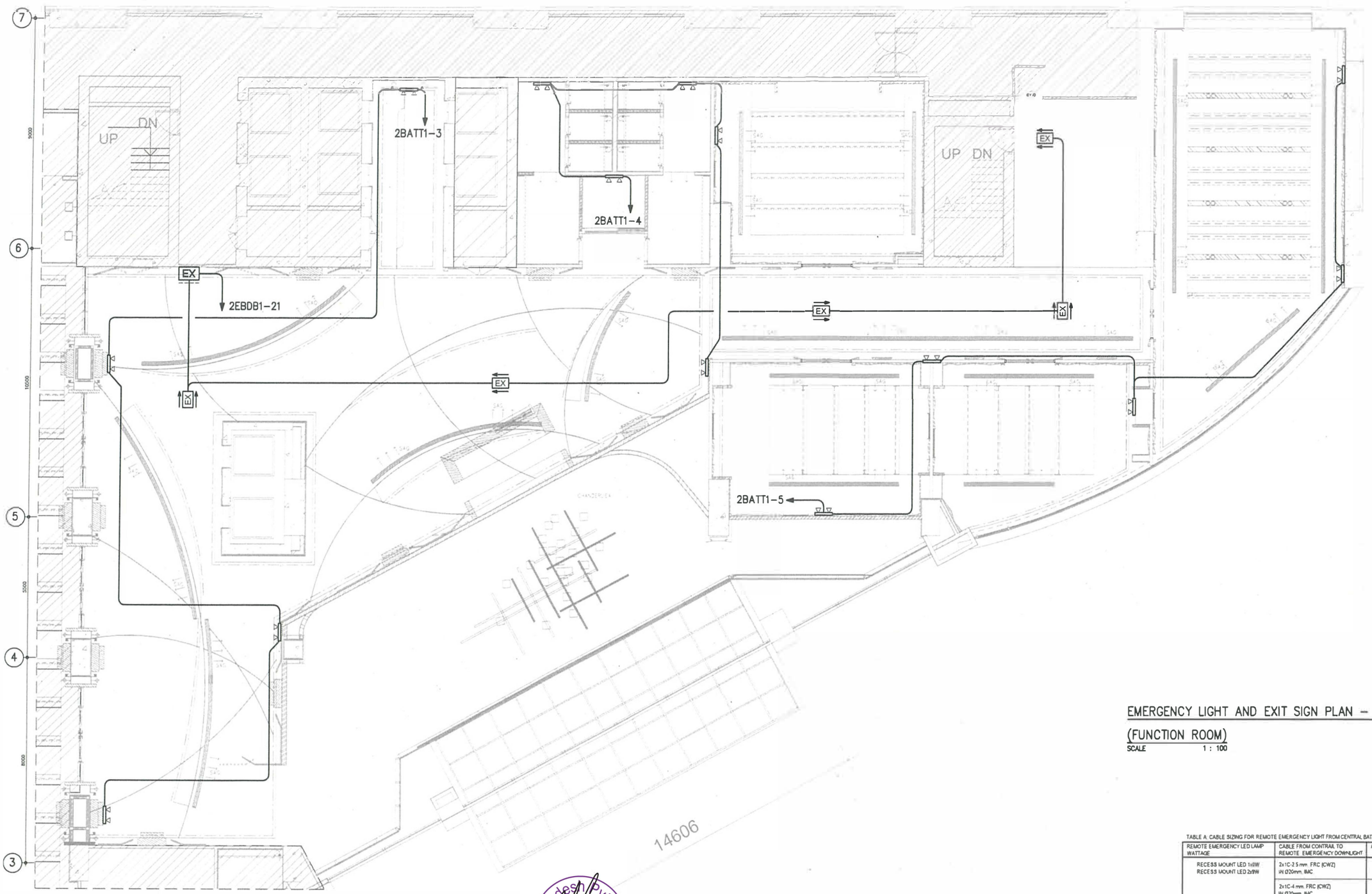
Architect & Planners
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31 Langsuan Road, Lumpini, Bangkok, Thailand 10330
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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN PLAN – LEVEL 2
(BALLROOM & PRE-FUNCTION)

DRAWN BY	SPH	CHECKED BY	WTS
DESIGN BY	WTS	PROJECT MGR.	Chanitorn
DATE	31-08-2018	SCALE	AS SHOWN
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	MHB-EE-12-002		

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EMERGENCY LIGHT AND EXIT SIGN PLAN – LEVEL 2

(FUNCTION ROOM)

SCALE 1 : 100

TABLE A CABLE SIZING FOR REMOTE EMERGENCY LIGHT FROM CENTRAL BATTERY 24 V

REMOTE EMERGENCY LED LAMP WATTAGE	CABLE FROM CONTRAIL TO REMOTE EMERGENCY DOWNLIGHT	ALLOWANCE MAXIMUM DISTANCE
RECESS MOUNT LED 1x6W RECESS MOUNT LED 2x9W	2x1C-2.5 mm FRC (CWZ) IN Ø20mm. IMC	70 M.
	2x1C-4 mm FRC (CWZ) IN Ø20mm. IMC	100 M.

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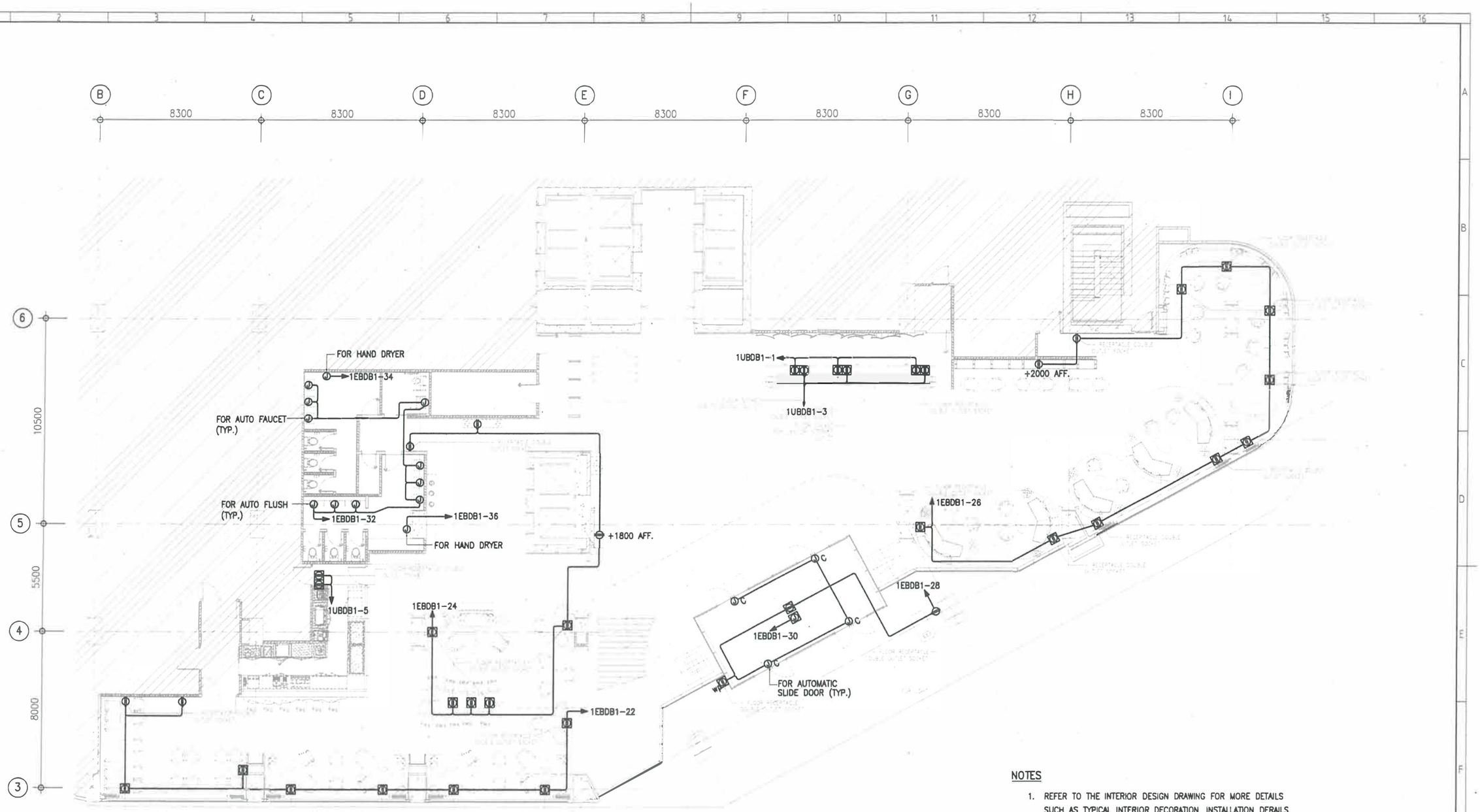
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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
EMERGENCY LIGHT AND EXIT SIGN PLAN – LEVEL 2 (FUNCTION ROOM)

DRAWN BY: SPH	CHECKED BY: WTS
DESIGN BY: WTS	PROJECT MGR: Chanintorn
DATE: 31-08-2018	SCALE: AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG NO.	MHB-EE-12-003

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NOTES

1. REFER TO THE INTERIOR DESIGN DRAWING FOR MORE DETAILS SUCH AS TYPICAL INTERIOR DECORATION, INSTALLATION DERAILS, ELEVATIONS AND SECTIONS.

ELECTRICAL OUTLET PLAN – LEVEL 1 (MAIN LOBBY)

SCALE 1 : 100

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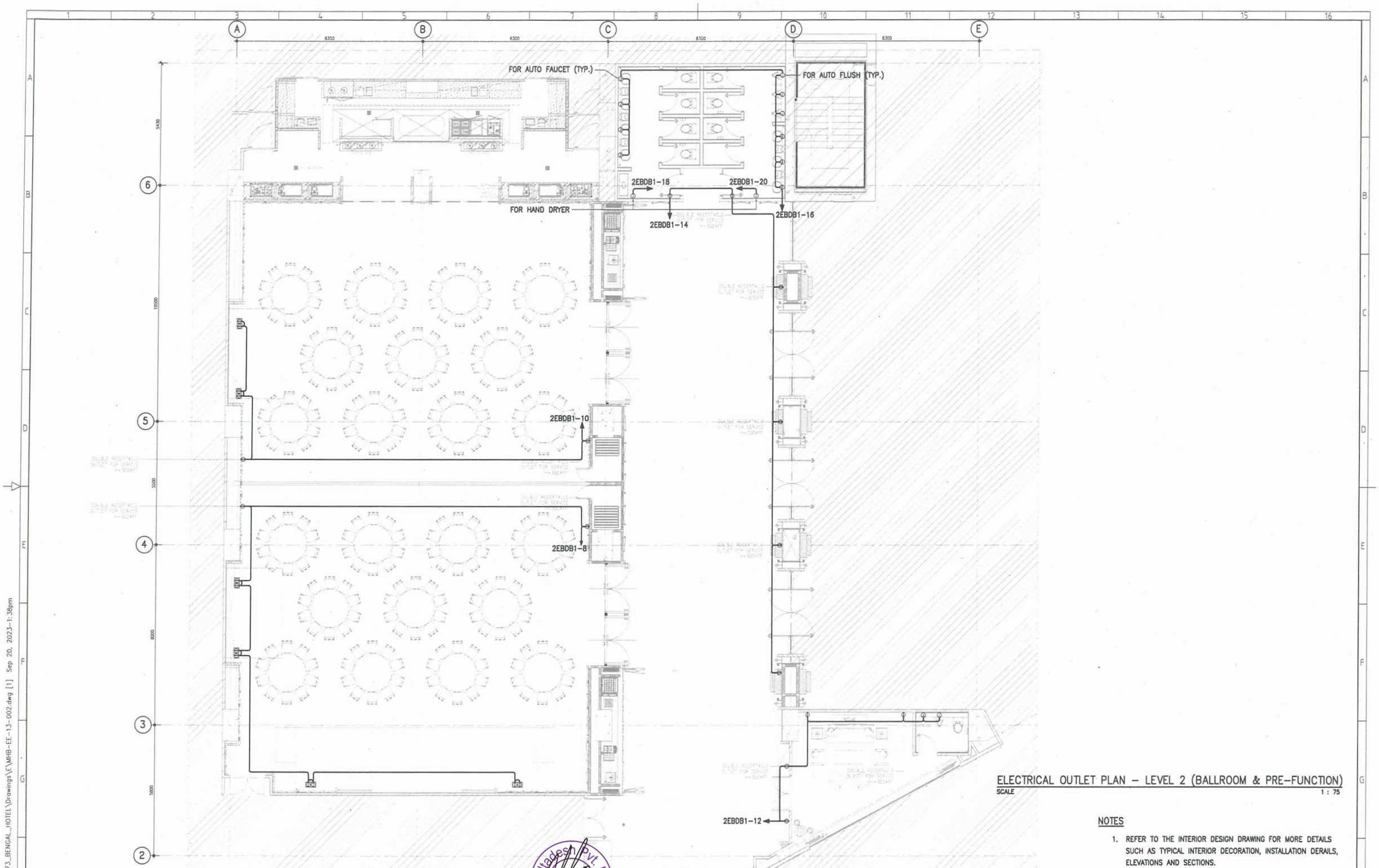
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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE
ELECTRICAL OUTLET PLAN – LEVEL 1 (MAIN LOBBY)

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DESIGN BY	WTS	PROJECT MGR.	Chanintorn
DATE	31-08-2018	SCALE	AS SHOWN
PROJECT NO	1 1 3 0 7 3		
DWG NO.	MHB-EE-13-001		

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ELECTRICAL OUTLET PLAN – LEVEL 2 (BALLROOM & PRE-FUNCTION)

SCALE 1 : 75

NOTES

1. REFER TO THE INTERIOR DESIGN DRAWING FOR MORE DETAILS SUCH AS TYPICAL INTERIOR DECORATION, INSTALLATION DERAILS, ELEVATIONS AND SECTIONS.

BENGAL hotels & resorts

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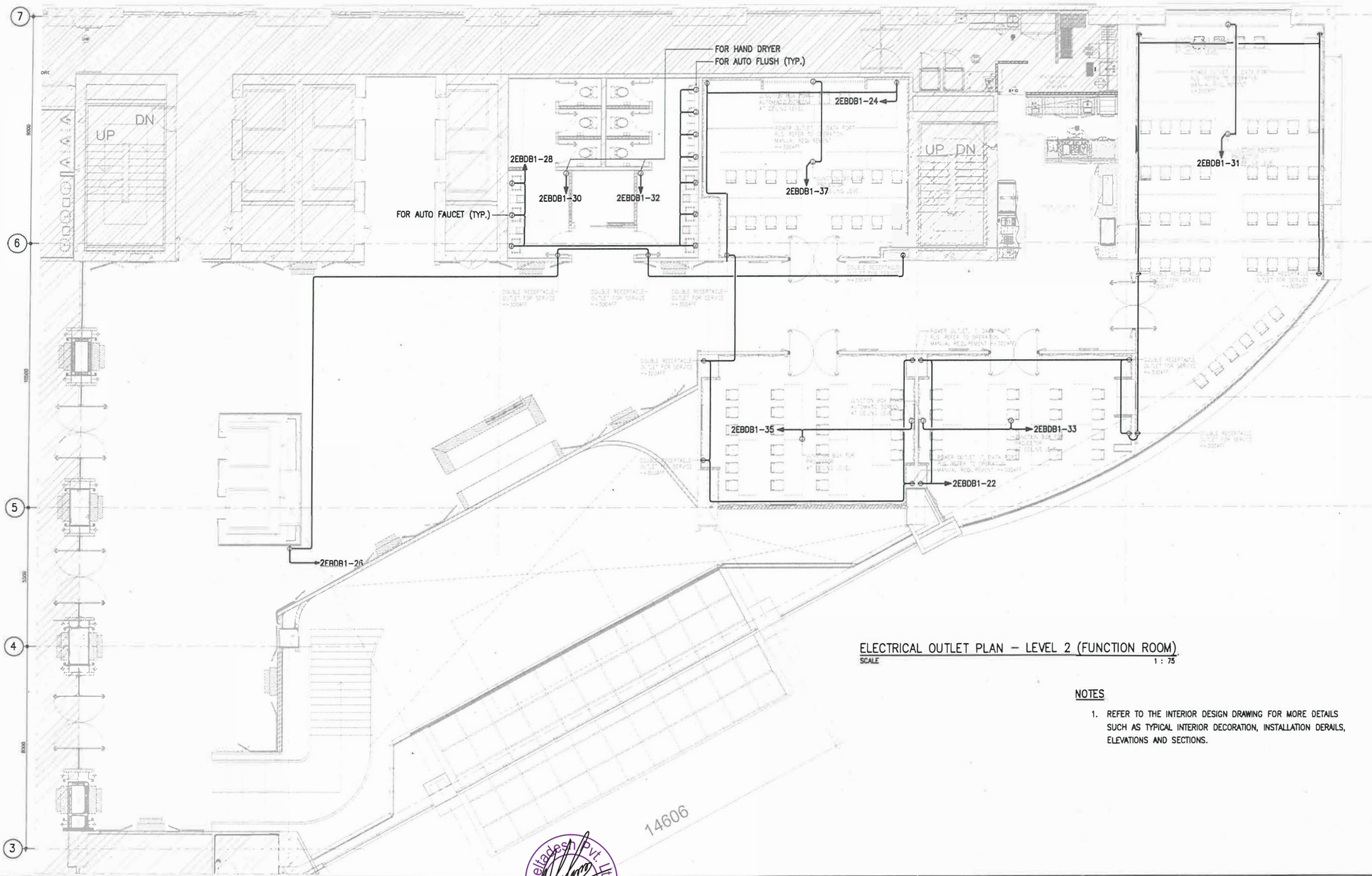
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PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: ELECTRICAL OUTLET PLAN – LEVEL 2 (BALLROOM & PRE-FUNCTION)

DRAWN BY : SPH		CHECKED BY : WTS	
DESIGN BY : WTS		PROJECT MGR. : Chanitorn	
DATE : 31-08-2018		SCALE : AS SHOWN	
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	MHB-EE-13-002		

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ELECTRICAL OUTLET PLAN – LEVEL 2 (FUNCTION ROOM)
SCALE 1 : 75

NOTES

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BENGAL HOUSE 75 GULSHAN AVENUE
DHAKA 1212 BANGLADESH

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PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: ELECTRICAL OUTLET PLAN – LEVEL 2 (FUNCTION ROOM)

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DESIGN BY	WTS	PROJECT MGR.	Chanitarn
DATE	31-08-2018	SCALE	AS SHOWN
PROJECT NO.	1130723		
DWG NO.	MHB-EE-13-003		

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BENGAL HOTELS AND RESORTS LIMITED
BENGAL HOUSE, GULSHAN AVENUE,
DHAKA 1212, BANGLADESH

BENGAL HOTELS AND RESORTS LIMITED

NIKETON, GULHAN-1, DHAKA, BANGLADESH

UPDATED FINAL ELECTRICAL DESIGN DRAWINGS
LEVEL 01 & LEVEL 02
(POWER SUPPLY CIRCUIT PROVISION-HVAC EQUIPMENT)

24 OCTOBER 2023

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LIST OF ELECTRICAL DRAWINGS (3)

NO.	DRAWING NO.	DESCRIPTION	REV.	REMARK
		HOTEL BUILDING		
135	MHB-EE-08-010	POWER SYSTEM PLAN FOR LAUNDRY, HOUSEKEEPING & STAFF KITCHEN – LEVEL 5 (PART 1)	A	15/10/2021
136	MHB-EE-08-011	POWER SYSTEM PLAN FOR LAUNDRY, HOUSEKEEPING & STAFF KITCHEN – LEVEL 5 (PART 2)	A	15/10/2021
137	MHB-EE-08-012	POWER SYSTEM PLAN FOR LAUNDRY, HOUSEKEEPING & STAFF KITCHEN – LEVEL 5 (PART 3)	A	15/10/2021
138	MHB-EE-08-013	POWER SYSTEM PLAN FOR LAUNDRY, HOUSEKEEPING & STAFF KITCHEN – LEVEL 5 (PART 4)	A	15/10/2021
139	MHB-EE-08-014	POWER SYSTEM PLAN FOR EXECUTIVE LOUNGE – LEVEL 25	A	15/10/2021
140	MHB-EE-08-015	POWER SYSTEM PLAN FOR ROOF TOP RESTAURANT 7 BAR – LEVEL 26	A	15/10/2021
141	MHB-EE-08-016	POWER SYSTEM PLAN FOR MAID SERVICE PANTRY	A	15/10/2021
142	MHB-EE-09-001	LIGHTING SYSTEM PLAN FOR TYPICAL GUEST ROOM TYPE KING BEDROOM	A	03/09/2021
143	MHB-EE-09-002	OUTLET PLAN FOR TYPICAL GUEST ROOM TYPE KING BEDROOM	A	03/09/2021
144	MHB-EE-09-003	LIGHTING SYSTEM PLAN FOR TYPICAL GUEST ROOM TYPE TWIN BEDROOM	A	03/09/2021
145	MHB-EE-09-004	OUTLET PLAN FOR TYPICAL GUEST ROOM TYPE TWIN BEDROOM	A	03/09/2021
146	MHB-EE-09-005	LIGHTING SYSTEM PLAN FOR TYPICAL GUEST ROOM CORRIDOR	A	13/09/2021
147	MHB-EE-10-001	ROOM CONTROL UNIT DIAGRAM (TYPE KING&TWIN BED ROOM)	A	03/09/2021
148	MHB-EE-12-001	EMERGENCY LIGHT AND EXIT SIGN PLAN – LEVEL 1 (MAIN LOBBY)	A	15/09/2023
149	MHB-EE-12-002	EMERGENCY LIGHT AND EXIT SIGN PLAN – LEVEL 2 (BALLROOM & PRE – FUNCTION)	A	15/09/2023
150	MHB-EE-12-003	EMERGENCY LIGHT AND EXIT SIGN PLAN – LEVEL 2 (FUNCTION ROOM)	A	15/09/2023
151	MHB-EE-13-001	ELECTRICAL OUTLET PLAN – LEVEL 1 (MAIN LOBBY)	A	15/09/2023
152	MHB-EE-13-002	ELECTRICAL OUTLET PLAN – LEVEL 2 (BALLROOM & PRE – FUNCTION)	A	15/09/2023
153	MHB-EE-13-003	ELECTRICAL OUTLET PLAN – LEVEL 2 (FUNCTION ROOM)	A	15/09/2023
154	MHB-EE-14-011	POWER SYSTEM PLAN FOR HVAC EQUIPMENT – LEVEL 1	A	09/10/2023
155	MHB-EE-14-012	POWER SYSTEM PLAN FOR HVAC EQUIPMENT – LEVEL 2	A	09/10/2023
156	MHB-EE-14-013	POWER SYSTEM PLAN FOR HVAC EQUIPMENT – LEVEL 2M	A	09/10/2023

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C	08/10/23	FINAL DESIGN	DEC				
B	15/08/23	FINAL DESIGN	DEC				
A	15/10/21	FINAL DESIGN	DEC				

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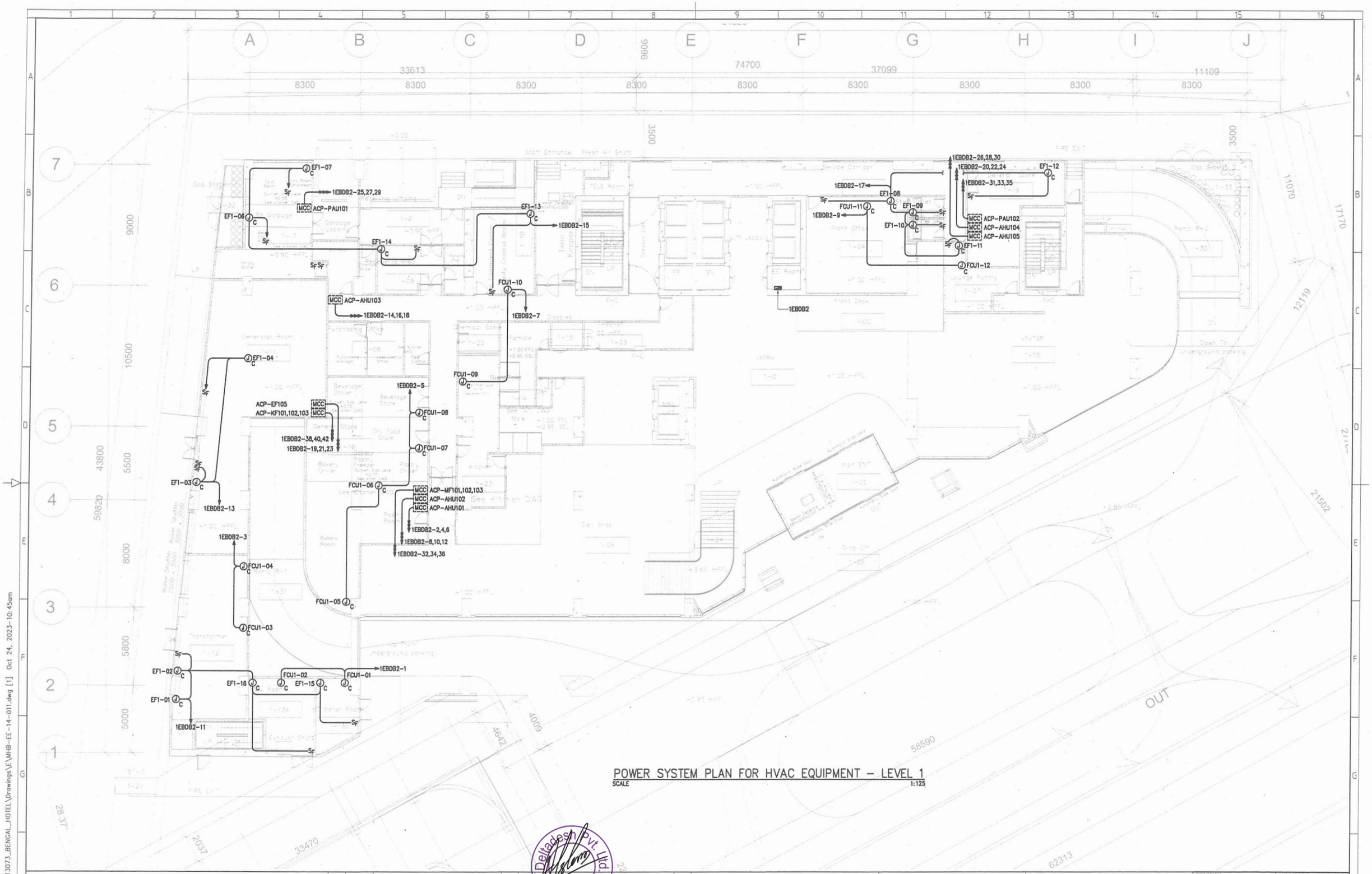
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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
LIST OF ELECTRICAL DRAWINGS (3)

DRAWN BY	SPH	CHECKED BY	WTS
DESIGN BY	WTS	PROJECT MGR	Chanintorn
DATE	31-08-2018	SCALE	AS SHOWN
PROJECT NO.	1130723		
DWG NO.	MHB-EE-00-003		

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POWER SYSTEM PLAN FOR HVAC EQUIPMENT – LEVEL 1

SCALE 1:125

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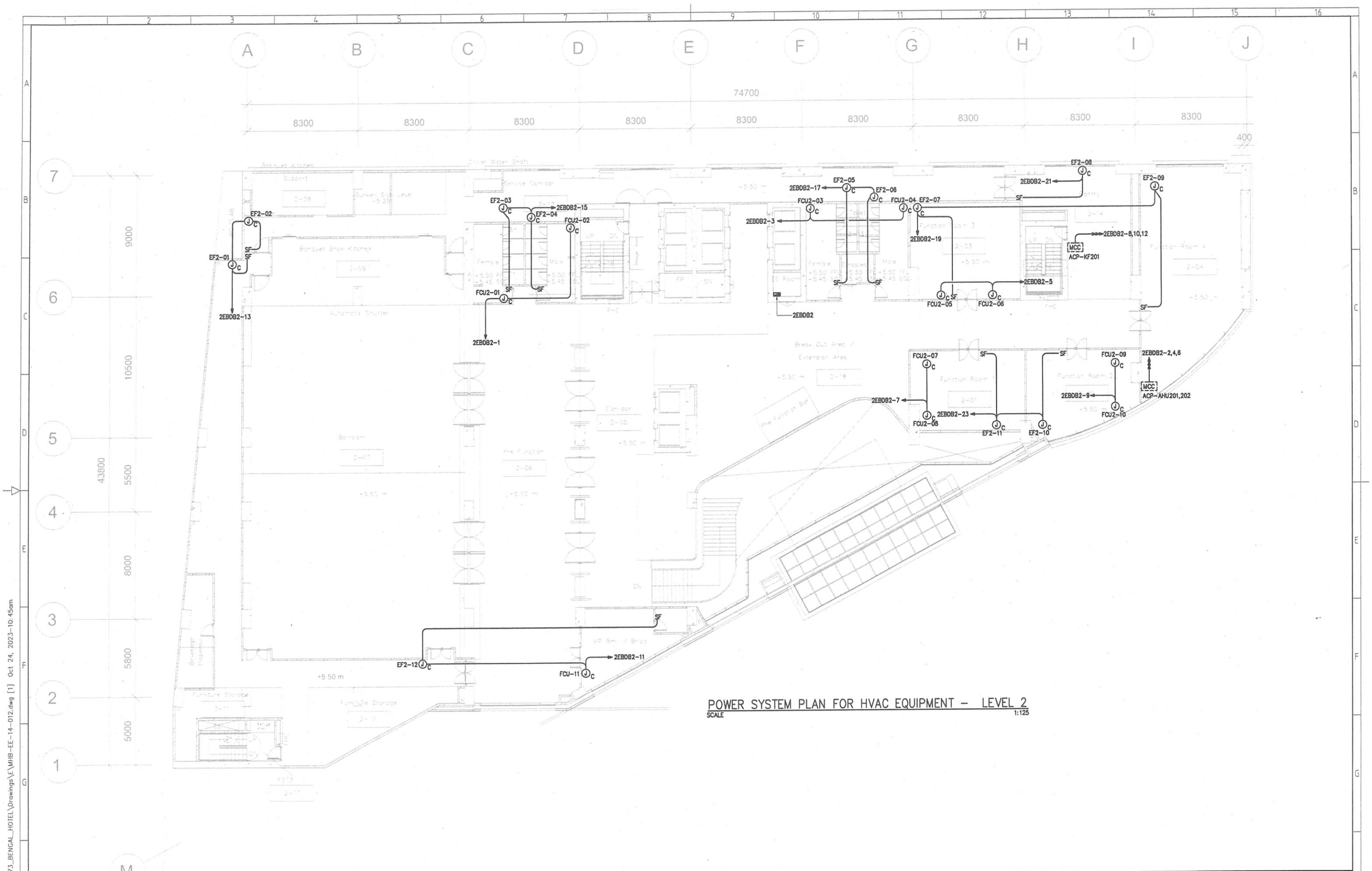
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PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: POWER SYSTEM PLAN FOR HVAC EQUIPMENT - LEVEL 1

DRAWN BY : SPH	CHECKED BY : WTS
DESIGN BY : WTS	PROJECT MGR. : Chanintorn
DATE : 31-08-2018	SCALE : AS SHOWN
PROJECT NO.	1 1 3 0 7 3
DWG.NO.	M H B - E E - 1 4 - 0 1 1

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POWER SYSTEM PLAN FOR HVAC EQUIPMENT – LEVEL 2

SCALE 1:125

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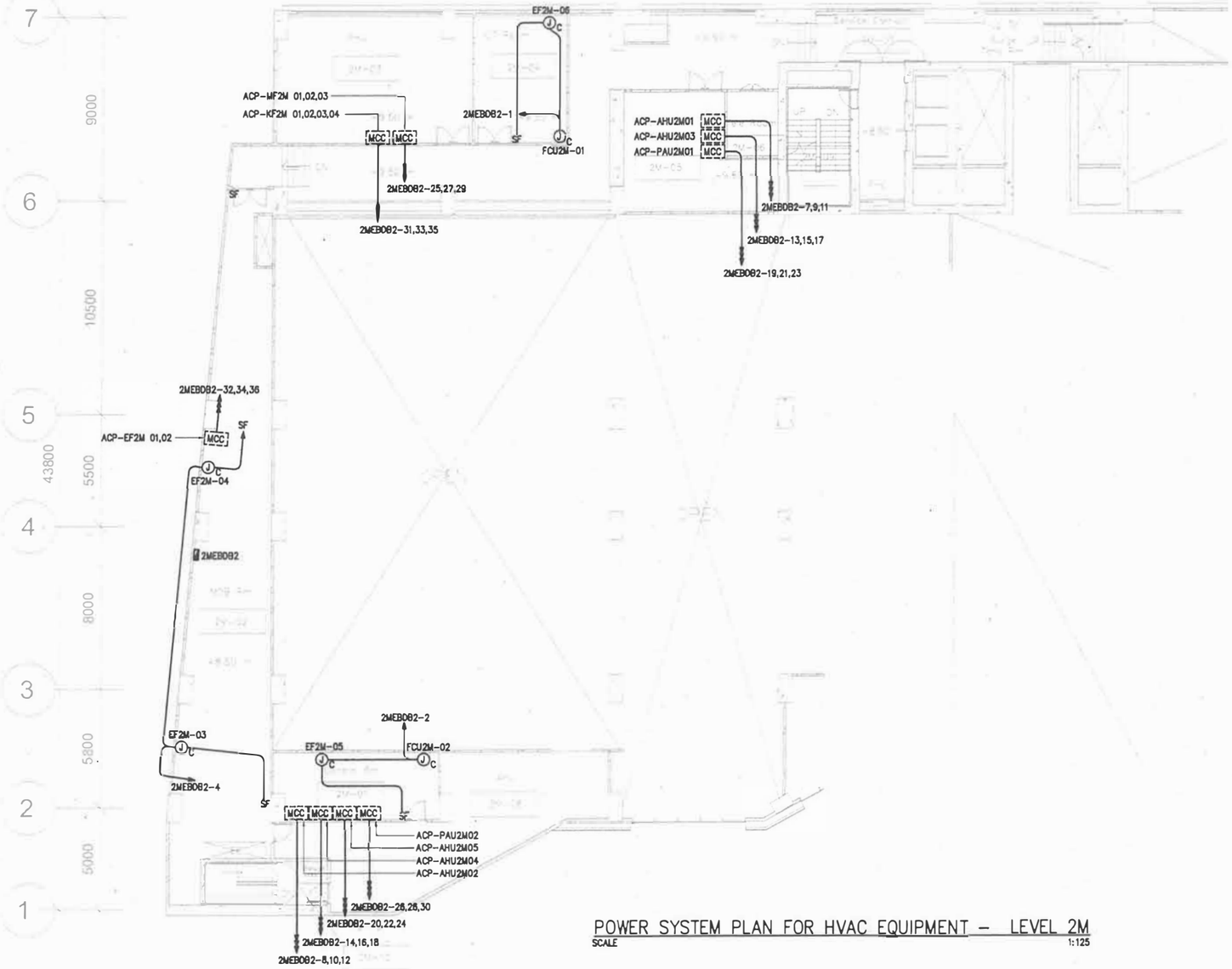
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PROJECT: BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE: POWER SYSTEM PLAN FOR HVAC EQUIPMENT - LEVEL 2

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DESIGN BY: WTS	PROJECT MGR: Chanintorn		
DATE: 31-08-2018	SCALE: AS SHOWN		
PROJECT NO.	1 1 3 0 7 3		
DWG.NO.	M H B - E E - 1 4 - 0 1 2		

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POWER SYSTEM PLAN FOR HVAC EQUIPMENT – LEVEL 2M

SCALE 1:125

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BENGAL hotels & resorts

BENGAL HOTELS AND RESORTS LIMITED
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PROJECT:
BENGAL HOTELS AND RESORTS
A FIVE STAR HOTEL

TITLE:
POWER SYSTEM PLAN FOR HVAC EQUIPMENT - LEVEL 2M

DRAWN BY: SPH	CHECKED BY: WTS
DESIGN BY: WTS	PROJECT MGR: Chanintorn
DATE: 31-08-2018	SCALE: AS SHOWN
PROJECT NO.: 113073	
DWG NO.: MHB-EE-14-013	

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Bill of Quantity Schedule



Bengal Hotels & Resorts Project

208, Tejgaon-Gulshan Link Road, Dhaka-1208, Bangladesh

BILL OF QUANTITY SCHEDULE FOR SUB-STATION SYSTEM WORK

Schedule: Supply, installation, testing and commissioning of External Electrification (Sub-Station Equipment) System with all associated works

Date: 26-Aug-24

Notes: Please cover enclosed Electrical Design drawings and Technical Specifications in price quotation.

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
1.0	**11kV Lightning Arrester**	Set	1				X	X				
	Outdoor type 11 kV, 50 Hz, 100A, (10 KA), 75 kV Basic Insulation Level (BIL) lightning arrester complete with mounting accessories etc (3 Nos. in a set).											
2.0	**11kV Drop Out Fuse**	Set	1				X	X				
	Outdoor type 11kV, 50 Hz, 5kA (20 KA) dropout fuse complete with mounting accessories etc. (3 Nos. in a set).											
3.0	**11 kV RMU (Ring main unit)**	Set	1				X	X				
	Metal clad / metal enclosed 11 kV, 3 phase, 50Hz, indoor type high tension double incoming and following number outgoing ring main unit (switchgear) made of sheet steel clade, dust and vermin proof, free standing floor mounting indoor type HT switchgear panel with 800 A, 3 phase hard drawn electrolytic copper bus bars incoming & outgoing both shall have common individual bus bar and all internal wiring and comprising of:											
	Incoming Feeder											

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Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	11 kV, 25KA, 800 A, 3-phase, 50 Hz. metal clad trolley mounted fully withdraw able type vacuum circuit breaker complete with motor operated spring charged stored energy mechanism for auto tripping at 12/24/48/110 volts DC (without battery) maximum service voltage 12 KV short circuit making current 50 KA having 4 NO+ 4 NC auxiliary contacts, capacitor compensated shunt tripping coil, closing solenoid.											
	1 No. Cast resin insulated, double pole, Potential Transformer,											
	Ratio: 11/.11 kV, Class 0.5, 50 VA, (in open delta connection).											
	1 No. MCB of adequate rating for PT Secondary Protection.											
	3 Nos. Cast resin insulated, 11 kV dry type double core CT with ratio adequate rating 1st core for metering, 2nd for protection											
	Core 1: 10 VA, Class 0.5M5											
	Outgoing Feeder											
	11 kV, 25KA, 800 A, 3-phase, 50Hz, metal clad trolley mounted fully withdraw able type vacuum circuit breaker complete with motor operated spring charged stored energy mechanism for auto tripping at 12/24/48/110 volts DC (without battery) maximum service voltage 12 kV short circuit making current 50 KA having 4 NO+ 4 NC auxiliary contacts, capacitor compensated shunt tripping coil, closing solenoid.											
	Origin: Vacuum interrupter from EATON / Schneider / Siemens /											
	1 No. Cast resin insulated, double pole, potential transformer,											
	ratio: 11/.11 kV, Class 0.5, 50 VA, (in open delta connection).											
	1 No. MCB of adequate rating for PT secondary protection.											
	3 Nos. Cast resin insulated, 11 kV dry type double core CT with ratio ad equating rating 1st core for metering, 2nd for protection											
	Core 1:10VA, class 0.5M5 core 2:15 VA, class 10P10											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	3 Nos. Ammeter, adequate rating											
	1 No Voltmeter, 0-15 kV, with selector switch.											
	1 No. Triple pole solid state microprocessor operated IDMT relay with 2 (two) over current and 1 (one) earth fault protection element with standard settings.											
	2 No. Triple pole solid state microprocessor operated IDMT relay with 2 (two) over current and 1 (one) earth fault protection element with standard settings.											
	Incoming - 2 Outgoing-2											
4.0	**HT Meter Unit (11 kV)**	Set	1				X	X				
	HT metering unit for 11 kV sub-station with TP hard drawn electrolytic copper bus bar earth link bars manufacture 16 SWG power coat painted louver sheet steel metal enclosed free standing floor mounting dust and vermin proof completely factory assembled & suitable for indoor use including all standard IP54 accessories manufactured & type tested in accordance with NEMA / IEC / JIS / BDS standards (Country of origin: USA / Japan / EU countries or relevant electricity supply authority and as per approved/accepted by the Engineer.											
	1 no. 3-phase 4 wire single/double tariff solid state programmable KWH meter with LCD display, MDI on kw integration period 30 minutes.											
	3 nos. cast resin PT		`									
	Ratio: 11000 : root 3/110v : root 3											
	Burden: 50VA, class : 0.5 for metering											
	1 no. TPMCCB for PT secondary protection											
	3 nos. cast resin CT……/ 5A (adequate rating to be inserted)											
	15 VA class 0.5 M5 for metering with selector switch											
	3 nos. indicating light phase indicator RYB											
	1 set cable terminal block with cover											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	1 no. panel heater.											
	Up to 3000 kVA											
	Electrical Energy Metering panel should be approved from DESCO/PDB/REB as per Govt. standard.											
5.0	**11 kV Automic Voltage Regulator (AVR), 4500 kVA**	Set	1						X	X		
	11 kV Automatic Voltage Regulator (AVR) of 3 phase, 50 Hz, with rated range of regulation +/-10% in 32 nos equal steps, basic insullation level (BIL) 95KV as per specifications.											
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16310-5											
6.0	**By Pass Switch Gear**	Set	1				X	X				
	11 kV indoor type 11 kV By pass Switch panel boards having self quenching, single phase, two position device LBS type with 20KA (1 Sec) and isolating or de-energizing of Auto Voltage regulator as per specifications.											
	Model & sample to be approved by the Engineer-in-charge.											
7.0	**11 kV (HT) Switchgear**											

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Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	11 kV, 3-phase, 50 Hz, indoor type, high tension switchgear complete with Vacuum Circuit Breaker, 800 A hard-drawn electrolytic copper bus-bars, 1 No 0-15 KV range voltmeter & 1 no. ammeter of adequate range both with selector switch, 1 no. of panel heater with auto thermostat control switch, manual ON & OFF push button switch and ON-OFF-TRIP indicators including following components (components such as VCB, CT, PT, microprocessor controlled IDMT relay shall be manufactured according to relevant NEMA / VDE / IEC / JIS / BS standards and shall have type test certificate (within 5 years) according to relevant IEC standard assembled locally in 14 SWG sheet steel metal clad, dust & vermin proof, free standing, floor mounting, epoxy resin powder coat painted cabinet as per relevant IEC standards and as per accepted/ approved by the Engineer-in-charge.											
7.1	**Incoming (1 No.)**	Set	1				X	X				
	Withdrawable type Vacuum/ SF6 Circuit Breaker											
	1 Set of 11 kV, 800 Amps (25KA), 3-phase, 50 Hz, trolley mounted fully withdraw able type Vacuum Circuit Breaker complete with motor operated spring charged stored energy mechanism for auto tripping at 12 / 24 / 48 / 110 volts D.C (without battery) .											
	2 Nos. 11 kV, cast resin insulated, dry type; double pole PT having ratio 11/0.11, burden 50VA, class 0.5 for metering & protection.											
	3 Nos. 11 kV cast resin insulated, dry type, double core CT of adequate current ratio (compatible with the transformer capacity), burden 10-15 VA, first core of class 0.5 M5 for metering and second core of class 10P10 for protection.											
	1 No of Triple pole solid-state microprocessor control IDMT relay with 2 elements of over current and short circuit protection and one for earth fault protection											
	1 No. 415V, 6A (10KA) TPMCB for PT secondary protection.											

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Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	1 No electronic digital type energy analyzer having 30 days memory and parameters of KW, KWH, KVAH, KVARH power factor, frequency etc. (energy analyzer shall be provided with RS-485 port)											
	Suitable arrangement for termination of 3x1C x 185 sqmm 11kV XLPE cable											
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16310											
7.2	**Outgoing (2 Nos.)**	Set	1				X	X				
	Withdrawable type Vacuum/ SF6 Circuit Breaker											
	1 Set of 11 kV, 630 Amps (25KA), 3-phase, 50 Hz, trolley mounted fully withdrawable type Vacuum Circuit Breaker complete with motor operated spring charged stored energy mechanism for auto tripping at 12 / 24 / 48 / 110 volts D.C (without battery).											
	2 Nos. 11 kV, cast resin insulated, dry type; double pole PT having ratio 11/0.11, burden 50VA, class 0.5 for metering & protection.											
	3 Nos. 11 kV cast resin insulated, dry type, double core CT of adequate current ratio (compatible with the transformer capacity), burden 10-15 VA, first core of class 0.5 M5 for metering and second core of class 10P10 for protection.											
	1 No of Triple pole solid-state microprocessor control IDMT relay with 2 elements of over current and short circuit protection and one for earth fault protection											
	1 No. 415V, 6A (10KA) TPMCB for PT secondary protection.											
	1 No electronic digital type energy analyzer having 30 days memory and parameters of KW, KWH, KVAH, KVARH power factor, frequency etc.(energy analyzer shall be provided with RS-485 port)											
	Suitable arrangement for termination of 3x1C x 185 sqmm 11kV XLPE cable											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16310											
8.0	**11 kV Transformer**											
	Transformer with amorphous metal core, natural air cooled, 3-phase, 50Hz, 11kV / 0.415 kV & 0.24 kV indoor type distribution transformer of DYN11 vector group having basic impulse insulation level 75 kV, HV & LV bushings, manual 5 position standard tap changer, complete with two windings of high conductivity aluminum foil with insulation material in class H.											
	It shall have earthing terminals, temperature sensor with thermometer, thermostat controlled blower fan (if required), lifting lugs, data plate etc. complete as required with maximum 60ºC temperature rise and suitable for operation at 40ºC ambient temperature manufactured & type tested in accordance with relevant NEMA / IEC / VDE / BS / JIS standards and as per approval / acceptance by the Engineer-in-charge.											
	Manufactured by Govt. of Bangladesh owned / shared company or the valid ISO-9001 certified company having type test certificate for the required or higher capacity of transformer according to relevant IEC standards from any internationally accredited independent laboratory.											
	Provision of temperature alarm (potential free contact for BMS interfacing.											
	Model & sample to be approved by the Engineer-in-charge.											
8.1	**Transformar capacity: 2500 kVA**	Set	1				X	X				
	(a) No load loss: 3600 watts (Maximum)											
	(b) Full load loss: 19500 watts (Maximum)											
	(c) Percentage impedance: 6% (Minimum)											
8.2	**Transformar capacity: 2000 kVA**	Set	1				X	X				

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							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	(b) No load loss: 3500 watts (Maximum)											
	(c) Full load loss: 16000 watts (Maximum)											
	(c) Percentage impedance: 6% (Minimum)											
9.0	**LT Switchgear (MDB-1)**	Set	1				X	X				
	415 V, 3-phase, 50 Hz, indoor type Emergency low tension switch-gear of following specification complete with voltmeter (0 - 500V) & ammeter of adequate rating both with selector switch, indicating lamps for ON - OFF and following components (components such as TP MCCBs shall be manufactured according to relevant NEMA/VDE/IEC/JIS/BS Standards											
	It shall have type test certificate according to relevant IEC Standard) assembled locally in 14 SWG sheet steel metal clad, dust & vermin proof, free standing, floor mounting, epoxy resin powder coat painted cabinet as per relevant IEC standards and as per approval & acceptance of the Engineer.											
	Assembled by Govt. of Bangladesh owned/Shared company or the valid ISO-9001 certified company having type test certificate for whole panel from any internationally accredited independent laboratory.											
	Incoming:											
	1 Set. - 415V, 5000A TP & NE hard drawn electrolytic copper busbar with heat shrinkable colour coded sleeves.											
	1 No. - 415V, 4000Amps AT/4000Amps AF (75KA), 4P withdraw able type ACB for main control with microprocessor based O/L, S/C & E/F releases and each having following protection and metering:											
	3 Nos. - 415V, 4000/5 ratio current transformer with suitable accuracy & burden.											
	Metering:											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	3 Nos. - 415V, 4000/5A ratio current transformer with suitable											
	1 Set of Phase Indication Lamp with 2A SP MCB.											
	1 No. Energy analyzer with RS-485 communication port to measure											
	Real Time											
	Total active energy (KWH/MWH)											
	Maximum demand (KVA/MVA) (KW/MW)											
	Maximum demand reset count.											
	Instantaneous power factor											
	Logging of active energy eight time of a day											
	Current											
	Voltage											
	Frequency											
	Outgoings											
	RS 485 port shall be provided on each outgoing except capacitor feeders.											
	1 No. - 415V, 3200Amps AT/3200Amps AF (75kA), 3P withdraw able type ACB with microprocessor based release unit for protection (For EMDB-1)											
	1 No. - 415V, 2500Amps AT/2500Amps AF (65kA), 3P withdraw able type ACB with microprocessor based release unit for protection (For Cap-1)											
	1 No. - 415V, 1250Amps AT/1250Amps AF (65kA), adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release . (For Chiller-1)											
	1 No. - 415V, 400Amps AT/400Amps AF (36kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	1 No. - 415V, 100Amps AT/100 Amps AF (25kA) adjustable type 3P TP MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											

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Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	1 No. - 415V, 160Amps AT/160Amps AF (25kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release. For Spare											
	1 No. - 415V, 100Amps AT/100Amps AF (25kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release. For Spare											
	1 No. - 415V, 63Amps AT/100Amps AF (25kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release. For Spare											
	2 Nos. Space											
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16425											
10.0	**LT Switchgear (MDB-2)**	Set	1				X	X				
	415 V, 3-phase, 50 Hz, indoor type Emergency low tension switch-gear of following specification complete with voltmeter (0 - 500V) & ammeter of adequate rating both with selector switch, indicating lamps for ON - OFF and following components (components such as TP MCCBs shall be manufactured according to relevant NEMA/VDE/IEC/JIS/BS Standards											
	It shall have type test certificate according to relevant IEC Standard) assembled locally in 14 SWG sheet steel metal clad, dust & vermin proof, free standing, floor mounting, epoxy resin powder coat painted cabinet as per relevant IEC standards and as per approval & acceptance of the Engineer.											
	Assembled by Govt. of Bangladesh owned/Shared company or the valid ISO-9001 certified company having type test certificate for whole panel from any internationally accredited independent laboratory.											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Incoming:											
	1 Set. - 415V, 4000A TP & NE hard drawn electrolytic copper busbar with heat shrinkable colour coded sleeves.											
	1 No. - 415V, 3200Amps AT/3200Amps AF (75KA), 4P withdraw able type ACB for main control with microprocessor based O/L, S/C & E/F releases and each having following protection and metering:											
	3 Nos. - 415V, 3200/5 ratio current transformer with suitable accuracy & burden.											
	Metering:											
	3 Nos. - 415V, 3200/5A ratio current transformer with suitable accuracy & burden complete with selector switch, CTs etc.											
	1 Set of Phase Indication Lamp with 2A SP MCB.											
	1 No. Energy analyzer with RS-485 communication port to measure and record following parameters:											
	Real Time											
	Total active energy (KWH/MWH)											
	Maximum demand (KVA/MVA) (KW/MW)											
	Maximum demand reset count.											
	Instantaneous power factor											
	Logging of active energy eight time of a day											
	Current											
	Voltage											
	Frequency											
	Outgoings											
	RS 485 port shall be provided on each outgoing except capacitor feeders.											

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Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	1 No. - 415V, 3200Amps AT/3200Amps AF (75kA), 3P withdraw able type ACB with microprocessor based release unit for protection (For EMDB-2)											
	1 No. - 415V, 2000Amps AT/2000Amps AF (65kA), 3P withdraw able type ACB with microprocessor based release unit for protection (For Cap-2)											
	1 No. - 415V, 1250Amps AT/1250Amps AF (65kA), adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release . (For Chiller-2)											
	1 No. - 415V, 400Amps AT/400Amps AF (36kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	1 No. - 415V, 100Amps AT/100 Amps AF (25kA) adjustable type 3P TP MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	1 No. - 415V, 160Amps AT/160Amps AF (25kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release. For Spare											
	1 No. - 415V, 100Amps AT/100Amps AF (25kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release. For Spare											
	1 No. - 415V, 63Amps AT/100Amps AF (25kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release. For Spare											
	2 Nos. Space											
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16425											
11.0	**Emergency LT Switchgear (EMDB-1)**	Set	1				X	X				

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	415 V, 3-phase, 50 Hz, indoor type Emergency low tension switch-gear of following specification complete with voltmeter (0 - 500V) & ammeter of adequate rating both with selector switch, indicating lamps for ON - OFF and following components (components such as TP MCCBs shall be manufactured according to relevant NEMA/VDE/IEC/JIS/BS Standards											
	It shall have type test certificate according to relevant IEC Standard) assembled locally in 14 SWG sheet steel metal clad, dust & vermin proof, free standing, floor mounting, epoxy resin powder coat painted cabinet as per relevant IEC standards and as per approval & acceptance of the Engineer.											
	Assembled by Govt. of Bangladesh owned/Shared company or the valid ISO-9001 certified company having type test certificate for whole panel from any internationally accredited independent laboratory.											
	Incoming:											
	1 Set. - 415V, 4000A TP & NE hard drawn electrolytic copper busbar with heat shrinkable colour coded sleeves.											
	1 No. - 415V, 3200Amps AT/3200Amps AF (65KA), 3P withdraw able type ACB for main control with microprocessor based O/L, S/C & E/F releases and each having following protection and metering:											
	3 Nos. - 415V, 3200/5 ratio current transformer with suitable											
	Metering:											
	3 Nos. - 415V, 3200/5A ratio current transformer with suitable accuracy & burden complete with selector switch, CTs etc.											
	1 Set of Phase Indication Lamp with 2A SP MCB.											
	1 No. Energy analyzer with RS-485 communication port to measure and record following parameters:											

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Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Real Time											
	Total active energy (KWH/MWH)											
	Maximum demand (KVA/MVA) (KW/MW)											
	Maximum demand reset count.											
	Instantaneous power factor											
	Logging of active energy eight time of a day											
	Current											
	Voltage											
	Frequency											
	Outgoings											
	RS 485 port shall be provided on each outgoing except capacitor feeders.											
	1 No. - 415V, 1600Amps AT/1600Amps AF (65kA), 3P withdraw able type ACB with microprocessor based release unit for protection											
	4 Nos. - 415V, 630Amps AT/630Amps AF (36kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	1 No. - 415V, 400Amps AT/400Amps AF (36kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	2 Nos. - 415V, 320Amps AT/400Amps AF (36kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	1 No. - 415V, 200Amps AT/250Amps AF (36kA) adjustable type TP MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	2 Nos. - 415V, 160Amps AT/160Amps AF (25kA) adjustable type TP MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	1 No. - 415V, 125Amps AT/160Amps AF (25kA) adjustable type TP MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	1 No. - 415V, 100Amps AT/100Amps AF (25kA) adjustable type TP MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	1 No. - 415V, 20Amps AT/100Amps AF (25kA) TP MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	1 No. - 415V, 320Amps AT/400Amps (36kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release. For Spare											
	2 Nos. - 415V, 100Amps AT/100Amps (25kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release. For Spare											
	2 Nos. Space											
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16425											
12.0	**Emergency LT Switchgear (EMDB-2)**	Set	1				X	X				
	415 V, 3-phase, 50 Hz, indoor type Emergency low tension switch-gear of following specification complete with voltmeter (0 - 500V) & ammeter of adequate rating both with selector switch, indicating lamps for ON - OFF and following components (components such as TP MCCBs shall be manufactured according to relevant NEMA/VDE/IEC/JIS/BS Standards											
	It shall have type test certificate according to relevant IEC Standard) assembled locally in 14 SWG sheet steel metal clad, dust & vermin proof, free standing, floor mounting, epoxy resin powder coat painted cabinet as per relevant IEC standards and as per approval & acceptance of the Engineer.											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Assembled by Govt. of Bangladesh owned/Shared company or the valid ISO-9001 certified company having type test certificate for whole panel from any internationally accredited independent laboratory.											
	Incoming:											
	1 Set. - 415V, 4000A TP & NE hard drawn electrolytic copper busbar with heat shrinkable colour coded sleeves.											
	1 No. - 415V, 3200Amps AT/3200Amps AF (75KA), 3P withdraw able type ACB for main control with microprocessor based O/L, S/C & E/F releases and each having following protection and metering:											
	3 Nos. - 415V, 3200/5 ratio current transformer with suitable accuracy & burden.											
	Metering:											
	3 Nos. - 415V, 3200/5A ratio current transformer with suitable accuracy & burden complete with selector switch, CTs etc.											
	1 Set of Phase Indication Lamp with 2A SP MCB.											
	1 No. Energy analyzer with RS-485 communication port to measure and record following parameters:											
	Real Time											
	Total active energy (KWH/MWH)											
	Maximum demand (KVA/MVA) (KW/MW)											
	Maximum demand reset count.											
	Instantaneous power factor											
	Logging of active energy eight time of a day											
	Current											
	Voltage											
	Frequency											
	Outgoings											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	RS 485 port shall be provided on each outgoing except capacitor feeders.											
	1 No. - 415V, 1600Amps AT/1600Amps AF (65kA), 3P withdraw able type ACB with microprocessor based release unit for protection											
	1 No. - 415V, 1000Amps AT/1000Amps AF (65kA), 3P withdraw able type ACB with microprocessor based release unit for protection											
	1 No. - 415V, 800Amps AT/800Amps AF (50kA), 3P withdraw able type ACB with microprocessor based release unit for protection											
	1 No. - 415V, 630Amps AT/630Amps AF (36kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	1 No. - 415V, 500Amps AT/630Amps AF (36kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	1 No. - 415V, 400Amps AT/400Amps AF (36kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	1 No. - 415V, 320Amps AT/400Amps AF (36kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	4 Nos. - 415V, 200Amps AT/250Amps AF (36kA) adjustable type TP MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	2 Nos. - 415V, 160Amps AT/160Amps AF (25kA) adjustable type TP MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	2 Nos. - 415V, 125Amps AT/160Amps AF (25kA) adjustable type TP MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											

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Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	1 No. - 415V, 100Amps AT/160Amps AF(25kA) adjustable type TP MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	1 No. - 415V, 100Amps AT/100Amps AF(25kA) adjustable type TP MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	1 No. - 415V, 80Amps AT/100Amps AF (25kA) adjustable type TP MCCB with thermal overload & instantaneous electro-magnetic short circuit release . (For Deep Tube Well)											
	2 Nos. - 415V, 40Amps AT/100Amps AF(25kA) adjustable type TP MCCB with thermal overload & instantaneous electro-magnetic short circuit release .											
	1 No. - 415V, 320Amps AT/400Amps AF (36kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release. For Spare											
	2 Nos. - 415V, 100Amps AT/100Amps AF (25kA) adjustable type 3P MCCB with thermal overload & instantaneous electro-magnetic short circuit release. For Spare											
	1 No. Space											
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16425											
13.0	**Bus Coupler**	Set	1				X	X				
	415 volt, 3 phase, 50 Hz, **Bus Coupler** and following capacity of 3200A (65KA), 4P withdraw able type ACB with microprocessor based O/L, S/C & E/F releases and each provided with ON/OFF/TRIP indication lamps backed up with control CBs.											
	Model & sample to be approved by the Engineer-in-charge.											
14.0	**Power Factor Improvement (PFI) Panel**											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	415 volt, 3 phase, 50 Hz power factor improvement panel complete with TP bus bars and earth block, microprocessor controlled auto power factor correction relay with digital PF reading display, capacitor bank, contactor, fuse, ON indicators for every stage of capacitor bank (except directly connected one) etc. shall be manufactured & tested as per NEMA / VDE / IEC / JIS / BS standards assembled locally in 16 SWG sheet steel clad dust & vermin proof, free standing, floor mounting, epoxy resin powder coat painted cabinet as per relevant IEC standards and as per accepted / approved by the Engineer-in-charge.											
	Assembled by the valid ISO-9001 certified company having test certificate (within five years) according to relevant IEC standards from BUET											
14.1	**PFI Capacity-1500KVAR**	Set	1				X	X				
	3 Nos. - 415V, 3500A hard drawn electrolytic copper busbar.											
	1 No. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge coil for connection directly with line through fuse.											
	1 No. - 415V, 75 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor.											
	2 Nos. - 415V, 100 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor.											
	8 Nos. - 415V, 150 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor.											
	1 No. - 415V, 125 Amps, 50 Hz auto TP magnetic contactor with AC3 duty.											
	2 Nos. - 415V, 160 Amps, 50 Hz auto TP magnetic contactor with AC3 duty.											
	8 Nos. - 415V, 250 Amps, 50 Hz auto TP magnetic contactor with AC3 duty.											

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Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	3 Nos. - 415V, 50 Amps. HRC fuse with base.											
	3 Nos. - 415V, 150 Amps. HRC fuse with base.											
	6 Nos. - 415V, 200 Amps. HRC fuse with base.											
	18 Nos. - 415V, 300 Amps. HRC fuse with base.											
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16480											
14.2	**PFI Capacity-1200KVAR**	Set	1				X	X				
	3 Nos. - 415V, 2000A hard drawn electrolytic copper busbar.											
	1 No. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge coil for connection directly with line through fuse.											
	2 Nos. - 415V, 25 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor.											
	3 Nos. - 415V, 750 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor.											
	6 Nos. - 415V, 150 KVAR, 50 Hz TP power capacitor bank with built in / separate discharge resistor.											
	2 Nos. - 415V, 40 Amps, 50 Hz auto TP magnetic contactor with AC3 duty.											
	3 Nos. - 415V, 125 Amps, 50 Hz auto TP magnetic contactor with AC3 duty.											
	6 Nos. - 415V, 250 Amps, 50 Hz auto TP magnetic contactor with AC3 duty.											
	9 Nos. - 415V, 50 Amps. HRC fuse with base.											
	6 Nos. - 415V, 200 Amps. HRC fuse with base.											
	18 Nos. - 415V, 300 Amps. HRC fuse with base.											
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16480											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
15.0	**H.T Cable**											
	HT (11kV) PVC insulated, sheathed, screened & armoured cable (NYSEYFGbY) / HT (11kV) armoured XLPE Cable : All electrical contacts shall be of brass / copper connected through connector or soldering (no twisting shall be allowed) and cables shall be manufactured and tested according to relevant IEC / BDS / BS / VDE standards. The work shall be carried out as per direction / approval / acceptance of the Engineer.											
	The work includes (if require) road cutting / under ground cable trench of adequate size with necessary back filling and brick or tile protection and mending the damages good by refilling trench with proper compaction.											
	Cable should be certified from KEMA KEUR and BASEC											
	1x3C x240 sqmm Cu. XLPE cable 12 kV	Rm	120				X	X	By Client	By Client		
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16121-1											
16.0	**Cable duct bank 4-125 mm dia. HDPE conduit**	Rm	45				X	X				
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16375											
17.0	**Manhole Chamber / Cable pit For Cable Laying**											
	Making the suitable sizes manhole chamber for cable pulling/ crossing or as mentioned in the drawings complete in all respect with bricks, cements, plaster etc.											
	600mm length x 600mm width x 900 mm depth	Nos.	3				X	X	By Client	By Client		
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16375											
18.0	**HDPE Pipe For H.T Cable Laying**											

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							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	125 mm dia hdpe Pipe	Rm	45				X	X	By Client	By Client		
	3x125 mm dia hdpe Pipe spare	Rm	30				X	X	By Client	By Client		
	Model & sample to be approved by the Engineer-in-charge.											
19.0	**Conduit RSC 125 mm dia.**											
	Model & sample to be approved by the Engineer-in-charge.	Rm	10				X	X				
	Specification Reference: 16120-2											
20.0	**LT & ELT Cable (Medium Voltage Cable)**											
	PVC insulated and sheathed stranded cable (NYY) / XLPE insulated and PVC sheathed stranded cable (2XY) & PVC insulated Green / White colour ECC wire (BYA) through PVC conduit of reputed manufacturer complete with fixing materials, including cable lux, cable tray, cable ladder other accessories etc. as required including mending the damages good. All electrical contacts shall be of brass / copper connected through connector or soldering (no twisting shall be allowed) and cables shall be manufactured and tested according to relevant IEC / BDS / BS / VDE standards. The work shall be carried out as per direction/approval/acceptance of the Engineer-in-charge.											
	Cable should be certified from KEMA-KEUR and BASEC											
20.1	3x1C-300 sq.mm.(NYY) cable with 150 sq.mm (BYA) as ECC	Rm	90				X	X	By Client	By Client		
20.2	4x1C-300 sq.mm.(NYY) cable with 150 sq.mm (BYA) as ECC	Rm	20				X	X	By Client	By Client		
20.3	4x1C-240 sq.mm.(NYY) cable with 120 sq.mm (BYA) as ECC	Rm	20				X	X	By Client	By Client		
20.4	4x1C-185 sq.mm.(NYY) cable with 95 sq.mm (BYA) as ECC	Rm	15				X	X	By Client	By Client		
20.5	4x1C-150 sq.mm.(NYY) cable with 95 sq.mm (BYA) as ECC	Rm	10				X	X	By Client	By Client		
20.6	4x1C-120 sq.mm.(NYY) cable with 70 sq.mm (BYA) as ECC	Rm	15				X	X	By Client	By Client		
20.7	4x1C-95 sq.mm.(NYY) cable with 50 sq.mm (BYA) as ECC	Rm	10				X	X	By Client	By Client		
20.8	4x1C-70 sq.mm.(NYY) cable with 35 sq.mm (BYA) as ECC	Rm	15				X	X	By Client	By Client		

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							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
20.9	4x1C-50 sq.mm.(NYY) cable with 25 sq.mm (BYA) as ECC	Rm	10				X	X	By Client	By Client		
20.11	4x1C-35 sq.mm.(NYY) cable with 16 sq.mm (BYA) as ECC	Rm	15				X	X	By Client	By Client		
20.12	4x1C-25 sq.mm.(NYY) cable with 16 sq.mm (BYA) as ECC	Rm	10				X	X	By Client	By Client		
20.13	4x1C-16 sq.mm.(NYY) cable with 16 sq.mm (BYA) as ECC	Rm	20				X	X	By Client	By Client		
20.14	4x1C-10 sq.mm.(NYY) cable with 10 sq.mm (BYA) as ECC	Rm	80				X	X	By Client	By Client		
20.15	4x1C-6 sq.mm.(NYY) cable with 6 sq.mm (BYA) as ECC	Rm	30				X	X	By Client	By Client		
20.16	4x1C-4 sq.mm.(NYY) cable with 4 sq.mm (BYA) as ECC	Rm	45				X	X	By Client	By Client		
20.17	2.5x1C-4 sq.mm.(NYY) cable with 4 sq.mm (BYA) as ECC	Rm	80				X	X	By Client	By Client		
	Specification Reference: 16121-2, 16121-3											
21.0	**PVC insulated cable (FR)**											
	Fire & Flame Retardant (FR) (PVC) insulated and stranded cable and FR (PVC) insulated ECC wire connecting at both ends through PVC conduit of reputed manufacturer complete with 18 SWG GP sheet pull box with 3 mm thick ebonite sheet cover, fixing materials, including cable lux, cable tray, cable ladder other accessories etc. including mending the damages good as required. All electrical contacts shall be of brass / copper connected through connector or soldering (no twisting shall be allowed) and cables shall be manufactured and tested according to relevant IEC / BDS / BS / VDE standards. The work shall be carried out as per direction & approval of the Engineer-in-charge.											
	Cable should be certified from KEMA-KEUR and BASEC											
21.1	4x1C-240 sq.mm.NYY(FR) Cable with 120 sq.mm BYA(FR) as	Rm	10				X	X	By Client	By Client		
21.2	4x1C-185 sq.mm.NYY(FR) Cable with 95 sq.mm BYA(FR) as ECC	Rm	15				X	X	By Client	By Client		
21.3	4x1C-150 sq.mm.NYY(FR) Cable with 95 sq.mm BYA(FR) as ECC	Rm	20				X	X	By Client	By Client		
21.4	4x1C-120 sq.mm.NYY(FR) Cable with 70 sq.mm BYA(FR) as ECC	Rm	10				X	X	By Client	By Client		
21.5	4x1C-95 sq.mm.NYY(FR) Cable with 50 sq.mm BYA(FR) as ECC	Rm	10				X	X	By Client	By Client		
21.6	4x1C-70 sq.mm.NYY(FR) Cable with 35 sq.mm BYA(FR) as ECC	Rm	15				X	X	By Client	By Client		
21.7	4x1C-50 sq.mm.NYY(FR) Cable with 25 sq.mm BYA(FR) as ECC	Rm	15				X	X	By Client	By Client		

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							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
21.8	4x1C-35 sq.mm.NYY(FR) Cable with 16 sq.mm BYA(FR) as ECC	Rm	20				X	X	By Client	By Client		
21.9	4x1C-25 sq.mm.NYY(FR) Cable with 16 sq.mm BYA(FR) as ECC	Rm	20				X	X	By Client	By Client		
21.10	4x1C-16 sq.mm.NYY(FR) Cable with 16 sq.mm BYA(FR) as ECC	Rm	25				X	X	By Client	By Client		
21.11	4x1C-10 sq.mm.NYY(FR) Cable with 10 sq.mm BYA(FR) as ECC	Rm	30				X	X	By Client	By Client		
21.12	4x1C-6 sq.mm.NYY(FR) Cable with 6 sq.mm BYA(FR) as ECC	Rm	30				X	X	By Client	By Client		
21.13	4x1C-4 sq.mm.NYY(FR) Cable with 4 sq.mm BYA(FR) as ECC	Rm	45				X	X	By Client	By Client		
21.14	4x1C-2.5 sq.mm.NYY(FR) Cable with 4 sq.mm BYA(FR) as ECC	Rm	55				X	X	By Client	By Client		
	Specification Reference: 16121-2, 16121-3											
22.0	**Cable terminator, 12kV**	Set	1				X	X				
	Each medium voltage cable shall be terminated in a cold shrink											
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16121-1											
23.0	**Distribution Board**											
	Distribution board as per Design, Technical Specification and instruction of the Engineer, complete in all respect.											
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16425											
23.01	**1UDB1 (FROM EMDB1)**	Set	1				X	X				
	Incoming											
	160 Amps AT/160 Amps AFAdjustable Type 3P MCCB (36 kA) with following accessories:											
	Busbars											
	200 amps TPN +E, copper busbars with color coded heat shrinkable insulation sleeve.											
	Outgoings											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	2 Nos. 160Amps AT/160Amps AF, Adjustable Type TP MCCB (25 kA)											
	2 Nos. 125Amps AT/160Amps AF, Adjustable Type TP MCCB (25 kA)											
	1 No. 32A, Adjustable Type TP MCCB (16 kA) for Spare											
23.02	**OUDB1** (FROM EMDB1)	Set	1				X	X				
	Incoming											
	2 Nos. 125 Amps AT/160 Amps AF Adjustable Type 3P MCCB (25 kA) with following accessories: (From 1UDB1)											
	Busbars											
	200 amps TPN +E, copper busbars with color coded heat shrinkable insulation sleeve.											
	Outgoings											
	1 No. 125Amps AT/ 160Amps AF, Adjustable Type TP MCCB (25kA) for UPS Testing											
	1 No. 125Amps AT/ 160Amps AF, Adjustable Type TP MCCB (25kA)											
	1 No. 125Amps AT/ 160Amps AF, Adjustable Type TP MCCB (25kA) (Incomming from EMDB-1) As per drawing											
	Outgoings											
	1 No. 80Amps AT/ 100Amps AF, Adjustable Type TP MCCB (25kA)											
	1 No. 63Amps AT/ 100Amps AF, Adjustable Type TP MCCB (25kA)											
	1 No. 32Amps AT/ 100Amps AF, Adjustable Type TP MCCB (25kA)											
	1 No. 32Amps AT/ 100Amps AF, Adjustable Type TP MCCB (25kA). For Spare											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	1 No. Space											
23.03	**REDBL1 (FROM EMDB2)**	Set	1				X	X				
	Incoming											
	160 Amps AT/160 Amps AFAdjustable Type 3P MCCB (36 kA) with following accessories:											
	Busbars											
	250 amps TPN +E, copper busbars with color coded heat shrinkable insulation sleeve.											
	Outgoings											
	2 Nos. 160Amps AT/160Amps AF, Adjustable Type TP MCCB (25 kA)											
	2 Nos. 160Amps AT/200Amps AF, Adjustable Type TP MCCB (25 kA)											
	1 No. 32A, Adjustable Type TP MCCB (16 kA) for Spare											
23.04	**REDBL1-A (FROM EMDB2)**	Set	1				X	X				
	Incoming											
	2 Nos. 160 Amps AT/200 Amps AF Adjustable Type 3P MCCB (25 kA) with following accessories: (From REDBL1)											
	Busbars											
	250 amps TPN +E, copper busbars with color coded heat shrinkable insulation sleeve.											
	Outgoings											
	1 No. 160Amps AT/ 200Amps AF, Adjustable Type TP MCCB (25kA) for UPS Testing											
	1 No. 125Amps AT/ 200Amps AF, Adjustable Type TP MCCB (25kA)											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	1 No. 160Amps AT/ 160Amps AF, Adjustable Type TP MCCB (25kA) (Incomming from EMDB-2) As per drawing											
	Outgoings											
	4 Nos. 50Amps AT/ 100Amps AF, Adjustable Type TP MCCB (25kA)											
	1 No. 50Amps AT/ 100Amps AF, Adjustable Type TP MCCB (25kA). For Spare											
	1 No. Space											
24.0	**Uninterruptible Power Supply (Online UPS)**	Sets	2						X	X		
	An Uninterruptible Power Supply (UPS) system shall be the static UPS type (solid-state type) based on the Double Conversion Technology. The UPS system shall be supplied and installed as indicated on the drawings and shall comply with the IEC 62040 – Uninterruptible Power System (UPS											
	Input Supply											
	Input voltage : 400 ± 15% V											
	Input frequency : 50 ± 10% Hz											
	Input power factor : > 0.8											
	Output Supply											
	Output Voltage											
	Steady state output voltage : 400/230 ± 1% V.											
	Transient 100% step load addition or rejection : 400/230 ± 10% V.											
	Transient recovery time to 1% output voltage : < 50 msec.											
	Output Frequency											
	Steady state output frequency : 50 ± 1% Hz											
	Free running : 50 ± 0.1% Hz											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Slew rate (df/dt) : 0.5 Hz/sec to 2 Hz/sec adjustable according to											
	Total Harmonic Distortion											
	100% linear load : < 3%											
	100% non-linear load : < 5%											
	Overload Capacity											
	125% of rated load within 10 minutes											
	150% of rated load within 1 minute											
	Model & sample to be approved by the Engineer-in-charge.											
	400/230V, 3PH, 4W, 50Hz, 60 kVA parallel operation with battery 15 minutes backup											
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16425-4											
25.0	**Uninterruptible Power Supply (Online UPS) for Passenger Lift**	Sets	2						X	X		
	An Uninterruptible Power Supply (UPS) system shall be the static UPS type (solid-state type) based on the Double Conversion Technology. The UPS system shall be supplied and installed as indicated on the drawings and shall comply with the IEC 62040 – Uninterruptible Power System (UPS											
	Input Supply											
	Input voltage : 400 ± 15% V											
	Input frequency : 50 ± 10% Hz											
	Input power factor : > 0.8											
	Output Supply											
	Output Voltage											

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							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Steady state output voltage : 400/230 ± 1% V.											
	Transient 100% step load addition or rejection : 400/230 ± 10% V.											
	Transient recovery time to 1% output voltage : < 50 msec.											
	Output Frequency											
	Steady state output frequency : 50 ± 1% Hz											
	Free running : 50 ± 0.1% Hz											
	Slew rate (df/dt) : 0.5 Hz/sec to 2 Hz/sec adjustable according to											
	Total Harmonic Distortion											
	100% linear load : < 3%											
	100% non-linear load : < 5%											
	Overload Capacity											
	125% of rated load within 10 minutes											
	150% of rated load within 1 minute											
	Model & sample to be approved by the Engineer-in-charge.											
	400/230V, 3PH, 4W, 50Hz, 80 kVA parallel operation with battery 15 minutes backup											
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16425-4											
26.0	**Earthing System**											

Deltatech Pvt. Ltd. Dhaka

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Earthing the electrical installation with 40 mm (1.5") dia GI pipe (Earth electrode) having 6.35 mm. dia hole across the pipe at 305 mm interval securedly bonded with 2 nos. of 2 SWG HDBC earth leads with its protection by 20 mm (3/4") dia G. I. pipe up to plinth level run at a depth of 609.6 mm (2 ft.) below G.L up to main board to be earthed including necessary connecting copper sockets. bolts. nuts. etc. complete for maintaining earth resistance within 1 ohm.											
26.1	**Earthing Boring**											
	Depth of bottom of main electrode at 37338 mm (122.5 ft) from GL & length of electrode 36576 mm. (120 ft)	Sets	12				X	X	By Client	By Client		
	Model & sample to be approved by the Engineer-in-charge.											
26.2	**Construction of Earthing inspection pit**	Sets	12				X	X	By Client	By Client		
	Construction of Earthing inspection pit inside measurement 600 mm x 600 mm with 250 mm thick brick in cement morter (1:4) with 100 mm thick RCC top slab (1:2:4) with 1% re-enforcement 450 mm dia water sealed CI man -hole cover with locking arrangement including necessary earth works, site filling and one brick flat soling 75 mm thick (1:3:6) base concrete for marking inlet channel & 12 mm thick (1:2) cement plaster with neat finishing etc. all complete up to a depth of 0.75 meter.											
	Model & sample to be approved by the Engineer-in-charge.											
26.3	**Earthing Wire**											
	Earthing 2 SWG HDBC wire through 12.7 mm (1/2") dia PVC pipe including bend, socket etc, in wall or column complete as per required.											
	Model & sample to be approved by the Engineer-in-charge.											
i)	1C-120 sq.mm.(BYA) Green Cable	Rm	20				X	X	By Client	By Client		
ii)	1C-95 sq.mm.(BYA) Green Cable	Rm	140				X	X	By Client	By Client		
iii)	1C-50 sq.mm.(BYA) Green Cable	Rm	120				X	X	By Client	By Client		

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
iii)	1C -25 mm2 BYA Cable Green Cable	Rm	70				X	X	By Client	By Client		
iv)	1C-16 mm2 BYA Cable Green Cable	Rm	65				X	X	By Client	By Client		
v)	1C-6 mm2 BYA Cable Green Cable	Rm	40				X	X	By Client	By Client		
vi)	8.230mm SWG Copper Wire	Kg	540				X	X	By Client	By Client		
27.0	**Ground bar**	Sets	7				X	X	By Client	By Client		
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16450											
28.0	**Cable Trench**											
	Making following cable trench in pucca floor having 76.2 mm (3") thick CC (4:2:1) base on one layer of flat brick soling over 76.2 mm (3") thick sand bedding at the bottom, 127 mm (5") thick brick work (4:1) at the sides complete with 12.7 mm (1/2") plaster and neat cement finishing duly covered with 4.8 mm (3/16") thick MS sheet having necessary lifting lugs :											
	Model & sample to be approved by the Engineer-in-charge.											
	Cable Tranch Made as Local											
	W (width) – 610 mm x D (depth) – 864 mm	Rm	25				X	X	By Client	By Client		
29.0	**Installation**											
	Installations, testing and commissioning of following 11 kV, 50 Hz. 3 - phase, indoor type HT switchgear and HT Meter on prepared foundation with the help of necessary tools, plants, skilled labour & technician as per direction of the Engineer-in-charge.											
i)	Withdraw type vacuum circuit breaker.	Job	3				X	X				

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Installation, testing and commissioning of following 11 kV/.415kV transformers on prepared platform on pole / CC foundation with the help of necessary tools & plants. Skilled labour & technician as per direction of the Engineer-in-charge.											
ii)	2500 kVA 3 phase transformer on CC pad	Job	1				X	X				
iii)	2000 kVA 3 phase transformer on CC pad	Job	1				X	X				
	Installation, testing and commissioning of 415V, 3-phase, 50 Hz indoor type LT switchgear / PFI plant suitable for following capacity transformer on prepared CC foundation with the help of necessary tools & plants, skilled labour & technician as per direction of the Engineer-in-charge.											
iv)	For 2500 kVA transformer	Job	1				X	X				
v)	For 2000 kVA transformer	Job	1				X	X				
30.0	HT **danger notice board** of 250mm x 200mm made of mild steel, at least 2mm thick and vitreous enameled white on both sides and with inscription in signal Red Colour on front side as required.	Sets	2				X	X	By Client	By Client		
31.0	S**ingle line diagram** framed in 1000mm x 800 mm size glass frame and installed in main switch room.	Sets	2				X	X				
32.0	F**irst aid box** of approved make as per specification containing material as required.	Sets	2				X	X	By Client	By Client		
33.0	**Miscellaneous Works**	Job	1				X	X	By Client	By Client		
	Provision of electrical load sanction, electricity licensing board permission, service connection fees and formalities from relevant govt.department/agencies etc for commissioning of sub-station and generator, all complete as per direction of Engineering in charge.											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
34.0	**Shop Drawing**	Job	1				X	X				
	Preparation of detail Shop drawing including, layout drawing, section details, schematic drawing, etc. Get approval of working drawing											
	Show actual dimension & weight of Equipment.											
	- Show actual kW (min), LRA, RLA, No of Phase, Circuit Breaker ratings, etc. rating of all equipment											
	-Reconfirm Electrical cable sizing											
	-Reconfirm Ampere ratings of Electric Panels' components.											
	-Submit Electrical connection diagram of Electric Panels											
	-Submit General arrangement of Electric Panels											
	-Show input requirement from Client in red color.											
	-Submit advance copy of Installation, Operation and maintenance manuals of all equipment.											
	Contractor should prepare this drawing at site coordinating with other services.											
	Material Take-off list											
	Drawing submission in suitable paper size with minimum 1:50 scale. Soft copy AutoCAD to be furnished with hard copy.											
	In case of any conflict between Design drawing and working drawing, information in the Design drawing will predominate unless recommended by the Consultant.											
	Tagging and identification of equipment, Panels, Cablings,etc. as per recommendation of the Consultant.											
35.0	**Tagging and Identification for Sub-Station System Works**	Job	1				X	X				
	Tagging and identification of all equipment like metering HT Panel, LT panel, Auto Transfer Switch (ATS), Transformer ACB, DB, cablings, etc. as per IEC guidelines.											
36.0	**As-Built drawing**	Job	1				X	X				
	Preparation and submission of As-built drawing in following forms:											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	One set in tracing paper, size A2											
	Two sets print out in A2 Paper											
	Soft Copy in CD in AutoCAD Version 2022											
	Soft Copy in PDF Version											
37.0	**Operation and maintenance (8 hr/day basis)**	Job	1				X	X				
	During operation and maintenance work, the Contractor shall have to depute one Electrical Engineer, one technician and one operator. All must have experience in this field for operation and maintenance of the system. During operation and maintenance if any defects is detected, it is to be rectified by the contractor at his own cost. The Contractor shall provide Training to Client's Engineer for three days, duration shall be two hour per day.											
	Log book for one hourly record shall be maintained by the Contractor and shall be submitted to the Owner in every week.											
									Total BDT		**Total BDT**	

Notes:

1	Cost for Custom Duty, VAT, ATV, Taxes, Port Charge, C&F Agent charge, Unloading and Loading at port, Transport to site, Unloading at site, Storing and protective measure, etc. for imported items shall be by the Client.
2	X denotes item to be quoted under other column including supply of main and consumable materials with anything requires.
3	Installation includes supply by cosumable materials
4	Contractor is to verify quantity of material before placement of order. They are to be prepared Material Take-Off (MTO) list for Client.
5	For all installation relevant codes BNBC to be followed.
6	No item or format of this BOQ can be changed. Any such deviation will be treated the bid "Disqualified". Bidder may use separate sheet for any minor deviation.
7	Payment for Local works and Installation / Service works shall be made based on actual certified work measurement.
8	Bidder must have to quote price for all items mentioned including. Any failure of this will be treated that they will do that item(s) as per design and BoQ and cost for that item is included in the costs of other items.

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
9	In case of any conflict between specification mentioned in these BoQ and main consultant's specification/drawing, priority shall be given to main Consultants specifications / drawings.											
10	This documents include this BoQ, Bidding Documents with Conditions of Contracts, Design Drawings, etc.											
11	The Bidder is to verify drawings. Any item found in drawing but not mentioned in BoQ is to notify to the Authority before Pre-Bid meeting in writing.											
12	The BoQ schedule is furnished in Excel as well PDF Copy. In case of any conflict between these two formats and data, the PDF copy will govern.											

Bengal Hotels & Resorts Project

208, Tejgaon-Gulshan Link Road, Dhaka-1208, Bangladesh

BILL OF QUANTITY SCHEDULE FOR BBT SYSTEM WORK

Schedule: Supply, installation, testing and commissioning of Busbar Trunking (BBT) System with all associated works

Date: 26-Aug-24

Notes: Please cover enclosed Electrical Design drawings and Technical Specifications in price quotation.

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
1.0	**Sandwich Construction Bus Ducts**											
	Bus bar trunking system (800 A and above) both feeder and plugging having the following specification:- * Rated operation voltage 1000V 3-phase, 5 wire. * All bus-bar trunking products and fixing (straight length, elbow, tees, flanged ends, cable tap box and circuit breaker etc.) shall be in accordance with IEC61439; 2012 or UL 857 and from the same manufacturer as per bus bar trunking system. * Short circuit rating: 800 A - 1000 A (40-60 KA/sec) 2500 A - 4000 A (165 -220 KA/sec) * Housing: Constructed of code gauge steel and aluminum to reduce hysteresis and eddy current losses. It shall be totally enclosed non ventilated and anticorrosive ability. * Bus bar: Hard drawn silver plated high conductivity copper of 99.9 % purity. Bus-bar insulation: class B or class F rated polyester film. (No epoxy insulation). * Joint: Bus bar trunking joint shall be of the one-bolt type and shall be possible to remove any joint connection assembly to allow electrical isolation of bus bar trunking length. * Indoor feeder and plug-in trunking shall be hanged 3 meters horizontally and 4.88 meters vertically spacing. * Line to line voltage drop shall not exceed 4% at full connected load. * Temperature rise at any point of the bus bar trunking enclosure shall no exceed 550ºC.											
	Bus bar trunking system with flange, elbow, plug in points and fixing supports.											
	Model & sample to be approved by the Engineer-in-charge.											
1.1	**Feeder busduct, aluminium, 4000A, 3PH, 4W, 100%N, 50%G**	Rm	32				X	X				

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
1.2	**Feeder busduct, aluminium, 3200A, 3PH, 4W, 100%N, 50%G**	Rm	36				X	X				
1.3	**Flexible busduct, aluminium, 4000A, 3PH, 4W, 100%N, 50%G**	Rm	4				X	X				
1.4	**Flexible busduct, aluminium, 3200A, 3PH, 4W, 100%N, 50%G**	Rm	4				X	X				
1.5	**Feeder busduct, aluminium, 2500A, 3PH, 4W, 100%N, 50%G**	Rm	6				X	X				
1.6	**Feeder busduct, aluminium, 2000A, 3PH, 4W, 100%N, 50%G**	Rm	6				X	X				
1.7	**Feeder busduct, aluminium, 3200A, 3PH, 4W, 100%N, 50%G**	Rm	164				X	X				
1.8	**Feeder busduct, aluminium, 1600A, 3PH, 4W, 100%N, 50%G**	Rm	188				X	X				
1.9	**Feeder busduct, aluminium, 1000A, 3PH, 4W, 100%N, 50%G**	Rm	147				X	X				
1.10	**Feeder busduct, aluminium, 630A, 3PH, 4W, 100%N, 50%G**	Rm	152				X	X				
	Specification Reference: 16425											
2.0	**Flanged end**	Sets	20				X	X				
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16425											
3.0	**Elbows 90**	Sets	85				X	X				
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16425											
4.0	**End box**	Sets	3				X	X				

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16425											
5.0	**Tap Off Box:**											
	Model & sample to be approved by the Engineer-in-charge.											
5.1	1600 TOB AT, 65kA	Sets	2				X	X				
5.2	Plug-in circuit breaker 63 AT, 36kA	Sets	18				X	X				
5.3	Plug-in circuit breaker 63 AT, 25kA	Sets	9				X	X				
5.4	Plug-in circuit breaker 40 AT, 25kA	Sets	9				X	X				
5.5	Plug-in circuit breaker 80 AT, 65kA	Set	1				X	X				
5.6	Plug-in circuit breaker 100 AT, 65kA	Set	1				X	X				
	Specification Reference: 16425											
6.0	**Fire and smoke stops**	ls	1				X	X				
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16070											
7.0	**Feed Unit BUSDUCT Fixing Support & Accessories End Cover, Feed unit etc Complete as required.**	Job	1				X	X				
8.0	**Shop Drawing**						X	X				

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Preparation of detail Shop drawing including, layout drawing, section details, schematic drawing, etc. Get approval of working drawing before any fabrication or installation works. Shop drawing must be coordinated with other services likely Electrical cabling, Light Fixtures, False Ceiling and Interior design. The work also includes:											
	Show actual dimension & weight of Equipment.											
	- Show actual kW (min), LRA, RLA, No of Phase, Circuit Breaker ratings, etc. rating of all equipment											
	-Reconfirm Electrical cable sizing											
	-Reconfirm Ampere ratings of Electric Panels' components.											
	-Submit Electrical connection diagram of Electric Panels											
	-Submit General arrangement of Electric Panels											
	-Show input requirement from Client in red color.											
	-Submit advance copy of Installation, Operation and maintenance manuals of all equipment.											
	Contractor should prepare this drawing at site coordinating with other services.											
	Material Take-off list											
	Drawing submission in suitable paper size with minimum 1:50 scale. Soft copy AutoCAD to be furnished with hard copy.											
	In case of any conflict between Design drawing and working drawing, information in the Design drawing will predominate unless recommended by the Consultant.											
	Tagging and identification of equipment, Panels, Cablings,etc. as per recommendation of the Consultant.											
9.0	**Tagging and Identification for BBT System Works**	Job	1				X	X				
	Tagging and identification of all equipment like metering BBT Riser, Tap Off Box, cablings, etc. as per IEC guidelines.											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
10.0	**As-Built drawing**	Job	1				X	X				
	Preparation and submission of As-built drawing in following forms:											
	One set in tracing paper, size A2											
	Two sets print out in A2 Paper											
	Soft Copy in CD in AutoCAD Version 2022											
	Soft Copy in PDF Version											
11.0	**Testing & Commissioning for Busber Trunking (BBT) System**	Job	1				X	X				
12.0	**Pre-shipment Inspection**	Job	1				X	X	X	X	X	X
	Shall be carried out by 3rd party inspection at factory.											
									Total BDT		**Total BDT**	

	Notes:
1	Cost for Custom Duty, VAT, ATV, Taxes, Port Charge, C&F Agent charge, Unloading and Loading at port, Transport to site, Unloading at site, Storing and protective measure, etc. for imported items shall be by the Client.
2	X denotes item to be quoted under other column including supply of main and consumable materials with anything requires.
3	Installation includes supply by cosumable materials
4	Contractor is to verify quantity of material before placement of order. They are to be prepared Material Take-Off (MTO) list for Client.
5	For all installation relevant codes BNBC to be followed.
6	No item or format of this BOQ can be changed. Any such deviation will be treated the bid "Disqualified". Bidder may use separate sheet for any minor deviation.
7	Payment for Local works and Installation / Service works shall be made based on actual certified work measurement.
8	Bidder must have to quote price for all items mentioned including. Any failure of this will be treated that they will do that item(s) as per design and BoQ and cost for that item is included in the costs of other items.
9	In case of any conflict between specification mentioned in these BoQ and main consultant's specification/drawing, priority shall be given to main Consultants specifications / drawings.
10	This documents include this BoQ, Bidding Documents with Conditions of Contracts, Design Drawings, etc.
11	The Bidder is to verify drawings. Any item found in drawing but not mentioned in BoQ is to notify to the Authority before Pre-Bid meeting in writing.

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
12	The BoQ schedule is furnished in Excel as well PDF Copy. In case of any conflict between these two formats and data, the PDF copy will govern.											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)

Bengal Hotels & Resorts Project

208, Tejgaon-Gulshan Link Road, Dhaka-1208, Bangladesh

BILL OF QUANTITY SCHEDULE FOR LPS SYSTEM WORK

Schedule: Supply, installation, testing and commissioning of Lightning Protection System with all associated works

Date: 26-Aug-24

Notes: Please cover enclosed Electrical Design drawings and Technical Specifications in price quotation.

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
A.	**ESEAT System**											
1.0	**Lightning Arrester**	Set	1						X	X		
	Early Streamer Emission Air Terminal (ESEAT) based on collection volume method (CVM) as per IEEE 998-2012 having the following technical specification:											
	Withstanding peak lightning current: 100kA											
	Material of Air Terminal: Stainless steel.											
	Dimension: 220 mm long (min), 25mm Dia solid rod at the bottom of the Air Terminal having M20 male thread to fix on mast.											
	Certified advance Time: Maximum 60µ second with a current peak higher than 100kA.											
	Radius of protection: 90 – 100 meter at 5 meter height from the plan.											
	Product certification and standards: UL-96											
2.0	**Mounting Mast**	Set	1				X	X				
	Insulated Air Terminal mast of the following specifications:											
	Made of stainless steel (Grade: 316)											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Length: 2300 mm (Approx)											
	Dia.: 30mm											
	The mast shall be fixed on the top of the GI tower with SS nuts bolts, clamps as per sample approved by the engineer.											
3.0	**Lightning Event Counter**	No	1				X	X				
	Lightning event counter of the following technical specification - Register capacity: 0-999 mechanical counting without external power supply (LCD display). The down conductor shall pass the hole of the counter and the same shall be fixed vertically at any point.											
	Brand: ABB / LPI / ERICO or equivalent.											
	Origin: USA / FRANCE/ AUSTRALIA or EU countries.											
4.0	**Earth Test Box**	No	1				X	X				
	Supply and installation of earth test box with following:											
	Test Joint: (80mm x 50mm x 20mm) made of copper.											
	30mm x 2mm and Dia. 8mm line coupling made of copper.											
5.0	**Down Conductor**	Rm	130				X	X				
	Copper made down conductor having Dia. 12.7 mm or copper strip (30mmx2mm) with fixing holder on vertical and horizontal surface. The fixing shall have 40mm to 50mm length or height and will be placed 3 nos. meter as per direction and sample approved by the engineer.											
6.0	**GI Tower**	Rm	1				X	X				
	Construction of GI tower with the following specification –											
	GI Pole:											
	Dia: 3”											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Length: 15’ (L-10’ D- 3”, L-5’ D- 2” Dia.)											
	duly painted with powder coating with epoxy polyester resin.											
	There will be minimum three guy wire for erection of the pole properly. The base of the pole and guy will be installed by CC on the roof-top and the size will be as required to hold the pole at any circumstances.											
7.0	**Maintenance Free Chemical Earthing System**	Job	2				X	X				
	Construction of earthing (2 nos.) for the lightning arrester as per instruction and enclosed Diagram (Fig:1) and as per direction of the engineer in the following :											
(i)	Soil digging: Size–3000mmx400mmx400mm (2 nos.)											
(ii)	Construction of pit by brick and RCC slab on it. On the top of the slab there will be a hole and a pit cover made by cast iron will be fixed on it. Size of the pit: (600mmx600mmx600mm) (2 nos.)											
(iii)	Copper plate: (300mmx150mmx15mm) (2 nos.) Copper plate will be fixed with the electrode (copper rod or copper strip) by necessary fixing materials made of copper.											
(iv)	Copper electrode (12.7mm Dia. copper rod or copper strip (30mmx2mm) Length of the copper rod or strip: minimum 3000mm (10+10) = 20 meter.											
(v)	Ground enhancing materials (40 + 40) = 80 kg. (2 Nos. of earthing is considered 1 set)											
8.0	**Surge Protection Device (SPD)**	Set.	4				X	X				
	Surge protection device (SPD) for protection of over-head line connected to LT line.											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Capacity: 50ka 4-pole with wiring and SPD box.											
9.0	**Installation Testing & Commissioning**	Job	1				X	X				
	Supply Installation Testing and Commissioning of all necessary accessories complete as full packages.											
B.	**Lightining Arrester System (Conventional)**											
1.0	**Air terminal, tapered point copper rod, 12.7mm. dia, 600mm. long**	Sets	4				X	X				
	Air terminal, tapered point copper rod, 12.7mm. dia, 600mm. long with sharp top end for arresting lightning securedly bonded with 6.6 mm. thick 150 mm. x 150 mm. Copper base plate to be recessed in wall complete with nuts, bolts, CC work etc.											
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16670											
2.0	**Copper tape, 3mm.x25mm.**	Rm	420				X	X				
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16670											
3.0	**Bare copper 70 sq.mm.**	Rm	100				X	X				
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16670											
4.0	**Cable BYA, 95 sq.mm.**	Rm	10				X	X	By Client	By Client		
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16121-2, 16121-3											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
5.0	**Cable BYA, 50 sq.mm.**	Rm	10				X	X	By Client	By Client		
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16121-2, 16121-3											
6.0	**Conduit PVC, 25 mm. dia.**	Rm	100				X	X	By Client	By Client		
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16670											
7.0	**Conduit IMC, 25 mm. dia.**	Rm	68				X	X	By Client	By Client		
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16670											
8.0	**Conduit IMC, 32 mm. dia.**	Rm	0				X	X				
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16670											
9.0	**Ground rod, 12.7mm. dia, 3.33m. long, copper**	Sets	4				X	X	By Client	By Client		
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16670											
10.0	**Test clamp box**	Sets	2				X	X				
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16670											
11.0	**Earthing Boring**	Set	2				X	X	By Client	By Client		

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Depth of bottom of main electrode at 31242 mm (102.5 ft) from GL & length of electrode 30480 mm. (100 ft)											
	Sample to be approved by the Engineer-in-charge.											
12.0	**Construction of Earthing inspection pit**	Sets	2				X	X	By Client	By Client		
	Construction of Earthing inspection pit inside measurement 600 mm x 600 mm with 250 mm thick brick in cement morter (1:4) with 100 mm thick RCC top slab (1:2:4) with 1% re-enforcement 450 mm dia water sealed CI man -hole cover with locking arrangement including necessary earth works, site filling and one brick flat soling 75 mm thick (1:3:6) base concrete for marking inlet channel & 12 mm thick (1:2) cement plaster with neat finishing etc. all complete up to a depth of 0.75 meter.											
	Specification Reference: 16670											
13.0	**Ground bar**	Sets	2				X	X	By Client	By Client		
	Model & sample to be approved by the Engineer-in-charge.											
	Specification Reference: 16450											
14.0	**Any Other items require to complete the works.**	ls	1				X	X				
	Specification Reference: 16670											
15.0	**Installation Testing & Commissioning**	Job	1				X	X				
	Supply Installation Testing and Commissioning of all necessary accessories complete as full packages.											
16.0	**Shop Drawing**											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Preparation of detail Shop drawing including, layout drawing, section details, schematic drawing, etc. Get approval of working drawing before any fabrication or installation works. Shop drawing must be coordinated with other services likely Electrical cabling, Light Fixtures, False Ceiling and Interior design. The work also includes:											
	Show actual dimension & weight of Equipment.											
	- Show actual kW (min), LRA, RLA, No of Phase, Circuit Breaker ratings, etc. rating of all equipment											
	-Reconfirm Electrical cable sizing											
	-Reconfirm Ampere ratings of Electric Panels' components.											
	-Submit Electrical connection diagram of Electric Panels											
	-Submit General arrangement of Electric Panels											
	-Show input requirement from Client in red color.											
	-Submit advance copy of Installation, Operation and maintenance manuals of all equipment.											
	Contractor should prepare this drawing at site coordinating with other services.											
	Material Take-off list											
	Drawing submission in suitable paper size with minimum 1:50 scale. Soft copy AutoCAD to be furnished with hard copy.											
	In case of any conflict between Design drawing and working drawing, information in the Design drawing will predominate unless recommended by the Consultant.											
	Tagging and identification of equipment, Panels, Cablings,etc. as per recommendation of the Consultant.											
17.0	**Tagging and Identification for LPS System Works**											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Tagging and identification of all equipment like metering LPS equipments etc. as per IEC guidelines.											
18.0	**As-Built drawing**											
	Preparation and submission of As-built drawing in following forms:											
	One set in tracing paper, size A2											
	Two sets print out in A2 Paper											
	Soft Copy in CD in AutoCAD Version 2022											
	Soft Copy in PDF Version											
									Total BDT		**Total BDT**	
	Notes:											
1	Cost for Custom Duty, VAT, ATV, Taxes, Port Charge, C&F Agent charge, Unloading and Loading at port, Transport to site, Unloading at site, Storing and protective measure, etc. for imported items shall be by the Client.											
2	X denotes item to be quoted under other column including supply of main and consumable materials with anything requires.											
3	Installation includes supply by cosumable materials											
4	Contractor is to verify quantity of material before placement of order. They are to be prepared Material Take-Off (MTO) list for Client.											
5	For all installation relevant codes BNBC to be followed.											
6	No item or format of this BOQ can be changed. Any such deviation will be treated the bid "Disqualified". Bidder may use separate sheet for any minor deviation.											
7	Payment for Local works and Installation / Service works shall be made based on actual certified work measurement.											
8	Bidder must have to quote price for all items mentioned including. Any failure of this will be treated that they will do that item(s) as per design and BoQ and cost for that item is included in the costs of other items.											
9	In case of any conflict between specification mentioned in these BoQ and main consultant's specification/drawing, priority shall be given to main Consultants specifications / drawings.											
10	This documents include this BoQ, Bidding Documents with Conditions of Contracts, Design Drawings, etc.											
11	The Bidder is to verify drawings. Any item found in drawing but not mentioned in BoQ is to notify to the Authority before Pre-Bid meeting in writing.											
12	The BoQ schedule is furnished in Excel as well PDF Copy. In case of any conflict between these two formats and data, the PDF copy will govern.											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	**Supply of Imported items (A)** (CFR to CTG Port)		**Supply of Local items (B)** (Excluding VAT & AIT)		**Installation / Service (C)** (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)

Bengal Hotels & Resorts Project

208, Tejgaon-Gulshan Link Road, Dhaka-1208, Bangladesh

BILL OF QUANTITY SCHEDULE FOR SOLAR SYSTEM WORK

Schedule Supply, installation, testing and commissioning of Solar Power System with all associated works

Date: 26-Aug-24

Notes: Please cover enclosed Electrical Design drawings and Technical Specifications in price quotation.

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Solar power system (on grid / grid tie) with required quantities of mono / poly crystalline silicon solar PV modules, inverter, energy meter, etc. as per following standards, specifications and certification. The system will be able to produce power for supplying to grid with required compatible solar cables (DC cables) and all necessary accessories to complete the installation providing one year free operation & maintenance of the system.											
1.0	**Solar PV Module / Panel**:	kWp	60				By Client	By Client	By Client	By Client		
	I. The manufacturing, installation, testing and commissioning of solar PV module / panel shall be inconformity with the requirement of IEC 61215, IEC 61730 (latest edition) standards certificate issued by the internationally recognized authority such as CE / TUV / VDE or equivalent certifying body according to the above requirement shall have to be submitted by the bidder.											

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Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	II. Solar panels shall be installed pointing to the right direction to capture most of the solar energy to transform it into electricity with the facility to be adjusted from the horizontal to 12 degree in summer and to 35 degree in winter to get the maximum efficiency and must face the true south in our country. For fixed panel mounting system, the panels must be tilted (22.5 ± 1) degree with horizontal and must face the south in BANGLADESH.											
	III. The average efficiency of PV module should be minimum 14%.											
	IV. The complete PV module shall be diode protected at junction box to protect reverse current.											
	V. Each combiner box of PV module shall be diode protected to ensure any back flow current to the PV array and may have fuse of adequate ratings in DC positive line of the PV array and wire terminals. The main combiner box shall have lightning surge protective device of as per nominal voltage of the combiner box both in positive and negative line in order to ensure the bypass diode always function even in thunder storm. The fuse, if exists, shall also have disconnection switch .The box shall be completely water proof according to IP 65.											
	Inverter :											
	The inverter shall be suitable for using on grid / grid tie solar panel. The inverter shall have following features:											
	I. Inverter type: grid tie.											
	II. Built in MPPT charge controller.											
	III. AC grid voltage 230 ± 5% (single phase)/ 415v ± 5% (three phase) AC											
	IV. AC grid frequency: 50±4 Hz											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	V. Power factor: cosθ = 1.											
	VI. Operating temperature range: 0°C- 50°C											
	VII. Relative humidity: 0- 95%, non- condensing											
	VIII. Total harmonic distortion : <3%											
	IX. Efficiency: minimum 90%											
	X. Noise <50 dB at 1m distance											
	XI. Internal power consumption: <1 W for 1 kWp inverter											
	XII. Communication port: RS 485 / RS 232. shall have the option to be incorporated with remote monitoring system.											
	XIII. Degree of protection: according to IP65 and IEC 60529.											
	XIV. Shall have lightning induced current by surge protective device of adequate rating both in DC and AC side in parallel at the entry and exit terminal of the inverter. Shall also have over load and over current protection from both DC and AC side											
	XV. Compliance: ISO9001 & ROHS (Restriction of Hazardous Substances) certified company.											
	XVI. Test result from BUET or Institute of Renewable Energy, Dhaka University for key spec items of solar inverter (self-consumption, efficiency, solar priority, dual mode with auto switching, power factor shall be provided.											
	Energy Meter:											
	Energy meters with following features:											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	I. Single phase / three phase (as per requirement)											
	II. Shall be able to measure and record the amount of solar energy provided by the system.											
	General guidelines / Criteria:											
	I. The bidder shall examine the site before the design of solar system & its components											
	II. The bidder shall have facilities for installing, testing & commissioning of solar panel.											
	III. Adequate space & height shall be provided in the rows of panels for easy air flow to avoid excessive heat generation in the panel and to provide access for rain water drainage and damage to protect from dirty water. Minimum air gap between two panels shall be 25 mm											
	IV. All frames of the PV module, combiner box, charge controller, inverter, lightning air terminal, building earth electrode, etc. shall be equipotential bonded and earthed by one or more conventional and / or chemical electrode system with soil conductivity enhancing material. The earth resistance must be less than 1 Ohm. For large installation above 10 kw solar system, several down conductor with more than 4 earth electrodes (minimum 3 meter apart) or two earth electrodes (minimum 5 meter apart) connected by equipotent bonding conductor running at the periphery of the building shall be installed as per related standard and code of practice.											
	V. The solar panel mounting shall be of galvanized iron or equivalent to ensure rust protection of the installation. All nut bolts shall be of stainless steel (SS) or galvanized mild steel (MS) materials.											

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Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	VI. After successful completion, testing & commissioning of the whole system the contractor shall have to train nominated person(s) of the user for a period of at least seven (07) days.											
	VII. After completion of whole system and before handing over the system to the concerned authority, the contractor must have to provide minimum 30 days' satisfactory operation for performance evaluation.											
	VIII. Technical specification with catalogue of PV module, inverter must be submitted with technical offer.											
	IX. Only PWD approved cable shall be used for wiring.											
	Operation & Monitoring:											
	I. Remote monitoring (web / smart phone based) using available technology such as GSM (Global System Mobile), GPRS (General Packet Radio Service) etc.											
	II. Local monitoring using LCD display and data logger.											
	III. System fault indication (local and remote)											
	IV. Field programmability.											
	Model & sample to be approved by the Engineer-in-charge.											
2.0	**Earthing System For Solar Panel**	Set	1				X	X	By Client	By Client		

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Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Earthing the electrical installation with 40 mm (1.5") dia GI pipe (Earth electrode) having 6.35 mm. dia hole across the pipe at 305 mm interval securedly bonded with No 2 SWG HDBC earth leads with its protection by 20 mm (3/4") dia G. I. pipe up to plinth level run at a depth of 609.6 mm (2 ft.) below G.L up to main board to be earthed including necessary connecting copper sockets. bolts. nuts. etc. complete for maintaining earth resistance within 1 ohm. Depth of bottom of main electrode at 31242 mm (102.5 ft) from GL & length of electrode 30480 mm. (100 ft)											
3.0	**Cutting and Mending Works**	Job	1				X	X	X	X		
	Cutting and making of floors / walls, holes in floors / walls and consequent mending goods the damage etc. all complete in all respects as per technical specification and approved by the Engineer in charge.											
4.0	**Testing and Commissioning**	Job	1				X	X	X	X		
5.0	**Shop Drawing**						X	X				
	Preparation of detail Shop drawing including, layout drawing, section details, schematic drawing, etc. Get approval of working drawing before any fabrication or installation works. Shop drawing must be coordinated with other services likely Electrical cabling, Light Fixtures, False Ceiling and Interior design. The work also includes:											
	Show actual dimension & weight of Equipment.											
	- Show actual kW (min), LRA, RLA, No of Phase, Circuit Breaker ratings, etc. rating of all equipment											
	-Reconfirm Electrical cable sizing											
	-Reconfirm Ampere ratings of Electric Panels' components.											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	-Submit Electrical connection diagram of Electric Panels											
	-Submit General arrangement of Electric Panels											
	-Show input requirement from Client in red color.											
	-Submit advance copy of Installation, Operation and maintenance manuals of all equipment.											
	Contractor should prepare this drawing at site coordinating with other services.											
	Material Take-off list											
	Drawing submission in suitable paper size with minimum 1:50 scale. Soft copy AutoCAD to be furnished with hard copy.											
	In case of any conflict between Design drawing and working drawing, information in the Design drawing will predominate unless recommended by the Consultant.											
	Tagging and identification of equipment, Panels, Cablings,etc. as per recommendation of the Consultant.											
6.0	**Tagging and Identification for Solar System Works**						X	X				
	Tagging and identification of all equipment like metering solar panel, etc. as per IEC guidelines.											
7.0	**As-Built drawing**						X	X				
	Preparation and submission of As-built drawing in following forms:											
	One set in tracing paper, size A2											
	Two sets print out in A2 Paper											

Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)
	Soft Copy in CD in AutoCAD Version 2022											
	Soft Copy in PDF Version											
									Total BDT		**Total BDT**	
	Notes:											
1	Cost for Custom Duty, VAT, ATV, Taxes, Port Charge, C&F Agent charge, Unloading and Loading at port, Transport to site, Unloading at site, Storing and protective measure, etc. for imported items shall be by the Client.											
2	X denotes item to be quoted under other column including supply of main and consumable materials with anything requires.											
3	Installation includes supply by cosumable materials											
4	Contractor is to verify quantity of material before placement of order. They are to be prepared Material Take-Off (MTO) list for Client.											
5	For all installation relevant codes BNBC to be followed.											
6	No item or format of this BOQ can be changed. Any such deviation will be treated the bid "Disqualified". Bidder may use separate sheet for any minor deviation.											
7	Payment for Local works and Installation / Service works shall be made based on actual certified work measurement.											
8	Bidder must have to quote price for all items mentioned including. Any failure of this will be treated that they will do that item(s) as per design and BoQ and cost for that item is included in the costs of other items.											
9	In case of any conflict between specification mentioned in these BoQ and main consultant's specification/drawing, priority shall be given to main Consultants specifications / drawings.											
10	This documents include this BoQ, Bidding Documents with Conditions of Contracts, Design Drawings, etc.											
11	The Bidder is to verify drawings. Any item found in drawing but not mentioned in BoQ is to notify to the Authority before Pre-Bid meeting in writing.											
12	The BoQ schedule is furnished in Excel as well PDF Copy. In case of any conflict between these two formats and data, the PDF copy will govern.											

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Sl.	Items	Unit	Total Qty	Brand	Country of Origin	Country of Manufacture	Supply of Imported items (A) (CFR to CTG Port)		Supply of Local items (B) (Excluding VAT & AIT)		Installation / Service (C) (Excluding VAT & AIT)	
							Rate (USD/EURO)	Amount (USD/EURO)	Rate (BDT)	Amount (BDT)	Rate (BDT)	Amount (BDT)

Summary for Sub-Station, BBT, LPS, Solar System.

Project: Bengal Hotels and Resorts Ltd, Tejgaon-Gulshan Link Road, Dhaka.

Date: 26.08.2024

Sl	Item	Supply of Imported (A) items in (C&F CTG Basis)	Local Works (B) excluding VAT & AIT	Installation Service (C) excluding AIT © BDT
		USD/ EURO	BDT	BDT
1	External Electrification (Sub-Station) System work			
2	Internal Electrification Busbar Trunking (BBT) System work			
3	Electrical Lightning Protection & Grounding System work			
4	Solar Power System work			
	Total Amount			

In words:

USD/EURO:

BDT