

# ***Maha Metro***



## **Tender Documents**

**UGC-02: DESIGN AND CONSTRUCTION OF UNDERGROUND STATIONS AT  
BUDHWAR PETH, MANDAI AND SWARGATE AND ASSOCIATED TUNNELS**

### **PART 1 – BIDDING PROCEDURES**

June 2018

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**PART 1 – BIDDING PROCEDURES**

**SECTION 1A- E-TENDER TOOL KIT**

June 2018

## SECTION IA- E-Tender Tool Kit

### E-Tender Toolkit

#### 1. TENDERING PROCEDURE

##### A) Tender/Bid Forms.

- i. Tender Forms can be purchased from the e-Tendering Portal of MAHA-METRO, i.e. <https://mahametrorail.etenders.in> after paying Tender Fees via online **mode** as Per the **Tender/Bid Schedule**.
- ii. Bidder should have valid class II/III digital signature certificates (DSC) obtained from any certifying authorities.
- iii. Bidder should install the Java and NxtCrypto service available on the Home Page of Download section **URL :- <https://mahametrorail.etenders.in>**

##### B) Pre-requisites to participate in the Tenders processed by MAHA-METRO:

###### i. Enrolment of Contractors on Electronic Tendering System:

The Contractors interested in participating in the Tenders of MAHA-METRO processed using the Electronic Tendering System shall be required to enroll on the Electronic Tendering System to obtain User ID.

If the information is found to be complete, the enrolment submitted by the Vendor shall be approved automatically.

The Contractors may obtain the necessary information on the process of enrolment either from Helpdesk Support Team or may visit the information published under the link Help manual and tutorials on the Home Page of the Electronic Tendering System.

###### ii. Obtaining a Digital Certificate:

The Bid Data that is prepared online is required to be encrypted and the hash value of the Bid Data is required to be signed electronically using a Digital Certificate (Class - II or Class -III). This is required to maintain the security of the Bid Data and also to establish the identity of the Contractor transacting on the System.

The Digital Certificates are issued by an approved Certifying Authority authorized by the Controller of Certifying Authorities of Government of India through their Authorized Representatives upon receipt of documents required to obtain a Digital Certificate.

Bid data / information for a particular Tender/Bid may be submitted only using the Digital Certificate which is used to encrypt the data / information and sign the hash value during the Tender Submission stage. In case during the process of preparing and submitting a Bid for a particular Tender, the Contractor loses his/her Digital Signature Certificate (i.e. due to virus attack, hardware problem, operating system problem); he / she may not be able to submit the Bid online.

Hence, the Users are advised to store his / her Digital Certificate securely and if possible, keep a backup at safe place under adequate security to be used in case of need.

In case of “online tendering”, if the Digital Certificate issued to an Authorized User of a Partnership Firm is used for signing and submitting a bid, it will be considered equivalent to a no objection certificate / power of attorney to that User to submit the bid on behalf of the Partnership Firm. The Partnership Firm has to authorize a specific individual via an authorization certificate signed by a partner of the firm (and in case the applicant is a partner, another partner in the same form is required to authorize) to use the digital certificate as per Indian Information Technology Act, 2000.

Unless the Digital Certificate is revoked, it will be assumed to represent adequate authority of the Authority User to bid on behalf of the Firm for the Tenders processed on the Electronic Tender Management System of Government of Maharashtra as per Indian Information Technology Act, 2000. The Digital Signature of this Authorized User will be binding on the Firm. It shall be the responsibility of Partners of the Firm to inform the Certifying Authority or Sub Certifying Authority, if the Authorized User changes, and apply for a fresh Digital Signature Certificate. The procedure for application of a Digital Signature Certificate will remain the same for the new Authorized User.

The same procedure holds true for the Authorized Users in a Private / Public Limited Company. In this case, the Authorization Certificate will have to be signed by the Director of the Company or the Reporting Authority of the Applicant.

For information on the process of application for obtaining Digital Certificate, the Contractors may visit the section Digital Signature Forms on the Home Page of the Electronic Tendering System.

iii. **Recommended Hardware and Internet Connectivity:**

To operate on the Electronic Tendering System, the Contractors are recommended to use Computer System with at least 1 GB of RAM and broadband connectivity with minimum 512 kbps bandwidth.

iv. **Set up of Computer System for executing the operations on the Electronic Tendering System:**

To operate on the Electronic Tendering System of MAHA-METRO, the Computer System of the Contractors is required be set up. The Contractors are required to install Utilities available under the section Downloads on the Home Page of the System.

The Utilities are available for download freely from the above mentioned section. The Contractors are requested to refer to the Help manual and Tutorials available online on the Home Page to understand the process of setting up the System, or alternatively, contact the Helpdesk Support Team on information / guidance on the process of setting up the System.

**C) The e-tender portal contains two sections Technical Bid Submission & Financial Bid Submission.**

- i. **Technical Bid Section:** - Technical Bid Section shall contain all Documents and enclosures as directed in NIT/IFB, ITB and EQC. Bidder shall upload the PDF copy of such documents in Technical Section only.
- ii. **Financial Bid Section:** - All prices/Commercial offers/ or any information pertain to commercial offer required by MAHA-METRO from the bidders, shall be filled/ uploaded (If directed by MAHA-METRO) in Financial bid Section only.
- iii. **No information pertaining to Financial Bid section should be uploaded/disclosed in Technical Bid Section or vice versa.**

**D) Steps to be followed by Contractors to participate in the e-Tenders processed by MAHA-METRO.**

**i. Preparation of online Briefcase:**

All Contractors enrolled on the Electronic Tendering System of MAHA-METRO are provided with dedicated briefcase facility to store documents / files in digital format. The Contractors can use the online briefcase to store their scanned copies of frequently used documents / files to be submitted as a part of their bid response. The Contractors are advised to store the relevant documents in the briefcase before starting the Tender Submission stage.

In case, the Contractors have multiple documents under the same type (e.g. multiple Work Completion Certificates) as mentioned above, the Contractors advised to either create a single .pdf file of all the documents of same type or compress the documents in a single compressed file in .zip or .rar formats and upload the same.

Note: Uploading of documents in the briefcase does not mean that the documents are available to MAHA-METRO at the time of Tender Opening stage unless the documents are specifically attached to the Tender during the Tender Submission stage.

**ii. Online viewing of Detailed Notice Inviting Tenders:**

The Contractors can view the entire tender document inter alia including Detailed **Tender Notice (NIT)**/Invitation for Bids (IFB) along with the Time Schedule (Key Dates) for all the Live Tenders/Bids released by MAHA-METRO and **Eligibility Criteria (EQ)** on the home page of MAHA-METRO e-Tendering Portal on <https://mahametrorail.etenders.in> under the section Online Tenders. Viewing & downloading the tender document is free of cost.

iii. **Download of BID Documents:**

After going through the NIT/IFB & EQ, if bidder finds himself eligible for the bidding, he may purchase the complete bid document via online mode by paying the cost of Tender Document by Debit Card/Credit Card/ Net Banking as described on E-Tender Portal. After paying the cost of the document, bidder may download the complete bid documents. The bidder shall not be able to bid without purchasing the bid document as per the online procedure.

iv. **Online Submission of Bid:**

- a. At the stage of EMD, the EMD payment may be either in the form of Cash or Bank Guarantee or combination of both. Bidders are advised to refer the Instruction to Bidders and Bid Data Sheet of the concerning Bid. For detail provision of payment of EMD, bidders are advised to refer concerning clause of Bid Document
- b. For Cash component Payment of EMD, which bidder has to pay online using any one online pay mode as **RTGS, NEFT, Debit Card, Credit Card & Net Banking** through payment gateway of E-Tender Portal. For EMD payment, if bidder use NEFT or RTGS then system will generate a challan (in two Copies) with unique challan No specific to the tender. Bidder will use this challan in his bank to make NEFT/RTGS Payment against the challan.
- c. Bidder should ensure the payment of online EMD, 72 Hours (Excepting Holiday if any) prior to the final submission date of the Bid.\*
- d. Bidders have the option to pay EMD either at the initial stage of submission of bid or at the final stage of submission of bid, when all mandatory formats/ documents filled/ uploaded.
- e. If the EMD is in form of Bank Guarantee or part of EMD in form of BG, scan copy of such BG shall be uploaded by bidders in technical section of E-Tender Portal.
- f. Bidder shall download the Complete Bid Document along with all Corrigendum/Addendum/Clarification etc. by logging in with E-Tender Portal using his DSC (i.e. DSC of POA/ Owner) & read the all tender Instruction & clauses carefully.
- g. **For submission of Tender/Bid Document and Corrigendum, Tick (v) Submission Process has been enabled in Technical section of E-Tender Portal of MAHA-METRO. Bidders have to tick (v) the corresponding checkbox provided in the Technical Section of E-Tendering portal as a token of acceptance of these bid documents & corrigendum / Addendums. By clicking the tick (v) the bid documents & corrigendum /addendum shall automatically attached to offer of bidder. Further bidder may proceed for submission by clicking submit button.**
- h. **If the bidder has completed the submission process of his bid before due date of submission and in between employer issue a corrigendum, in this circumstances the bidder has to re-submit his bid by “clicking tick (v)” to the new added corrigendum, in case the new corrigendum has any implications to his already submitted bid. Bidder may, at his option, amend his bid accordingly & re-submit it.**

- i. Physical Sign & seal of bidder on each page of Bid Documents available online is not required.
- j. All required enclosures as per bid document shall be uploaded in “Technical Envelope” / “Technical Bid Section” of E-Tender portal by using DSC of bidder.
- k. The “Technical Envelope” / “Technical Section” of E-Tender portal has been provided with facilities to upload a file of maximum size of 10 mb only at each entity.
- l. If bidder are desirous to upload a file more than 10mb size , he shall spilt the file in two or more parts of 10mb or lesser than 10mb each and can upload the same at appropriate Technical Template or “**Additional Document**” section of “**Technical Envelope/Technical Bid section**” of E-Tender Portal.

**Note:-**

- \* **Realization of NEFT/RTGS payment normally takes 24 hours, so it is advised to make Sure that NEFT/RTGS payment activity should be completed well before time.**
- \* **NEFT/RTGS option will be depend on the amount of EMD.**
- \* **Help File regarding use of e-Payment Gateway can be downloaded from e-Tendering portal.**

**v. Short listing of Contractors for Financial Bidding Process:**

The Tendering Authority will first open the Technical Bid documents of all Contractors and after scrutinizing these documents will shortlist the Contractors who are eligible for Financial Bidding Process. The shortlisted Contractors will be intimated by email.

**vi. Opening of the Financial Bids:**

The Contractors may remain present in the Office of the Tender Opening Authority at the time of opening of Financial Bids.

**vii. Tender Schedule (Key Dates):**

All the online activities are time tracked and the Electronic Tendering System enforces time-locks that ensure that no activity or transaction can take place outside the Start and End Dates and Time of the stage as defined in the Tender Schedule.

At the sole discretion of the Tender Authority, the time schedule of the Tender stages may be extended.

**Note: - For details illustrations, please refer or down load the PPT demonstration available on E-Tender portal of <https://mahametrorail.etenders.in>**

### **Terms and Conditions for Online-Payments**

The Terms and Conditions contained herein shall apply to any person ("User") using the services of MAHA-METRO Maharashtra, hereinafter referred to as "Merchant", for making Tender fee and Earnest Money Deposit (EMD) payments through an online Payment Gateway Service ("Service") offered by ICICI Bank Ltd. in association with E Tendering Service provider and Payment Gateway Service provider through MAHA-METRO Maharashtra website i.e. <https://mahametrorail.etenders.in> Each User is therefore deemed to have read and accepted these Terms and Conditions.

### **Privacy Policy:**

The Merchant respects and protects the privacy of the individuals that access the information and use the services provided through them. Individually identifiable information about the User is not willfully disclosed to any third party without first receiving the User's permission, as covered in this Privacy Policy.

This Privacy Policy describes Merchant's treatment of personally identifiable information that Merchant collects when the User is on the Merchant's website. The Merchant does not collect any unique information about the User (such as User's name, email address, age, gender etc.) except when you specifically and knowingly provide such information on the Website. Like any business interested in offering the highest quality of service to clients, Merchant may, from time to time, send email to the User and other communication to tell the User about the various services, features, functionality and content offered by Merchant's website or seek voluntary information from The User.

Please be aware, however, that Merchant will release specific personal information about the User if required to do so in the following circumstances:

- a) In order to comply with any valid legal process such as a search warrant, statute, or court order, or available at time of opening the tender.
- b) if any of User's actions on our website violate the Terms of Service or any of our guidelines for specific services, or
- c) to protect or defend Merchant's legal rights or property, the Merchant's site, or the Users of the site or;
- d) to investigate, prevent, or take action regarding illegal activities, suspected fraud, situations involving potential threats to the security, integrity of Merchant's website/offerings. General

### **Terms and Conditions for E-Payment on E-Tender Portal**

1. Once a User has accepted these Terms and Conditions, he/ she may register on Merchant's website and avail the Services.
2. Merchant's rights, obligations, undertakings shall be subject to the laws in force in India, as well as any directives/ procedures of Government of India, and nothing contained in these Terms and Conditions shall be in derogation of Merchant's right to comply with any law enforcement agencies request or requirements relating to any

User's use of the website or information provided to or gathered by Merchant with respect to such use. Each User accepts and agrees that the provision of details of his/her use of the Website to regulators or police or to any other third party in order to resolve disputes or complaints which relate to the Website shall be at the absolute discretion of Merchant.

3. If any part of these Terms and Conditions are determined to be invalid or unenforceable pursuant to applicable law including, but not limited to, the warranty disclaimers and liability limitations set forth herein, then the invalid or unenforceable provision will be deemed superseded by a valid, enforceable provision that most closely matches the intent of the original provision and the remainder of these Terms and Conditions shall continue in effect.
4. These Terms and Conditions constitute the entire agreement between the User and Merchant. These Terms and Conditions supersede all prior or contemporaneous communications and proposals, whether electronic, oral, or written, between the User and Merchant. A printed version of these Terms and Conditions and of any notice given in electronic form shall be admissible in judicial or administrative proceedings based upon or relating to these Terms and Conditions to the same extent and subject to the same conditions as other business documents and records originally generated and maintained in printed form.
5. The entries in the books of Merchant and/or the Payment Gateway Service Providers kept in the ordinary course of business of Merchant and/or the Payment Gateway Service Providers with regard to transactions covered under these Terms and Conditions and matters therein appearing shall be binding on the User and shall be conclusive proof of the genuineness and accuracy of the transaction.
6. Refund for Charge Back Transaction: In the event there is any claim for/ of charge back by the User for any reason whatsoever, such User shall immediately approach Merchant with his/ her claim details and claim refund from Merchant alone. Such refund (if any) shall be affected only by Merchant via payment gateway or by means of a demand draft or such other means as Merchant deems appropriate. No claims for refund/ charge back shall be made by any User to the Payment Gateway Service Provider(s) and in the event such claim is made it shall not be entertained.
7. In these Terms and Conditions, the term "Charge Back" shall mean, approved and settled credit card or net banking purchase transaction(s) which are at any time refused, debited or charged back to merchant account (and shall also include similar debits to Payment Gateway Service Provider's accounts, if any) by the acquiring bank or credit card company for any reason whatsoever, together with the bank fees, penalties and other charges incidental thereto.
8. Refund for fraudulent/duplicate transaction(s): The User shall directly contact Merchant for any fraudulent transaction(s) on account of misuse of Card/ Bank details by a fraudulent individual/party and such issues shall be suitably addressed by Merchant alone in line with their policies and rules.

9. Server Slow Down/Session Timeout: In case the Website or Payment Gateway Service Provider's webpage, that is linked to the Website, is experiencing any server related issues like 'slow down' or 'failure' or 'session timeout', the User shall, before initiating the second payment, check whether his/her Bank Account has been debited or not and accordingly resort to one of the following options:
- In case the Bank Account appears to be debited, ensure that he/ she does not make the payment twice and immediately thereafter contact Merchant via e-mail or any other mode of contact as provided by Merchant to confirm payment.
  - In case the Bank Account is not debited, the User may initiate a fresh transaction to make payment.

However, the User agrees that under no circumstances the Payment Gateway Service Provider shall be held responsible for such fraudulent/duplicate transactions and hence no claims should be raised to Payment Gateway Service Provider. No communication received by the Payment Gateway Service Provider(s) in this regard shall be entertained by the Payment Gateway Service Provider.

#### **Limitation of Liability of Merchant/ Payment Gateway**

- Merchant has made this Service available to the User as a matter of convenience. Merchant expressly disclaims any claim or liability arising out of the provision of this Service. The User agrees and acknowledges that he/ she shall be solely responsible for his/ her conduct and that Merchant reserves the right to terminate the rights to use of the Service immediately without giving any prior notice thereof.
- Merchant and/or the Payment Gateway Service Providers shall not be liable for any inaccuracy, error or delay in, or omission of (a) any data, information or message, or (b) the transmission or delivery of any such data, information or message; or (c) any loss or damage arising from or occasioned by any such inaccuracy, error, delay or omission, nonperformance or interruption in any such data, information or message. Under no circumstances shall the Merchant and/or the Payment Gateway Service Providers, its employees, directors, and its third party agents involved in processing, delivering or managing the Services, be liable for any direct, indirect, incidental, special or consequential damages, or any damages whatsoever, including punitive or exemplary arising out of or in any way connected with the provision of or any inadequacy or deficiency in the provision of the Services or resulting from unauthorized access or alteration of transmissions of data or arising from suspension or termination of the Services.
- The Merchant and the Payment Gateway Service Provider(s) assume no liability whatsoever for any monetary or other damage suffered by the User on account of:
  - (i) the delay, failure, interruption, or corruption of any data or other information transmitted in connection with use of the Payment Gateway or Services in connection thereto; and/ or

(ii) any interruption or errors in the operation of the Payment Gateway.

4. The User shall indemnify and hold harmless the Payment Gateway Service Provider(s) and Merchant and their respective officers, directors, agents, and employees, from any claim or demand, or actions arising out of or in connection with the utilization of the Services.

The User agrees that Merchant or any of its employees will not be held liable by the User for any loss or damages arising from your use of, or reliance upon the information contained on the Website, or any failure to comply with these Terms and Conditions where such failure is due to circumstance beyond Merchant's reasonable control.

**Miscellaneous Conditions:**

Any waiver of any rights available to Merchant under these Terms and Conditions shall not mean that those rights are automatically waived.

1. The User agrees, understands and confirms that his/ her personal data including without limitation details relating to debit card/ credit card transmitted over the Internet may be susceptible to misuse, hacking, theft and/ or fraud and that Merchant or the Payment Gateway Service Provider(s) have no control over such matters.
2. Although all reasonable care has been taken towards guarding against unauthorized use of any information transmitted by the User, Merchant does not represent or guarantee that the use of the Services provided by/ through it will not result in theft and/or unauthorized use of data over the Internet.
3. The Merchant, the Payment Gateway Service Provider(s) and its affiliates and associates shall not be liable, at any time, for any failure of performance, error, omission, interruption, deletion, defect, delay in operation or transmission, computer virus, communications line failure, theft or destruction or unauthorized access to, alteration of, or use of information contained on the Website.
4. The User may be required to create his/ her own User ID and Password in order to register and/ or use the Services provided by Merchant on the Website. By accepting these Terms and Conditions the User agrees that his/ her User ID and Password are very important pieces of information and it shall be the User's own responsibility to keep them secure and confidential. In furtherance hereof, the User agrees to;
  - i. Choose a new password, whenever required for security reasons.
  - ii. Keep his/ her User ID & Password strictly confidential.
  - iii. Be responsible for any transactions made by User under such User ID and Password.

The User is hereby informed that Merchant will never ask the User for the User's password in an unsolicited phone call or in an unsolicited email. The User is hereby required to sign out of his/ her Merchant account on the Website and close the web browser window when the transaction(s) have been completed. This is to ensure that others cannot access the User's personal information and correspondence when the

User happens to share a computer with someone else or is using a computer in a public place like a library or Internet cafe.

### **Debit/Credit Card, Bank Account Details**

1. The User agrees that the debit/credit card details provided by him/ her for use of the aforesaid Service(s) must be correct and accurate and that the User shall not use a debit/ credit card, that is not lawfully owned by him/ her or the use of which is not authorized by the lawful owner thereof. The User further agrees and undertakes to provide correct and valid debit/credit card details.
2. The User may make his/ her payment (Tender Fee/Earnest Money deposit) to Merchant by using a debit/credit card or through online banking account. The User warrants, agrees and confirms that when he/ she initiates a payment transaction and/or issues an online payment instruction and provides his/ her card / bank details:
  - i. The User is fully and lawfully entitled to use such credit / debit card, bank account for such transactions;
  - ii. The User is responsible to ensure that the card/ bank account details provided by him/ her are accurate;
  - iii. The User is authorizing debit of the nominated card/ bank account for the payment of Tender Fee and Earnest Money Deposit
  - iv. The User is responsible to ensure sufficient credit is available on the nominated card/ bank account at the time of making the payment to permit the payment of the dues payable or the bill(s) selected by the User inclusive of the applicable Fee.

### **Personal Information**

1. The User agrees that, to the extent required or permitted by law, Merchant and/ or the Payment Gateway Service Provider(s) may also collect, use and disclose personal information in connection with security related or law enforcement investigations or in the course of cooperating with authorities or complying with legal requirements.
2. The User agrees that any communication sent by the User vide e-mail, shall imply release of information therein/ therewith to Merchant. The User agrees to be contacted via e-mail on such mails initiated by him/ her.
3. In addition to the information already in the possession of Merchant and/ or the Payment Gateway Service Provider(s), Merchant may have collected similar information from the User in the past. By entering the Website the User consents to the terms of Merchant's information privacy policy and to our continued use of previously collected information. By submitting the User's personal information to us, the User will be treated as having given his/her permission for the processing of the User's personal data as set out herein.
4. The User acknowledges and agrees that his/ her information will be managed in accordance with the laws for the time in force.

**Payment Gateway Disclaimer:** The Service is provided in order to facilitate payment of Tender Fees/Earnest Money Deposit online. The Merchant or the Payment Gateway Service Provider(s) do not make any representation of any kind, express or implied, as to the operation of the Payment Gateway other than what is specified in the Website for this purpose. By accepting/ agreeing to these Terms and Conditions, the User expressly agrees that his/ her use of the aforesaid online payment service is entirely at own risk and responsibility of the User.

***Maha Metro***



# **Tender Documents**

**UGC-02: DESIGN AND CONSTRUCTION OF UNDERGROUND STATIONS AT  
BUDHWAR PETH, MANDAI AND SWARGATE AND ASSOCIATED TUNNELS**

**PART I – BIDDING PROCEDURES**

**Section IB – Instructions to Bidders**

June 2018

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## Section IB – Instructions to Bidders

### A. General

1. **Scope of Bid**
  - 1.1 In connection with the Invitation for Bids **specified in the Bid Data Sheet (BDS)**, the Employer, as **specified in the BDS**, issues these Bidding Documents (hereinafter referred to as “Bidding Documents”) for the procurement of plant and installation services as specified in Section VI, Employer’s Requirements. The name, identification, and number of the lot(s) (contract(s) comprising this International Competitive Bidding (ICB) are **specified in the BDS**
  - 1.2 Throughout these Bidding Documents:
    - (a) the term “in writing” means communicated in written form and delivered against receipt;
    - (b) except where the context requires otherwise, words indicating the singular also include the plural and words indicating the plural also include the singular; and
    - (c) “day” means calendar day.
2. **Source of Funds**
  - 2.1 The Borrower specified in the BDS has applied for or received loans from an external agency/bank towards the cost of the project specified in the BDS. The Borrower intends to apply a portion of the proceeds of the Loan to eligible payments under the Contract(s) for which these Bidding Documents are issued.
  - 2.2 Disbursement of Loans will be subject, in all respects, to the terms and conditions of the Loan Agreement, including the disbursement procedures and the applicable “Guidelines for Procurement” specified in the BDS. No party other than the Borrower shall derive any rights from the Loan Agreement or have any claim to the Loan proceeds.
  - 2.3 The above Loan Agreement will cover only part of the project cost. As for the balance portion, the Borrower will take appropriate measures for finance.

### 3. Corrupt Fraudulent Practices

and 3.1 It is funding agency's policy to require that Bidders and Contractors as well as Borrowers observe the highest standard of ethics during the procurement and execution of such contracts.

The prohibited Conduct Includes:

- **Corrupt Practice** is the offering, giving, receiving or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party.
- **Fraudulent practice** is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation.
- **Coercive Practice** is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of any party to influence improperly the actions of another party.
- **Collusive Practice** is an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party.
- **Obstructive Practice** is (a) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation or (b) acts intended to materially impede the exercise of the funding agency's contractual rights of audit or access to information or the rights that any banking, regulatory or examining authority or other equivalent body of the funding agency or its Member states may have in accordance with any law, regulation or treaty or pursuant to any agreement into which the funding agency has entered in order to implement such law, regulation or treaty.
- **Money Laundering** is defined in the Bank's Anti-Fraud Policy
- **Terrorist Financing** is defined in the Bank's Anti-Fraud Policy
- **Project Owner** means the person designated as such in the bidding documents or the contract.

In pursuance of this policy, funding agency:

- (a) is committed to ensuring that its loans are used for purposes intended and its operations are free from prohibited conduct (including but not limited to fraud, corruption, collusion, coercion, and money laundering and terrorist funding).
- (b) may declare an individual or an entity ineligible to be awarded a contract under any EIB Project or to enter into any relationship

with it, if it determines pursuant to its exclusion procedures that such individual or entity has engaged in any prohibited conduct in the course of the procurement process and/or implementation of the contract; and

- (c) may cancel all or part of the financing allocated to a contract for works, goods or services if it, at any time, determines pursuant to its exclusion procedures that an individual or an entity has engaged in any prohibited conduct during the procurement process or during the execution of the contract, without the promoter having taken action satisfactory to the bank to investigate and/or terminate the prohibited conduct or, as the case may be, remedy the damage.

The Bidders are required as a condition of admission to eligibility, to execute and attach a Covenant of Integrity in the form indicated in Section IV a: Bidding Forms.

- 3.2 Furthermore, Bidders shall be aware of the provision stated in Sub-Clause 15.2 of General Conditions of Contract.

#### **4. Eligible Bidders**

- 4.1 A Bidder may be a firm that is a single entity or any combination of such entities in the form of a joint venture (JV) under an existing agreement or with the intent to enter into such an agreement supported by a letter of intent. In the case of a JV:
  - (a) all members shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms, and
  - (b) the JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the bidding process and, in the event the JV is awarded the Contract, during Contract execution.
- 4.2 A Bidder shall not have a conflict of interest. A Bidder shall not be employed under any of the circumstances set forth below throughout the bidding/selection process and/or the execution of the Contract unless the conflict has been resolved in a manner acceptable to Funding agency.
  - (a) A firm shall be disqualified from providing goods or non-consulting services resulting from or directly related to Consulting services for the preparation or implementation of a project that it provided or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm. This provision does not

apply to the various firms (consultants, contractors, or suppliers) only due to the reason that those firms together are performing the Contractor's obligations under a turnkey or design and build contract.

- (b) A firm that has a close business relationship with the Borrower's professional personnel, who are directly or indirectly involved in any part of: (i) the preparation of the prequalification and Bidding Documents for the Contract, (ii) the prequalification and Bid evaluation, or (iii) the supervision of such Contract, shall be disqualified.
  - (c) Based on the "One Bid Per Bidder" principle, which is to ensure fair competition, a firm and any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm shall not be allowed to submit more than one Bid, either individually or as a member in a JV. A firm (including its affiliate), if acting in the capacity of a Subcontractor in one Bid, may participate in other Bids, only in that capacity.
  - (d) A firm having any other form of conflict of interest other than (a) through (c) above shall be disqualified.
- 4.3 A Bidder shall be from any of the eligible source countries indicated in Section V, Eligible Source Countries of External Funding agency.
  - 4.4 A Bidder that has been determined to be ineligible by funding agency in accordance with ITB 3.1 shall not be eligible to be awarded a Contract.
  - 4.5 This bidding is open only to prequalified Bidders unless **specified in the BDS**.
  - 4.6 A Bidder shall provide such evidence of its continued eligibility satisfactorily to the Employer, as the Employer shall reasonably request.

## 5. Eligible Plant, Material And services

- 5.1 The Plant, Material and Services to be supplied under the Contract shall have their origin in any of the eligible source countries indicated in Section V, Eligible Source Countries of External Funding agency, and all expenditures under the Contract will be limited to such Plant, Material and Services.
- 5.2 For purposes of ITB 5.1 above, "origin" means the place where the plant, or component parts thereof are mined, grown, produced or manufactured, and from which the services are provided. Plant components are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that is

substantially different in its basic characteristics or in purpose or utility from its components.

## **B. Contents of Bidding Documents**

### **6. Sections of Bidding Documents**

6.1 The Bidding Documents consist of Parts 1, 2, and 3, which include all the Sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB 8.

**(Unless otherwise specified in BDS)**

#### **PART 1 Bidding Procedures**

- Section I. Instructions to Bidders (ITB)
- Section II. Bid Data Sheet (BDS)
- Section III. Eligibility and Qualification Criteria
- Section IV. Bidding Forms
- Section V. Eligible Source Countries of Funding Agency

#### **PART 2 Employer's Requirements**

- Section VI. Employer's Requirements

#### **PART 3 Conditions of Contract and Contract Forms**

- Section VII. General Conditions (GC)
- Section VIII. Particular Conditions (PC)
- Section IX. Annex to the particular Conditions-Contract Forms

6.2 The Invitation for Bids issued by the Employer is not part of the Bidding Documents.

6.3 Unless obtained directly from the Employer, the Employer is not responsible for the completeness of the Bidding Documents, responses to requests for clarification, the minutes of the pre-bid meeting (if any), or Addenda/Corrigendum to the Documents in accordance with ITB 8. In case of any contradiction, documents obtained directly from the Employer shall prevail.

6.4 The Bidder is expected to examine all instructions, forms, terms, and Employer's Requirements in the Bidding Documents, and to furnish with its Bid all information and documentation as is required by the Bidding Documents.

**7. Clarification of Bidding Documents, Site Visit, Pre-Bid Meeting**

- 7.1 A Bidder requiring any clarification of the Bidding Documents shall contact the Employer in writing at the Employer's address **specified in the BDS** or raise his enquiries during the pre-bid meeting if provided for in accordance with ITB 7.4. The Employer will respond in writing to any request for clarification, provided that such request is received no later than fourteen (14) days prior to the deadline for submission of Bids. The Employer shall forward copies of its response to all Bidders who have acquired the Bidding Documents in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. If so **specified in the BDS**, the Employer shall also promptly publish its response at the web page **identified in the BDS**. Should the clarification result in changes to the essential elements of the Bidding Documents, the Employer shall amend the Bidding Documents following the procedure under ITB 8 and ITB 24.2.
- 7.2 The Bidder is advised to visit and examine the Site and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works. The costs of such visits to the site shall be at the Bidder's own expense.
- 7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection., costs, and expenses incurred as a result of the inspection.
- 7.4 The Bidder's designated representative is invited to attend the pre-bid meeting, if so **specified in the BDS**. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage. A site visit will be arranged by the Employer at the time of the pre-bid meeting, if so **specified in the BDS**.

- 7.5 The Bidder is requested to submit any questions in writing, to reach the Employer not later than one (1) week before the meeting.
  - 7.6 Minutes of the pre-bid meeting, if applicable, including the text of the questions asked by Bidders, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders through e-mail who have acquired the Bidding Documents in accordance with ITB 6.3. Any modification to the Bidding Documents that may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an addendum/Corrigendum pursuant to ITB 8 and will be uploaded in Employer's website/E-tender portal and not through the minutes of the pre-bid meeting. Non-attendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.
  - 7.7 Bidders should alert the Employer in writing with a copy to Funding Agency in case they consider that certain clauses or technical specifications of the tender documents might limit international competition or introduce an unfair advantage to some bidders.
- 8. Amendment of Bidding Documents**
- 8.1 At any time prior to the deadline for submission of bids, the Employer may amend the Bidding Documents by issuing addenda/Corrigenda.
  - 8.2 Any addendum/Corrigendum issued shall be part of the Bidding Documents and shall be communicated in writing to all who have obtained the Bidding Documents from the Employer in accordance with ITB 6.3 and ITB 7.6. If so **specified in the BDS**, the Employer shall also promptly publish the addendum/Corrigendum on the Employer's web page in accordance with ITB 7.1.
  - 8.3 To give Bidders reasonable time in which to take an addendum/Corrigendum into account in preparing their Bids, the Employer may extend the deadline for the submission of Bids, pursuant to ITB 24.2.

### **C. Preparation of Bids**

- 9. Cost of Bidding**
- 9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

## 10. Language of Bid

10.1 The Bid, as well as all correspondence and documents relating to the Bid exchanged by the Bidder and the Employer, shall be written in the language specified in the BDS. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language of Bid, in which case, for purposes of interpretation of the Bid, such translation shall govern.

## 11. Documents Comprising the Bid

11.1 The Bid shall comprise two envelopes submitted simultaneously, one called the Technical Bid containing the documents listed in ITB 11.2 and the other the Price Bid containing the documents listed in ITB 11.3, both envelopes enclosed together in an outer single envelope.

11.2 The Technical Bid submitted by the Bidder shall comprise the following:

- (a) Letter of Technical Bid;
- (b) Bid Security, in accordance with ITB 21;
- (c) Acknowledgment of Compliance with the Guidelines for Procurement under funding agency (Form ACK), which shall be signed and dated by the Bidder's authorized representative;
- (d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 22.2;
- (e) in the case of a Bid submitted by a JV, a copy of the JV agreement, or letter of intent, signed by all members, to enter into a JV including a draft agreement, indicating at least the parts of the Project to be executed by the respective members;
- (f) documentary evidence establishing in accordance with ITB 14 that the Works offered by the Bidder in its Bid or in any alternative Bid, if permitted, are eligible;
- (g) documentary evidence in accordance with ITB 15 establishing the Bidder's eligibility and qualifications to perform the Contract if its Bid is accepted;
- (h) Technical Proposal in accordance with ITB 17;
- (i) documentary evidence establishing in accordance with ITB 16 that the Works offered by the Bidder conform to the Bidding Documents;
- (j) alternative Bids, if permissible, in accordance with ITB 13;
- (k) list of Subcontractors, in accordance with ITB 17.2 and 17.3; and
- (l) any other document **required in the BDS**.

**11.3** The Price Bid submitted by the Bidder shall comprise the following:

- (a) Letter of Price Bid;
- (b) completed Price Schedules, in accordance with ITB 12 and 18;
- (c) alternative Price Bids, at the Bidder's option and if permissible, in accordance with ITB 13; and
- (d) Any other document **required in the BDS**.

**12. Letter of Bid and Schedules**

12.1 The Bidder shall complete the Letters of Technical Bid and Price Bid, including the appropriate Technical and Price Schedules, using the relevant forms furnished in Section IV a, Bidding Forms. The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITB 22.2. All blank spaces shall be filled in with the information requested.

**13. Alternative Bids**

13.1 **The BDS indicates** whether alternative Bids are allowed. If they are allowed, **the BDS will also indicate** whether they are permitted in accordance with ITB 13.3, **or** invited in accordance with ITB 13.2 and/or ITB 13.4.

13.2 When alternatives to the Time for Completion of the whole of the Works or the sections are explicitly invited, a statement to that effect will be **included in the BDS**, and the method of evaluating different time schedules will be described in Section III, Eligibility and Qualification Criteria.

13.3 Except as provided under [ITB 13.4](#) below, Bidders wishing to offer technical alternatives to the Employer's requirements as described in the Bidding Documents must also provide : (i) a price at which they are prepared to offer such alternative meeting the Employer's requirements; and (ii) all information necessary for a complete evaluation of the alternatives by the Employer, including drawings, design calculations, technical information(particulars),breakdown of prices, and proposed installation methodology and other relevant details. Only the technical alternatives, if any, of the lowest evaluated bidder conforming to the basic technical requirements shall be considered by the Employer.

13.4 When Bidders are **invited in the BDS** to submit alternative technical solutions for specified parts of the Works, such parts shall be described in Section VI, Employer's Requirements. Technical alternatives that comply with the performance and technical criteria specified for the Works shall be considered by the Employer on their own merits, pursuant to ITB 35.2.

**14. Documents  
Establishing the  
Eligible Source  
Countries - Plant,  
Materials and  
Services**

14.1 To establish the eligibility of Plant, Materials and Services in accordance with ITB 5, Bidders shall complete the country of origin declarations in the Price Schedule Forms, included in Section IV a, Bidding Forms.

**15. Documents  
Establishing the  
Eligibility and  
Qualifications of  
the Bidder**

15.1 In accordance with Section III, Eligibility and Qualification Criteria, if the prequalification process was conducted prior to the bidding process, the Bidder shall provide in the corresponding information sheets included in Section IV, Bidding Forms, (i) updated information on any assessed aspect that changed from that time to establish that the Bidder continues to meet the criteria used at the time of prequalification and (ii) the requested information on the additional qualification criteria stated in Section III, Eligibility and Qualification Criteria, or if the assessment of qualification criteria was not conducted prior to the bidding process, the Bidder shall provide the information requested in the corresponding information sheets included in Section IV a, Bidding Forms.

15.2 Any change in the structure or formation of a Bidder after being prequalified and invited to bid (including, in the case of a JV, any change in the structure or formation of any member thereto) shall be subject to the written approval of the Employer prior to the deadline for submission of Bids. Such approval shall be denied if (i) such change has not taken place by the free choice of the firms involved; (ii) as a consequence of the change, the Bidder no longer substantially meets the qualification criteria set forth in the Prequalification Documents; or (iii) in the opinion of the Employer, the change may result in a substantial reduction in competition. Any such change should be submitted to the Employer not later than fourteen (14) days after the date of the Invitation for Bids.

**16. Documents  
Establishing  
conformity of the  
works**

- 16.1 The documentary evidence of the conformity of the Works with the Bidding Documents may be in the form of literature, drawings and data, and shall include:
- (a) a detailed description of the essential technical and performance characteristics of the Plant, including the Schedule of Guarantees of the proposed Plant, in response to the Employer's Requirements. The Schedule of Guarantees of the proposed Plant shall be stated in the applicable form in Section IV a, Bidding Forms;
  - (b) a list giving full particulars, including available sources, of all spare parts, special tools, etc., necessary for the proper and continuing functioning of the Plant for the period specified in the BDS, following completion of the Works in accordance with the provisions of Contract; and
  - (c) Adequate evidence demonstrating the substantial responsiveness of the Works to those Employer's Requirements. Bidders shall note that standards for workmanship, materials and equipment designated by the Employer in the Bidding Documents are intended to be descriptive (establishing standards of quality and performance) only and not restrictive. The Bidder may substitute alternative standards, brand names and/or catalogue numbers in its Technical Proposal, provided that it demonstrates to the Employer's satisfaction that the alterations are substantially equivalent or superior to the standards designated in the Employer's Requirements.

## 17. Technical Proposal, Subcontractors

- 17.1 The Bidder shall furnish a Technical Proposal, including a statement of work methods, equipment, personnel, schedule, safety plan, and any other information as stipulated in Section IV a, Bidding Forms in sufficient detail to demonstrate substantial responsiveness of the Bidder's proposal to the Employer's Requirements and the completion time.
- 17.2 For major items of the Works as listed by the Employer in Section III, Eligibility and Qualification Criteria, which the Bidder intends to purchase or subcontract, the Bidder shall give details of the name and nationality of the proposed Subcontractors, including manufacturers, for each of those items. In addition, the Bidder shall include in its Technical Proposals information establishing compliance with the requirements specified by the Employer for these items. Bidders are free to list more than one Subcontractor against each item of the Works. Quoted rates and prices will be deemed to apply to whichever Subcontractor is appointed, and no adjustment of the rates and prices will be permitted.
- 17.3 The Bidder shall be responsible for ensuring that any Subcontractor proposed complies with the requirements of ITB 4 and that any Works to be provided by the Subcontractor comply with the requirements of ITB 5 and ITB 16.1.
- 17.4 Unless **otherwise stated in the BDS**, the Employer does not intend to execute any specific elements of the Works by subcontractors selected in advance by the Employer (nominated subcontractors).
- 17.5 In case Prequalification was not conducted prior to the bidding process, Bidders planning to subcontract any of the key activities indicated in Section III, Eligibility and Qualification Criteria, shall clearly identify the proposed specialist subcontractor(s) in Forms ELI-1.2 and EXP-4.2(a) in Section IV A, Bidding Forms. Such proposed specialist subcontractors(s) shall meet the corresponding qualification requirements specified in Section III, Eligibility and Qualification Criteria.
- 17.6 In case Prequalification was conducted prior to the bidding process, the Bidder's Bid shall name the same specialist subcontractor(s) whose experience in the key activities was evaluated in the Prequalification, unless such change is explicitly approved by the Employer in accordance with ITB 15.2.

## 18. Bid Prices and Discounts

- 18.1 **Unless otherwise specified in the BDS,** Bidders shall quote for the Works such that the total Bid Price covers all the Contractor's obligations mentioned in or to be reasonably inferred from the Bidding Documents in respect of the design, manufacture, including procurement and subcontracting (if any), delivery, construction, installation and completion of the Works. This includes all requirements under the Contractor's responsibilities for testing, pre-commissioning and commissioning of the plant and, where so required by the Bidding Documents, the acquisition of all permits, approvals and licenses, etc.; the operation, maintenance and training services and such other items and services as may be specified in the Bidding Documents, all in accordance with the requirements of the General Conditions. Items against which no price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed to be covered by the prices for other items.
- 18.2 Bidders are required to quote the price for the commercial, contractual and technical obligations outlined in the Bidding Documents.
- 18.3 Bidders shall provide price in each item in the manner and detail called for in the price schedules included in Section IV a, Bidding Forms. Further, bidders may add breakdowns of items and provide the prices in each Price Schedule included in Section IV a, Bidding Forms.
- 18.4 The price to be offered in the Letter of Bid, in accordance with ITB 12.1, shall be the total **price of the Bid, excluding any discounts that may be offered.**
- 18.5 **Unless otherwise specified in the BDS and the Contract,** the prices offered by the Bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract. In such a case, the Bidder shall furnish the indices and weightings for the price adjustment formulae in the Schedule of Adjustment
- 18.6 If so specified in BDS 1.1, Bids are being invited for individual lots (contracts) or for any combination of lots (packages). Bidders wishing to offer discounts for the award of more than one Contract shall specify in their Bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Discounts shall be submitted in accordance with ITB 18.4, provided the Bids for all lots (contracts) are opened at the

18.7 **Unless otherwise provided in the BDS**, all duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date twenty-eight (28) days prior to the deadline for submission of Bids, shall be included in the rates and prices and the total Bid Price submitted by the Bidder.

18.8 Bidders wishing to offer any unconditional discount shall specify in their Letter of Price Bid the offered discounts and the manner in which price discounts will apply.

## 19. Currencies of Bid and Payment

19.1 The currency (ies) of the Bid shall be, as **specified in the BDS**. Payment of the Contract Price shall be made in the currency or currencies in which the Bid Price is expressed in the Bid of the successful Bidder.

19.2 Bidders may be required by the Employer to justify, to the Employer's satisfaction, their local and foreign currency requirements.

## 20. Period of Validity of Bids

20.1 Bids shall remain valid for the period **specified in the BDS** after the Bid submission deadline date prescribed by the Employer pursuant to ITB 24.1. A Bid valid for a shorter period shall be rejected by the Employer as non-responsive.

20.2 In exceptional circumstances, prior to the expiration of the Bid validity period, the Employer may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. The Bid Security shall also be extended for twenty-eight (28) days beyond the deadline of the extended validity period. A Bidder may refuse the request without forfeiting its Bid Security. A Bidder granting the request shall not be required or permitted to modify its Bid, except as provided in ITB 20.3.

20.3 If the award is delayed by a period exceeding fifty-six (56) days beyond the expiry of the initial Bid validity, the Contract Price shall be determined as follows:

(a) In the case of Fixed Price Contracts, the Contract Price shall be the Bid Price adjusted by the factor specified in the BDS.

(b) In the case of Adjustable Price Contracts, to determine the Contract Price, the fixed portion of the Bid Price shall be adjusted by the factor specified in the BDS.

(c) In any case, Bid evaluation shall be based on the Bid Price without taking into consideration the effect of the corrections indicated above.

## 21. Bid Security

21.1 The Bidder shall furnish as part of its Bid a Bid Security in the amount and currency **specified in the BDS**.

21.2 The Bid Security shall be a demand guarantee in any of the following forms at the Bidder's option:

- a) an unconditional guarantee issued by a bank or financial institution (such as an insurance, bonding or surety company);
- b) an irrevocable letter of credit;
- c) a cashier's or certified check; or
- d) any other security **specified in the BDS**

from a reputable source from an eligible source country. If the unconditional guarantee is issued by an insurance company or a bonding company located outside the Employer's Country, the issuer shall have a correspondent financial institution located in the Employer's Country to make it enforceable. In the case of a bank guarantee, the Bid Security shall be submitted either using the Bid Security Form included in Section IV a, Bidding Forms or in another substantially similar format approved by the Employer prior to Bid submission. In either case, the form must include the complete name of the Bidder. The Bid Security shall be valid for twenty-eight (28) days beyond the original validity period of the Bid, or beyond any period of extension if requested under ITB 20.2

21.3 Any Bid not accompanied by a substantially responsive Bid security shall be rejected by the Employer as non-responsive.

21.4 The Bid Security of unsuccessful Bidders shall be returned as promptly as possible upon the Bidder is being disqualified or in case the Bidder pass the technical evaluation.

21.5 The Bid Security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the Contract and furnished the required Performance Security.

21.6 The Bid Security may be forfeited:

- a) if a Bidder withdraws its Bid during the period of Bid validity specified by the Bidder on the Letters of Technical Bid and Price Bid, or any extension thereto provided by the Bidder; or

b) if the successful Bidder fails to:

(i) sign the Contract in accordance with ITB 43; or

(ii) furnish a Performance Security in accordance with ITB 44.

21.7 The Bid Security of a JV shall be in the name of the JV that submits the Bid. If the JV has not been legally constituted into a legally enforceable JV at the time of bidding, the Bid Security shall be in the names of all future members as named in the letter of intent referred to in ITB 4.1 and ITB 11.2.

## 22. Format and Signing of Bid

22.1 The Bidder shall prepare one original of the Technical Bid and one original of the Price Bid as described in ITB 11 and clearly mark it “TECHNICAL BID - ORIGINAL” and “PRICE BID - ORIGINAL.” Alternative Bids, if permitted in accordance with ITB 13, shall be clearly marked “ALTERNATIVE”. In addition, the Bidder shall submit copies of the Technical and Price Bids, in the number **specified in the BDS** and clearly mark them “COPY.” In the event of any discrepancy between the original and the copies, the original shall prevail.

22.2 The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as **specified in the BDS** and shall be attached to the Bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Bid where entries or amendments have been made shall be signed or initialed by the person signing the Bid.

22.3 In case the Bidder is a JV, the Bid shall be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.

22.4 Any interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Bid.

## D. Submission and Opening of Bids

### 23.Submission, Sealing and Marking of Bids

- 23.1 Bidders may submit their Bids by mail or by hand. Procedures for submission, sealing and marking are as follows:  
Bidders shall enclose the original of the Technical Bid, the original of the Price Bid, and each copy of the Technical Bid and of the Price Bid, including alternative Bids, if permitted in accordance with ITB 13, in separate sealed envelopes, duly marking the envelopes as “TECHNICAL BID – ORIGINAL,” “PRICE BID – ORIGINAL,” “TECHNICAL BID – COPY,” “PRICE BID – COPY,” and “ALTERNATIVE,” as appropriate. These envelopes containing the original, the copies and the alternative(s), if any, shall then be enclosed in one single envelope. The rest of the procedure shall be in accordance with ITB 23.2 through 23.5.
- 23.2 The inner and outer envelopes shall:
- a) bear the name and address of the Bidder;
  - b) be addressed to the Employer in accordance with ITB24.1 and;
  - c) Bear the specific identification of this bidding process specified in BDS 1.1.
- 23.3 The outer envelopes and the inner envelopes containing the Technical Bid shall bear a warning not to open before the time and date for the opening of Technical Bids, in accordance with ITB 27.1.
- 23.4 The inner envelopes containing the Price Bid shall bear a warning not to open until advised by the Employer in accordance with ITB 27.7.
- 23.5 If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the Bid.

### 24.Deadline for Submission of Bids

- 24.1 Bids must be received by the Employer at the address and no later than the date and time **specified in the BDS**.
- 24.2 The Employer may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Documents in accordance with ITB 8, in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

## 25. Late Bids

- 25.1 The Employer shall not consider any Bid that arrives after the deadline for submission of Bids, in accordance with ITB 24. Any Bid received by the Employer after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.

## 26. Withdrawal, Substitution and Modification of Bids

- 26.1 A Bidder may withdraw, substitute, or modify its Bid – Technical or Price – after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 22.2, (except that withdrawal notices do not require copies).

The corresponding substitution or modification of the Bid must accompany the respective written notice. All notices must be:

- (a) prepared and submitted in accordance with ITB 22 and ITB 23 (except that withdrawals notices do not require copies), and in addition, the respective envelopes shall be clearly marked “WITHDRAWAL,” “SUBSTITUTION,” “MODIFICATION;” and
  - (b) Received by the Employer prior to the deadline prescribed for submission of Bids, in accordance with ITB 24.
- 26.2 Bids requested to be withdrawn in accordance with ITB 26.1 shall be returned unopened to the bidders.
- 26.3 No bid maybe withdrawn, substituted, or modified in the interval between the deadline for submission of Bids and the expiration of the period of Bid validity specified by the Bidder on the Letter of Technical Bid and on the Letter of Price Bid or any extension thereof.

## 27. Bid Opening

- 27.1 Except in the cases specified in ITB 25 and ITB 26, the Employer shall publicly open and read out in accordance with ITB 27.5 all Technical Bids received by the deadline, at the date, time and place **specified in the BDS**, in the presence of Bidders’ designated representatives who may choose to attend. The Price Bids will remain unopened and will be held in custody of the Employer until the time of their opening to be specified in accordance with ITB 27.7.
- 27.2 First, envelopes marked “WITHDRAWAL” shall be opened and read out and the envelope with the corresponding Bid shall not be opened, but returned to the Bidder. No Bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at opening of the Technical Bids.

- 27.3 Second, outer envelopes marked “SUBSTITUTION” shall be opened. The inner envelopes containing the Substitution Technical Bid and/or Substitution Price Bid shall be exchanged for the corresponding envelopes being substituted, which are to be returned to the Bidder unopened. Only the Substitution Technical Bid, if any, shall be opened and read out. Substitution Price Bid will remain unopened in accordance with ITB 27.1.

No envelope shall be substituted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at opening of technical bids.

- 27.4 Next, outer envelopes marked “MODIFICATION” shall be opened. No Technical Bid and/or Price Bid shall be modified unless the corresponding modification notice contains a valid authorization to request the modification and is read out at the opening of Technical Bids. Only the Technical Bids, both Original as well as Modification are to be opened and read out at the opening. Price Bids, both Original as well as Modification, will remain unopened in accordance with ITB 27.1

- 27.5 All other envelopes holding the Technical Bids shall be opened one at a time, reading out:

- (a) the name of the Bidder;
- (b) whether there is a modification;
- (c) the Bid Price(s), including any discounts and alternative Bids; and
- (d) Any other details as the Employer may consider appropriate.

Only Technical Bids and alternative Technical Bids read out at Bid opening shall be considered for evaluation. The Employer shall neither discuss the merits of any Bid nor reject any Bid (except for late Bids, in accordance with ITB 25.1).

- 27.6 The Employer shall prepare a record of the opening of Technical Bids that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification; alternative proposals; and the presence or absence of a Bid Security. The Bidders’ representatives who are present shall be requested to sign the record. The omission of a Bidder’s signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders.

- 27.7 At the end of the evaluation of Technical Bids, the Employer will invite Bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified for award to attend the opening of the Price Bids. The date, time, and location of the opening of Price Bids and the result of the technical evaluation shall be published on webpage of Maha-Metro before the opening of the price bid at least 5 days in advance.
- 27.8 The Employer will notify, in writing, Bidders who have been determined to be ineligible and not qualified on the grounds of their Technical Bids being substantially non-responsive to the requirements of the Bidding Documents and return their Bid security and Price Bids unopened after signing the contract.
- 27.9 The Employer shall conduct the opening of Price Bids of all Bidders who submitted substantially responsive Technical Bids, and who have been considered eligible and qualified, in the presence of Bidders' designated representatives who choose to attend at the address, date and time specified by the Employer. The Bidder's representatives who are present shall be requested to sign a register evidencing their attendance.
- 27.10 All envelopes containing Price Bids shall be opened one at a time, reading out:
- (a) the name of the Bidder;
  - (b) whether there is a modification;
  - (c) the Bid Price(s), including any discounts and alternative Bids; and
  - (d) any other details as the Employer may consider appropriate

Only Price Bids discounts, and alternative Bids read out and recorded during the opening of Price Bids shall be considered for evaluation. No Bid shall be rejected at the opening of Price Bids.

- 27.11 The Employer shall prepare a record of the opening of Price Bids that shall include, as a minimum: the name of the Bidder, the Bid Price, (per lot if applicable), including any discounts, and alternative Bids. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders.

## E. Evaluation and Comparison of Bids

### 28. Confidentiality

- 28.1 Information relating to the evaluation of Bids and recommendation of Contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on Contract award is communicated to all Bidders in accordance with ITB 42.
- 28.2 Any attempt by a Bidder to influence the Employer in the evaluation of the Bids or Contract award decisions may result in the rejection of its Bid.
- 28.3 Notwithstanding ITB 28.2, from the time of Bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the bidding process, it shall do so in writing.

### 29. Clarification of Bids

- 29.1 To assist in the examination, evaluation, and comparison of the Technical and Price Bids, and qualification of the Bidders, the Employer may, at its discretion, ask any Bidder for a clarification of its Bid, giving a reasonable time for a response. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change in the substance of the Technical Bid or prices in the Price Bid, including any voluntary increase or decrease in the prices, shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids, in accordance with ITB 36.
- 29.2 If a Bidder does not provide clarifications of its Bid by the date and time set in the Employer's request for clarification, its Bid may be rejected.

### 30. Deviations, Reservations, and Omissions

- 30.1 During the evaluation of Bids, the following definitions apply:
  - (a) "Deviation" is a departure from the requirements specified in the Bidding Documents;
  - (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Documents; and
  - (c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Documents.

### **31. Preliminary Examination of Technical Bids**

- 31.1 The Employer shall examine Technical Bids to confirm that all documents and technical documentation requested in ITB 11.2 have been provided, and to determine the completeness of each document submitted.
- 31.2 The Employer shall confirm that the following documents and information have been provided in the Technical Bid. If any of these documents or information is missing, the Bid shall be rejected.
  - (a) Letter of Technical Bid;
  - (b) Written confirmation of authorization to commit the Bidder;
  - (c) Bid Security; and
  - (d) Technical Proposal.

### **32. Qualification of the Bidders**

- 32.1 The Employer shall determine to its satisfaction whether Bidders meet the qualification criteria specified in Section III, Eligibility and Qualification Criteria, during the evaluation of Technical Bids. However, if prequalification was carried out prior to the bidding process, the Employer may carry out the assessment of the qualification criteria specified in Section III, Eligibility and Qualification Criteria, for the Bidder who submitted the lowest evaluated and substantially responsive Bid only.
- 32.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 15.
- 32.3 An affirmative determination shall be a prerequisite for award of the Contract to the Bidder. A negative determination shall result in disqualification of the Bid, in which event the Employer shall return the unopened Price Bid to the Bidder after signing the contract.

If the assessment of the Bidder's qualification is conducted for the lowest evaluated Bidder only, in accordance with ITB 32.1, and the result of such assessment is negative, the Employer shall proceed to the next lowest evaluated Bid to make a similar determination.

32.4 The capabilities of the manufacturers and Subcontractors proposed in its Bid to be used by the Bidder will also be evaluated for acceptability in accordance with Section III, Evaluation and Qualification Criteria. Their participation should be confirmed with a letter of intent between the parties, as needed. Should a manufacturer or Subcontractor be determined to be unacceptable, the Bid will not be rejected, but the Bidder will be required to substitute an acceptable manufacturer or Subcontractor without any change to the Bid Price. Prior to signing the Contract, the corresponding Appendix to the Contract Agreement shall or be completed, listing the approved manufacturers or Subcontractors for each item concerned.

**33. Determination of Responsiveness of Technical Bids**

33.1 The Employer's determination of a Technical Bid's responsiveness is to be based on the contents of the Bid itself, as defined in ITB 11.2.

33.2 A substantially responsive Technical Bid is one that meets the requirements of the Bidding Documents without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that,

(a) if accepted, would:

- I. affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or
- II. limit in any substantial way, inconsistent with the Bidding Documents, the Employer's rights or the Bidder's obligations under the proposed Contract; or

(b) If rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.

33.3 The Employer shall examine the technical aspects of the Technical Bid submitted in accordance with ITB 17, in particular, to confirm that all requirements of Section VI, Employer's Requirements have been met without any material deviation, reservation, or omission.

33.4 If a Technical Bid is not substantially responsive to the requirements of the Bidding Documents, it shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.

**34. Nonmaterial  
Nonconformities**

- 34.1 Provided that a Technical Bid is substantially responsive, the Employer may waive any nonconformity in the Technical Bid that does not constitute a material deviation, reservation or omission.
- 34.2 Provided that a Technical Bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Technical Bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price of the Price Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.
- 34.3 Provided that a Technical Bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component. The adjustment shall be made using the method indicated in Section III, Eligibility and Qualification Criteria.

**35. Detailed  
Evaluation of  
Technical Bids**

- 35.1 The Employer will carry out a detailed technical evaluation of the Bids not previously rejected as being substantially non-responsive, in order to determine whether the technical aspects are in compliance with the Bidding Documents. The Bid that does not meet minimum acceptable standards of completeness, consistency and detail, and the specified minimum (or maximum, as the case may be) requirements for specified Schedule of Guarantees, will be rejected for non-responsiveness. In order to reach such a determination, the Employer will examine and compare the technical aspects of the Bids on the basis of the information supplied by the Bidders, taking into account the following:
- (a) overall completeness and compliance with the Employer's Requirements; conformity of the Works offered with specified performance criteria, corresponding to each Schedule of Guarantees, as indicated in the Technical Requirements; suitability of the Works offered in relation to the environmental and climatic conditions prevailing at the site; and quality, function and operation of any process control concept included in the Bid;
  - (b) other relevant factors, if any, listed in Section III,

- 35.2 Where alternative technical solutions have been allowed in accordance with ITB 13.4, and offered by the Bidder, the Employer will make a similar evaluation of the alternatives. Where alternatives have not been allowed but have been offered, they shall be ignored.
- 36. Correction of Arithmetical Errors**
- 36.1 During the evaluation of Price Bids, the Employer shall correct arithmetical errors on the following basis:
- (a) where there are errors between the total of the amounts given under the column for the price breakdown and the amount given under the Total Price, the former shall prevail and the latter will be corrected accordingly;
  - (b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
  - (c) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.
- 36.2 Bidders shall be requested to accept correction of arithmetical errors. Failure to accept the correction, in accordance with ITB 36.1, shall result in the rejection of the Bid and forfeiture of Bid Security.
- 37. Conversion to Single Currency**
- 37.1 For evaluation and comparison purposes, the currency(ies) of the Bid shall be converted into a single currency as **specified in the BDS.**
- 38. Evaluation of Price Bids**
- 38.1 The Employer shall use the criteria and methodologies indicated in this Clause. No other evaluation criteria or methodologies shall be permitted.
- 38.2 To evaluate a Price Bid, the Employer shall consider the following:
- (a) the Bid Price, excluding Provisional Sums in the Price Schedules, but including Day work items, where priced competitively;
  - (b) price adjustment for correction of arithmetic errors in accordance with ITB 36.1;
  - (c) price adjustment due to discounts offered in accordance with ITB 18.7 or ITB18.8;
  - (d) price adjustment due to quantifiable nonmaterial nonconformities in accordance with ITB 34.3;

- (e) converting the amount resulting from applying (a) to (d) above, if relevant, to a single currency in accordance with ITB 37; and
- (f) the evaluation factors indicated in Section III, Evaluation and Qualification Criteria.

38.3 If price adjustment is allowed in accordance with ITB 18.7, the estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in Bid evaluation.

38.4 If these Bidding Documents allow Bidders to quote separate prices for different lots (contracts), and the award to a single Bidder of multiple lots (contracts), the methodology to determine the lowest evaluated price of the lot (contract) combinations, including any discounts offered in the Letter of Price Bid, is specified in Section III, Eligibility and Qualification Criteria.

38.5 If the Bid, which results in the lowest evaluated Bid Price, is Seriously unbalanced or front loaded in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Price Schedules, to demonstrate the internal consistency of those prices with the methods and the Price Schedules proposed. After evaluation of the price analyses, taking into consideration the Schedule of Payment, the Employer may require that the amount of the Performance Security be increased at the expense of the Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.

**39. Comparison of Bid** 39.1 The Employer shall compare the evaluated prices of all substantially responsive Bids in accordance with ITB 38.2 to determine the lowest evaluated Bid.

**40. Employer's Right to Accept Any Bid, and to reject any or All Bids** 40.1 The Employer reserves the right to accept or reject any Bid, and to annul the bidding process and reject all Bids at any time prior to Contract award, without thereby incurring any liability to Bidders. In case of annulment, all Bids submitted and specifically, Bid Securities shall be promptly returned to the Bidders.

## F. Award of Contract

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|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>41. Award Criteria</b>        | 41.1 Subject to ITB 40.1, the Employer shall award the Contract to the Bidder whose offer has been determined to be the lowest evaluated Bid and is substantially responsive to the Bidding Documents, provided further that the Bidder is determined to be eligible and qualified to perform the Contract satisfactorily.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>42. Notification of Award</b> | <p>42.1 Prior to the expiration of the period of Bid validity, the Employer shall notify the successful Bidder, in writing, that its Bid has been accepted. The notification letter (hereinafter and in the Conditions of Contract and Contract Forms called the “Letter of Acceptance”) shall specify the sum that the Employer will pay the Contractor in consideration of the execution and completion of the Works (hereinafter and in the Conditions of Contract and Contract Forms called “the Accepted Contract Amount”). The outcome/result of the evaluation shall be published on the webpage of Maha-Metro before sending out the notification of the award</p> <p>42.2 After Notification of Award, unsuccessful Bidders may request in writing to the Employer a debriefing seeking explanations on the grounds on which their bids were not selected .The Employer <b>shall promptly respond</b>, in writing, to any unsuccessful Bidders who, after the Notification of Award, request a debriefing.</p> <p>42.3 After a Contract has been determined to be eligible for financing under funding agency, the following information may be made public by funding agency:</p> <ul style="list-style-type: none"> <li>(a) name of each Bidder who has submitted a Bid;</li> <li>(b) Bid Prices as read out at Bid opening;</li> <li>(c) name and address of the successful Bidder;</li> <li>(d) name and address of the supplier (if applicable); and</li> <li>(e) award date and amount of the Contract.</li> </ul> <p>42.4 Until a formal Contract is prepared and executed, the Letter of Acceptance shall constitute a binding Contract.</p> |

#### 43. Grounds Exclusion

for

Bidders (either natural or legal persons including any of their subcontractors) shall not be awarded this contract if, on the date of submission of an application or of a bid or on the date of award of a contract, they have been the subject of a conviction by final judgment for one of the following reasons:

- a) where the bidder is bankrupt or is the subject of insolvency or winding-up proceedings, where its assets are being administered by a liquidator or by the court, where it is in an arrangement with creditors, where its business activities are suspended or it is in any analogous situation arising from a similar procedure under national laws and regulations;
- b) bidder have not fulfilled their obligations regarding the payment of social security contributions or taxes in accordance with the legal provisions of the country where they are established or the Employer 's country
- c) where the Employer can demonstrate by any appropriate means a violation by the bidder of applicable obligations in the fields of environmental, social and labour law established by national law, collective agreements or by the international environmental, social and labour law provisions;
- d) where the Employer has sufficiently plausible indications to conclude that the bidder has entered into agreements with other bidder(s) aimed at distorting competition;
- e) where the bidder has shown significant or persistent deficiencies in the performance of a substantive requirement under a prior public contract, a prior contract with the Employer or a prior concession contract which led to early termination of that prior contract, damages or other comparable sanctions;
- f) bidder have been convicted within the past five years by a court decision, which has the force of residential jurisdiction in the country where the project is implemented, of fraud or corruption or any other Prohibited Conduct (as defined in the Covenant of Integrity) committed during the procurement or performance of a contract, unless they provide supporting information together with their Covenant of Integrity which shows that this conviction is not relevant in the context of this project;
- g) bidder is listed for financial sanctions by the United Nations, the European Union and/or any other organization for the purposes of fight against terrorist financing or threat to international peace and security;

- h) bidder including JV Partners should be excluded by the EU Institutions or any major Multilateral Development Bank (including World Bank Group, African Development Bank, Asian Infrastructure Investment Bank, Asian Development Bank, European Bank for Reconstruction and Development, European Investment Bank or Inter-American Development Bank) from participation in a tendering procedure on the grounds of Prohibited Conduct;
- i) where the Employer can demonstrate by appropriate means that the bidder is guilty of grave professional misconduct, which renders its integrity questionable;
- j) where a conflict of interest within the meaning of ITB 4.2 cannot be effectively remedied by other less intrusive measures;
- k) where a distortion of competition from the prior involvement of the bidder in the preparation of the procurement procedure, as referred to in ITB 3.1, cannot be remedied by other, less intrusive measures;
- l) where the bidder has been guilty of serious misrepresentation in supplying the information required for the verification of the absence of grounds for exclusion or the fulfilment of the selection criteria, has withheld such information or is not able to submit the supporting documents required pursuant to ITB 15; or
- m) where the bidder has undertaken to unduly influence the decision-making process of the Employer, to obtain confidential information that may confer upon it undue advantages in the procurement procedure or to negligently provide misleading information that may have a material influence on decisions concerning exclusion, selection or award.

Notwithstanding point (a) of the first subparagraph, Employer might not exclude a bidder which is in one of the situations referred to in that point, where the Employer has established that the bidder in question will be able to perform the contract, taking into account the applicable national rules and measures on the continuation of business in the case of the situations referred to in point (a).

Any bidder that is in one of the situations referred to in the above paragraph may provide evidence to the effect that measures taken by the bidder are sufficient to demonstrate its reliability despite the existence of a relevant ground for exclusion. If such evidence is considered as sufficient, the bidder concerned will not be excluded from the procurement procedure.

For this purpose, the bidder shall prove that it has paid or undertaken to pay compensation in respect of any damage caused by the criminal offence or misconduct, clarified the facts and circumstances in a comprehensive manner by actively collaborating with the investigating authorities and taken concrete technical, organisational and personnel measures that are appropriate to prevent further criminal offences or misconduct.

The measures taken by the bidder will be evaluated taking into account the gravity and particular circumstances of the criminal offence or misconduct. Where the measures are considered to be insufficient, the bidder shall receive a statement of the reasons for that decision.

Bidders and all of its associates (if any) and all the members of the “Group” in case of Joint Venture are required as a condition of admission to eligibility, to execute and attach a Covenant of Integrity in the form indicated in Form 24 of Section IVA Bidding Forms.

Bidders will also be required to confirm and declare that no agent, middleman or any intermediary has been, or will be, engaged to provide any services, or any other items of work related to the award and performance of this contract.

Bidder and all of its associates (if any) and all the members of the “Group” in case of joint venture will be required to confirm and declare in the Tender submittal to that effect that in case they are successful Bidder, they will be deploying at least the proposed resources, personnel throughout the construction period as provided in the Tender submittals by the lead member and JV member(s). Non-deployment/compliance to the Tender submissions may lead to remedial action in accordance with the contract.

#### **44. Signing of Contract**

44.1 Promptly upon notification, the Employer shall send the successful Bidder the Contract Agreement.

44.2 Within twenty-eight (28) days but no sooner than 10 days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Employer.

#### **45. Performance Security**

- 45.1 Within twenty-eight (28) days of the receipt of the Letter of Acceptance from the Employer, the successful Bidder shall furnish the Performance Security in accordance with the General Conditions of Contract, subject to ITB 38.5, using for that purpose the Performance Security Form included in Section IX Contract Forms, or another form acceptable to the Employer. If the Performance Security furnished by the successful Bidder is in the form of a bond, it shall be issued by a bonding or insurance company that has been determined by the successful Bidder to be acceptable to the Employer. A foreign institution providing a bond shall have a correspondent financial institution located in the Employer's Country.
- 45.2 Failure of the successful Bidder to submit the above-mentioned Performance Security or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event the Employer may award the Contract to the next lowest evaluated Bidder whose Bid is substantially responsive and is determined by the Employer to be qualified to perform the Contract satisfactorily.

#### **46. Incentive Clause**

The bidder will be eligible for incentive payment, if he completes the work in all respects and certified by the Engineer to that effect, at the rate as specified In the BDS.

# *Maha Metro*



## **Tender Documents**

**UGC-02: DESIGN AND CONSTRUCTION OF UNDERGROUND STATIONS AT  
BUDHWAR PETH, MANDAI AND SWARGATE AND ASSOCIATED TUNNELS**

**PART I – BIDDING PROCEDURES**

**Section II – Bid Data Sheet**

June 2018

## Section II. Bid Data Sheet

A. Introduction	
ITB 1.1	The number of the Invitation for Bids is: <b>P1UG-02/2018</b>
ITB 1.1	The Employer is: <b><u>Maharashtra Metro Rail Corporation Limited (Maha-Metro)</u></b>
ITB 1.1	<b>NAME OF WORK:</b> <b>Design and Construction of Underground stations at Budhwar Peth, Mandai and Swargate and associated tunnels</b> The identification number of the ICB is: <b>P1UG-02/2018</b>
ITB 1.3 (New Para)	<p>The detailed Scope of Work for the Construction of this contract is further described in the Part II: <b>Section-VI (A, B, C &amp; D)</b> Employer's Requirements and other documents. The Contractor has to execute the work accordingly with the approval of Employer. The Bidders are particularly advised to pay attention to the IT Requirements of Employer (<a href="#">Clause 2.3</a> of General Specifications of Employer's Requirements).</p> <p>The Contractor shall also carry out effective interface and coordination with Detailed Design Consultants, Designated Working Contractors and other agencies appointed by the Employer from time to time, during the Contract Period. Apart from that co-ordinations may require with the local administration and various other authorities of Government of Maharashtra.</p>
ITB 1.4 (New Para)	The successful Bidder has to establish its <b>Office at Pune</b> if it does not have at present. The cost and expenses for setting up the said office(s) will be deemed to have been included in the Bill of Quantities and no separate / extra / additional payment will be made on this account.
ITB 1.5 (New Para)	The Contractor shall also carry out effective interface and coordination with the relevant Authorities and Designated Contractors and others appointed by the Employer from time to time, during the Contract Period.

<b>ITB 1.6 (New Para)</b>	The Contractor shall assist in Integrated Testing and Commissioning of Railway systems on the section in co-ordination with Designated Contractors, under supervision of Engineer. It shall also assist in all statutory tests and trials on railway systems necessary for obtaining sanction of competent / statutory authorities for opening the system for public carriage of passengers and provide assistance and information as required by the appropriate statutory authorities in India.
<b>ITB 2.1</b>	The name and the details of the project is <b><u>Pune Metro Rail Project.</u></b>  The Employer is in the process of applying for part financing of the entire project from external agency as European Investment Bank (EIB). However, this work is also being partly funded through equity from Government of India & Government of Maharashtra.
<b>ITB 4.1</b>	Maximum number of members in the JV shall be: <b><u>Three</u></b>  Lead member shall have minimum <b>40%</b> participation and other members shall have minimum <b>25%</b> participation in the proposed JV / Consortium for this work. The lead member must be technical and have maximum share in the JV.  In case of JV / Consortium, change in constitution or percentage participation of JV/Consortium shall not be permitted at any stage after their submission of Bid and thereafter.  The authorized representative from lead member of JV/Consortium shall be signatory of the bid. <b>(Ref. Form-9. Section-IV a of Part-1)</b>
<b>ITB 4.2 (C) (Add)</b>	No Bidder can be a subcontractor while submitting a Bid individually in his own name or as a partner of a JV / Consortium in the same bidding process. A Bidder, if proposed as a subcontractor in any Bid, may be a proposed subcontractor in more than one Bid also, but only in the capacity of Sub-contractor. The credentials of parent and sister company shall not be considered for eligibility criteria.
<b>ITB 4.5</b>	This Bidding Process is in single stage two-packet system through e-tender portal of Maha-Metro. Unless otherwise approved by the Employer, the Bids for this Contract will be considered only from those companies, corporation, partnerships, consortia and joint ventures who pass the Eligibility and Criteria (Initial Filter) under Section III based on submissions with the Bid. Further evaluation will be done of only such eligible Bidders.

<p><b>ITB 4.7 (New Para)</b></p>	<p>Where the Bidder is a Consortium or Joint Venture, the Bidder shall submit the following additional information to meet the qualification criteria for eligibility:</p> <p>(a) A Memorandum of Understanding / Consortium Agreement shall be provided duly notarized by the notary public of country of origin and should be stamped by Embassy / High Commission.</p> <p>(b) nomination of one of the Members of the Consortium or Joint Venture to be in-charge (“Lead member”); and this authorization shall be covered in the Power of Attorney signed by the legally authorized signatories of all Members of Consortium or Joint Venture.</p> <p>(c) Details of the intended financial participation by each member shall be furnished with complete details of the proposed division of project execution responsibilities and relationships among the individual Members.</p> <p>(d) The Lead member shall be authorized to incur liabilities, receive payment (if provided for in MoU / Consortium Agreement) and receive instructions for and on behalf of any or all Members of the Consortium / Joint Venture.</p> <p>(e) All members of the Consortium / Joint Venture shall be jointly and severally responsible for the execution of the Contract in accordance with the terms and conditions of the Contract.</p> <p>(f) The Bid shall be signed so as to be legally binding on all the Members of the Consortium.</p>
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<b>ITB 4.8 (New Para)</b>	Each Bidder (each Member in the case of a JV/Consortium) is required to confirm and declare with its Bid that no agent, middleman or any intermediary has been, or will be, engaged to provide any services, or any other item or work related to the award and performance of this Contract. Such Bidder or Member will have to further confirm and declare in the Bid that no agency commission or any payment which may be construed as an agency commission has been, or will be, paid and that the Contract Price will not include any such amount. If the Employer subsequently finds to the contrary, the Employer reserves the right to declare the Bidder as non-compliant, and declare any Contract if already awarded to the Bidder to be null and void. Specific declaration to this effect exactly as per <a href="#">Section IV a: Bidding Form (Form 18)</a> shall be submitted with the Technical Package.
<b>ITB 4.9 (New Para)</b>	Canvassing or offer of an advantage or any other inducement by any person with a view to influencing acceptance of a Bid will be an offence under laws of India. Such action will result in the rejection of the Bid, in addition to other punitive measures.
<b>ITB 4.10 (New Para)</b>	Indian Bidders, or Indian Members of a Consortium shall submit, a copy of the Permanent Account Number (PAN) issued by the Income Tax Authorities and a certified copy of the last 3 years (including the latest Financial Year) income tax return, duly acknowledged by Income Tax department with their Bid and the Technical Package. In case the Indian member of a Consortium is a wholly owned 100% subsidiary of their foreign member in the said Consortium and this Indian company has been formed less than 3 years ago, the certified copy of the latest Financial Year income tax return (applicable only if company was formed more than a year ago), duly acknowledged by Income Tax department shall be submitted in the Technical Package.

<b>ITB 5.3 (New Para)</b>	<p>Bidders are encouraged <b>(Not mandatory &amp; Binding)</b> to adopt Indian sources to the maximum possible extent. However, all plant, materials, supplies, equipment and services shall be to the satisfaction of the Employer and Engineer. The information on all plant, materials, supplies, equipment and services included in the bidder's Proposal and incorporated into the Contract shall not, in any event, be construed as a submission to the Employer under the Contract. Bidder will be required to take specific approval of the Employer for deployment of plant, materials, supplies, equipment and services in accordance with the Conditions of Contract and Employer's Requirements.</p>
<b>ITB 6.1</b>	<p><b>Replace provisions of ITB 6.1 with the following:</b></p> <p>The Bidding Documents consist of Parts 1, 2, 3 &amp; 4 which include all the Sections specified below, and which should be read in conjunction with any Addenda/Corrigenda issued in accordance with <a href="#">ITB 8</a>.</p> <p><b>PART 1 Instructions to Bidders</b></p> <ul style="list-style-type: none"> <li>• Section IA. E-tender Tool Kit</li> <li>• Section IB. Instructions to Bidders (ITB)</li> <li>• Section II. Bid Data Sheet (BDS)</li> <li>• Section III. Eligibility and Qualification Criteria</li> <li>• Section IV a. Bidding Forms</li> <li>• Section IV b. Pricing Schedule &amp; Financial Bid</li> <li>• Section V. Eligible Source Countries of funding agency</li> </ul> <p><b>PART 2 Employer's Requirements</b></p> <ul style="list-style-type: none"> <li>• Section VI. Employers requirements and appendices <ul style="list-style-type: none"> <li>A. General.</li> <li>B. Functional.</li> <li>C. Design</li> <li>D. Construction</li> <li>E. Manufacture, Installation and Testing</li> <li>F. Appendices</li> </ul> </li> <li>• Section VII. Outline Design Specifications</li> <li>• Section VIII. Outline Construction Specifications</li> </ul>

	<ul style="list-style-type: none"> <li>Section IX. Tender Drawings</li> </ul> <p><b>PART 3 Conditions of Contract and Contract Forms</b></p> <ul style="list-style-type: none"> <li>Section X. General Conditions of Contract (GCC)</li> <li>Section XI. Particular Conditions of Contract (PCC)</li> <li>Section XII. Contract Forms</li> </ul> <p><b>PART 4 Reference Documents</b></p> <ul style="list-style-type: none"> <li>Section XIII. Geotechnical Report</li> <li>Section XIV. OHS&amp;E Manual</li> <li>Section XV. Building Condition Survey</li> <li>Section XVI. Utility Survey</li> <li>Section XVII. Tree Cutting Survey</li> <li>Section XVIII. Bore Well Survey</li> </ul> <p>The contents of Part 4 – Reference Documents are for general reference information only and any interpretation of the results shall be construed as opinions only and not as representations or warranties as to the actual site or sub-soil conditions.</p> <p>The Bidder shall check the pages of all documents against page numbers given in the Contents Page to each Part/Section, and in the event of discovery of any discrepancy, the Bidder shall inform the Employer forthwith.</p>
<b>ITB 6.3 (a)</b> <b>(Additional para)</b>	<p><b><u>Add to ITB 6.3</u></b></p> <p>Unless obtained directly by the bidder concerned from the Employer's E-tender portal, the Employer is not responsible for the completeness of the Bidding Documents, responses to requests for clarification, the minutes of the pre-Bid meeting (if any), or Addenda/Corrigenda to the Bidding Documents in accordance with <b>ITB 8</b>. (Downloaded / Uploaded by Bidder). In case of any contradiction, documents available / uploaded on E-Tender portal of Employer shall prevail.</p>
<b>ITB 6.3(b)</b> <b>(Additional para)</b>	<p><b><u>Add to ITB 6.3</u></b></p> <p>Failure to comply with the requirements of the Bidding Documents and to furnish all information required by the Bidding Documents or submission of a Bid not substantially responsive to the Bidding Documents in every respect will be at the Bidder's risk and may result in rejection of its Bid.</p>
<b>ITB 6.5 (New)</b>	<p>The Bidder shall not make or cause to be made any alteration, erasure or obliteration to the text of the Bid Documents as uploaded on the E-tender</p>

Para)	portal of Maha-Metro.
ITB 6.6 (New Para)	The document including the Bid Documents and all attached documents provided by Maha-Metro are and shall remain or becomes the property of Maha-Metro and are transmitted to the Bidders solely for the purpose of preparation and the submission of a Bid in accordance herewith. The provisions of this Para shall also apply <i>mutatis mutandis</i> to the Bids and all other documents submitted by the Bidders, and Maha-Metro will not return to the Bidders any Bid, document or any information provided along therewith.
ITB 6.7 (New Para)	<b>Contents of Supporting Documents</b>
ITB 6.7.1 (New Para)	The reference documents, reports, drawings containing site information included in the Bidding Documents are for general information only and any interpretation of the results shall be construed as opinions only and not as representations or warranties as to the actual site conditions. The Bidders' attention is specifically drawn to <a href="#">ITB 6.7.3</a> below.
ITB 6.7.2 (New Para)	The Bidders shall note the existence of over ground, at grade and underground structures, utilities and infrastructure in the near vicinity of the Works to be constructed.
ITB 6.7.3 (New Para)	The accuracy or reliability of the documents and reports referred to in this Para <a href="#">ITB 6.7</a> and of any other information supplied, prepared or commissioned at any time by the Employer or others in connection with the Contract is not warranted. The Bidders' attention is drawn to <a href="#">Clause 4.10 of GCC</a> in this regard. The Bidder should visit, examine and assess the Site including working conditions and will be deemed to have satisfied himself of the risks and obligations under the Contract.
ITB 7.1	<p><b>For clarification purposes and for any update/addendum/corrigendum/pre-bid queries</b> the Employer's address is:</p> <p>Attention: <u>General Manager (Procurement)</u>  Street Address: <b>101, The Orion, Opposite Don Bosco Youth Centre, Koregaon Park</b>  City: <u>Pune</u>  ZIP Code: <u>411001</u>  Country: <u>India</u>  Telephone: 020-26051074  E-Mail Address: <a href="mailto:mahametro.tenders@gmail.com">mahametro.tenders@gmail.com</a>  Web page: <a href="http://www.punemetrorail.org">www.punemetrorail.org</a>  e-tendering portal <a href="https://mahametrorail.etenders.in">https://mahametrorail.etenders.in</a></p>

<b>ITB 7.1.1 (Additional Para)</b>	Should the Bidder for any reason whatsoever, be in doubt about the meaning of anything contained in the Bid Documents or the extent of detail in the Employer's Requirements (General Specification and Technical Specification) and Bidding Drawings, the Bidder shall seek clarification from Maha-Metro, not later than the date specified. Bidders are advised to use the format attached in <a href="#">Section IV a: Bidding Forms (Form 11)</a> while seeking clarifications.
<b>ITB 7.4</b>	A Pre-Bid meeting shall take place for this tender on 26.06.2018. However, bidders are allowed to raise queries pertaining to bid up till the following date and time: Date: _____ Time: _____
<b>ITB 7.5</b>	The Bidder is requested, as far as possible, to submit any questions in writing, to reach the Employer before the date and time specified for Pre-Bid meeting in NIT & ITB 7.4 above. The bidder may send such queries either by post to the address mentioned in the bid document or send by mail to <a href="mailto:mahametro.tenders@gmail.com">mahametro.tenders@gmail.com</a> .
<b>ITB 7.6</b>	Minutes of the pre-bid meeting, if applicable, including the text of the questions asked by Bidders, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be uploaded on the E-Tender portal of Maha-Metro in accordance with ITB 6.3, and the same shall also be part and parcel of the Bid Document.
<b>ITB 7.8 (new Para)</b>	<p><b>Proposals for use of Work Areas</b></p> <p>7.8.1 The Bidder shall note the requirements of the Land Acquisition Act, of India</p> <p>7.8.2 The Bidder shall note the provision contained in <a href="#">Appendix 2A</a> of Employer's Requirements.</p> <p>7.8.3 The Bidder is to note that the Contractor will be fully responsible for the provision of all utility services like water, electricity, sewerage etc. necessary for the construction and completion of the Works as described in <a href="#">Appendix-8</a> to the Employer's Requirements (<a href="#">Section VI</a>).</p>
<b>C. Preparation of Bids</b>	
<b>ITB 10.1</b>	The language of the bid is: <b>English</b> All correspondence/ exchange shall be in the <b>English language</b> . Language for

	<p>translation of supporting documents and printed literature is <b>English</b>.</p> <p>Supporting documents related to eligibility criteria enclosed with the bid, other than English Language, should be translated in to <b>English</b> and each such translated page will have to be notarized/registered with appropriate statutory authority in the jurisdiction where the supporting document is being issued and should be endorsed by Indian Embassy.</p> <p>The bidder should provide the relevant contact number &amp; E-Mail ID along with the postal address, in <b>English</b>, of issuing authority / agency of such documents for verification purpose.</p>
<b>ITB 11</b>	<p><b>Documents Comprising the Bid</b></p> <p><b>Replace the Para 11 and its Sub-Paras with the following:</b></p>
<b>11.1</b>	<p>The Bidder shall, on or before the date and time given in the Notice of Invitation to Bid, upload his Bid on e-tendering portal <a href="https://mahametrorail.etenders.in">https://mahametrorail.etenders.in</a> in accordance with provisions in ITB 26.1.</p>
<b>ITB 11.2</b>	<p><b>General Requirements</b></p>
<b>ITB 11.2 (a)</b>	<p>The Bidder shall follow the procedure and steps of E-Tender portal of Maha-Metro given in E-Toolkit provided as <b>Section 1A-Etender Tool Kit</b>.</p> <p><b>Cost of the bid</b> : Paid online through E-Tender portal</p> <p><b>Bid Security</b>: Scanned Copy of BG to be uploaded</p> <p><b>Technical Package</b>: To be submitted at appropriate place i.e. Technical Envelope on e-tender portal.</p> <p><b>Financial Package</b>: Financial bid form to be duly filled up directly in the Commercial Envelope only on e-tender portal and not anywhere else.</p> <ul style="list-style-type: none"> <li>• <b>Bidder should ensure that the no part of the Financial Bid should be up- loaded anywhere in the Technical Bid; if the bidder does so then his bid will be rejected out rightly.</b></li> <li>• The original Bank Guarantee from an Indian Schedule commercial bank (excluding Cooperative Banks) or from a schedule Foreign Bank having business office in India as defined in Section 2(e) of RBI Act 1934. Bid Security shall be submitted within three working days from the last date stipulated for submission of bid at the office of Maha-Metro at address given above.</li> <li>• <b>For Bid Security</b>: refer <a href="#">BDS ITB 21.1</a> below</li> </ul>

<b>ITB 11.2 (b)</b>	The bid documents shall include all the corrigendum/ addendum/ clarifications provided by the Employer during the course and before submission of Bid. In case of failure by the bidder in uploading (submission) the same, the bid shall be treated as non-responsive and not evaluated further.
<b>ITB 11.2(c)</b>	<p>The Bidder shall submit/ upload (through digital signature of authorized person in e-tender portal of Maha-Metro) in the Technical Package of its Bid the following documents, duly completed, which in the event of acceptance of the Bid, shall form part of the Contract:-</p> <ol style="list-style-type: none"> <li>i. Letter of Bid in accordance with ITB 12.</li> <li>ii. Complete bid documents along with addendum/ corrigendum/ clarifications &amp; reply of quires issued online to be down loaded by bidder using DSC of authorized signatory of bidders or JV/Consortium only and entire document to be uploaded by bidder on E-Tender portal of Maha-Metro through the same digital signature of the Bidder.</li> <li>iii. Copy of Power of Attorney signing the bid of bidder</li> <li>iv. Scanned copy of Bid Security</li> <li>v. Scanned copy of POA of each member &amp; Lead member in case of JV/ Consortium</li> <li>vi. All relevant formats given in Section IV a : Bidding format. Physically signed by authorized signatory.</li> <li>vii. Certificate of registration and other statutory documents of formation of bidder's company or JV/ Consortium or each members of JV/ Consortium (If not incorporated yet) issued by appropriate authority.</li> <li>viii. Jointly and Severally liability undertaking for the execution of contract</li> <li>ix. Copy of all financial documents as directed in Section-III</li> <li>x. Relevant work experience certificate (in line of Section III: Eligibility and Qualification Criteria).</li> <li>xi. All format of Section-IV a and other enclosure, certificates stated above or desired elsewhere in the bid documents shall be physically filled, signed &amp; stamped by authorized signatory and scanned copies of such enclosures/documents should be uploaded on e-tender portal of Maha-Metro along with bid documents. The enclosures meant for Technical package shall be uploaded with Technical Envelope. The pre-qualification documents shall comprise of all information and supporting documents as per Section III: Eligibility and Qualification Criteria <ul style="list-style-type: none"> <li>• Letter of application</li> <li>• Letter of participation from each member of the group</li> </ul> </li> </ol>

	<ul style="list-style-type: none"> <li>All other details</li> </ul> <p>xii. Covenant of Integrity duly filled in the format given in Section IV a: Bidding Forms</p>
<b>ITB 11.3</b>	Alternative price bid is <b>not permissible</b>
<b>ITB 11.4 (New Clause)</b>	Technical Package
<b>ITB 11.4.1 (New Clause)</b>	<p><b>Outline Quality Plan (Form 4.7 under Section IV a: Bidding Form):</b> The Bidder shall submit as part of its Bid an Outline Quality Plan illustrating the intended means of compliance with the General Specifications Part 2, Section VI-A, Employer's Requirements, and setting out in summary form an adequate basis for the development of the more detailed document required under specifications of the Bid. The Outline Quality Plan shall contain sufficient information to demonstrate clearly the proposed method of achieving the Bidder's quality objectives with regard to the requirement of the Contract.</p> <p>Overall responsibility of quality for manufacture, testing, commissioning and DLP shall be with the Consortium member based on whose experience and strength, the Bidder has qualified for this Bid.</p>
<b>ITB 11.4.2 (New Clause)</b>	<p><b>Outline Safety Plan (Form 4.8 under Section IV a: Bidding Form):</b> The Bidder shall submit as part of its Bid an Outline Safety Plan which shall contain sufficient information to demonstrate clearly the Bidder's proposals for achieving effective and efficient safety procedures in the design, manufacture, testing and commissioning of the Works. The Outline Safety Plan should include an outline of the safety procedures and regulations to be developed and the mechanism by which they will be implemented for ensuring safety including Hazard Analysis, Fire Control, Electro Magnetic Compatibility/Electro-magnetic Interference control, reliability, availability and maintainability requirements as given in the Employer's Requirements Particular Conditions.</p> <p>The Outline Safety Plan shall be headed with a formal statement of policy in relation to safety and shall be sufficiently informative to define the Bidder's Safety Plans and set out in summary an adequate basis for the development of the Site Safety and Safety in transportation to be submitted in accordance with Employer's Requirements and PCC. The Bidder may be requested by Maha-Metro in writing to amplify, explain or develop its Outline Safety Plan prior to the date of acceptance of the Bid and to provide more details with a view to reaching provisional acceptance of such a Plan.</p>
<b>ITB11.4.3 (New Clause)</b>	<p><b>Outline Environmental Plan (Form 4.8 under Section IV a: Bidding Form):</b> The Bidder shall submit as part of its Bid an Outline Environmental Plan setting out in summary form its intended means of complying with the</p>

	<p>Employer's Safety, Health and Environment Manual and noise standards for the Works. This shall be an adequate basis for the development of the more detailed document to be submitted under Employer's Requirements. This shall form the basis for the submission of a detailed and comprehensive Environmental Plan to be submitted in accordance with Employer's Requirement at the time of detailed design.</p> <p>The Bidder may be requested by Maha-Metro in writing to amplify, explain or develop its Outline Environmental Plan prior to the date of acceptance of the Bid and to provide more detail with a view to reaching provisional acceptance of such a Plan.</p>
<b>ITB11.4.4 (New Clause)</b>	<p>The Structure of the Bidder including details of ownership and control of the Bidder (<b>Form 4.10 under Section IV a: Bidding Form</b>).</p>
<b>ITB11.4.5 (New Clause)</b>	<p><b>Project Management Plan (Form 4.9 under Section IV a: Bidding Form):</b></p> <p>The Bidder shall submit with its Bid a Project Management Plan including staffing schedule as prescribed in Employer's Requirements, inter-alia, indicating names, qualifications, professional experience and corporate affiliation of all proposed key management and engineering personnel (above the level of supervisor) and specialists. Details shall be included for all such personnel whether directly employed or engaged on a consultancy or advisory basis and whether associated with the design or the construction of the Works. The submission shall include a provisional management structure and organization chart showing areas of responsibility, relative seniorities and lines of reporting.</p> <p>The Bidder shall include its proposals for its Co-ordination Control Team and include the name and qualifications of the Team Leader responsible for the interface co-ordination with Designated Contractors.</p> <p>The successful Bidder shall deploy those proposed key management and engineering personnel. Should they be not available for the Work, the successful Bidder shall deploy an equivalent or superior expert (in qualification, experience and capability) acceptable to the Employer and subject to the written prior approval of Employer.</p>
<b>ITB11.4.6 (New Clause)</b>	<p><b>Staffing Schedule and Organization Chart (refer Form 4.1 under Section IV a: Bidding Form)</b></p> <p>(i) The Bidder shall submit with his Bid, as per format provided in Section IV a: Bidding Forms a staffing schedule containing the names, qualifications, professional experience and corporate affiliation of all proposed management personnel (above the level of shift supervisor) and specialists for this work. Details shall be included for all such personnel whether directly employed or engaged on a consultancy or advisory basis and whether associated with the design or the construction of the Works. The</p>

	<p>submission shall include a provisional management structure and organization chart showing areas of responsibility, relative seniorities and lines of reporting. The proposed staffing plan shall in no way be less than the minimum requirement as indicated in Section III: Eligibility and Qualification Criteria.</p> <p>(ii) The Bidder shall include his proposals for his Co-ordination &amp; Control Team and include the name and qualifications of the Team Leader responsible for the interface co-ordination with Designated Contractors.</p> <p>(iii) The key staff for tunneling shall be from that member of the JV who has the experience of tunneling and on whose experience the JV qualifies the criteria of work experience and if the JV qualifies on the credentials of work eligibility by the foreign member then the Project Manager deployed shall be an expatriate having minimum 15 years of total experience out of which 10 years should be in projects of similar nature.</p> <p>In case the successful Bidder is a JV having a foreign member and if the experience of tunneling for the purpose of qualifying the minimum eligibility criteria was fulfilled by the foreign member then the foreign member shall submit an additional Bank Guarantee (In addition to performance security) of an amount equal to 1% of the contract value as per LOA for the fulfillment of the condition of deployment of key staff and the expatriate Project Manager for the project.</p>
<b>ITB11.4.7 (New Clause)</b>	Bidder's Proposed Works and Design submission Programme
(1)	The Bidder shall submit with its Bid, a Works Programme which shall indicate how the Bidder intends to organize and carry out the Works and achieve Stages and complete the whole of the Works by the appropriate Key Dates. Detailed requirements for the Works Programme are set out in Section IV a: Bidding Forms ( <b>Form 4.3</b> ). The Works Programme shall be prepared in terms of weeks from Commencement Date of Works. The Works Programme given in the Bid shall not in any event be construed as a submission of the Works Programme as required to be furnished according to the Employer's Requirements.
(2)	The Bidder shall submit with its Bid its proposed Design Submission Programme to cover the Design Phase. Such proposed programme shall: (a) be consistent with the Works Programme as detailed in Employer's Requirements; (b) Include a Schedule identifying, describing, cross-referencing and explaining the Design Packages and Submissions which the Bidder intends to submit; (c) take due account of the design co-ordination interface periods during which the Contractor shall be required

	to undertake and complete all aspects of design co-ordination with other contractors (Designated Contractors) engaged in the design of the Project such that each contractor can complete its coordinated design in the knowledge that such design will be compatible and coordinated with others and allowing adequate time for the Employer's assessments and decisions. The proposed Design Submission Programme submitted at the time of Bid shall be modified and developed as necessary during the Contract Period to incorporate the Employer's programme requirements in respect of review by the Employer and the Engineer.
(3)	The Bidder's attention is drawn to the Employer's Requirements and the requirements that the initial Proposed Works Programme and Design Submission Programme shall be submitted within the period stipulated in Employer's Requirements. However, the Bidder should note that it may be requested by Maha-Metro in writing to amplify, explain and develop its proposed Works Programme prior to award of Contract.
(4)	The proposed Design Submission Programme and other submissions given in the Bid shall not, in any event, be construed as a submission as required to be furnished as per the Employer's Requirements
<b>ITB 13.1</b>	Alternative bids shall not be permitted under ITB 13.1, ITB 13.2, ITB 13.3, or ITB 13.4
<b>ITB 13.2</b>	Alternative times for completion not permitted.
<b>ITB 18.5</b>	The prices quoted by the bidder shall not be adjustable as it is a fix priced contract.
<b>ITB 18.9 (New Clause)</b>	Due to change in law, the Employer may get, from the Government, partial or complete waiver of taxes under GST, royalties, Labour, cess, and other levies payable to various authorities. The successful Bidder (the Contractor) shall maintain meticulous records of all the taxes and duties paid under GST etc. and provide the same with each running bill. In case the waiver becomes effective, the Contractor will be advised on the process to be followed to obtain the refund from the concerned authority. The Contractor shall arrange for the remit of the refund to the Employer. In case of failure by the Contractor to remit such amounts, the same shall be recovered from amounts due for payment to the Contractor. The Pro forma of undertaking is provided in Section IV a: Bidding Form (Form 21).
<b>ITB 18.10 (New Clause)</b>	With the Bid submission, the Bidder shall submit the Pro forma of undertaking provided in Section IV a: Bidding Form (Form 22) stating that registrations under various fiscal and labour laws like GST, Profession Tax, Import Export Code, Employee State Insurance, Provident Fund, Maharashtra Labour Welfare Fund, shall be obtained by the bidders in the event of award of the work.

<b>ITB 18.11 (New Clause)</b>	The price quoted by bidders deemed to be inclusive of all kinds of duties, taxes, Cess and other levies payable as per GST, Custom tariff act etc. and as prevailing on 30 days (Base Date) prior to final date of submission of bid (Closing time & date of submission of online bid.
<b>ITB 18.12 (New Clause)</b>	No document with regard to Custom and Excise duty will be required to be submitted. In view of above, the Bidders are advised to quote the price inclusive of all taxes, levies, duties, cess as per GST/Custom Tariff Act royalty, etc. and all other incidental charges required to fulfill the tender conditions including statutory deduction viz., TDS towards Income Tax / Works Contract Tax etc. after considering ITB 18.7 to 18.12 above.
<b>ITB 19.1</b>	The Payment of the Contract Price shall be made in INR and other two currencies(Euro and USD) in which the Bid Price is expressed in the Bid of the successful Bidder
<b>ITB 20.1</b>	The bid validity period shall be 180 days.
<b>ITB 20.3</b>	Not used.
<b>ITB 21.1</b>	<p><b>A Bid Security is required as mentioned below:-</b></p> <p>The total bid security amount shall be <b>INR 56.25 Million</b> submitted as below:</p> <p><b>INR 56.25 Million</b> in form of Bank Guarantee, as per procedure given in bid documents, from an Indian Schedule commercial bank (excluding Cooperative Banks) or from a schedule Foreign Bank as defined in Section 2(e) of RBI Act 1934.</p> <p><b>(a) A scanned copy of this BG is to be uploaded online and the bidder should ensure physical submission of the original bank guarantee at the office of Maha-Metro at address specified in bid document, within 3 working days from the last date stipulated for submission of the bid documents (online).</b></p> <p><b>(b) If the bidder fails to submit the scanned copy at the aforesaid BG or fails to submit the original bank guarantee, his Bid shall not be considered for opening &amp; rejected outright.</b></p>
<b>ITB 21.2</b>	The Bidder shall submit with his Bid, a Bid Security for the sum mentioned in BDS/IFB by BG as specified in ITB 21.1 above. Such bid security in form of Bank Guarantee, from an Indian Schedule commercial bank (excluding Cooperative Banks) or from a schedule Foreign Bank as defined in Section 2(e) of RBI Act 1934 and shall be valid for a period of 60 days beyond the bid validity period stipulated in the bid.
<b>ITB 22.1</b>	<p><b>Replacement for ITB as under:</b></p> <p>Bid to be submitted through e-tender portal of Maha-Metro only.</p>

ITB 22.2	<p><b>Replacement for ITB as under:</b></p> <p>The entire Bid Document available on e-tender portal of Maha-Metro with all Corrigendum and Addendum issued from time to time and requisite enclosures described and directed in bid documents shall be downloaded, filled and uploaded on the e-tender portal of MAHA-METRO by the authorized signatory on behalf of the bidder with his digital signature (DSC). The bidder who fails to submit as mentioned aforesaid, his bids shall be treated as non-responsive and not considered for evaluation.</p>
<b>D. Submission and Opening of Bids</b>	
ITB 23.1, 23.2	As per ITB 22.2 above
ITB 23.3, 23.4, 23.5	(Deleted)
ITB 23.6 (new Para)	<p>Bids shall be submitted through e-tender portal of MAHA-METRO only with clearly marked 'Pre-qualification &amp; Technical Proposal', containing documents comprising the Technical Proposal in accordance with the provisions of ITB 17, and the other clearly marked 'Financial Proposal', containing Schedule of Prices or the Pricing Documents in accordance with the provisions of ITB 18.</p>
ITB 24.1	<p><b>Replacement for ITB as under:</b></p> <p>Bid to be submitted through e-tender portal of MAHA-METRO only.</p> <p>The Bidder shall, on or before the date and time given in the Notice inviting Bid or as may have been amended from time to time, upload his Bid on e-tendering portal <a href="https://mahametrorail.etenders.in">https://mahametrorail.etenders.in</a>. Bidders may refer to e-tender procedures (Toolkit for using e-tender portal) at Part-I-A.</p> <p>In case of support or help required during online submission or difficulty encountered during online submission, the Bidders may contact the following officials: <b>(Helpline for on line submission of Bid only)</b></p> <ol style="list-style-type: none"> <li>1. _____</li> <li>2. _____</li> </ol>
ITB 25.1	<p><b>Replacement for ITB as under:</b></p> <p>As the bidding process is through online e-tendering process late submission of bid will not be allowed by the e-tender portal of MAHA-</p>

	METRO
ITB 26.1	<p><b><u>Replacement for ITB as under:</u></b></p> <p>As the bid process is through e-tendering portal of MAHA-METRO only amendment/ modification of bid by going into the Re-Work option of the E-Tender portal shall be permissible, in case the bidder wants to Withdraw the already uploaded submissions the same would not be possible but the bidder in such case can opt for not carrying out the process specified in the portal for handing over of the completed and uploaded bid. The bidder should further note that in such case the Bid Security deposited through the system shall not be refundable immediately.</p>
ITB 27.1	<p>The bid opening/ shall take place at office of:  <b>General Manager (Procurement)</b>  <b>MAHARASHTRA METRO RAIL CORPORATION LIMITED</b>  <b>101, The Orion, Opposite Don Bosco Youth Centre, Koregaon Park, Pune-411001</b>  <b>Date:</b>  <b>Time:</b></p> <p><b><u>The Technical Envelope/ Packages of Online Submitted Bids shall be opened/ downloaded by the opening committee on due date and time of Bid opening.</u></b></p> <p><b>Add following paragraph below the existing paragraph of ITB 27.1:</b></p> <p>The Bid Security will be checked and details will be read out for the information of representative of Bidders, present at the time of opening of Bid. Technical Envelope/ Package of those Bidders who have not submitted Bid Security shall not be considered for further evaluation. Bid which is accompanied by an unacceptable or fraudulent Bid Security shall be considered as non – compliant and rejected. <b>Also, bidders who have not uploaded the entire Bid document, Corrigendum, Addendum as uploaded in the portal by MAHA-METRO, their submission treated as non-responsive and no further technical evaluation will be carried out.</b></p> <p>After evaluation of Technical Bid received electronically via E-Tender portal of MAHA-METRO, the Financial/ Commercial Package/ Envelope of bid of the bidders who have been evaluated as substantially responsive shall be opened. The date &amp; time of opening of Financial Bid shall be communicated to such substantially responsive bidders only, electronically (E-mail).</p>
ITB 27.2,27.3, 27.4	<p><b>Replace 27.2,27.3,27.4 with the following:</b></p> <p>The final bid submitted to the e-tender portal of MAHA-METRO, after all the re-works shall be considered valid and only the same shall be</p>

	considered for evaluation. The bid which is not full/ complete in any manner shall not be considered for evaluation.
<b>ITB 27.5</b>	<p><b>Replace provisions of ITB 27.5 with the following:</b></p> <p>For the avoidance of doubt, all references to the opening bids received electronically via e-tender portal of MAHA-METRO and reading out shall mean opening and reading out the corresponding Technical Proposal as applicable. The reading out of the Technical Proposal shall include the presence or absence of a bid security; and any other details as the Employer may consider appropriate. The Employer shall neither discuss the merits of any bid nor reject any bid (except for late bids, in accordance with ITB 25.1) at this stage.</p>
<b>E. Evaluation, and Comparison of Bids</b>	
<b>ITB 33.1.1 (Additional Para)</b>	<p><b>General Evaluation:</b> Prior to the detailed evaluation of Bids, the Employer will determine whether each Bid:</p> <ul style="list-style-type: none"> <li>• All enclosures, declarations, formats are properly signed by authorized Person.</li> <li>• the complete bid document including all corrigendum/addendum/clarifications issued time to time, prior to submission of bid and all required enclosures should be uploaded to the e-tender portal of MAHA-METRO through digital signature of bidders or through Digital Signature (DSC) of authorized representative of all member of a JV/Consortium</li> <li>• has been accompanied by a valid Bid Security; and</li> <li>• submitted is supported by documents covering the Eligibility &amp; Qualification Criteria</li> </ul>
<b>ITB 37</b>	Exchange rates shall be the selling rate of exchange at the close of business hours of the Reserve Bank of India 28 days prior to submission.
<b>ITB 38.4</b>	The bidder is to note that, if the L1 bidder for this package is same as the L1 bidder(or contractor) for package-1, then during the process of evaluation of the bid, a post-qualification criteria as mentioned in the Eligibility and Qualification criteria for the combined packages shall be checked before awarding the contract for this package. In case the L1 bidder of this package fails to meet the post-qualification criteria, then the contract will be awarded to the L2 bidder of this package.
<b>ITB 38.5</b>	<b><u>Deleted</u></b>
<b>F. Award of Contract</b>	
<b>ITN 45.3 (New Para)</b>	Failure of the successful Bidder to comply with the requirements of ITB 44 and ITB 45 shall constitute sufficient grounds for the annulment of the

	award and forfeiture of the Bid Security.
<b>ITB 46</b>	<b>Incentive:</b> INR 10 Lacs per day for each day completed earlier reckoned from the date of completion stipulated in the agreement, subject to a maximum of INR 15 Crores. Engineer's decision in regard to payment of incentive and the amount thereof shall be final and binding on the Contractor, without any right to appeal or raise disputes. The payment for incentive shall be applicable, if all the original Key Dates mentioned in the contract are met.

# *Maha Metro*



## **Tender Documents**

**UGC-02: DESIGN AND CONSTRUCTION OF UNDERGROUND STATIONS AT  
BUDHWAR PETH, MANDAI AND SWARGATE AND ASSOCIATED TUNNELS**

### **PART I – BIDDING PROCEDURES**

#### **Section III – Eligibility and Qualification Criteria**

June 2018

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## Section III A: Qualification Requirement

### Filter of Applicants- Checklist (To be filled by applicant and each member in case of a joint venture)

Name of Applicant/JV Member \_\_\_\_\_

Sr. no	Criteria	Yes	No
1.	Has the applicant abandoned any work in the last 10 years?		
2.	Has the applicant delayed any work in the last 10 years by more than 75% of the original period of completion due to his default?		
3.	Has the applicant delayed by more than 50% of the original period of completion in more than 20% of the number of works in the last 10 years due to his default?		
4.	Has the applicant suffered bankruptcy/insolvency in the last 10 years?		
5.	Has any misleading information been given in this application?		
6.	Has the applicant (each member in case of JV) submitted "Covenant of Integrity"?		
7.	Is the net worth of the applicant as per clause 3.1 of eligibility criteria and qualification requirement?		
8.	Has the applicant certified that no agent/middleman has been or will be engaged or any agency commission been or will be paid?		
9.	Has the bidder undergone Corporate Debt Restructuring (CDR) since last five years? (a.) If yes, has the bidder submitted their bankers certificate stating that their account with the bank is standard account as on 31st March 2018? (b.) If no, has the bidder submitted an undertaking to the affect? In case the bidder fails to submit an undertaking or banker's certificate, the bidder is liable for rejection.		

1. A 'YES' answer to any question 1, 2, 3, 4 or 5 will disqualify the applicant
2. A 'NO' answer to any question 6, 7, 8, 9(a.) or 9(b.) will disqualify the applicant.

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria				Compliance Requirements			Documentation
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
1. Eligibility							
1.1	Nationality	Nationality in accordance with ITB 4.3.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments
1.2	Conflict of Interest	No conflicts of interest as described in ITB 4.2	Must me et requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
1.3	EIB Ineligibility	Not having been declared ineligible by EIB, as described in ITB 4.4	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid Form 24
2. Historical Contract Non-Performance							
2.1	History of Non-Performan ce of Contracts	Non-performance of a contract (i) did not occur as a result of contractor’s default since last five years.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Form CON-2
2.2	Pending Litigation	All pending litigation shall in total not represent more than Hundred percent (100 %) of the Bidder’s net worth and shall be treated as resolved against the Bidder.	Must meet requirement	N/A	Must meet requirement	N/A	Form CON-2

### Section III B: Qualification Details and Criteria

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
2.3	<b>Litigation History</b>	No consistent history of court/arbitral award decisions against the Bidder since 1 <sup>st</sup> January 2013.	Must meet requirement	N/A	Must meet requirement	N/A	Form CON-2

#### Notes for the Bidder

(i) Non-performance, as decided by the Employer, shall include all contracts:

(a) where non-performance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and

(b) that were so challenged but fully settled against the contractor.

Non-performance shall not include contracts where Employer's decision was overruled by the dispute resolution mechanism. Non-performance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Applicant have been exhausted.

(ii) This requirement also applies to contracts executed by the Bidder as a JV member/ Consortium.

(iii) The Bidder shall provide accurate information on the related Bidding Form about any litigation or arbitration resulting from contracts completed or on-going under its execution over the last five (5) years. A consistent history of awards against the Bidder or any member of a joint venture may result in rejection of the bid. Consistent means more than 50% of awards against the bidder.

### 3. Financial Situation

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
3.1	<b>Financial Performance</b>	<p>The audited balance sheets or, if not required by the laws of the Applicant's country, other financial statements acceptable to the Employer, for the last five (5) years shall be submitted and must demonstrate the current soundness of the Applicant's financial position and indicate its prospective long-term profitability.</p> <p>As a minimum requirement, the Bidder's Net Worth calculated as the difference between total assets and total liabilities should be positive in any two financial years out of last five financial years.</p> <p>The financial year as applicable in the country of origin of the bidders would be considered. The 'last financial year' will be the lat-</p>	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Form FIN – 3.1 with attachments

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
		est financial year that ended before the date of issue of IFB (Invitation For Bids) for this bid.					
3.2	<b>Average Annual Turnover</b>	<p>Minimum average annual construction turnover of <b>INR 6570 Million</b> Calculated as total certified payments in progress and/ or completed, in the last five (5) Financial years starting from 2013-14 to 2017-2018.</p> <p><b>Post evaluation, If the bidder is L1 for both the packages (UGC-01 and UGC-02), the minimum average annual turnover shall be INR 13050 Million</b> Calculated as total certified payments in progress and/ or completed, in the last five (5) Financial years starting from 2013-14 to 2017-2018. (Chartered accountant certificate to be submitted).<sup>(ix)</sup></p>	Must meet requirement	Must meet requirement	Must meet minimum 25 % of the requirement	Must meet minimum 40 % of the requirement	Form FIN – 3.2

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
		The financial year as applicable in the country of origin of the bidders would be considered. The 'last financial year' will be 2017-2018.					
3.3	<b>Financial Resources</b>	<p>(i) The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the cash flow requirements estimated as <b>INR 1638 Million</b> as on bid submission date.</p> <p><b>Post evaluation, if the bidder is L1 for both the packages (UGC-01 and UGC-02), the Bidder shall demonstrate that it has access to, or has available, liquid assets,</b></p>	Must meet requirement	Must meet requirement	Must meet minimum 25 % of the requirement	Must meet minimum 40 % of the requirement	Form FIN – 3.3

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
		unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the cash flow requirements estimated as <b>INR 3240 Million</b> as on bid submission date. <sup>(ix)</sup>					
3.4	<b>Cash Flow Requirements</b>	(ii) The Bidder shall also demonstrate, to the satisfaction of the Employer, that it has adequate sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.	Must meet requirement	Must meet requirement	N/A	N/A	Form FIN – 3.3 and Form FIN – 3.4
3.5	<b>Bid capacity</b>	Available bid capacity = $(2 \times A \times N) - B$ . Available bid capacity should be $\geq$ <b>INR 11520 Million</b> .  Post evaluation, If the bidder is <b>L1</b> for both the packages	Must meet the requirement	Must meet the requirement	Must meet as per their % age of participation In JV	Must meet as per their % age of participation In JV	Form 3.5

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
		(UGC-01 and UGC-02), available bid capacity = (2xAxN)-B. Available bid capacity should be $\geq$ <b>INR 22770 Million.</b> <sup>(ix)</sup>					
3.6	<b>Profitability</b>	Earnings before interest and tax should be positive in any Two years out of the last five years for each member of the Joint Venture.	Must meet requirement	Must meet Requirement	Must meet Requirement	Must meet Requirement	Form 3.6
<b>4. Experience</b>							
4.1	<b>General Experience</b>	For the lead member, experience under construction contracts (single entity or Lead member of JV) shall be for at least the last Ten (10) years from 1.1.2008. Whereas the other members of JV shall be at least five (5) years' under construction contracts from 1.1.2013.	Must meet requirement	N/A	Must meet requirement	Must meet requirement	Form EXP – 4.1

### Section III B: Qualification Details and Criteria

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
4.2 (a)	<b>Specific Experience</b>	<p>Experience under contracts in the role of contractor (single entity or JV member) for design and construction of underground stations and tunnel including finishes. The Applicant must meet the following eligibility criteria for being considered as qualified in Technical evaluation and become eligible for financial package opening.</p> <p>In case the Applicant is a JV, the JV member shall satisfy the eligibility criteria a1 or a2 or a3 mentioned below either individually or as a JV member whose participation was a minimum 25% in the previous group with experience either in tunnelling or in construction of underground station.</p>					

### Section III B: Qualification Details and Criteria

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
		<p><b>a1.</b> The bidder during last five (5) years (Since 1<sup>st</sup> Jan 2013) should have carried out design and construction of tunnel by TBM shield (EPB/Slurry) method for length of at least <b>4000 meters</b> of 5 meter minimum finished diameter in Single contract in Urban area.</p> <p><b>Post evaluation, If the bidder is L1 for both the packages (UGC-01 and UGC-02),</b> the bidder during last five (5) years (Since 1<sup>st</sup> Jan 2013) should have carried out design and construction of tunnel by TBM shield (EPB/Slurry) method for length of at least <b>8000 meters</b> of 5 meter minimum finished diameter in Single contract in Urban area. <sup>(ix)</sup></p>	Must meet requirement	Must meet requirement	N/A	Must meet requirement	Form EXP – 4.2 (a)

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
		<p><b>a2.</b> The bidder during last five (5) years (Since 1st Jan 2013) should have carried out design and construction of at least Two Underground metro stations including RCC diaphragm walls/Secant/ continuous Pile walls and similar activities of work.</p> <p><b>Post evaluation, If the bidder is L1 for both the packages (UGC-01 and UGC-02),</b>the bidder during last five (5) years (Since 1st Jan 2013) should have carried out design and construction of at least Four Underground metro stations including RCC diaphragm walls/Secant/ continuous Pile walls and similar activities of work. <sup>(ix)</sup></p> <p><b>a3.</b> In case of JV Foreign member should have minimum number of</p>	Must meet requirement	Must meet requirement	N/A	N/A	Form EXP – 4.2 (a)
			Must meet	Must meet	Foreign		

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
		One (1) similar contract of value not less than <b>INR 4608 Million</b> or more that has/have been satisfactorily completed outside the country of origin as a contractor (single entity or JV member) in the last five years from 1st January 2013. <b>Post evaluation, If the bidder is L1 for both the packages (UGC-01 and UGC-02),</b> JV Foreign member should have minimum number of One (1) similar contract of value not less than <b>INR 9108 Million</b> or more that has/have been satisfactorily completed outside the country of origin as a contractor (single entity or JV Member) in the last five years from 1 <sup>st</sup> January 2013. <sup>(ix)</sup> <b>a4.</b> Compliance requirements for each JV member in specific	requirement	requirement	Member Must meet requirement	N/A	Form EXP – 4.2 (a)
			N/A	N/A	Must meet requirement	N/A	

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
		construction experience should be satisfied, relevant experience of similar work as mentioned in a1, a2 and a3 irrespective of the value, in addition to those for all parties combined. In addition, the applicant should define the specific responsibilities of each JV partner member, and adhere to those during the contract execution.					Form EXP – 4.2 (a)

### Section III B: Qualification Details and Criteria

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria				Compliance Requirements			Documentation
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
<u>Notes for the Bidder:</u>							
<p>(i) The similarity shall be based on the physical size, complexity, methods/technology of tunnel construction of minimum five (5) m dia and underground metro rail stations in urban area and other characteristics described in section VI, Employer’s Requirements. Summation of number of small value contracts to meet the overall requirement will not be accepted.</p> <p>(ii) For contracts under which the Bidder Participated as a JV member, only the Bidder’s share , by value , shall be considered to meet this requirement.</p> <p>(iii) In case of JV, the value of contracts completed by its members individually shall not be aggregated to determine the requirement of the minimum value of a single contract.</p> <p>(iv) For Contracts under which the Bidder participated as a JV member or Sub contractor, only the Bidder’s share shall be counted to meet this requirement.</p> <p>(v) Banking reference(s) should contain in clear terms that the Bank will be in a position to lend for this work to the applicant / member of the Joint Venture / Consortium.</p> <p>(vi) Requirement of working capital is to be distributed between members as per their percentage participation and every member should satisfy the requirement for his portion.</p> <p>(vii) Available bid capacity = (2xAxN)-B. Where,</p> <p>A = Maximum of the value of construction works executed in any one year during the last five financial years (updated to 31.03.2018 price</p>							

### Section III B: Qualification Details and Criteria

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria				Compliance Requirements			Documentation
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
<p>level assuming 5% inflation for Indian Rupees every year and 2% for Foreign currency portion per year).</p> <p>N = number of years prescribed for completion of the works for which the bids are invited.</p> <p>B = Value of existing commitments (as on 31.3.2018) for ongoing construction works during the period of 42 Months with effect from 31.03.2018.</p> <p><b>(viii)</b> Urban Area means metropolitan boundary of municipal corporation</p> <p><b>(ix)</b> It is to be noted by the bidder bidding for this Package-2 that, in case the L1 bidder for this Package-2 is the same as the L1 bidder (or contractor) for Package-1, then during the process of evaluation of the bid for this Package-2, the criteria for both the Packages-1 &amp; 2 (UGC-01 and UGC-02) mentioned above shall be deemed to be met by the bidder post qualification. If the bidder fails to meet the above criteria post-qualification for both the Packages-1 &amp; 2 (UGC-01 and UGC-02), then the Package-2 contract will be awarded to the L2 bidder of Package-2.</p> <p><u>Additional Notes for the Bidder:</u></p> <p>1.For Para 4.2 a1 to 4.2 a2: For projects executed outside India, all Completion Certificates or Performance Certificates or Implementation Completion Reports shall be translated to unambiguous English language and bidders from member countries of Hague convention may submit all these documents with apostille stamp. Failure to comply with this requirement will result in disqualification of the submitted bid. 2. For SI. Nos 4.2 a1 to 4.2 a2 above, Completed work means even ‘ongoing works’ where the required similar work has been 80% physically completed in all respects and the same is required to be supported by Client’s Certificate(s) along with the bid submission. Certified copies of Client’s duly</p>							

### Section III B: Qualification Details and Criteria

Eligibility and Qualification Criteria				Compliance Requirements			Documentation
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	

signed Certificates shall be self-attested by the Applicant.

3. 'Bidders/Applicant shall engage Detailed Design Consultant or if they choose so use their own in-house capacity for design. In either case Bidders/Applicant needs to submit all the relevant credentials and other required information to facilitate qualification of DDC.'

4. If the DDC proposed is not a JV consortium member, there is no bar for the same DDC to be nominated by other Bidder(s).

5. Bidders/Applicant shall engage a sub- contractor or if they choose so use their own in-house capacity for tunnelling by NATM. In either case Bidders/Applicant needs to submit all the relevant credentials and other required information to facilitate qualification of sub-contractor.'

6. Bidders/Applicant shall engage a sub- contractor or if they choose so use their own in-house capacity for E&M works. In either case bidders/Applicant needs to submit all the relevant credentials and other required information to facilitate qualification of E&M contractor.'

#### QUALIFICATION FACTORS

The Applicants are required to demonstrate their capabilities by furnishing material based on their experience, past performance, their technical and organizational capability ,equipment and financial resources as detailed in this Section of Part-I.

The bidders who pass in the Eligibility and Qualification Criteria (Refer 2.1 to 2.3 above),will be assessed additionally with reference to the following:

- Methodology of Executing the Subject Work including Diaphragm Wall/Secant piles along with details of Water proofing of joints of panels of Diaphragm wall/Secant piles without affecting adjacent Rail/Road traffic and adjacent building/ structures and with proper care and safety during mass excavation of earth, Transport, disposal and stacking of excavated materials as per requirements.
- Methodology of Executing the Subject Work including Bored Tunnels of diameter not less than 5m by use of TBM and wherever required NATM, along with details of Charging/Pushing and Receiving Chambers of TBM or other Tunnel Boring Appliances as per requirement

### Section III B: Qualification Details and Criteria

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria				Compliance Requirements			Documentation
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
<div>without affecting adjacent Rail/Road traffic and adjacent existing buildings/Structures and with proper care and safety during mass excavation of earth, Transport, disposal and stacking of excavated materials as per requirements.</div> <div><div>• Methodology of Executing the Subject Work including Metro Stations with cut and cover method/NATM, ramps, cut and cover box-tunnels along with details of Water proofing of base slab, joints of panels of Diaphragm wall without affecting adjacent Rail/Road traffic and adjacent building/structure with proper care and safety during mass excavation of earth, Transport, disposal and stacking of excavated materials as per requirements.</div></div>							
5. Detailed Design Consultant (DDC)							
5.1	Nominated DDC	<div>A list of potential Detailed Design Consultants of at least two (DDC proposed to be appointed on behalf of the Applicant) to be submitted.</div> <div>For one contract package, The successful bidder will be obliged to appoint a DDC from the list submitted during the bidding stage and as approved by the Employer. The approval given by the Employer for the chosen DDC would be communicated after award of contract in due course of</div>	Must meet requirement	Must meet requirement	N/A	N/A	Form 2.(c)

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
		<p>time so as to not to affect any design activity</p> <p><u>For two contract packages,</u> The successful bidder shall appoint DDC for each contract package from the list submitted for approval.</p> <p><u>Eligibility Criteria</u> Detailed Design Consultant (DDC) proposed to estimate, pre-engineer, detailed design of the works on behalf of the applicant must meet the following eligibility criteria</p> <p>(1)A minimum number of three (3) distinct contracts of comparable nature and complexity <sup>(ii)</sup> to the proposed contract package that have been successfully <sup>(iii)</sup></p>					

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
		<p>completed as a lead detailed design consultant during the last ten (10) years</p> <p>(2)DDC for execution and completion of Bored Tunnels by closed mode of at least three (3) km in total length and of finished internal diameter not less than 5m.</p> <p>(3) DDC for execution and completion of at least two (2) underground rail stations.</p> <p>(4) In addition to the criteria as described above, DDC for Execution and completion of tunnelling by NATM (mining method) of at least 100 meters in total length (single tunnel length 100 meters in total length (single tunnel length to be counted ) and of fin-</p>					

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
		ished cross sectional area of not less than 50m <sup>2</sup> below the local water table.					
<b>6. Sub-contractors</b>							
6.1	Nominated Sub-contractor	<p>1) The nominated/ Specialised subcontractors during last five years(5) (Since 1<sup>st</sup> Jan 2013) should have carried out tunnelling by NATM of minimum length 100m in urban area and minimum cross sectional area of 35 Sqm in a single contract in urban environment.</p> <p>2) The Nominated/ Specialised Subcontractors for MEP works would be proposed by the bidder in the bid submission. The proposed subcontractor firm for MEP must have carried out and completed Design and Construc-</p>					Form 25

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
		tion/execution of at least two UG (Under Ground) metro stations in a single order in last 5 years (starting w.e.f 01.01.2013). The bidder shall propose at least two Nominated/ Specialised Subcontractors in the bid submissions. The selection of one subcontractor would be done by the Engineer/Employer after award of contract. The approval for the selected MEP subcontractor by the Employer would final and binding on the contractor.					

### Section III B: Qualification Details and Criteria

Section III B: Qualification Details and Criteria							
Eligibility and Qualification Criteria				Compliance Requirements			Documentation
No	Factor	Requirement	Single Entity	Consortium/Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	Lead Member	
<u>Notes for the Applicant</u>							
<p>(i) It is not necessary for the DDC &amp; sub-contractors to be jointly and severally bound with the Applicant. However, the proposed DDC &amp; sub-contractors shall complete Form EXP 2 © it is not mandatory for these forms to be signed by the proposed DDCs, instead they may be signed by the Applicants.</p> <p>(ii) The nominated DDC and all its team members should operate from Pune.</p> <p>(iii) The comparable nature and complexity shall be based on the physical size, complexity, methods/technology and/or other characteristics described in, Scope of Works. Each contract shall include TBM tunnelling works and/or an underground station.</p> <p>(iv) Successful completion shall be demonstrated with submission of Performance Certificate.</p> <p>(v) The successful bidder may change the DDC with Employer’s approval after award of work if required.</p>							

## 7. KEY PERSONNEL:

The bidders must deploy the Key Personnel for the work as indicated below. The number Key Personnel should not be less than as specified. The Joint Venture as a whole (for all members put together in case of Joint Venture) will be considered and should cover disciplines mentioned below. .

In respect of the Project managers, Deputy Project Managers and Tunneling Expert the Bidder is required to submit CVs along with their bid as described below:

- (i) **Project Manager cum Team leader:** The requirement is **One** Project Manager. The Project Manager should be min BE/BTech Civil Engineering with 15 years of total experience and 6 years as Project Manager in Similar Nature of works in Design and build underground Tunnel and Stations as per requirement Section IV a: Bidding Forms FORM PER-1. The CV of the Project Managers shall be submitted as per Section IV a: Bidding Forms FORM PER-1.
- (ii) **Deputy Project Managers:** The requirement is **Five** Deputy Project Managers, One each for Station Structures and Casting Yard. Deputy Project Manager should be minimum BE/BTech Civil Engineering with 12 years of total experience and 4 years as Deputy Project Manager in Similar Nature of works in the respective fields viz, Tunnel, Underground Stations and Casting Yard. The CV of the Deputy Project Managers shall be submitted as per Section IV a: Bidding Forms FORM PER-1.
- (iii) **TUNNELING EXPERT:** The requirement is one Expert for TBM Drives and one expert for NATM works. The TBM and NATM Expert should be BE/BTech Civil/Mechanical Engineering with 12 years of total experience and 5 years in Similar Nature of works in the respective field. The CV of the TBM and NATM Expert shall be submitted as per Section IV a: Bidding Forms FORM PER-1.
- (iv) **Chief Interface Coordinator:** BE/ B Tech in Civil/Electrical/Mechanical Engineering with 8 years total experience and 4 years in similar works.
- (v) **Chief Quality Assurance & Control Manager:** B.E / B Tech in Civil Engineering with 12 years total experience and 6 years in similar works.
- (vi) **Chief Safety Expert:** B.E/ B Tech in Civil/Mechanical/Electrical Engineering with 15 years total Experience and 7years in similar works.

- (vii) **Geotechnical Expert:** MSc (Geology) /B. E/ B tech in Civil Engineering with 12 years of total experience and 8 years as Geological Expert in similar Nature of works in the respective field. The CV of the Geological Expert shall be submitted as per Section IV a: Bidding Forms FORM PER-1.
- (viii) **Geotechnical Engineer:** B. E/ B tech in Civil Engineering with 6 years of total experience and 3 years as Geotechnical Engineer in similar Nature of works in the respective field. The CV of the Geotechnical Expert shall be submitted as per Section IV a: Bidding Forms FORM PER-1.
- (ix) **Planning Manager:** BE/ B Tech in Civil Engineering/Construction Management with 8 years total experience and 4 years in similar works. Should be proficient with Primavera/ BIM.
- (x) **Engineering Manager:** BE/ B Tech in Civil Engineering with 15 years total experience and 6 years in Design of similar works.
- (xi) **E&M Project Manager:** BE/ B Tech in Engineering with 15 years total experience and 6 years in similar works.
- (xii) **Lead Design Consultant & Lead Design Checker:** The requirement is **one** Lead Design consultant & lead design checker respectively having minimum ME/M Tech in Civil Engineering with 15 years of total experience and 6 years in projects of similar nature and 3 years in similar post or kin of.

**Notes:**

1. Bidder may propose any number of names of Personnel for each Key Position mentioned in para 6 above. Any of the personnel approved by Engineer as per the requirement for each key position have to be mandatorily deployed in case of award of work.
2. The successful bidder has to deploy the same key personnel (within 100 days of commencement date) as indicated in the bid submittal failing which penalty of INR 0.10 Million / week /position will be imposed.
3. The proposed Key personnel are not to be changed till the completion of the work. Under exceptional circumstances, in case they are required to be changed, the replacement should have similar or better experience and qualification than as required above. These changes are permitted only with the approval of the Employer.

## 8. PLANT & MACHINERY:

Applicants should be able to deploy a minimum plant and machinery as mentioned below in Section IV a: Bidding Forms EQU either owned or to be made available on hire or lease for this work. Joint Venture as a whole will be considered. These Plants & Machinery will be taken into consideration for while evaluating the bidder for satisfactory the Eligible and Qualification criteria.

SI No	Description	Numbers Required
1.	Tunnel Boring Machine(New) (Machine shall be capable of changing from open to close mode)	2
2.	Gantry Crane	1
3.	Casting Yard fully equipped for casting of segments	1
4.	Pilling rig machines	5
5.	Excavation with breaker hammer	6
6.	Drilling Machines	5
7.	Shotcrete Machine	5
8.	Loader	6
9.	Long boom Excavator	3
10.	Fully automated batching plant 30cum/hour capacity	2
11.	Compressor	5

The plant and machinery indicated above is minimum to be deployed at appropriate stage of the work. However depending on the requirement to complete the work within the stipulated completion period, the contractor shall deploy additional machinery as circumstances warrant at no extra cost.

**Section III C: Check list for submission of Important Information (Not Exhaustive)**

SL No.	Requirement	Submission Requirement	Ref. Page No.	Remarks, if any
1.	Applicants Check List	Section III A of Eligibility and Qualification Criteria( Part-1, Section III)	Page 2	
2.	Share of partners in the case of JV	Form 1A & 8 of the Bidding Forms(Part-1, Section IV a)	Page 9 & 59 respectively.	
3.	Conflict of Interest	Form 1.1 & Form ELI-1.2 of the Bidding Forms(Part-1, Section IV a)	Page 3 & 40 respectively.	
4.	Submission of documents(including minutes of pre-bid meeting and corrigendum)	Stamped and signed on all pages	-	
5.	Tender Security	Form 6 of the Bidding Forms(Part-1, Section IV a)	Page 55	
6.	Letter of application	Form 1.2 & 1.3 of the Bidding Forms(Part-1, Section IV a)	Page 5 & 7 respectively	
7.	Only one bid either individually or as a partner of a JV	Form 1.1 of the Bidding Forms(Part-1, Section IV a)	Page 3	
8.	Work Experience	Form EXP- 4.1 & 4.2 (a) of the Bidding Forms(Part-1, Section IV a)	Page 49 & 50 respectively	
9.	Liquidity	Form 4.11 & 15 of the Bidding Forms(Part-1, Section IV a)	Page 35 & 88 respectively	
10.	Profitability	Form FIN 3.1 & 3.4 of the Bidding Forms(Part-1, Section IV a)	Page 44 & 48 respectively	
11.	Net Worth	Form FIN 3.1 of the Bidding Forms(Part-1, Section IV a)	Page 43	
12.	Annual Turnover	Form FIN 3.2 of the Bidding Forms(Part-1, Section IV a)	Page 45	
13.	Works in hand	Form FIN 3.4 of the Bidding Forms(Part-1, Section IV a)	Page 47	

SL No.	Requirement	Submission Requirement	Ref. Page No.	Remarks, if any
14.	Key Personnel	Form 4.6 of the Bidding Forms(Part-1, Section IV a)	Page 28	
15.	Plant & Machinery	Form EQU : Equipment of the Bidding Forms(Part-1, Section IV a)	Page 27	
16.	Litigation History	Form 5.3 of the Bidding Forms(Part-1, Section IV a)	Page 41	
17.	Power of attorney	Form 9 of the Bidding Forms(Part-1, Section IV a)	Page 69	
18.	MOU (Memorandum of Understanding) for JV participation.	Form 8A of the Bidding Forms(Part-1, Section IV a)	Page 65	
19.	Structure of JV	Form 4.10 of the Bidding Forms(Part-1, Section IV a)	Page 33	
20.	Physical completion Certificate complete as referred.	Form ELI 1.1 of the Bidding Forms(Part-1, Section IV a)	Page 39	
21.	Covenant Of Integrity	Form 24 of the Bidding Forms(Part-1, Section IV a)	Page 98	
22.	Proposed Sub-Contractors	Form 25 of the Bidding Forms(Part-1, Section IV a)	Page 100	

***Maha Metro***



# **Tender Documents**

**UGC-02: DESIGN AND CONSTRUCTION OF UNDERGROUND STATIONS AT  
BUDHWAR PETH, MANDAI AND SWARGATE AND ASSOCIATED TUNNELS**

**PART I – BIDDING PROCEDURES**

**Section IV a – Bidding Forms**

June 2018

## Section IV a. Bidding Forms

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### 1.1 Letter of Initial Filter

Date: \_\_\_\_\_

Loan Agreement No.: \_\_\_\_\_

IFB No: \_\_\_\_\_

To:

Managing Director,  
Pune Metro Rail Project,  
101, The Orion, Opposite Don Bosco Youth Centre,  
Koregaon Park, Pune 411001  
Maharashtra, India

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB 8): *(insert the number and issuing date of each addendum)*; \_\_\_\_\_;
- (b) We have no conflict of interest in accordance with ITB 4;
- (c) We have not been suspended nor declared ineligible by the Employer in absence of a Bid Security in the Employer's country in accordance with ITB 4.4.
- (d) We offer to execute in conformity with the Bidding Documents the following Works: \_\_\_\_\_;
- (e) The total price of our Bid for the work has been submitted by us only in the commercial section/option in the pricing document provided in the E-Tender portal of MAHA-METRO and nowhere else.
- (f) Deleted
- (g) Our bid shall be valid for a period of 180 days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (h) If our bid is accepted, we commit to obtain a performance security in accordance with ITB 42 of the Bidding Documents;

- (i) We are not participating, as a Bidder, in more than one bid in this bidding process in accordance with ITB 4.2(c),
- (j) We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract:

Name of Recipient	Address	Reason	Amount
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

*[If none has been paid or is to be paid, indicate "none."]*

- (k) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed; and
- (l) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.
- (m) We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in any type of fraud and corruption.

Name of the Bidder\* \_\_\_\_\_

Name of the person duly authorized to sign the Bid on behalf of the Bidder\*\* \_\_\_\_\_

Title of the person signing the Bid \_\_\_\_\_

Signature of the person named above \_\_\_\_\_

Date signed \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_

\*: In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder

\*\* : Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid

## 1.2 Letter of Technical Bid

Date:  
Loan agreement No:  
IFB No:

To:  
Managing Director,  
Pune Metro Rail Project,  
101, The Orion, Opposite Don Bosco Youth Centre,  
Koregaon Park, Pune 411001  
Maharashtra, India

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB 8): *[insert the number and issuing date of each Addendum]*;
- (b) We, including any Subcontractors/ manufacturers, for any part of the Contract, meet the eligibility requirements in accordance with ITB 4 and ITB 5;
- (c) We, including any Subcontractors/ manufacturers, for any part of the Contract, have no conflict of interest in accordance with ITB 4;
- (d) Having inspected, examined the ITB, BDS, Employer's Requirements, General Conditions of Contract, Particular Conditions of Contract, Tender Drawings including Pricing Document, and addenda thereto (if any) issued by Pune Metro Rail Project for the Design and Construction of Underground Stations and Tunnel between Budhwar Peth and Swargate including stabling areas & scissor cross-over at Northern End Of Swargate hereto, we offer to

---

in conformity with the Bidding Documents.

- (e) Our Bid shall be valid for a period of 180 days from the date fixed for the Bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (f) We are not participating, as a Bidder or as a Subcontractor/ manufacturers, in more than one Bid in this bidding process in accordance with ITB 4.2 (c), other than alternative Bids submitted in accordance with ITB 13; and
- (g) We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in any type of fraud and corruption.

Name of the Bidder\* \_\_\_\_\_

Name of the person duly authorized to sign the Bid on behalf of the Bidder\*\* \_\_\_\_\_

Title of the person signing the Bid \_\_\_\_\_

Signature of the person named above \_\_\_\_\_

Date signed \_\_\_\_\_ day of \_\_\_\_\_

\*: In the case of the Bid submitted by a Joint Venture specify the name of the Joint Venture as Bidder

\*\* : Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid.

## 1.3 Letter of Price Bid

Date:  
Loan Agreement No.:  
IFB No.:

To:  
Managing Director,  
Pune Metro Rail Project,  
101, The Orion, Opposite Don Bosco Youth Centre,  
Koregaon Park, Pune 411001  
Maharashtra, India

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB 8): *[insert the number and issuing date of each Addendum]*;
- (b) We offer to Design and Construction of Underground Stations and Tunnel of Underground Stations and Tunnel between Budhwar Peth and Swargate including stabling areas & scissor cross-over at Northern end of Swargate in conformity with the Bidding Documents.
- (c) The total price of our Bid, excluding any discounts offered in item (d) below is:  
In case of only one lot, total price of the Bid *[insert the total price of the Bid in words and figures, indicating the various amounts and the respective currencies]*  
  
*[In case of multiple lots, insert the total price of each lot]*  
*[In case of multiple lots, insert the total price of all lots (sum of all lots)]*;
- (d) The discounts offered and the methodology for their application are:  
The discounts offered are: *[specify in detail each discount offered]*  
  
The exact method of calculations to determine the net price after application of discounts is shown below: *[specify in detail the method that shall be used to apply the discounts]*;
- (e) Our Bid shall be valid for a period of 180 days from the date fixed for the Bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (f) If our Bid is accepted, we commit to obtain a Performance Security in accordance with the Bidding Documents;

- (g) We understand that this Bid, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding Contract between us, until a formal Contract is prepared and executed; and
- (h) We understand that you are not bound to accept the lowest evaluated Bid or any other Bid that you may receive.

Name of the Bidder\* \_\_\_\_\_

Name of the person duly authorized to sign the Bid on behalf of the Bidder \_\_\_\_\_

Title of the person signing the Bid \_\_\_\_\_

Signature of the person named \_\_\_\_\_

Date signed \_\_\_\_\_ day of \_\_\_\_\_

\*: In the case of the Bid submitted by a Joint Venture specify the name of the Joint Venture as Bidder

\*\*: Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid.

## 1A. Pro-Forma Letter of Participation from Each Member of Joint Venture (JV)

(On each Firm's Letter Head)

No....

Dated .....

From:

.....

.....

To,  
THE MANAGING DIRECTOR,  
MAHARASHTRA METRO RAIL CORPORATION LTD.,  
101, The Orion, Opp. Don Bosco Youth Centre,  
Koregaon Park, Pune- 411001

Sir,

Regarding:

*\*Insert the Name of Work as per Bid Document/Corrigenda\**

Ref: Your notice for Invitation for Bid (IFB) .....

We wish to confirm that our company/firm (delete as appropriate) has formed a Joint Venture with and for the purposes associated with IFB referred to above.

*(Member(s) who are not the lead partner of the JV/consortium should add the following paragraph)\**

'This JV is led by ..... whom we hereby authorize to act on our behalf for the purpose of submission of Bid for ..... and authorize to incur liabilities and receive instructions for an on behalf of any and all the partners or constituents of the Joint Venture.'

OR

*(Member being the lead member of the group should add the following paragraph)\**

'In this group we act as leader and, for the purposes of applying for qualification, represent the Joint Venture.'

In the event of our group being awarded the contract, we agree to be jointly with..... (Names of other members of our JV)..... and severally liable to the MAHA-METRO, its successors and

assigns for all obligations, duties and responsibilities arising from or imposed by the contract subsequently entered into between MAHA-METRO and our JV.

\*I/We, further agree that entire execution of the contract shall be carried out exclusively through the lead partner.

Yours faithfully,

(Signature)

(Name of Signatory).....

(Capacity of Signatory).....

Seal

\* Delete as applicable

## 2. Appendix to Bid

### Contract Data

SN	Conditions	Sub-Clause	Data
1	Employer's name and address	1.1.2.2 & 1.3	Maharashtra Metro Rail Corporation Limited, The Orion Building, 1st Floor, 101, Opp. Don Bosco Youth Centre, Koregaon Park-1, Pune- 411001
2	Engineer's name and address	1.1.2.4 & 1.3	Employer will nominate.
3	Time for Completion	1.1.3.19 & 8.2	182 weeks
4	Defects Notification Period (Defect Liability Period)	1.1.3.7	104 weeks from the date of issue of Taking Over Certificate for the whole of the Works
5	Sections	1.1.5.6	Refer to Appendix 2A-Employer's Requirements of the bidding documents (Part-2, Section VI)
6	Country	1.1.6.2	India
7	Site	1.1.6.7	Pune, Maharashtra
8	Electronic transmission systems	1.3	Electronic transmission shall be in the form of scanned original documents. In case of Price Bid, only the format in the commercial section of the bid is to be filled up online.
9	Governing Law	1.4	Acts and Laws of India
10	Ruling language	1.4	English
11	Language for communications	1.4	English
12	Contract Agreement	1.6	Signing of the Contract by the Employer is subject to provision of a compliant Performance Security by the Contractor
13	Care and Supply of Documents	1.8	Documents to be supplied by the Contractor or the Employer under the Contract shall also be provided in digital form.

SN	Conditions	Sub-Clause	Data
14	Time for access to the Site	2.1	The Employer shall give the Contractor right to access to the Site upon submission of evidence that the insurances specified in Particular Conditions have been effected. Access to site will be given in a progressive manner within a week's time of issue of LOA. The last stretch of site will be given within 12 months of LOA.
15	Engineer's Duties and Authority	3.1	<p>The Engineer shall obtain the specific approval of the Employer before taking the following actions:</p> <p><i>[The Employer may decide to limit the authority of the Engineer by selecting one or several of the options below:]</i></p> <ul style="list-style-type: none"> <li>– issuing a Variation for substantial technical modifications, increase of the Accepted Contract Amount or extension of time;</li> <li>– proceeding to Determination under clause 3.5 of the GCC;</li> <li>– issuing Interim Payment Certificate under clause 14.6 of the GCC; and</li> <li>– issuance of a Taking over Certificate under clauses 10.1 and 10.2 of the GCC.</li> </ul>
16	Delegation by the Engineer	3.2	Delegation by the Engineer is subject to the provisions of the contract between the Employer and the Engineer.
17	Contractor's General Obligations	4.1	<p>The Contractor shall provide the following documents as part of the Contract:</p> <ul style="list-style-type: none"> <li>– shop drawings to be approved by the Engineer prior to starting the Works;</li> <li>– as-built drawings to be approved by the Engineer prior to taking over of the Works; and</li> <li>– operation and maintenance manuals.</li> </ul>
18	Performance Security	4.2	10% of the Contract Price in types and

SN	Conditions	Sub-Clause	Data
			proportions of currencies in which the contract price is payable.
19	Contractor's Representative	4.3	Prior consent of the Employer is required for replacing the Contractor's representative.
20	Subcontractors	4.4	Prior consent of the Employer is required for other proposed Subcontractors.
21	Progress reports	4.21	Refer to Part-2 Section VI Employer's Requirements – Appendix 5 Monthly Progress Reports
22	Normal working hours	6.5	The Contractor, if required in view of the engineer, shall carry out work during night hours or in shifts. The Contractor shall not be entitled to any increase in the Accepted Contract Amount on account of night/shift working.
23	Testing	7.4	The Engineer shall give the Contractor not less than one (1) working day notice of the Engineer's intention to attend the tests.
24	Commencement of Works	8.1	The Commencement Date shall be: Date given in LOA or Employer's Notice to Proceed
25	Extension of time	8.4	Granting any extension of time is subject to the Engineer's determination in accordance with sub-clause 3.5 – Determinations.
26	Delay damages for the Works	8.7 & 14.15(b)	Liquidated damages shall be levied as per the rate given in Appendix of Employer's Requirement for delays caused to KD's.  The total amount of Liquidated Damages and penalties on all Key Dates summed up including KD related to taking over on completion of entire work shall be 10% of the total Contract Value.
27	Maximum amount of delay damages	8.7	10 % of the final Contract Price.

SN	Conditions	Sub-Clause	Data
28	Right to Vary	13.1	Additional work, plant, material or services not related to the Permanent Works shall not be entitled to a Variation.
29	Variation Procedure	13.3	Any Variation issued for substantial technical modifications, additional cost or extension of time shall be consolidated in a signed Amendment to Contract.
30	Provisional Sums	13.5.(b)(ii)	<i>Not applicable.</i>
31	Contract Price	14.1 (a)  14.1(d)	<p>The contract is a lump sum contract Sub-paragraph 14.1 (a) is substituted by the Contract Price shall be the lump sum Accepted Contract Amount and be subject to adjustments in accordance with the Contract;</p> <p>The breakdown of all unit prices shall also be submitted by the Contractor within 84 days from the Commencement Date.</p>
32	Total advance payment	14.2	<p>The Mobilization advance shall be 10% of original contract value payable in two equal installments. The first installment shall be paid after submission of BG.</p> <p>Second installment shall be paid on production of effective and proper utilization of the first installment duly accepted and certified (with or without modification) by the engineer of Maha-Metro.</p> <p>Mobilization advance shall be paid against acceptable Bank Guarantee from a scheduled commercial bank having business offices in India. The value of Bank Guarantee taken towards security of “Mobilization Advance” shall be 110% of the advance taken by the contractor. The Contractor, once the 50% of mobilization advance has been recovered, shall have a onetime option to reduce the Bank Guarantee for the mobilization advance by the amount recovered.</p>
33	Percentage of Retention	14.3	0% (Zero percentage)

SN	Conditions	Sub-Clause	Data
34	Limit of Retention Money	14.3	The aggregate amount of the Performance Security and the Retention Money shall not exceed 10% of the Accepted Contract Amount
35	Minimum Amount of Interim Payment Certificates	14.3	Minimum 1%.
36	Payment	14.7	<p>The Employer shall pay to the Contractor the amount certified in each Interim Payment Certificate.</p> <p>Payment to the Contractor of the amounts due in each currency shall be made into the following bank accounts:</p> <p>(a)[insert bank account details at the time of contract signing]</p>
37	Currencies of Payment	14.15	The Contract Price shall be paid in the currency(ies) named in the Summary of Payment Currencies of the Contract.
38	Insurance cover for Contractor's All Risk and other requirements as specified in the GCC	18	100% of the Total Contract Price
39	<b>Periods for submission of insurance:</b> <p>a. evidence of insurance.</p> <p>b. relevant policies</p>	18.1	<p>14 days from Commencement Date</p> <p>28 days from Commencement Date</p>
40	Minimum amount of third party insurance	18.3	INR 0.50 Million for any one incident, with no. of incidents unlimited
41	Amount of Professional Indemnity Insurance (PII) (For design work)	18.5 (PC)	AOA (any one accident) limit equal to 6% of the contract value against Schedule 'A' of Price Bid in respect of 'design and construct' with AOY (any one year) limit of 2 incidents in a- year. In the. Professional Indemnity insurance Policy the deductible amount shall not be more than 5% AOA limit. All Policy shall be obtained within Four weeks from 'date of commencement' and shall be valid for five years after date of issue of 'Performance Certificate' or 3 years after commencement of commercial

SN	Conditions	Sub-Clause	Data
			train operations whichever is later. Wherever the Contractor submits policy for shorter period / annual renewable policy, the same shall be renewed before its expiry date. In such situation, the performance guarantee shall be retained till required validity period. The Contractor's submission of such shorter period / renewable policy shall be construed as their irrevocable consent for retention of the performance guarantee.
42	Rules of arbitration	20.6(a)	Rules of Arbitration in accordance with the Arbitration and Conciliation Act 1996 & its further amendments time to time.
		20.6(b)	Place of Arbitration: Pune

Signature of the Tenderer: .....

Name & Designation of Authorized signature: .....

Place , date and seal/stamp of the tenderer: .....

### **3. Schedules**

*Refer to Pricing Document*

#### **4. Technical Proposal**

- 4.1 Staffing Schedule and Site Organization
- 4.2 Method Statement
- 4.3 Works Programme and Design Submission Programme
- 4.4 Bidder's Technical Submissions
- 4.5 Equipment - Form EQU
- 4.6 Personnel – Forms PER-1 and PER-2
- 4.7 Outline Quality Plan
- 4.8 Outline Safety Assurance Plan
- 4.9 Outline Project Management Plan
- 4.10 Structure of the Bidder
- 4.11 Statement of Deviations

#### 4.1 Staffing Schedule and Site Organization

The Bidder shall provide with the Bid a complete Schedule and Organization chart as required.

(1) The name, background and professional experience of each key staff member to be assigned to this project, with particular reference to his experience of a nature similar to that of the proposed assignment.

(2) An organization chart with assignment of each key staff member (identified by name), duration & timing together with clear description of the responsibilities of each key staff member within the overall work programme.

(3) The Bidder to propose his design organization in detail and outline his manufacturing/testing organization. Also, the Bidders shall provide the necessary details on their staff for the project design phase. For the later phases, staff needs to be proposed for key positions.

We hereby confirm to deploy the minimum manpower as per “Key Personnel” under [Section III](#) Eligibility and Qualification Criteria with prescribe qualifications and experiences as detailed.

We also confirm to deploy manpower required for safety as per **OHS & E Manual (Part-4, Section –XIV)** attached with the Bidding Documents.

SIGNATURE OF AUTHORIZED SIGNATORY ON BEHALF OF  
BIDDER

Note: - The Bidder shall provide a complete Staffing Schedule and Organization Chart he proposes for the work, which has to satisfy the requirement above.

## 4.2 Method Statement

Each Bidder shall set out details of the Method Statement for the Works to demonstrate how it will meet the Employer's objective and requirements. As a minimum, the Method Statement shall address the following:

- (a) Details of the arrangements and methods which the Bidder proposes to implement for the construction of the Works, in sufficient detail to demonstrate their adequacy to achieve the requirements of the Contract including completion within the Time for Completion stated in the Particular Conditions of Contract.
- (b) Outline of the arrangements of the Bidder to manage coordination of Site access.
- (c) Comments on the geotechnical and subsurface aspects of the Works including materials, material sources and any constraints.
- (d) [Comments on any offshore or waterfront aspects of the Works.]; e.g. schedule of components to be manufactured off-shore and description of plants to be imported etc.
- (e) Comments on logistics and traffic management ***[as may be appropriate]***.
- (f) Outline of the arrangements and organisation of the Bidder to ensure compliance with the Works Requirements.
- (g) Outline of the arrangements of the Bidder to carry out testing upon completion as specified in the Works Requirements.
- (h) [Insert other information, as may be appropriate.]***

### 4.3 Works Programme and Design Submission Programme

Requirements for proposed Works Programme and Design Submission Programme

1. The Bidder shall submit a Work Plan as a part of the Bid which shall contain the following:
  - a. Proposed Works Programme.
  - b. Proposed Design Submission Programme.
2. The Bidder's proposed Works Programme shall indicate how the Bidder intends to organize and carry out the Works and achieve Stages and complete the whole of the Works by the appropriate Key Dates. The Works Programme shall be prepared in terms of weeks from the Commencement Date of Works.
3. The Bidder's Design Submission Programme shall cover the Design phase and include a schedule identifying, describing, cross-referencing and explaining the Design Packages and submissions, which it intends to submit.
4. The Design Submission Programme should take due account of the design coordination interface periods with other Designated Contractors and be consistent with the Works Programme.
5. The Works Programme and Design Submission Programme shall include details as stipulated in Work Requirements, for review by the Engineer.
6. The proposed Works Programme shall show how the Bidder proposes to organize and carry out the Works and to achieve Stages and complete the whole of the Works by the given Key Dates.
7. The proposed Works Programme or Programmes shall be developed as a critical path network using the Precedence Diagramming Method and be presented in bar chart and time scaled logic network format and shall clearly show the division of the Works into the Cost Centres, the start and completion dates for each activity and their inter-relationships, Milestones, and Key Dates. The network must be fully resourced and show the co-ordination with Designated Contractors.
8. The proposed Works Programme shall show achievement of all Key Dates. The proposed Works Programme shall also show Milestones, but the Milestones shall not be taken as imposing any constraints that in any way affect the logic or limit any other dates in the Programme.
9. The proposed Works Programme shall take account of the Bidder's proposed Design Submission Programme and should indicate, wherever possible, dates and periods relating to interfaces with and between others including dates for submission of further documents required by the Contract and periods for their acceptance.
10. The proposed Works Programme shall contain sufficient detail to assure the Employer of the feasibility of the plan and approach proposed by the Bidder.
11. The Bidder should have regard to the possibility, that during the Bid evaluation period, should Maha-Metro require in writing for the Bidder to amplify / explain for clarification purposes, the proposed Works Programme may be developed into a Programme which, in the event of award of the Contract, would be the submission of the Preliminary Works Programme. To facilitate this

process the Bidder shall, in the preparation of the proposed Works Programme, take due account of the provisions of Employer's Requirements in so far as they concern the Works Programme.

12. The proposed Works Programme shall be accompanied by a narrative statement that shall describe Programme activities, assumptions and logic, and highlight the Bidder's perception of the major constraints and critical areas of concern in the organization, design, construction, supply and transport of materials, testing and commissioning of various sections. This narrative statement shall also indicate which elements of the Works the Bidder intends to carry out offshore and/or in India with details of the proposed locations of where any such work is to be carried out, the facilities available and or proposed to be set up. In particular the Bidder must state the assumptions made in respect of the interfaces with the Employer, other contractors and third parties both in detail and time, and any requirements for information on matters which would affect his works.

13. The Bidder's attention is drawn to the Key dates specified in Appendix-2B Employer's Requirement Part-II. The Bidder shall prepare logic diagrams providing the philosophy for interface with other designated contractors & availability of track, electrification and signaling system to be available and submitted as part of its Bid. These logic diagrams shall be developed and submitted along with the Works Programmes as submitted during the course of the Works.

14. All programmes shall include design, procurement periods of major materials, off-shore production, production in India, dispatch, transport, interface periods for system wide, and adjacent contractors, testing and commissioning (including integrated testing & commissioning) along with any other training and service trial running information.

## 4.4 Bidder's Technical Submissions

### Requirements for Bidder's Technical Proposals

1. The Bidder's attention is drawn to the List of Definitions and List of Abbreviations in the Works Requirements and the General Conditions of Contract in which terms are defined.
2. The Bidder's Technical Submissions shall comply or, subject to reasonable development, be capable of complying with the Works Requirements in all respects. The Bidder's Technical Submissions shall demonstrate such compliance. The Bidder's Technical Submissions shall establish
3. The following paragraphs list the minimum documentation that shall be supplied by the Bidder to enable technical evaluation of the Bid. The Bidder shall include any further information necessary to demonstrate the suitability of his proposal.
4. The Bidder's Technical Proposals shall cover the following:
  - 4.1 structural form, materials and structural principles, method of carrying or accommodating loads or actions, fixed points and articulation, and choice and grades of structural materials;
  - 4.2 alignment of roadways, railways and river basins/river beds, location and geometry of structures and main features thereof, clearances, principal dimensions, principal movements and, deflections;
  - 4.3 testing and investigations undertaken, or to be undertaken;
  - 4.4 earthworks, slopes, protective measures and ground drainage;
  - 4.5 foundations, main substructure and superstructure elements;
  - 4.6 Tunnels including supports, linings, walls, floors, slabs and all structural components, methods of jointing and, waterproofing, drainage and corrosion protection;
  - 4.7 Cross passages and sump arrangements in sufficient details.
  - 4.8 Details of excavation proposals for the station and tunnel. Where excavation in rock, details are to be provided confirming that vibration levels can be achieved and proposals should also be submitted for methods that do not involve blasting.
  - 4.9 Structural and construction arrangements at interfaces with adjacent contracts;
  - 4.10 Traffic management plan showing temporary traffic and road diversions wherever required.
  - 4.11 initial settlement assessment, effect on adjacent structures including utilities and proposed protection works, if any, including instrumentation and monitoring, if required;
  - 4.12 Approach to co-ordination with other Project contractors. Bidder shall elaborate the organization and system giving frequency of meetings or any other system / approach which has to be adopted.
  - 4.13 construction and erection methods, including proposals for ensuring that disruption to road and pedestrian traffic is minimized;

- 4.14 Detail of Tunnel Boring Machines (TBMs) and backup equipment proposed to be used for the Work in sufficient details to enable review and consent by the Engineer;
- 4.15 TBM rescue work in the mixed ground where the works area are not available, in sufficient detail.
- 4.16 Protective coatings and systems, finishes.
- 4.17 Landscaping and Reinstatement works
- 4.18 Area flood lighting and building interior lighting system:
- 4.19 lightning protection system:
- 4.20 Details of conductors, earthing arrangements, terminal clamps and other system components and the specifications to which they conform.
- 4.21 Provide the following in connection with the Station Architectural Layout for each station
  - a. Details of platform layout including elevators, escalators and staircases.
  - b. Details of concourse layout including paid/unpaid areas, fare collection gates, ticket offices, elevators, escalators and staircases from concourse to platform and concourse to ground.
  - c. Details of ground plan including entrances, ventilation shafts, emergency/fireman's staircases, equipment hatches.
  - d. Details of Traffic Integration including parking for various types of vehicles and landscaping.
  - e. Details of Environmental control system and ventilation system layout at platform level and concourse level.
  - f. Details of potential advertising areas.
  - g. Details of commercial saleable area proposed in the station.
  - h. Details of passenger flow pattern during peak minute flows outlining any prospective location of flow conflict.
  - i. Details of arrangement of escalators / staircases at adjacent stations showing clearly the uniform distribution of passenger in various coaches of a train.
  - j. Calculations regarding sizing of platforms, staircases, escalators, fare collection, entrances, maximum time taken in evacuation of a platform and time taken in various alternative routes of interchange at interchange stations.
  - k. Details of queuing spaces required and provided at various places.
  - l. Details of typical entrances to stations including architectural finishes.
  - m. The Contractor is free to include other technical information in support of his offer.
5. The Contractor's Technical Proposals shall include the following documents:
  - 5.1 **Drawings**  
Drawings shall illustrate, where appropriate, aspects of the Works identified in Para 4 above, including layouts, appearance, main structural features, general

arrangements, plans, elevations, principal sections and typical details of critical areas. In particular the drawings shall indicate the proposed arrangements at the interface with adjacent Contractors. A Conceptual drawing must be added showing the section of Segmental Girder integrated with the parapet, shape, top width of Girder, centre of tracks thereon, cable ducts, incorporating power cables fixing arrangements, etc. The top deck width/trough width of the girder should be as per the tender drawings.

## **5.2 Specifications**

5.2.1 The Specifications shall comprise two parts, the Design Specifications and the Construction Specifications. Each part shall consist of the Outline Specification, which shall be identical to those contained in the Bid Documents and a Particular Specification. The Particular Specification shall draw attention to any part or parts of the Outline Specification which the Contractor intends to amend or omit and shall contain further material such that the design of the Permanent Works is fully specified, and the construction of the Permanent Works is specified at least in outline at this stage.

5.2.2 In producing the Particular Specifications the Bidder shall ensure that clauses, paragraphs and any appendices therein are identified by their numbering as uniquely belonging to the Particular Specifications, and shall not in any event amend or change the numbering in the Outline Specifications.

5.2.3 The Bidder should note that the Specifications submitted with the Bid as part of the Contractor's Technical Proposals will, prior to acceptance of Bid, be merged and consolidated into a single document for incorporation into the Contract.

5.2.4 The Bidder should note that the Particular Specifications form a crucial part of the Contractor's Technical Proposals, and shall be prepared in sufficient detail to demonstrate full compliance with the Employer's Requirements. The quality of the Particular Specifications will be paramount in evaluating technical compliance of Tenders.

## **5.3 Statement of Compliance**

A joint statement from the Bidder and the proposed Designers is required to be furnished to the effect that the Contractor's Technical Proposals comply with the Employer's Requirements and can be developed to become the Definitive Design of the Permanent Works without significant change other than amplification.

## **5.4 Statement of Maintainability**

The Bidder shall state the maintenance objectives and the anticipated operational life associated with the principal elements and components of the Permanent Works and in particular how these apply in the selection and use of proposed materials. The Bidder shall demonstrate a reasonable balance between construction costs and maintenance costs and the effect of its proposals on the lifetime costs of the Permanent Works. The Bidder shall include in this statement a schedule of the main maintenance operations, including intervals between such operations, for all aspects of the required construction and of main spares and stores required and their rates of use.

6. The Bid shall be accompanied by documents in amplification of the Contractor's Technical Proposals, which shall include:
- 6.1 Technical Notes**

Such technical notes or notes on calculations necessary for understanding and explaining the Contractor's Technical Proposals.
  - 6.2 Site investigation Proposals**

Results of any site investigations undertaken by the Bidder and proposals for site investigations to be undertaken by the Contractor giving the nature of the investigations, locations and intended purposes.
  - 6.3 Testing Proposals**

Results of any testing undertaken by the Bidder and proposals for other testing to be carried out by the Contractor for design or associated purposes (not including control of quality of construction, fabrication or manufacture), giving the nature of the testing, intended purposes, and the location of the test facilities used or to be used.
  - 6.4 Codes and Standards**

A list of all codes of practice and standards to be used in the design shall be provided. Except for those codes and standards available in Hindi, all other codes and standards shall be available in certified English translation. The Bidder shall provide justification, in accordance with Design Basis Report, for any codes or standards it proposes in its list as alternatives or additions to those specified in the Employer's Requirements, Design Basis Report and Technical Specifications. The Bidder will be required, during the Bidding process, to provide a certified English translation of any codes or standards it proposes to use and which are not normally available in English.

## 4.5 Form EQU: Equipment

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in [Section III](#), Eligibility and Qualification Criteria. A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder.

Item of equipment		
Equipment information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current status	Current location	
	Details of current commitments	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

Omit the following information for equipment owned by the Bidder.

Owner	Name of owner	
	Address of owner	
	Telephone	Contact name and title
	Fax	Telex
Agreements	Details of rental / lease / manufacture agreements specific to the project	

## 4.6 Personnel

### Form PER-1: Proposed Personnel

Bidders should provide the names of suitably qualified personnel to meet the specified requirements. The data on their experience should be supplied using the Form below for each candidate.

1.	Title of position*
	Name
2.	Title of position*
	Name
3.	Title of position*
	Name
4.	Title of position*
	Name

\*\*As listed in 'Key Personnel-Eligibility and Qualification Criteria'.

**Form PER-2: Resume of Proposed Personnel**

<b>Name of Bidder</b>
-----------------------

<b>Position</b>		
<b>Personnel information</b>	<b>Name</b>	<b>Date of birth</b>
	<b>Professional qualifications</b>	
<b>Present employment</b>	<b>Name of employer</b>	
	<b>Address of employer</b>	
	<b>Telephone</b>	<b>Contact (manager / personnel officer)</b>
	<b>Fax</b>	<b>E-mail</b>
	<b>Job title</b>	<b>Years with present employer</b>

Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

From	To	Company / Project / Position / Relevant technical and management experience

## 4.7 Outline Quality Plan

The Contractor shall establish and maintain a Quality Assurance System in design and construction procedures and the interfaces between them. This Quality Assurance system shall be applied without prejudice to, or without in any way limiting, any Quality Assurance Systems that the Contractor already maintains.

The Bidder shall submit with the Bid their corporate quality policy document duly signed by managing director/whole-time director/director/chief executive officer or any other officer duly authorized by its board of directors (in case of company) /governing body (in case of any entity other than a company).

The Bidder shall submit as part of its Bid an Outline Quality Plan which shall contain sufficient information to demonstrate clearly the Bidder's proposals for achieving effective and efficient Quality Assurance System. The Outline Quality Plan should include an outline of the procedures and regulations to be developed and the mechanism by which they will be implemented for ensuring Quality as indicated in the Employer's Requirements (Part 3).

The Bidder may be requested to amplify, explain or develop its Outline Quality Plan prior to the date of acceptance of the Bid and to provide more detail with a view to reaching provisional acceptance of such a plan.

## 4.8 Outline Safety, Health and Environment Plan

The Bidder shall submit as part of his Bid an Outline Safety, Health & Environment Plan which shall contain sufficient information to demonstrate clearly the Bidder's proposals for achieving effective and efficient compliance to the conditions of contract on SHE and SHE manual. The Outline Plan should include an outline of the procedures and regulations to be developed and the mechanism by which they will be implemented for ensuring safety as required by [Clause 4.8, 4.18 & 6.7 of the GCC](#).

The Outline Plan shall be headed with a formal statement of policy in relation to Safety, Health & Environment protection and shall be sufficiently informative to define the Bidder's plans and set out in summary an adequate basis for the development of the Site Safety, Health & Environment Plan to be submitted in accordance with [Clause 4.8, 4.18 and 6.7 of the GCC](#). The Outline Plan shall also include the methods and procedures for the Environmental Impact Assessment to be performed under the Contract.

The Bidder may be requested to amplify, explain or develop his Outline Safety, Health & Environment Plan prior to the date of acceptance of the Bid and to provide more details with a view to reaching provisional acceptance of such a plan.

## 4.9 Outline Project Management Plan

The Bidder shall submit with its Bid a Project Management Plan as prescribed in Works Requirements - inter-alia indicating names, qualifications, professional experience and corporate affiliation of all proposed key management and engineering personnel (above the level of supervisor) and specialists.

The Bidder shall include its proposals for its Co-ordination Control Team and include the name and qualifications of the Team Leader responsible for the interface co-ordination with Designated Contractors.

The Bidders shall provide a complete staffing schedule and organization chart as required.

The Bidder shall include in its proposals the methods that it shall employ to implement the Employer's requirements for Quality, Safety and Environmental Assurance. These shall include a commentary on how the programmes shall be initiated, maintained and reported, the tests that shall be carried out, and who shall be responsible for controlling and monitoring the programmes

## 4.10 Structure of the Bidder (Only for JV/Consortium)

The Bidder shall supply a chart particularizing the structure of the Bidder (identifying all companies comprising the Bidder in the event that the Bidder is a Consortium) and the ownership of the Bidder including the ownership of each of the companies comprising the Bidder, identifying all respective intermediate and ultimate holding companies.

### COMPOSITION OF THE BIDDER

1. A notarized copy of Consortium Agreement relating to the composition of the Bidder shall be submitted, if the Bidder is a Consortium. Should the Bidder be an entity established or to be established to Bid for this Contract, details of the shareholders' agreement or proposed shareholders' agreement or proposed shareholders' agreement shall be supplied together with the percentage participation and percentage equity in the agreements.
2. The contractual arrangements and copies of agreements in relation thereto must, as a minimum, provide information on all members or participants involved, their respective participation in the Bid, the management structure, ownership and control of the members or participants comprising the Bidder and the name of the Lead Member who would have overall lead management responsibility for the Works, the registered addresses of all parties and the names of their respective senior partners, chairmen or managing directors as appropriate. Such agreements should also reflect the joint and several liabilities of the members to the Employer in the event that the Contract is awarded to them and provide "deadlock" provisions in the event that decisions of the Consortium cannot be reached by unanimous agreement.
3. The Bidder shall confirm that the broad scope split of work amongst the Consortium members shall be as hereunder:

SN	Work & Responsibility	Partner Qualifying	Local partner (if any)
1	Design	P	S
2	Engineering	P	S
3	QC for manufacturing – Off shore and On shore	P	S
4	Manufacturing – Off shore	P	X
5	Manufacturing – On shore	S	P
6	Interfacing	P	S
7	Testing and commissioning	P	S
8	Design validation and type testing	P	S
9	Warranty services	P	S
10	Project management	P	S
11	Training (off shore & onshore)	P	S
12	Manuals	P	S

P – Responsible Partner – Primary Responsibility  
S – Support Partner – Secondary Responsibility  
X – No Role

Note: The responsibilities as confirmed in the table above are independent of the invoicing structure given in the Pricing Document of the financial package.

4. The Bidder shall provide written confirmation that:

- (a) The agreement or agreements submitted represent the entire agreement between the members or participants comprising the Bidder as to the Bidder's legal persona;
- (b) There is or are no other agreements relating to the Bidder's incorporation, powers or organization which may affect in any way its ability to carry out the Works; and
- (c) No changes will be made to any such agreements during the Bidding period or during the contract period (if contract awarded) without first obtaining the Employer's agreement to the proposed change or changes

## 4.11 Statement of Deviations

### (A) STATEMENT OF DEVIATIONS FROM THE PCC

Clause Number	Details of Deviations	Remarks explaining reasons for deviations and why it may be considered by the Employer	Price for Unqualified Withdrawal given in Financial Package (YES/NO)

Note:

1. We hereby confirm that the pricing for unconditional withdrawal of the above deviations has been given in the financial bid.
2. We hereby confirm that all implicit and explicit deviations, comments and remarks mentioned elsewhere in our proposal shall be treated as NULL and VOID and stand withdrawn.
3. We hereby confirm that but for the deviations noted herein, our proposal is fully and truly compliant.

SIGNATURE OF BIDDER.

## B) STATEMENT OF DEVIATIONS FROM THE WORKS REQUIREMENT

Clause Number	Details of Deviations	Remarks explaining reasons for deviations and why it may be considered by the Employer	Price for Unqualified Withdrawal given in Financial Package (YES/NO)

Note:

1. We hereby confirm that the pricing for unconditional withdrawal of the above deviations has been given in the financial bid.
2. We hereby confirm that all implicit and explicit deviations, comments and remarks mentioned elsewhere in our proposal shall be treated as NULL and VOID and stand withdrawn.
3. We hereby confirm that but for the deviations noted in herein, our proposal is fully and truly compliant.

SIGNATURE OF BIDDER

**(C) UNDERTAKING FOR PRICING FOR DEVIATIONS WITHDRAWAL (Deleted)**  
**(To be submitted on Bidder's Letterhead)**

Dated:.....

To:

Managing Director  
Maha Metro Rail Corporation Limited  
1st Floor, The Orion, 5, Koregaon Road,  
Pune- 411001, Maharashtra, INDIA

Letter of Undertaking

CONTRACT No. \_\_\_\_\_

Design and Construction of Underground section including two Underground Stations between Budhwar Peth and Swargate including stabling areas & scissor cross-over at Northern end Of Swargate and Associated Tunnels from CH:---- to CH:----- on the North-South Corridor of Pune Metro Rail Project.

We, (name of individual Bidder / Consortium) hereby undertake that:

1. We hereby confirm that the pricing for unconditional withdrawal of the deviations in statements A, B and C of 'Form 4.12 Statement of Deviations' has been given in the financial bid.
2. We hereby confirm that all implicit and explicit deviations, comments and remarks mentioned elsewhere in our proposal shall be treated as NULL and VOID and stand withdrawn.
3. We hereby confirm that but for the deviations noted in 'Form 4.12 Statement of Deviations', our proposal is fully and truly compliant.

Signed.....

For on behalf of

(Name of Bidder / Consortium)

## 5. Bidders Qualification without prequalification

To establish its qualifications to perform the contract in accordance with [Section III](#) (Eligibility and Qualification Criteria) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder.

## 5.1 Form ELI -1.1

### Bidder Information Form

Date: \_\_\_\_\_  
NCB No. and title: \_\_\_\_\_  
Page \_\_\_\_\_ of \_\_\_\_\_ pages

Bidder's name
In case of Joint Venture (JV), name of each member:
Bidder's actual or intended country of registration: <i>[indicate country of Constitution]</i>
Bidder's actual or intended year of incorporation:
Bidder's legal address [in country of registration]:
Bidder's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
<p>1. Attached are copies of original documents of</p> <p><input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above.</p> <p><input type="checkbox"/> In case of JV, letter of intent to form JV or JV agreement, in accordance with <a href="#">ITB 4.1</a>.</p> <p><input type="checkbox"/> In case of Government-owned enterprise or institution documents establishing:</p> <ul style="list-style-type: none"> <li>• Legal and financial autonomy</li> <li>• Operation under commercial law</li> <li>• Establishing that the Bidder is not dependent agency of the Employer</li> </ul> <p>2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.</p>

## 5.2 Form ELI -1.2

### Bidder's JV Information Form

(to be completed for each member of Bidder's JV and any specialized subcontractor if applicable)

Date: \_\_\_\_\_

NCB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

Bidder's JV name:

JV member's name:

JV member's country of registration:

JV member's year of constitution:

JV member's legal address in country of constitution:

JV member's authorized representative information

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone/Fax numbers: \_\_\_\_\_

E-mail address: \_\_\_\_\_

1. Attached are copies of original documents of

- ☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above.
- ☐ In case of a Government-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and absence of dependent status.

2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

### 5.3 Form CON -2

## Historical Contract Non-Performance, Pending Litigation and Litigation History

(to be completed by the Bidder and by each member of the Bidder's JV)

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

JV Member's Name \_\_\_\_\_

NCB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

Non-Performed Contracts in accordance with Section III, Eligibility and Qualification Criteria			
<input type="checkbox"/> Contract non-performance did not occur since 1 <sup>st</sup> January, 2013 specified in Section III, Eligibility and Qualification Criteria, Sub-Factor 2.1.			
<input type="checkbox"/> Contract(s) not performed since 1 <sup>st</sup> January, 2013 specified in Section III, Eligibility and Qualification Criteria, requirement 2.1.			
Year	Non-performed portion of contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and INR equivalent)
[insert year]	[insert amount and percentage]	Contract Identification: [indicate complete contract name/ number, and any other identification] Name of Employer: [insert full name] Address of Employer: [insert street/city/country] Reason(s) for non-performance: [indicate main reason(s)]	[insert amount]
Pending Litigation, in accordance with Section III, Eligibility and Qualification Criteria			
<input type="checkbox"/> No pending litigation in accordance with Section III, Eligibility and Qualification Criteria, Sub-Factor 2.2.			
<input type="checkbox"/> Pending litigation in accordance with Section III, Eligibility and Qualification Criteria, Sub-Factor 2.2 as indicated below.			

Year of dispute	Amount in dispute (currency)	Contract Identification	Total Contract Amount (currency), INR Equivalent (exchange rate)
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in dispute: _____ Party who initiated the dispute: _____ Status of dispute: _____	

## 5.4 Form FIN – 3.1:

### Financial Situation and Performance

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

JV Member's Name: \_\_\_\_\_

NCB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

#### 1. Financial data

Type of Financial information in (currency)	Historic information for previous _____ years, (amount in currency, currency, exchange rate, INR equivalent)				
	Year 1	Year 2	Year 3	Year 4	Year 5
Statement of Financial Position (Information from Balance Sheet)					
Total Assets (TA)					
Total Liabilities (TL)					
Total Equity/Net Worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Working Capital (WC)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
Cash Flow Information					
Cash Flow from Operating Activities					

#### 2. Financial documents

The Bidder and its parties shall provide copies of financial statements for 5 years pursuant Section III, Eligibility and Qualifications Criteria, Sub-factor 3.1. The financial statements shall:

- (a) Reflect the financial situation of the Bidder or in case of JV member , and not an affiliated entity (such as parent company or group member).
- (b) be independently audited or certified in accordance with local legislation.
- (c) be complete, including all notes to the financial statements.
- (d) correspond to accounting periods already completed and audited.

☐ Attached are copies of financial statements<sup>1</sup> for the 5 years required above and complying with the requirements

**Notes:**

Financial data for latest last five audited financial years has to be submitted by the Bidder in Form [FIN-3.1 to 3.3](#) along with audited balance sheets. The financial data in the prescribed format shall be certified by Chartered Accountant with his stamp and signature. In case audited balance sheet for the immediately preceding financial year i.e. 2017-18 is not available, he has to submit an affidavit certifying that the “balance sheet has actually not been audited so far”. In such a case the financial data of previous ‘five audited financial years before 2016-17 will be taken into consideration for evaluation. If audited balance sheet of any year other than the last year is not submitted, the Bid will be considered as non-responsive.

Weightage of 5% (Compounded annually) for Indian currency and 2 % per year for foreign currency shall be given for equating the financial turnover of the previous year to the current year.

Where a work has been earlier undertaken in a JV/consortium, only that portion of the contract which has been undertaken by the concerned applicant/member should be indicated and the remaining done by the other members of the group be excluded. This is to be substantiated with documentary evidence.

---

<sup>1</sup> If the most recent set of financial statements is for a period earlier than 12 months from the date of bid, the reason for this should be justified.

### 5.5 Form FIN – 3.2:

## Average Annual Construction Turnover

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

JV Member's Name: \_\_\_\_\_

NCB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

		Annual turnover data (construction only)	
Year	Amount Currency	Exchange rate	INR equivalent
[indicate year]	[insert amount and indicate currency]		
Average Annual Construction Turnover *			

\* See Section III, Eligibility and Qualification Criteria, Sub-Factor 3.2.

The financial data in the prescribed format shall be certified by Chartered Accountant with his stamp and signature.

### 5.6 Form FIN – 3.3:

## Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject contract or contracts as specified in Section III (Eligibility and Qualification Criteria)

Financial Resources		
No.	Source of financing	Amount (INR equivalent)
1		
2		
3		

The financial data in the prescribed format shall be certified by Chartered Accountant with his stamp and signature. If needed the working capital availability shall be demonstrated through a bank certificate.

### 5.7 Form FIN – 3.4:

## Current Contract Commitments / Works in Progress

Bidders and each member to a JV should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

Current Contract Commitments					
No.	Name of Contract	Employer's Contact Address, Tel, Fax	Value of Outstanding Work [Current INR Equivalent]	Estimated Completion Date	Average Monthly Invoicing Over Last Six Months [INR/month]
1					
2					
3					
4					
5					

The financial data in the prescribed format shall be certified by Chartered Accountant with his stamp and signature.

## 5.8 Form FIN – 3.5:

### Bidder's Profitability

Bidders and each member to a JV should provide information on their earnings before interest and tax in any two years out of the last five years. The financial data in the prescribed format shall be certified by Chartered Accountant with his stamp and signature.

	Profitability-earnings before Interest and Tax in INR					Years in which Profitability-earnings before Interest and Tax is +ve (Positive)
	2013-14	2014-15	2015-16	2016-17	2017-18	
Member-1 (Lead Member)						
Member-2 (other than Lead Member)						
Member-3 (other than Lead Member)						

## 5.9 Form EXP - 4.1

### General Construction Experience

(Each Bidder or member of a JV must fill this form)

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

JV Member's Name \_\_\_\_\_

NCB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

Starting Year*	Ending Year	Contract Identification	Role of Bidder
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	

\* See Section III Eligibility and Qualification Criteria – Sub Factor 4.1

## 5.10 Form EXP - 4.2(a)

### Specific Construction and Contract Management Experience

(each Bidder or member of a JV or Specialized subcontractor must fill this form)

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

JV Member's Name \_\_\_\_\_

NCB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

Similar Contract No.	Information			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime (Single) Contractor <input type="checkbox"/>	Lead Member in JV <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Sub- contractor <input type="checkbox"/>
Total Contract Amount	[insert Contract amount(s) and currency(ies)]		INR Equivalent	
If member in a JV or sub-contractor, specify participation in total Contract amount	[insert percentage of participation]	[insert amount(s) and currency(ies) of participation]	INR Equivalent	
Employer's Name:				
Address:				
Telephone/fax number				
E-mail:				

### 5.11 Form EXP - 4.2(a) (cont.)

## Specific Construction and Contract Management Experience (cont.)

Similar Contract No.	Information
Description of the similarity in accordance with Sub-Factor 4.2(a) of Section III:	
1. Amount	
2. Physical size of required works items	
3. Complexity	
4. Methods/Technology	
5. Construction rate for key activities	
6. Other Characteristics	

#### Notes:

The Bidder shall submit details of works executed by them in the above form for the works to be considered for qualification of similar work experience criteria. Documentary proof such as completion certificates from client indicating the nature/scope of work, actual completion cost and actual date of completion of such work should be submitted. The offers submitted without above documentary proofs shall not be evaluated.

Credential certificates issued by Government Organizations / Semi Government Organizations of Central or State Government; or by Public Sector Undertakings / Autonomous Bodies or Central or State Government; or by Public Ltd. Companies listed in Stock Exchange in India or Abroad shall only be accepted for assessing the eligibility of Bidder.

In case the work is executed for Public Ltd. Company listed in Stock Exchange in India or Abroad, copy of work order, bill of quantities, bill wise details of payment received certified by C.A., T.D.S. certificate for all payments received and copy of final/last bill paid by client shall also be submitted. Work done certificate signed by the director of the company is preferable. However, the same from power of attorney holder will also be acceptable. Only the quantum of work as executed by the Bidder / member in his own name should be indicated. Where a work is undertaken by a group, only that portion of the contract which is undertaken by the concerned Bidder/ member should be indicated and the remaining done by the other members of the group be excluded. Bidder has to attach credential certificates from client in support of above details.

## 5.12 Form - 2(c): Detailed Design Consultancy

[The following table shall be filled in for Contracts performed by the Bidder and by each member of a JV.]

Date: \_\_\_\_\_  
 Bidder's Legal Name: \_\_\_\_\_  
 Joint Venture Party Legal Name: \_\_\_\_\_  
 IFB No.: \_\_\_\_\_  
 Page \_\_\_ of \_\_\_ pages

[Fill out one (1) form per Contract, in accordance with Section III, Eligibility and Qualification Criteria, Clause 5).]

1. Key Activity No. (1): [insert brief description of the Activity, emphasizing its specificity]

Total Quantity of Activity under the Contract: \_\_\_\_\_

Contract With Similar Key Activities Information			
ITEM	INFORMATION		
Contract Identification			
Award date			
Completion date			
Role in Contract (check the appropriate box)	Contractor		Sub-contractor
	Single <input type="checkbox"/>	JV <input type="checkbox"/>	<input type="checkbox"/>
Total Contract Amount	[insert Contract amount(s) and currency(ies)]		INR Equivalent
Quantity (as applicable) performed under the Contract per year or part of the year [insert extent of participation indicating actual quantity of key activity successfully completed in the role performed]	Total quantity in the Contract (i)	Percentage participation (ii)	Actual Quantity Performed (i) × (ii)
Year 1			
Year 2			

Year 3			
Year 4			
Employer's Name	<i>[insert full name]</i>		
Address	<i>[indicate street / number / town or city / country]</i>		
Telephone/fax number	<i>[insert telephone/fax numbers, including country and city area codes]</i>		
E-mail	<i>[insert E-mail address, if available]</i>		



## 6. Form of Bid Security (Demand Guarantee)

\_\_\_\_\_

**Beneficiary:** \_\_\_\_\_

**Invitation for Bids No:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**BID GUARANTEE No.:** \_\_\_\_\_

**Guarantor:** \_\_\_\_\_

We have been informed that \_\_\_\_\_ (hereinafter called "the Applicant") has submitted or will submit to the Beneficiary its bid (hereinafter called "the Bid") for the execution of \_\_\_\_\_ under Invitation for Bids No. \_\_\_\_\_ ("the IFB").

Furthermore, we understand that, according to the Beneficiary's conditions, bids must be supported by a bid guarantee.

At the request of the Applicant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of \_\_\_\_\_ (\_\_\_\_\_) upon receipt by us of the Beneficiary's first demand, supported by the Beneficiary's statement, whether in the demand itself or a separate signed document accompanying or identifying the demand, stating that either the Applicant:

- (a) has withdrawn its Bid during the period of bid validity set forth in the Applicant's Letter of Bid ("the Bid Validity Period"), or any extension thereto provided by the Applicant; or
- (b) having been notified of the acceptance of its Bid by the Beneficiary during the Bid Validity Period or any extension thereto provided by the Applicant, (i) has failed to execute the contract agreement, or (ii) has failed to furnish the performance security,, in accordance with the Instructions to Bidders ("ITB") of the Beneficiary's bidding document.

This guarantee will expire: (a) if the Applicant is the successful bidder, upon our receipt of copies of the contract agreement signed by the Applicant and the performance security issued to the Beneficiary in relation to such contract agreement; or (b) if the Applicant is not the successful bidder, upon the earlier of (i) our receipt of a copy of the Beneficiary's

notification to the Applicant of the results of the bidding process; or (ii) twenty-eight days after the end of the Bid Validity Period.

Consequently, any demand for payment under this guarantee must be received by us at the office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.

---

*[signature(s)]*

## 6A. Form of Additional Bank Guarantee by Bank

Deleted

## 7. Form of Bid-Securing Declaration

**FORM DELETED**

## 8. Form of Joint Bidding Agreement

(JV/ Consortium Agreement)

*(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution, duly signed on each page. Foreign entities submitting the Bid are required to follow the applicable law in their country)*

FORM OF CONSORTIUM AGREEMENT BETWEEN

M/S....., M/S.....,

M/S..... AND M/S.....

FOR (.....)

THIS Consortium Agreement (hereinafter referred to as “Agreement”) executed on this..... day of ..... Two thousand Twelve between

..... a company incorporated under the laws of ..... and having its Registered Office at ..... (hereinafter called the “Party 1”, which expression shall include its successors, executors and permitted assigns), and

..... a company incorporated under the laws of ..... and having its Registered Office at ..... (hereinafter called the “Party 2”, which expression shall include its successors, executors and permitted assigns) and

..... a Company incorporated under the laws of ..... and having its Registered Office at ..... (hereinafter called the “Party 3”, which expression shall include its successors, executors and permitted assigns)

*(The Bidding consortium should list the name, address of its registered office and other details of all the consortium Members)*

for the purpose of submitting the Bid in response to the Bidding Documents and in the event of selection as Successful Bidderto execute the Contract Agreement and/or other requisite documents, and to carry out the ‘.....’ (“Works”) for Pune Metro Rail Project to be awarded by Maharashtra Metro Rail Corporation Limited (hereinafter referred as “MAHA-METRO” or “the Company”).

Party 1, Party 2, and Party 3 are hereinafter collectively referred to as the “Parties” and individually as a “Party”.

WHEREAS MAHA-METRO desired to engage a contractor for ..... [name of the Works] for Pune Metro Rail Project.

AND WHEREAS the Consortium of [.....] (insert the names of all the Members) intends to participate for the Bid, against the Bidding Documents issued to ..... [Insert the name of purchaser of Bidding Document].

AND WHEREAS Para BDS ITB 4.7 of the Instructions to Bidder stipulates that the Bidders bidding on the strength of a consortium shall submit a legally enforceable Consortium Agreement in a format specified in the Bidding Documents.

NOW THEREFORE, THIS INDENTURE WITNESSTH AS UNDER:

In consideration of the above premises and agreement, all the parties in this Consortium do hereby mutually agree as follows:

1. In consideration of the selection of the Consortium as the Successful Bidder by the Company, we the Members of the Consortium and Parties to the Consortium Agreement do hereby unequivocally agree that M/s..... (Insert name of the Lead Member), shall act as the Lead Member as defined in the Bidding Documents for self and agent for and on behalf of ..... (the names of all the other Members of the Consortium to be filled in here) to do on behalf of the Consortium, all or any of the acts, deeds or things necessary or incidental to the Consortium's Bid for the Contract including submission of the Bid, participating in meetings, responding to queries, submission of information/ documents and generally to represent the Consortium in all its dealings with MAHA-METRO or any other Government Agency or any person, in connection with the Works until culmination of the process of bidding till the Contract is entered into with MAHA-METRO and thereafter till the expiry of the Contract.
2. The Lead Member is hereby authorized by the Members of Consortium and Parties to the Consortium Agreement to bind the Consortium, incur liabilities and receive instructions for and on behalf of all Members. It is agreed by all the Members that entire execution of the Contract including payment shall be carried out exclusively through the Lead Member.
3. The Lead Member shall be liable and responsible for ensuring the individual and collective commitment of each of the Members of the Consortium in discharging all their respective obligations under the Contract with MAHA-METRO. Each Consortium Member further undertakes to be individually liable for the performance of its part of the obligations without in any way limiting the scope of collective liability envisaged in this Agreement.
4. In case of any breach of any of the obligations as specified under [clause 3](#) above by any of the Consortium Members, the Lead Member shall be liable to fulfil such obligation.
5. It is agreed that sharing of responsibilities hereto among the Consortium members shall not in any way be a limitation of responsibility of the Lead Member under these

presents.

6. This Consortium Agreement shall be construed and interpreted in accordance with the Laws of \_\_\_\_\_.
7. It is hereby agreed that the Lead Member shall furnish the Bid Security, as stipulated in the Bidding Documents, on behalf of the Consortium.
8. It is hereby agreed that in case of selection of bidding consortium as the Successful Bidder, the Parties to this Consortium Agreement do hereby agree that the Lead Member shall furnish the Performance Security on behalf of the Consortium, as stipulated in the Bidding Documents.
9. It is further expressly agreed that the Consortium Agreement shall be irrevocable and, for the Successful Bidder, shall remain valid over the term of the Contract, unless expressly agreed to the contrary by the Company.
10. The Lead Member is authorized and shall be fully responsible for the accuracy and veracity of the representations and information submitted by the Consortium Members respectively from time to time in response to the Bidding Documents for the purposes of the Bidding.
11. It is expressly understood and agreed between the Members that the responsibilities and obligations of each of the Members shall be as follows:  
  
.....  
.....
12. It is agreed by the Members that the above sharing of responsibilities and obligations shall not in any way be a limitation of joint and several responsibilities and liabilities of the Members, with regards to all matters relating to the execution of the Works as envisaged in the Bidding Documents and the Contract. The Parties shall be jointly and severally liable for execution of the Works in accordance with the terms of the Contract and the Bidding Documents.
13. It is clearly agreed that the Lead Member shall ensure performance under the Contract and if one or more Consortium Members fail to perform its /their respective obligations under the agreement(s), the same shall be deemed to be a default by all the Consortium Members.
14. It is hereby agreed that in case of selection of the Consortium as the Successful Bidder, [the Lead Member shall furnish the Performance Security on behalf of the Consortium as stipulated in the Bidding Documents] / [the Performance Security as stipulated in the Bidding Documents shall be furnished by the Members on behalf of the Consortium in such proportion as may be agreed to between us]

15. It is agreed by all the Members that there shall be separate Consortium Bank Account (distinct from the bank accounts of the individual Members) to which the individual Members shall contribute their share capital and/or working capital and the financial obligations of the Consortium shall be discharged through the said Consortium Bank Account only and also all the payments received by the Consortium from the Employer shall be through that account alone.
16. It is hereby expressly agreed between the Parties to this Consortium Agreement that neither Party shall assign or delegate its rights, duties or obligations under this Agreement except with prior written consent of the Company.
17. We hereby agree to ratify all acts, deeds and things lawfully done by the aforesaid Lead Member pursuant to this Agreement and that all acts, deeds and things done by the aforesaid Lead Member shall and shall always be deemed to have been done by us/Consortium.

#### This Consortium Agreement

- (a) has been duly executed and delivered on behalf of each Party hereto and constitutes the legal, valid, binding and enforceable obligation of each such Party,
- (b) sets forth the entire understanding of the Parties hereto with respect to the subject matter hereof including the Consortium/Bidder's legal persona and there is or are no other agreements relating to the Consortium/Bidder's incorporation, constitution, powers or organisation which may affect in any way its ability to carry out the Works;
- (c) may not be amended or modified except in writing signed by each of the Parties and with prior written consent of the Company.

IN WITNESS WHEREOF, the Parties to the Consortium Agreement have, through their authorized representatives, executed these presents and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

Common Seal of ..... For and on behalf of  
has been affixed in my/our Consortium Member (party 1)  
presence pursuant to the M/s.....  
Board of Director's resolution  
dated .....

.....	.....
(Signature)	(Signature of authorized
representative)	
Name: .....	Name: .....
Designation: .....	Designation: .....
Place: .....	

Date: .....

Witness:

1. ....

(Signature)

Name .....

Designation.....

2. ....

(Signature)

Name .....

Designation.....

Common Seal of ..... For and on behalf of  
has been affixed in my/our Consortium Member (Party 2)  
presence pursuant to the M/s.....  
Board of Director's  
resolution dated .....

.....  
(Signature)

Name:

Designation:

Place:

Date:

.....  
(Signature of authorized  
representative)

Name:

Designation:

WITNESS

1. ....

(Signature)

Name .....

Designation.....

2. ....

(Signature)

Name .....

Designation.....

Attested:

.....

(Signature)

(Notary Public)

Place: .....

Date: .....

Common Seal of ..... For and on behalf of  
has been affixed in my/our Consortium Member (Party 3)  
presence pursuant to the M/s.....  
Board of Director's  
resolution dated .....

.....

(Signature)

Name:

Designation:

Place:

Date:

.....

(Signature of authorized  
representative)

Name:

Designation:

WITNESS

1. ....

(Signature)

Name .....

Designation.....

2. ....

(Signature)

Name .....

Designation.....

Attested:

.....

(Signature)

(Notary Public)

Place: .....

Date: .....

## 8A. Draft Memorandum of Understanding (MOU) for JV participation

among

M/s ..... having its registered office at ..... (Hereinafter referred to as ..... ) acting as the Lead Partner of the first part,

and

M/s .....having its registered office at ..... (hereinafter referred to as .....') in the capacity of a Joint Partner of the second part.

and

M/s .....having its registered office at ..... (here in after referred to as .....') in the capacity of a Joint Partner of the third part.

The expressions of ..... and .....and ..... shall wherever the context admits, mean and include their respective legal representatives, successors-in-interest and assigns and shall collectively be referred to as “the Parties” and individually as “the Party”

### WHEREAS:

Bangalore Metro Rail Corporation Limited (BMRCL) [hereinafter referred to as “Employer”] has invited tenders for ... “[Insert name of work].....”

### NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. The following documents shall be deemed to form and be read and construed as an integral part of this MOU.
  - i) Notice Inviting Tender, and
  - ii) Tender document
  - iii) Any Addendum/Corrigendum issued by Bangalore Metro Rail Corporation Limited
  - iv) The tender submitted on our behalf jointly by the Lead Partner.
2. The ‘Parties’ have studied the documents and have agreed to participate in submitting a ‘tender’ jointly in the name of -----(insert name of the JV)
3. M/s .....shall be the lead member of the JV for all intents and purpose and shall represent the Joint Venture in its dealing with the Employer. For the purpose of submission of tender proposals, the parties agree to nominate ..... as the leader duly authorized to sign and submit all documents and subsequent clarifications, if any, to the Employer. However M/s ..... shall not submit any such proposals, clarifications or commitments before securing the written clearance of the other partners which shall be expeditiously given by M/s.....and M/s -----to M/s.....( insert lead partner name)
4. The ‘Parties’ have resolved that the distribution of share and responsibilities between the JV partners **(Tenderder shall ensure that the assigned responsibilities are commensurate with the Eligibility cum Qualification Criteria, failing which the tender may be rejected)** is as under:-

- (A) Lead Partner .....(insert name)share .....% ;  
*Responsibilities*  
 (i) .....  
 (ii) .....  
 (iii) .....
- (b) Joint Partner .....(insert name)share .....% ;  
*Responsibilities*  
 (i) .....  
 (ii) .....  
 (iii) .....
- (C) Joint Partner .....(insert name)share .....% ;  
*Responsibilities*  
 (i) .....  
 (ii) .....  
 (iii) .....

#### 5. JOINT AND SEVERAL RESPONSIBILITY

The Parties undertake that they shall be jointly and severally liable to the Employer in the discharge of all the obligations and liabilities as per the contract with the Employer and for the performance of contract awarded to their JV.

#### 6. ASSIGNMENT AND THIRD PARTIES

*The parties shall co-operate throughout the entire period of this MoU on the basis of exclusivity and none of the parties shall make arrangement or enter into agreement either directly or indirectly with any other party or group of parties on matters relating to the project except with prior written consent of the other party and the employer.*

#### 7. EXECUTIVE AUTHORITY

The said Joint Venture through its authorized representative shall receive instructions, payments from the Employer. The management structure for the project shall be prepared by mutual consultations to enable completion of project to quality requirements within permitted cost and time.

#### 8. GUARANTEES AND BONDS

- (i) *The Tender Security: Tender security can be furnished by any one of the members of the Joint Venture. the JV member M/s----- (insert name of the JV member) has furnished the tender security for the tender.*
- (ii) *Performance Security: If contract is awarded, each member of the JV shall submit the Performance Security in proportion to their participation.*

**9. TENDER SUBMISSION**

*Each party shall bear its own cost and expenses for preparation and submission of the tender and all costs until conclusion of a contract with the employer for the project. Common expenses shall be shared by all the parties in the ratio of their actual participation.*

**10. INDEMNITY**

*Each party hereto agrees to indemnify the other party against its respective parts in case of breach/default of the respective party of the contract works of any liabilities sustained by the joint venture.*

11. For the execution of the respective portions of works, the parties shall make their own arrangements to bring the required finance, plants and equipment, materials, manpower and other resources.

**12. DOCUMENTS & CONFIDENTIALITY**

Each Party shall maintain in confidence and not use for any purpose related to the Project all commercial and technical information received or generated in the course of preparation and submission of the tender.

**13. ARBITRATION**

*Any dispute, controversy or claim arising out of or relating to this MoU shall be settled in the first instance amicably between the parties. If an amicable settlement cannot be reached as above, it will be settled by arbitration in accordance with the Indian arbitration and conciliation act 1996 and amendments Act 2015, and as amended from time to time. The venue of the arbitration shall be: Bangalore.*

**14. VALIDITY**

*This MoU shall remain in force till the occurrence of the earliest to occur of the following, unless by mutual consent, the parties agree in writing to extend the validity for a further period.*

- a. The tender submitted by the Joint Venture is declared unsuccessful, or
- b. Cancellation/shelving of the Project by the Employer for any reasons prior to award of work
- c. Execution of detailed JV agreement by the parties, setting out detailed terms after award of work by the Employer.

15. This MOU is drawn in **four**..... number of copies with equal legal strength and status. One copy is held by M/s ..... and the others by M/s .....& M/s..... and a copy submitted with the tender.

16. This MOU shall be construed under the laws of India.

**17. NOTICES BETWEEN JV PARTNERS**

Notices shall be given in writing by fax confirmed by registered mail or commercial courier to the following fax numbers and addresses:

Lead Partner (First Part)	Second JV Partner	Third JV Partner
.....	.....	.....
.....	.....	.....
.....	.....	.....
(Name & Address)	(Name & Address)	(Name & Address)

IN WITNESS WHEREOF THE PARTIES, have executed this MOU the day, month and year first before written.

M/s.....	M/s.....	M/s.....
.....	.....	.....
(Stamp)		(Stamp)
(Stamp)		

Witness

1..... (Name & Address)  
,  
2..... (Name & Address)  
3..... (Name & Address)

## 9. Form of Legal Capacity / Power of Attorney

*(To be forwarded on the letterhead of the Bidder/ Lead Member of Consortium)*

### Format for Board Resolution

#### **(A) Format for the Board resolution to be passed by a Bidder (not applicable in case of consortium)**

The Board, after discussion, at the duly convened Meeting on ..... (Insert date), with the consent of all the Directors present and in compliance of the provisions of the Companies Act, 1956/2013, passed the following Resolution:

RESOLVED THAT pursuant to the applicable provisions of the Companies Act, 1956/2013 and as permitted under the Memorandum and Articles of Association of the Company, approval of the Board be and is hereby accorded to submit a Bid in response to the Bidding Documents dated \_\_\_\_\_ issued by Maharashtra Metro Rail Corporation Limited (MAHA-METRO) for *[Insert name of the work]* for Pune Metro Rail Project.

FURTHER RESOLVED THAT Mr./Ms....., (insert the name and designation of the concerned official of the Company) be and is hereby authorized to take all the steps required to be taken by the Company for submission of the aforesaid Bid, including in particular, signing the Bid, making changes thereto and submitting amended Bid, signing and executing all the documents related to the Bid, certified copy of this Board resolution or letter or undertakings, etc., required to be submitted to MAHA-METRO as part of the Bid or such other documents as may be necessary in this regard and to do in our name and our behalf all or any of the acts, deeds or things necessary or incidental to submission of our said Bid including signing and executing the Contract Documents, making representations to MAHA-METRO or any other authority, and providing information / responses to MAHA-METRO, representing us in all matters before MAHA-METRO, and generally dealing with MAHA-METRO in all matters in connection with our Bid till the completion of the bidding process as per the terms of the above said Bidding Documents and further till the Contract is entered into with MAHA-METRO and thereafter till the expiry of the Contract.

FURTHER RESOLVED THAT a power of attorney as per the draft attached to the Bidding Documents be issued in favour of the above named person, \_\_\_\_\_, to be executed by Mr. \_\_\_\_\_ or Mr. \_\_\_\_\_, Directors of the Company under the Common seal of the Company, affixation thereof to be witnessed by one or both of the above named Directors and by Mr. \_\_\_\_\_, (insert the name and designation of the concerned official of the Company) or as per the Memorandum and Articles of Association of the Company.

Signature and stamp of Company Secretary / Managing Director/Director of Bidder

**Notes:**

1. This certified true copy should be submitted on the letterhead of the Company, signed by the Company Secretary / Managing Director/Director of the Bidder.
2. The contents of the format may be suitably re-worded indicating the identity of the entity passing the resolution.
3. In the event the Board resolution is from a company incorporated outside India, the same needs to be notarized by a notary in the home country of company passing the resolution and legalized by the Indian Embassy there. However, in case such company is from a country which has signed The Hague Legislation Convention 1961, then the Board Resolution is not required to be legalized by the Indian Embassy if it carries a conforming Apostille certificate.
4. This format may be modified only to the limited extent required to comply with the local regulations and laws applicable to a foreign entity submitting this resolution. For example, reference to Companies Act 1956/2013 may be suitably modified to refer to the law applicable to the entity submitting the resolution. However, in such case, the foreign entity shall submit an unqualified opinion issued by the legal counsel of such foreign entity, stating that the Board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing company and the authorizations granted therein are true and valid.

**(B) Format for the Board resolution to be passed by Lead Member of Consortium (applicable in case the Bidder is a consortium)**

The Board, after discussion, at the duly convened Meeting on ..... (Insert date), with the consent of all the Directors present and in compliance of the provisions of the Companies Act, 1956/2013, passed the following Resolution:

RESOLVED THAT pursuant to the applicable provisions of the Companies Act, 1956/2013 and as permitted under the Memorandum and Articles of Association of the Company, approval of the Board be and is hereby accorded to submit a Bid in response to the Bidding Documents dated \_\_\_\_\_ issued by Maharashtra Metro Rail Corporation Limited (MAHA-METRO) for '.....' [Name of the work] for Pune Metro Rail Project in consortium with \_\_\_\_\_ (insert the name and address of the other consortium members).

FURTHER RESOLVED THAT pursuant to the applicable provisions of the Companies Act, 1956/2013 and as permitted under the Memorandum and Articles of Association of the Company, approval of the Board be and is hereby accorded to execute a Consortium Agreement as per the format annexed to the aforesaid Bidding Documents with

\_\_\_\_\_ (insert the name and address of the other consortium members).

FURTHER RESOLVED THAT approval of the Board be and is hereby accorded to the Company to accept and act as the Lead Member of the aforesaid Consortium and also as true and lawful attorney to do in the name and on behalf of the Consortium, all such acts, deeds and things necessary in connection with or incidental to submission of Consortium's Bid in response to the Bidding Documents dated \_\_\_\_\_ issued by MAHA-METRO for '.....' [name of the work] including signing and submission of the Bid and all documents related to the Bid as specified in the Bidding Documents, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document, which MAHA-METRO may require us to submit and carrying out the Contract and doing all necessary deeds and things as may be required in respect of the above and also for making representations to MAHA-METRO and providing information / responses to MAHA-METRO, representing the Consortium in all matters before MAHA-METRO, and generally dealing with MAHA-METRO and/or any other authority in all matters in connection with Consortium's Bid, till completion of the bidding process in accordance with the Bidding Documents and further till the Contract is entered into with MAHA-METRO and thereafter till the expiry of the Contract.

FURTHER RESOLVED THAT Mr./Ms....., (insert the name and designation of the concerned official of the Company) be and is hereby authorized to take all the steps required to be taken by the Company for submission of the Consortium's Bid, including in particular, signing the Bid, making changes thereto and submitting amended Bid, signing and executing all the documents related to the Bid, certified copy of this Board resolution or letter or undertakings, etc., required to be submitted to MAHA-METRO as part of the Bid or such other documents as may be necessary in this regard and to do in the name and on behalf the Consortium all or any of the acts, deeds or things necessary or incidental to submission of said Bid including signing and executing the Contract Documents, making representations to MAHA-METRO or any other authority, and providing information / responses to MAHA-METRO, representing the Consortium in all matters before MAHA-METRO, and generally dealing with MAHA-METRO in all matters in connection with our Bid till the completion of the bidding process as per the terms of the above said Bidding Documents and further till the Contract is entered into with the Company and thereafter till the expiry of the Contract.

FURTHER RESOLVED THAT a power of attorney as per the draft attached to the Bidding Documents be issued in favour of the above named person, \_\_\_\_\_, to be executed by Mr. \_\_\_\_\_ or Mr. \_\_\_\_\_, Directors of the Company under the Common seal of the Company, affixation thereof to be witnessed by one or both of the above named Directors and by Mr. \_\_\_\_\_, (insert the name and designation of the concerned official of the Company) or as per the Memorandum and Articles of Association of the Company.

Signature and stamp of Company Secretary / Managing Director/Director of Bidder

**Notes:**

1. This certified true copy should be submitted on the letterhead of the Company, signed by the Company Secretary / Managing Director/Director of the Bidder.
2. The contents of the format may be suitably re-worded indicating the identity of the entity passing the resolution.
3. In the event the Board resolution is from a company incorporated outside India, the same needs to be notarized by a notary in the home country of company passing the resolution and legalized by the Indian Embassy there. However, in case such company is from a country which has signed The Hague Legislation Convention 1961, then the Board Resolution is not required to be legalized by the Indian Embassy if it carries a conforming Appostille certificate.
4. This format may be modified only to the limited extent required to comply with the local regulations and laws applicable to a foreign entity submitting this resolution. For example, reference to Companies Act 1956/2013 may be suitably modified to refer to the law applicable to the entity submitting the resolution. However, in such case, the foreign entity shall submit an unqualified opinion issued by the legal counsel of such foreign entity, stating that the Board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing company and the authorizations granted therein are true and valid.

**(C) Format for the Board resolution to be passed by a Member other than the Lead Member of Consortium (applicable in case the Bidder is a consortium)**

The Board, after discussion, at the duly convened Meeting on ..... (Insert date), with the consent of all the Directors present and in compliance of the provisions of the Companies Act, 1956/2013, passed the following Resolution:

RESOLVED THAT pursuant to the applicable provisions of the Companies Act, 1956/2013 and as permitted under the Memorandum and Articles of Association of the Company, approval of the Board be and is hereby accorded to submit a Bid in response to the Bidding Documents dated \_\_\_\_\_ issued by Maharashtra Metro Rail Corporation Limited (MAHA-METRO) for '.....' [name of the work] for Pune Metro Rail Project in consortium with \_\_\_\_\_ (insert the name and address of the other consortium members).

FURTHER RESOLVED THAT pursuant to the applicable provisions of the Companies Act, 1956/2013 and as permitted under the Memorandum and Articles of Association of the Company, approval of the Board be and is hereby accorded to execute a Consortium Agreement as per the format annexed to the aforesaid Bidding Documents with \_\_\_\_\_ (insert the name and address of the other consortium members).

FURTHER RESOLVED THAT approval of the Board be and is hereby accorded to constitute, appoint and authorize \_\_\_\_\_ (name and registered office address of the Lead Member), which is one of the Members of the Consortium, to act as the Lead Member of the aforesaid Consortium and also as true and lawful attorney, to do in the name and on behalf of the Consortium, all such acts, deeds and things necessary in connection with or incidental to submission of Consortium's Bid in response to the Bidding Documents dated \_\_\_\_\_ issued by MAHA-METRO for '.....' [name of the work] including signing and submission of the Bid and all documents related to the Bid as specified in the Bidding Documents, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document, which MAHA-METRO may require us to submit and carrying out the Contract and doing all necessary deeds and things as may be required in respect of the above and also for making representations to MAHA-METRO and providing information / responses to MAHA-METRO, representing the Consortium in all matters before MAHA-METRO, and generally dealing with MAHA-METRO and/or any other authority in all matters in connection with our Bid, till completion of the bidding process in accordance with the Bidding Documents and further till the Contract is entered into with MAHA-METRO and thereafter till the expiry of the Contract.

FURTHER RESOLVED THAT a power of attorney as per the draft attached to the Bidding Documents be issued in favour of the above said Lead Member, \_\_\_\_\_, to be executed by Mr. \_\_\_\_\_ or Mr. \_\_\_\_\_, Directors of the Company under the Common seal of the Company, affixation thereof to be witnessed by one or both of the above named Directors and by Mr. \_\_\_\_\_, (insert the name and designation of the concerned official of the Company) or as per the Memorandum and Articles of Association of the Company.

FURTHER RESOLVED THAT a power of attorney as per the draft attached to the Bidding Documents be issued in favour of Mr./Ms....., (insert the name and designation of the concerned official of the Company) to be executed by Mr. \_\_\_\_\_ or Mr. \_\_\_\_\_, Directors of the Company under the Common seal of the Company, affixation thereof to be witnessed by one or both of the above named Directors and by Mr. \_\_\_\_\_, (insert the name and designation of the concerned official of the Company) or as per the Memorandum and Articles of Association of the Company.

FURTHER RESOLVED THAT Mr./Ms....., (insert the name and designation of the concerned official of the Company) be and is hereby authorized to take all the steps required to be taken by the Company for submission of the aforesaid Bid, including in particular, signing and executing all the documents related to the Bid, certified copy of this Board resolution or letter or undertakings, etc., required to be submitted to MAHA-METRO as part of the Bid or such other documents as may be necessary in this regard and to do in our name and our behalf all or any of the acts, deeds or things necessary or incidental to give effect to this resolution.

Signature and stamp of Company Secretary / Managing Director/Director of Bidder

**Notes:**

1. This certified true copy should be submitted on the letterhead of the Company, signed by the Company Secretary / Managing Director/Director of the Bidder.
2. The contents of the format may be suitably re-worded indicating the identity of the entity passing the resolution.
3. In the event the Board resolution is from a company incorporated outside India, the same needs to be notarized by a notary in the home country of company passing the resolution and legalized by the Indian Embassy there. However, in case such company is from a country which has signed The Hague Legislation Convention 1961, then the Board Resolution is not required to be legalized by the Indian Embassy if it carries a conforming Apostille certificate.
4. This format may be modified only to the limited extent required to comply with the local regulations and laws applicable to a foreign entity submitting this resolution. For example, reference to Companies Act 1956/2013 may be suitably modified to refer to the law applicable to the entity submitting the resolution. However, in such case, the foreign entity shall submit an unqualified opinion issued by the legal counsel of such foreign entity, stating that the Board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing company and the authorizations granted therein are true and valid.

**(D) Power of Attorney to be provided by each of the Members of the Consortium (other than the Lead Member) in favour of the Lead Member**

WHEREAS Maharashtra Metro Rail Corporation Limited, (the Company) has issued the Bidding Documents on \_\_\_\_\_ for inviting Bids for '.....' [name of the work] for Pune Metro Rail Project on the terms and contained in the Bidding Documents;

AND WHEREAS ....., ..... and ..... (Insert names of all Members of Consortium) the Members of the Consortium are desirous of submitting a Bid in response to the Bidding Documents, and if selected, undertaking the responsibility of '**Insert the name of the work**' as per the terms of the Bidding Documents;

AND WHEREAS all the Members of the Consortium have agreed under the Consortium Agreement dated ..... entered into between all the Members and submitted along with the Bid to appoint ..... (Insert the name and address of the Lead Member) as Lead Member to represent all the Members of the Consortium for all matters regarding the Bidding Documents and the Bid;

AND WHEREAS pursuant to the terms of the Bidding Documents and the Consortium Agreement, we, the Members of the Consortium hereby designate M/s ..... (Insert name of the Lead Member) as the Lead Member to represent us in all matters regarding the Bid and the Bidding Documents, in the manner stated below:-

Know all men by these presents, We ..... (Insert name and address of the registered office of the Member-1), ..... (Insert name and address of the registered office of the Member-2) ..... (Insert name and address of the registered office of the Member-n) do hereby constitute, appoint and authorize ..... (name and registered office address of the Lead Member), which is one of the Members of the Consortium, to act as the Lead Member and our true and lawful attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to submission of Consortium's Bid in response to the Bidding Document dated \_\_\_\_\_ issued by the Company for '.....' [name of the work] including signing and submission of the Bid and all documents related to the Bid as specified in the Bidding Documents, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document, which the Company may require us to submit and carrying out the Contract and doing all necessary deeds and things as may be required in respect of the above. The aforesaid Attorney shall be further authorized for making representations to the Company named in the Bidding Documents, and providing information / responses to the Company named in the Bidding Documents, representing us and the Consortium in all matters before the Company named in the Bidding Documents, and generally dealing with the Company named in the Bidding Documents and/or any other authority in all matters in connection with our Bid, till completion of the bidding process in accordance with the Bidding Documents and further till the Contract is entered into with the Company and thereafter till the expiry of the Contract.

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

All the terms used herein but not defined shall have the meaning ascribed to such terms in the Bidding Documents.

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

Dated this ..... day of .....

Accepted

.....  
Signature of Attorney  
(Name, designation and address of the Attorney)

Attested

.....  
(Signature of the executant)  
(Name, designation and address of the executant)

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

Common seal of ..... has been affixed in my/our presence pursuant to Board of Director's Resolution dated.....

WITNESS:

1. ....  
(Signature)  
  
Name .....  
Designation.....

2. ....  
(Signature)

Name .....

Designation.....

**Notes:**

1. The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and the same should be under common seal of the executant affixed in accordance with the applicable procedure. Further, the person whose signatures are to be provided on the power of attorney shall be duly authorized by the executant(s) in this regard.
2. In the event, power of attorney has been executed outside India, the same needs to be notarized by a notary in the home country of company executing this power of attorney and legalized by the Indian Embassy there. However, in case such company is from a country which has signed The Hague Legislation Convention 1961, then the said power of attorney is not required to be legalized by the Indian Embassy if it carries a conforming Apostille certificate.
3. Also, wherever required, the executant(s) should submit for verification the extract of the chartered documents and documents such as a Board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).

**(E) Format for PoA for Lead Member**  
**POWER OF ATTORNEY**

*(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution. Foreign companies submitting Bids are required to follow the applicable law in their country)*

Power of Attorney to be provided by the Bidder Company/ Lead Member in favour of its representative as evidence of authorized signatory's authority.

Know all men by these presents, We .....(name and address of the registered office of the Bidding Company or Lead Member of the Bidding Consortium, as applicable) do hereby constitute, appoint and authorize Mr./Ms.....(name and residential address) who is presently employed with us and holding the position of \_\_\_\_\_, as our Attorney to do in our name and our behalf all or any of the acts, deeds or things necessary or incidental to submission of our Bid for '.....' [name of the work] for Pune Metro Rail Project in response to the Bidding Document dated \_\_\_\_\_ issued by Maharashtra Metro Rail Corporation Limited (MAHA-METRO) (the Company) including signing and submission of the Bid and all other documents related to the bidding, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document which the Company may require us to submit and also signing and executing the Contract Documents. The aforesaid Attorney is further authorized for making representations to the Company or any other authority, and providing information / responses to the Company, representing us in all matters before the Company, and generally dealing with the Company in all matters in connection with our Bid till the completion of the bidding process as per the terms of the Bidding Documents and further till the Contract is entered into with the Company and thereafter till the expiry of the Contract.

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

(Add in the case of a Consortium)

Our firm is a Member/Lead member of the Consortium of \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_

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

Signed by the within named

.....[Insert the name of the executant company]

through the hand of

Mr. ....

duly authorized by the Board to issue such Power of Attorney

Dated this ..... day of .....

Accepted

.....

Signature of Attorney

(Name, designation and address of the Attorney)

Attested

.....

(Signature of the executant)

(Name, designation and address of the executant)

.....

Signature and stamp of Notary of the place of execution

Common seal of ..... has been affixed in my/our presence pursuant to Board of Director's Resolution dated.....

#### WITNESS

1. ....

(Signature)

Name .....

Designation.....

2. ....

(Signature)

Name .....

Designation.....

#### Notes:

1. The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and the same should be under common seal of the executant affixed in accordance with the applicable procedure. Further, the person whose signatures are to be provided on the power of attorney shall be duly authorized by the executant(s) in this regard.
2. In the event, power of attorney has been executed outside India, the same needs to be duly notarized by a notary public of the jurisdiction where it is executed.
3. Also, wherever required, the executant(s) should submit for verification the extract of the charter documents and documents such as a board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).

**(F) Format for PoA for Other Member(s)**  
**POWER OF ATTORNEY**

*(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution. Foreign companies submitting Bids are required to follow the applicable law in their country)*

Power of Attorney to be provided by each Member other than the Lead Member in favor of its representative as evidence of authorized signatory's authority. (applicable to consortium only)

Know all men by these presents, We .....(name and address of the registered office of the Member of the Consortium, as applicable) do hereby constitute, appoint and authorize Mr./Ms.....(name and residential address) who is presently employed with us and holding the position of \_\_\_\_\_, as our Attorney to sign and execute the Contract Agreement and any other requisite document in our name and our behalf for '.....' [name of the work] for Pune Metro Rail Project in response to the Bidding Document dated \_\_\_\_\_ issued by Maharashtra Metro Rail Corporation Limited (MAHA-METRO) (the Company) and to do all or any of the acts, deeds or things necessary or incidental to the above.

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

(Add in the case of a Consortium)

Our firm is a Member of the Consortium of \_\_\_\_\_, \_\_\_\_\_ and  
\_\_\_\_\_

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

Signed by the within named

.....[Insert the name of the executant company]

through the hand of

Mr. ....

duly authorized by the Board to issue such Power of Attorney

Dated this ..... day of .....

Accepted

.....  
Signature of Attorney  
(Name, designation and address of the Attorney)

Attested

.....  
(Signature of the executant)  
(Name, designation and address of the executant)

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

Common seal of ..... has been affixed in my/our presence pursuant to Board of Director's Resolution dated.....

#### WITNESS

1. ....  
(Signature)  
  
Name .....  
Designation.....

2. ....  
(Signature)  
  
Name .....  
Designation.....

#### Notes:

1. The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and the same should be under common seal of the executant affixed in accordance with the applicable procedure. Further, the person whose signatures are to be provided on the power of attorney shall be duly authorized by the executant(s) in this regard.
2. In the event, power of attorney has been executed outside India, the same needs to be duly notarized by a notary public of the jurisdiction where it is executed.
3. Also, wherever required, the executant(s) should submit for verification the extract of the charter documents and documents such as a board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).

## 10. Bid Index

The Bidder shall include with its Bid an index which cross refers all of the Employer's bidding requirements elaborated in these documents to all the individual sections within Package 1: Technical Package and Package 2: Financial Package which the Bidder intends to be the responses to each and every one of those requirements.

The Packages submitted must be clearly presented, all pages numbered and laid out in a logical sequence with main and subheadings to facilitate evaluation.

## 11. Form for seeking clarification on Bidding Documents

Name of the Bidder:

SN	Volume No.	Clause No.	Bid Condition	Bidder's Queries
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

**SIGNATURE OF THE BIDDER**



## 12. Not Used

## 13. Letter of Undertaking Regarding Confidentiality of Bid Information

(This document is to be prepared by the Bidder and submitted on Bidder's Letterhead as part of Technical Package as per Instructions to Bidder)

To:

Date: .....

Managing Director  
Maharashtra Metro Rail Corporation Limited  
1st Floor, The Orion, 5, Koregaon Road,  
Pune- 411001, Maharashtra, INDIA

Sub: *["Insert Name of the work"]*

Contract No. *["Insert Contract No."]*- Regarding Letter of Undertaking

We (Name of Bidder / Consortium) hereby undertake that the Bid drawings, both in hard copy and digitized format, and the Bidding documents purchased as a necessary part of our preparation of this Bid shall be used solely for the preparation of the Bid and that if the Bid is successful, shall be used solely for the execution of Works.

We further undertake that the aforesaid Bid drawings and documents prepared by MAHA-METRO, shall not be used in whole, in part or in any altered form on any other project, scheme, design or proposal that the Bidder / Consortium / Members of Consortium or its/their parent companies or sub-contractors of the Bidder / Consortium are, or will be involved with either in India or in any other Country.

Signed: .....

For and on behalf of  
(Name of Bidder / Joint Venture / Consortium)  
(To be signed by each member of the Joint Venture / Consortium, as applicable)

## 14. Undertaking for Downloaded Bidding Documents

We hereby confirm that, we have downloaded the complete set of Bid Documents along with the set of enclosures hosted in e-tendering portal <http://mahametrorail.etenders.in>. We confirm that the Bidding Documents has not been edited or modified by us. In case, it is observed by MAHA-METRO that the Bidding Documents have been edited or modified, we agree for the rejection of our Bid by MAHA-METRO.

Company name .....  
Name .....  
Signature .....  
Postal address .....  
E-mail ID .....  
Phone Fax .....

## 15. Sample Format for Banking Reference for Liquidity

(to be submitted on the letter head of the Bank with Contact details, Address, Phone Number, E. Mail id, etc. )

### BANK CERTIFICATE

This is to certify that M/s ..... is a reputed company with a good financial standing.

If the contract for the work, namely.....is awarded to the above firm, we shall provide overdraft / credit facilities to the extent of Rs..... to meet their working capital requirements for executing the above contract.

Signature:- \_\_\_\_\_

Name of Bank: \_\_\_\_\_

Senior Bank Manager \_\_\_\_\_

Address of the Bank \_\_\_\_\_

Change the text as follows for Joint Venture / JVA / Consortium

---

This is to certify that M/s ..... who has formed a JV / Consortium with M/s ..... and M/s ..... for participating in this bid, is a reputed company with a good financial standing.

If the contract for the work, namely.....is awarded to the above joint venture / Consortium, we shall provide overdraft / credit facilities to the extent of Rs..... to M/s ..... to meet their working capital requirements for executing the above contract.

Signature:- \_\_\_\_\_

Name of Bank: \_\_\_\_\_

Senior Bank Manager \_\_\_\_\_

Address of the Bank \_\_\_\_\_

[This should be given by the JV members in proportion to their financial participation]

## **16. Form of Certificate confirming submission of all documents of Financial Package in the Technical Package with prices left blank**

1. This is to certify that the copy of all the documents of Financial Package, submitted with the Technical Package, is a true Copy of the Financial Package with prices left blank.
2. It is further certified that there are no additional comments, remarks, deviations, terms and conditions in our Financial Package and even if it is there, it shall be treated as NULL and VOID and stand withdrawn.

**SIGNATURE OF BIDDER**

## 17. Form of Certificate confirming downloading of all Bidding Documents, Corrigenda and Addenda

This is to certify that we, M/s \_\_\_\_\_ [\* Name of the Bidder] have downloaded all Bidding Documents, Corrigenda, Clarifications and Addenda for Contract No. \_\_\_\_\_ as listed below:

1. Addendum No. ....
2. ....
3. ....
4. ....

**SIGNATURE OF BIDDER**

Note:

\* In case of a Consortium, to be submitted by the Authorized representative of the Lead Member.

## 18. Form of Declaration for non-engagement of any agent, middleman or intermediary

[We hereby declare / We hereby jointly and severally]@ declare that the submission of this Bid confirms that no agent, middleman or any intermediary has been, or will be engaged to provide any services, or any other item or work related to the award and performance of this Contract. We further confirm and declare that no agency commission or any payment, which may be construed as an agency commission, has been, or will be paid and that the Bid price does not include any such amount. We acknowledge the right of the Employer, if it finds to the contrary, to declare our Bid to be non-compliant and if the Contract has been awarded to declare the Contract NULL and VOID.

**SIGNATURE OF THE BIDDER**

(In case of a partnership, joint venture or consortium, to be submitted by the each constituent member)

@ Strike out whichever is not applicable

## **19. Form of certificate confirming careful examination of all the contents of Bidding Documents and signing of all pages of Bidder's proposal**

This is to certify that we, M/s\_\_\_\_\_ [\*Name of the company/consortium] have carefully examined all the contents of the Bidding Documents including Addenda (if any) and all the pages of our proposal have been signed and stamped by our authorized signatory.@.

SIGNATURE OF BIDDER

@In case of a joint venture or consortium, such pages to be signed by authorized signatory of the Lead member.

## 20. Undertaking for ensuring supply of critical spares and availability of technical support

(To be submitted on Bidder's Letterhead)

Dated:.....

To:

Managing Director  
Maharashtra Metro Rail Corporation Limited  
1st Floor, The Orion, 5, Koregaon Road,  
Pune- 411001, Maharashtra, INDIA

### Letter of Undertaking

CONTRACT No. [*“Insert Contract No.”*]

[*“Insert Name of the work”*]

We hereby certify that we will make credible arrangements for ensuring supply of critical spares and availability of technical support for maintenance and up gradation of equipment / systems / Machinery & Plant / Software, etc., which will become part of the Permanent Works executed under the contract [*“Insert Contract No.”*] during their service life.

Signed.....

For on behalf of

(Name of Bidder / Consortium)

## 21. Undertaking for passing on benefits of exemptions to MAHA-METRO and for adjustment of amounts due from balance due

(To be submitted on Bidder's Letterhead)

Dated:.....

### Letter of Undertaking

**CONTRACT No. ["Insert Contract No."]**

**["Insert Name of the Work."]**

I \_\_\_\_\_ (State Name of Director/Partner/ Karta/Authorized Person) in capacity of \_\_\_\_\_ of \_\_\_\_\_ (State name of the undertaking organization) here by undertake to reimburse / pass on benefit of any duty draw back / export, import incentive / exemption / concession / benefit etc. obtained for the MAHA-METRO project to MAHA-METRO. I will maintain proper records as required by MAHA-METRO and relevant statute. I will furnish such records to MAHA-METRO as and when required by them.

I agree to adjustment of any benefits/ duty draw back / export, import incentive / exemptions / concessions to be made from the balance due to me without any prejudice.

I also undertake to indemnify MAHA-METRO in case of any loss caused due to non-reimbursement / passing on the benefit of duty draw back / export, import incentive / exemption / concession etc.

I state that everything declared by me is true and correct to my belief.

Signed.....

For on behalf of

(Name of Bidder / Consortium)

## 22. Undertaking for obtaining registrations under various fiscal and labour laws

(To be submitted on Bidder's Letterhead)

Dated:.....

### Letter of Undertaking

**CONTRACT No. ["Insert Contract No."]**

**["Insert Name of the Work."]**

I \_\_\_\_\_ (State Name of Director/Partner/ Karta/Authorized Person) in capacity of \_\_\_\_\_ of \_\_\_\_\_ (State name of the undertaking organization) here by undertake to get registered under \_\_\_\_\_ (state the type of registration to be obtained) before \_\_\_\_\_ (state time line) (preferably immediately after award of Contract).

I also undertake to indemnify MAHA-METRO in case of any loss caused due to non-registration.

I state that everything declared by me is true and correct to my belief.

Signed.....

For on behalf of

(Name of Bidder / Consortium)

## **23. Historical Debarment/ Blacklisting/ Termination/ Rescind**

**Deleted**

## 24. COVENANT OF INTEGRITY

**to the Promoter  
from a Bidder, Contractor, Supplier or Consultant to be attached to its Tender  
(or to the Contract in the case of a negotiated procedure)**

“We declare and covenant that neither we nor anyone, including any of our directors, employees, agents, joint venture partners or sub-contractors, where these exist, acting on our behalf with due authority or without knowledge or consent, or facilitated by us, has engaged, or will engage, in any Prohibited Conduct (as defined below) in connection with the tendering process or in the execution or supply of any works, goods or services for [*specify the contract or tender invitation*] (the “**Contract**”) and covenant to so inform you if any instance of any such Prohibited Conduct shall come to the attention of any person in our organisation having responsibility for ensuring compliance with this Covenant.

We shall, for the duration of the tender process and, if we are successful in our tender, for the duration of the Contract, appoint and maintain in office an officer, who shall be a person reasonably satisfactory to you and to whom you shall have full and immediate access, having the duty, and the necessary powers, to ensure compliance with this Covenant.

If (i) we have been, or any such director, employee, agent or joint venture partner, where this exists, acting as aforesaid has been, convicted in any court of any offence involving a Prohibited Conduct in connection with any tendering process or provision of works, goods or services during the five years immediately preceding the date of this Covenant, or (ii) any such director, employee, agent or a representative of a joint venture partner, where this exists, has been dismissed or has resigned from any employment on the grounds of being implicated in any Prohibited Conduct, or (iii) we have been, or any of our directors, employees, agents or joint venture partners, where these exist, acting as aforesaid has been excluded by the EU Institutions or any major Multi-lateral Development Bank (including World Bank Group, African Development Bank, Asian Development Bank, European Bank for Reconstruction and Development, European Investment Bank or Inter-American Development Bank) from participation in a tendering procedure on the grounds of Prohibited Conduct, we give details of that conviction, dismissal or resignation, or exclusion below, together with details of the measures that we have taken, or shall take, to ensure that neither this company nor any of our directors, employees or agents commits any Prohibited Conduct in connection with the Contract [*give details if necessary*].

In the event that we are awarded the Contract, we grant the Project Owner, the European Investment Bank (EIB) and auditors appointed by either of them, as well as any authority or European Union institution or body having competence under European Union law, the right of inspection of our records and those of all our sub-contractors under the Contract. We accept to preserve these records generally in accordance with applicable law but in any case for at least six years from the date of substantial performance of the Contract.”

For the purpose of this Covenant, Prohibited Conduct includes<sup>2</sup>,

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<sup>2</sup> Most definitions are those of the IFI Anti-Corruption Task Force’s Uniform Framework of September 2006.

- **Corrupt Practice** is the offering, giving, receiving or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party.
- **Fraudulent Practice** is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation.
- **Coercive Practice** is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of any party to influence improperly the actions of a party.
- **Collusive Practice** is an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party
- **Obstructive Practice** is (a) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or(b) acts intended to materially impede the exercise of the EIB's contractual rights of audit or access to information or the rights that any banking, regulatory or examining authority or other equivalent body of the European Union or of its Member States may have in accordance with any law regulation or treaty or pursuant to any agreement into which the EIB has entered in order to implement such law, regulation or treaty;
- **Money Laundering** is defined in the Bank's Anti-Fraud Policy
- **Terrorist financing** is defined in the Bank's Anti-Fraud Policy
- **Project Owner** means the person designated as such in the bidding documents or the Contract.

#### SIGNATURE OF THE BIDDER

(In case of a partnership, joint venture or consortium, to be submitted by the each constituent member)

## 25. Nominated Sub-Contractors

Name of Proposed Subcontractor: - .....

Sl. No	Name of work executed by the proposed Sub-Contractor with location.	Name & address of “Employer” as well as “Engineer”	Total value of the work (Rupees in Million)	Value for which the proposed subcontractor was responsible (Rupees in Million)	Contract Period		
					Stipulated (Years)	Actual	
						Start (date)	Completion (date)
i) Works completed in last 5 years starting 1.1.2013							
ii) Works in hand							

**Annexure I**  
**Form CER**  
**Quality Management / Environmental, Social, Health and Safety (ESHS)**  
**Certification**

Bidder's Legal Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Bidder's JV Member name: \_\_\_\_\_ NCB No.: \_\_\_\_\_

DESCRIPTION	INFORMATION
Identification of the certificate	_____ [insert full name of the certificate]
First award date	_____ [insert day, month, year of first certificate award]
Last update of the certificate	_____ [insert day, month, year of latest renewal, if any]
Issuers Name	_____ [insert full name]
Address	_____ [insert street / number / town or city / country]
Telephone/fax number	_____ [insert phone/fax no., incl. country & city area codes]
E-mail	_____ [insert e-mail address, if available]
Compliance with international standards	The certificate is [ISO 9001, ISO 14001, OHSAS 18001] [select as appropriate] <input type="checkbox"/> Yes / <input type="checkbox"/> No
If no, proof of conformity with ISO standards by the Bidder	The Bidder shall provide a conformity assessment of its certificate by an internationally recognized Accredited Certification Body

The Bidder shall fill this Form for each Certification required under sub criteria 4.2 (C) of Section III – Eligibility and Qualification Criteria

## Annexure I

### Form ESHS

### Environmental, Social, Health and Safety (ESHS) Documentation

Bidder's Legal Name: \_\_\_\_\_ Date: \_\_\_\_\_

Bidder's JV Member name: \_\_\_\_\_ NCB No.: \_\_\_\_\_

The Bidder shall demonstrate the existence of the following in-house policies and procedures.		
	DESCRIPTION	SUPPORTING DOCUMENTATION REQUIRED IN ENGLISH (ORIGINAL OR TRANSLATION)
1	Health & Safety Policy	Policy document or the index of the health & safety manual or other relevant documents acceptable to the Employer.
2	Environmental Management Policy	Policy document or the index of the Environmental Management manual or other relevant documents acceptable to the Employer
3	Declaration of compliance with ILO core labour standards <sup>3</sup> in operations	<p>The Bidder certifies (by ticking explicitly) complying with the following core labour standards</p> <p><input type="checkbox"/> Freedom of Association</p> <p><input type="checkbox"/> Forced Labour</p> <p><input type="checkbox"/> Discrimination</p> <p><input type="checkbox"/> Child Labour</p>
4	Reviews, inspections and audits related to ESHS issues within the company and especially on construction sites	Provide detailed samples of such reviews or audits which were carried out during the past 5 years
5	Internal and external integration and enforcement policy	<p>Provide information on:</p> <ul style="list-style-type: none"> <li>- how the Bidder ensures that subcontractors, suppliers or temporary workforce a) are aware of and b) comply with ESHS requirements</li> <li>- nature and content of the ESHS trainings</li> </ul>

<sup>3</sup> See relevant ILO conventions C087, C098, C029, C105, C100, C111, C138, C182; more detailed information are available at [www.ilo.org/ilolex/english/docs/declworld.htm](http://www.ilo.org/ilolex/english/docs/declworld.htm).

The Bidder shall demonstrate the existence of the following in-house policies and procedures.		
	DESCRIPTION	SUPPORTING DOCUMENTATION REQUIRED IN ENGLISH (ORIGINAL OR TRANSLATION)
		provided to employees
6	Procedures on main ESHS issues	<p>Unless information is already provided in policy documents submitted under the requirements of Articles 1 and 2 above, provide in-house procedures for managing the following E&amp;S issues, acceptable to the Employer:</p> <p>[Delete items if not applicable and add items specific to the works and resulting from the project's ESMP if any – refer to the “User Guide for including Environmental and Social (E&amp;S) Criteria” located at the start of this SBD of Works]</p> <ul style="list-style-type: none"> <li>a) Wastewater effluents</li> <li>b) Air emissions, noise and traffic</li> <li>c) Waste</li> <li>d) Erosion and sedimentation</li> <li>e) Site rehabilitation and revegetation</li> <li>f) Hazardous products</li> <li>g) Training and recruitment</li> <li>h) Safety on construction sites</li> <li>i) First aid and medical evacuation for staff</li> <li>j) Control of infectious and communicable diseases (HIV/AIDS, malaria...)</li> </ul>

## **Annexure I**

### **Form EXP – ESHS Environmental, Social, Health and Safety (ESHS) Experience**

**Deleted**

## **Annexure II**

### **Deleted**

# ***Maha Metro***



## **Tender Documents**

**UGC-02: DESIGN AND CONSTRUCTION OF UNDERGROUND STATIONS AT  
BUDHWAR PETH, MANDAI AND SWARGATE AND ASSOCIATED TUNNELS**

### **PART I – BIDDING PROCEDURES**

#### **Section IV b – Pricing Schedule and Financial Bid**

June 2018

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## 1.1 Preamble

The Pricing Document shall be read in conjunction with Notice of Invitation to Bidders, Instructions to Bidders and all Bidding Documents, Specifications and Drawings as listed in Contents of Bidding Documents.

The Contract is a Lump Sum Priced Contract, adjusted by the Price Adjustment Formula detailed in Part- III of PCC Sub-Clause 13.8 . The Works are divided into Price Centre representing one or more groups of inter-related works forming part of the Works. The detailed Scope of Works is given in Clause Employers Requirement Part- 2 – Employers Requirements Section VI B-Functional.

The individual item descriptions within each Price Centre are indicative only of the Work included in this Contract and shall not be taken as defining the scope of work to be executed either under the Price Centre or the Contract.

The item descriptions, if given, are general summaries only, therefore no omission from, or error in, item descriptions within this Pricing Document shall warrant an adjustment of the Contract Price nor entitle the Contractor to seek an extension of time under the Contract.

The breakdown of rates and item descriptions, with the breakdown cost of each lump sum item as submitted by the Contractor in accordance with the Clause 1.3.3.3 of this volume and shall be used as the basis for evaluating any variations pursuant to Clause 13 [Variations and Adjustment of Particular Conditions of Contract.

The individual percentages inserted in the Percentage Column of the payment Schedule shall be used for the sole purpose of assessing amounts due for inclusion or exclusion within interim payments.

The percentage rate for each item detailed in Price Centres A, B, C, D, E, F & G and the rate for each item detailed in Price centres H, I, J , K , L & M of this Pricing Document are for finished items of work 100% complete in all respects, and shall be held to include wastage on materials, rebar overlaps, supports for rebar cages and incidentals, duties, landing charges, shipping costs for transport by air, sea or land (or any combination thereof), insurance, import taxes and duties, GST, unloading, storage, getting into position, hoisting, lowering, erection, distributing to positions, fixing, temporary works including false-work and formwork (shuttering), demolition, excavation, removal of debris, labour, materials, scaffolding and staging, plant, supervision, maintenance, Contractor's profit and establishment/ overheads, together with preparation of design and drawings, all general risks, insurance liabilities, compliance of labour laws and taxes/duties, etc. as per statutory obligations set out or implied in the Contract, making good prior to handing over to the Employer and anything reasonably to be inferred from the description of the item and indispensably necessary thereto, and all other requirements of the Contract

The activity descriptions for items within Price Centres shall be deemed to cover all aspects of the relevant item scope, irrespective of the fact that the Bidder may not have inserted an amount against any item description. The total amount of each Price Centre shall be deemed inclusive of all of the Contractor's obligations to execute the part of the Works covered by the Price Centre and to perform all of his other obligations under the Contract in respect thereof.

The Contractor shall not be entitled to receive any further or additional payment in respect of such Price Centre.

The total amount of each of the Price Centres B to G shall be equal to 95.00% of the Sum of the Price Centres inserted into the Pricing Summary in Clause 1.7.

The person authorized to sign on behalf of the Bidder shall sign in full, with company seal and date, at the bottom of all pages of the Pricing Schedule.

## 1.2 Contract Price

The total of all Price Centres B, C, D, E, F, G, H, I, J, K, L & M as shown in the Pricing Summary in Clause 1.7, with the addition of GST, constitutes the “Contract Price” which shall be the total amount to be paid to the Contractor for executing the Works and performing all other obligations under the Contract, subject only to any further amounts as may be determined by the Engineer as being due to the Contractor in accordance with the Contract.

The Price Centre totals and the Contract Price shall not be subject to adjustment by the Contractor in respect of any error or oversight in the preparation of the Pricing Document, this Volume and they represent the full extent of the Contractor’s entitlement to receive payment in respect of such Price Centres. Errors will be corrected by the Employer for any arithmetic mistakes in computation or summation found in the bid submission, as indicated Part-1 Bidding Procedures, Section 1B-Instructions to Bidders.

Payments for Price Centres B, C, D, E, F, G, K, L & M can be made in Indian Rupees, /or in a maximum of two other specified foreign currencies, US Dollars and Euros if the Contractor so desires, or in a combination of the above three currencies.

Price Centres “A, H, I, J & N” shall be paid in Indian Rupees only.

## 1.3 Description of Pricing Centres

The Pricing Documents comprise Price Centre “A”, which represents Preliminaries and General Requirements associated with Price Centres B to G inclusive, and Price Centres “B, C, D, E F & G” which represent a series of work activities comprising a complete component when constructed. The Price Centres “H, I, J, K, L & M” are for BOQ based portion of work and shall be paid on the quoted prices of the items accordingly. Price Centre N is for Lump sum provision to be operated for incidental and unforeseen items and Miscellaneous Works likely to be required while execution of work. These items will be operated from any of the latest SOR in order of PWD Pune Circle, Maharashtra PWD and CPWD schedules as approved by the Engineer. The cost under this Price Centre “N” will stand fixed at INR 50,00,00,000 and this amount of Rupees Fifty Crores already provided as fixed amount in the summary of pricing centres.

### 1.3.1 Price Centre A

Price Centre A is not priced as it is deemed to be included in the total amount inserted into the Pricing Summary for Price Centres “B to G” and is included in this document for payment purposes only. Price Centre A is dedicated to Preliminaries and General Requirements as stated in the Schedule of Payments, including, but not limited to, the following, as per the requirements and other details given in the Employer’s Requirements, Drawings and Specifications;

- a) Initial works programme
- b) Three month rolling programme
- c) Detailed works programme

- d) Monthly progress report
- e) Software support plan
- f) Back-up copies of the software submission
- g) Interface management plan
- h) Interface matrix and specific contract interface sheets
- i) Station co-ordination installation plan for each station on a room by room basis
- j) Project management information system
- k) Contractor's staff organisation plan
- l) Occupational Safety, Health & Environmental Plan
- m) OHS&E Manual requirements submission
- n) Environmental management plan
- o) Dust Control plan
- p) Temporary traffic and control plan
- q) Accommodation proposals and provisions
- r) Procurement Plan
- s) Contractor's manufacturing management plan
- t) Comprehensive testing programme
- u) testing and commissioning programme
- v) Test procedures
- w) Inspection and Test Plan
- x) Factory test plan
- y) Partial acceptance test plan
- z) System acceptance test plan
- aa) Maintenance support plan
- bb) Schedule of spare parts for EMPS
- cc) All interfacing works within the Project and other Interfacing Contractors, and
- dd) All other items included in the Scope of Works given in Employer's Requirements (Part 2).

The Bidder is to note that some of the Items are payable as a portion of the indicated percentage on a monthly or quarterly basis or are paid proportionately using the percentages of the items of works as noted in brackets (\*\*%) in the Price Centre.

The Bidder should note that for the following Key Staff- Project Manager cum Team Leader, Chief Quality Assurance & Control manager, Chief Safety Expert and Chief Interface Coordinator and others as mentioned under Key Staff-EQC, not employed/deployed on site within 30 days of date of mobilisation in accordance with the Contractor's Programme, there shall be a deduction of INR 0.1 Million for each week per key personnel, or part thereof, as determined by the Engineer and his decision shall be final and binding on contractor.

### 1.3.2 Price Centres “B, C, D, E F & G ”

Price Centres “B, C, D, E ,F and G” are dedicated to the design of the temporary and permanent works, construction and finishing of all Stations, entrances/exits, bored tunnels, cut and cover tunnels, ramps, , cross passages, subways, walkways, vehicle parking (where applicable), drop off Zones, landscaping (where applicable), restoration/reinstatement of the road works, architectural and builders works, building services, finishes, water proofing,grouting etc. as specified and as stated in the Schedule of Payments, as per the requirements and other details given in the Employer’s Requirements, Drawings and Specifications; all as specified in Clause B2(1) of Part II, Section VI. B - Functional.

The Contractor is to note that some of the Items are payable proportionately using the percentages of the items of works, as cumulative percentages, as noted in brackets (\*\* %) in the Price Centre item description.

The lump sum price for Tunnel Price Centres shall include for the capping, removal of or other measures necessary for dealing with the presence of the existing wells/bore-wells and replacement/relocation/reinstatement/re-provision of all such affected wells/bore-wells. The Contractor shall also be responsible for arranging/providing alternative water supplies (on the same scale of consumption as was existing before) in lieu of existing water supplies, which were being catered to by the existing wells/bore-wells affected by the Works. These alternative water supplies to be arranged by the Contractor shall continue till the permanent arrangements in the form of replacement/relocation/reinstatement/re-provision of wells/bore-wells are made by the Contractor in lieu of affected wells/bore-wells.

For Works relating to architectural finishing and hard landscaping works, Electrical and Machanical works, the payment shall be made based in BOQ measurement and quoted rates.

Works relating to diversion, relocation, etc., of the uncharted utilities met with during execution), and such works to be executed if Engineer directs to do it and the payment shall be on a BOQ measurement basis and the rates shall be the concerned utility department current rates.

The Bidder shall carry out the works relating to unchartered utilities in consultation with the utility agencies. Also at the time of execution of this work, of required/insisted by the utility agencies their Sub-contractors shall be used.

The cost of works/activities pertaining to those utilities which are required to be retained/protected/supported (or those utilities that are not permitted to be diverted by the Relevant Authorities) during construction will be deemed to be included in Price Centres “B to G”.

### 1.3.3 Price / Cost Breakdown

- 1.3.3.1 The totals for each Price Centre B, C, D, E ,F and G of this Pricing Document shall be deemed to include for all costs associated with the supply, manufacture and delivery to Site of such item by the Contractor (including, without limitation, the cost of design, manufacture, packing, supply and delivery to Site, testing and commissioning, labour cost if applicable, preliminaries and other general requirements, overheads and profit etc) irrespective of the quantity of the items to be supplied.

- 1.3.3.2 The percentage indicated for each item detailed in Price Centres B, C, D, E, F and G of this Pricing Document is for payment only for finished items of work, 100% complete in all respects, as stated in preamble Clause 1.1 of this, Pricing Document.
- 1.3.3.3 The rates quoted for each of the items in the Price Centres H, I, J, K, L & M of this pricing document is for Architectural & Hard landscaping works and E&M works for stations 100% complete in all respects.
- 1.3.3.4 Within 60 days from the date of issue of LOA, the Contractor shall submit the detailed break up of Lump sum amount quoted against each Price centre.
- 1.3.3.5 Variations will only be considered if there is any additional work required beyond the scope of the underground stations and tunnels.
- 1.3.3.6 Payments to the Contractor will be made on a monthly basis in accordance with Clause 14 of the Particular Conditions of Contract, [Application for IPCs], unless otherwise stipulated. All items will be paid at 100% completion unless payment is noted as being paid proportionately using the percentages of the items of works as noted in brackets (\*\*%) in the Price Centre.
- 1.3.3.7 No payment will be made against any item in the Contractor's Pricing Document which does not have a value entered against it within the Amount column, including '0', 'NIL' or intentionally left blank.

#### 1.4 Schedule of Payments (SOPs)

The total sum for Price Centre "A" Preliminaries shall be equal for 5.0% of Price Centres B, C, D, E, F and G. Payments under Price Centre A will be made on a monthly, quarterly, or percentage basis as indicated in Price Centre A.

The Schedule of Payments, refer to Sub-clause 14.4 of GCC Part-III, for a Price Centre shows the amount payable to the Contractor for work carried out in that Price Centre subject to conditions stated in this Contract and shall be used to determine the amounts of the interim payments in accordance with Sub-clause 14.4 of GCC Part-III.

As part of the first Monthly Progress Report provided in accordance with Sub-clause 4.21 of GCC Part-III, the Contractor shall convert the time scale of the SOPs included as part of the Contractor's Submission from "months after Commencement Date" to months and years on the Gregorian calendar.

#### 1.5 Payment Concept

Payment will be calculated using the Schedule of Payments (SOPs), subject to the Engineer being satisfied that the works for each item are 100% complete, unless payment is on a percentage/monthly/quarterly basis. Payment will be based on the Contractor's submission of a monthly statement, in accordance with Sub-clause 14.3 of GCC Part III. The Engineer may, at his discretion, certify partial completion and payment of item units in parts of not less than 15% of that item.

Subject to the Contractor's Monthly Statement meeting the minimum value of 1% of Contract Price, and after the Engineer's assessment, the Engineer will issue an Interim Payment Certificate calculated on percentages from the SOP Items.

## 1.6 Revisions during the Contract Period

### 1.6.1 Revisions to Schedule of Payments

The affected Price Centre total, the Schedule of Payments, and the Contractor's Price shall be adjusted by the Engineer with the approval of the Employer and consent of Contractor incorporate any change to the Contract Price. The Contractor shall update the Schedule of Payments and submit to the Engineer for a Notice

## 1.7 Financial proposal

### 1.7.1 Pricing Summary

The Bidder may quote his offer in Indian Rupees and two other currencies , US dollars & Euros. The offer should be in the following proforma as suggested in the price bid format:

Price Centre	Description	Amount in Indian Rupees	Amount in US Dollars	Amount in Euros
B	Budhwar Peth Station			
C	Mandai Station			
D	Swargate Station			
E	Section (1) Tunnel Between Budhwar Peth Station to Swargate			
F	Turn back/stabling siding tunnels (2 No.) at Southern end of Swargate Station			
G	Tunnel at cross over at northern end of Swargate Station			
H	Architectural finishing and hard landscaping works for Budhwar Peth Station			
I	Architectural finishing and hard landscaping works for Mandai Station			
J	Architectural finishing and hard landscaping works for Swargate Station			

Price Centre	Description	Amount in Indian Rupees	Amount in US Dollars	Amount in Euros
K	Electrical and Mechanical Works for Budhwar Peth Station			
L	Electrical and Mechanical Works for Mandai Station			
M	Electrical and Mechanical Works for Swargate Station			
N	Lump sum provision to be operated for incidental and unforeseen items and Miscellaneous Works likely to be required as per PWD Pune Circle, Maharashtra PWD and CPWD schedules	50,00,00,000		
<b>TENDER SUB-TOTAL</b>				
<b>P</b>				
<b>GST Q</b>			N/A <sup>3</sup>	N/A <sup>3</sup>
<b>Customs Duty R</b>			N/A <sup>3</sup>	N/A <sup>3</sup>
<b>TENDER TOTAL</b>				
<b>TENDER TOTAL</b>				
<b>IN EQUIVALENT INDIAN RUPEES</b>				
<b>-S-</b>				
<b>-DO-IN WORDS</b>				
<b>--</b>				

**Notes:**

- 1) Payments under this Contract will be made in Indian Rupees, and/or a maximum two other currencies such as US Dollar and Euro if the Contractor so desires, or in a combination of all three currencies.
- 2) Insert currency symbol as appropriate.
- 3) The Bidder is to note that i) GST and ii) Customs Duties must be priced in Indian Rupees only.

- 4) The Bid Price(Contract Price) Total shall be equal to the sum of the Tender Totals, including the sum inserted for Customs Duties and GST. The Tender Price Total shall be converted into Indian Rupees if other currencies are used and the exchange rates(s) shall be as published by the Reserve Bank of India selling rates of exchange at the close of business hours of RBI, 30 days prior to submission of Bid.
- 5) The Bidder also shall complete the Tender Price Total in equivalent INR in words below;

**Equivalent INR -----**

---

**Authorized Signatory with Company Seal**

### 1.7.2 Schedule of Payments

Price Centre “A” Preliminaries and General requirements shall equal 5% of the Price Centre Totals for Price Centres B to G, excluding GST.

Price Centre	Description	Unit	Qty	Percentage for Sub-Items
A	Preliminaries and General requirements (5%)			
A1	Contractual Submissions			
A1.1	Submission of Performance Guarantee , insurances, etc.	Item	1	4.00
A2	General Items			
A2.1	Initial Works Programme,	Item	1	2.00
A2.2	Works Programme updates, revisions and Three Month Rolling Programme	No.	14	6.00
A2.3	Monthly Progress Report	No	42	6.00
A2.4	Design Manual & Programme for Design Deliverables (Design Units)	Item	1	4.00
A2.5	Quality Assurance & Quality Control Plans & Audits Quarterly	No	14	8.00
A2.6	Interface Management Plan & Audits Quarterly	No	14	8.00
A2.7	Interface Matrix and Specific Contract Interface Sheets	Item	1	4.00
A2.8	All Interface management and coordination, including provision of services, for the Interfacing Contractors	No	14	10.00
A2.9	Interface management and coordination from the issue of Taking Over Certificate until start of Revenue Services. (Employer to instruct if required.)	No	6	2.00
A2.10	Station Coordination Installation Plan for Each Station on a Room by Room Basis	No	30	6.00
A2.11	Project Management Information	No	42	4.00

Price Centre	Description	Unit	Qty	Percentage for Sub-Items
	System			
A2.12	Contractor's Staff Organisation Plan & Key Staff. (Key Staff payment deduction, refer to Clause 1.3.1 above.)	No	42	2.00
A2.13	OHS&E Plan Submission	Item	1	2.00
A2.14	Compliance with Occupational Safety, Health and Environmental Plan & Audits Quarterly	No	14	12.00
A2.15	Environmental Management Plan & Audits to include; Spoils Management, Diesel Emission Mitigation and Dust Control Plans & Audits Quarterly	No	14	4.00
A2.16	Comprehensive Testing and Commissioning Programme	No	1	4.00
A2.17	Schedule of Spare Parts Supply	Item	1	2.00
A2.18	Training Plan, Manual Updates and Audits	No	20	2.00
A2.19	Making additional bore holes along the alignment as required by the contractor to ascertain additional geotech information for efficient design.	Number	120	4.00
A2.20	Maintenance of Employers/Engineers office provided by the contractor	Month	42	4.00
	Total for Price Centre A			100%

The above total for Price Centre A shall be equal to 5% of the sum of the total amount for each Price Centre "B to G", but is not required to be inserted into the Pricing Summary in Clause 1.7.1 above.

Price Centre	Description.	Percentage for Sub-Items
B	<b>Budhwar Peth Station</b>	
B1.0	<b>General</b>	
B1.1	Submission of detailed site and Ground investigation Reports, including, but not limited to, additional bore logs, laboratory testing and interpretive reports.	1%
B 1.2	Submission of Detailed Survey Reports and Drawings, including topographic surveys and pre-condition surveys of adjacent buildings, structures, water wells, railway facilities, etc.(EBS)	1%
B 1.3	Submit and obtain the Engineer's Notice of No Objection for Design Deliverables; Payment (at completion of): i) Submission of Preliminary Design and other design/durability related documents(30%) ii) Detailed Design (40%) iii) Good For Construction Drawings Issued (20%) iv) As Built Drawings (10%)	4%
B 1.4	Submit and obtain the Engineer's Notice of No Objection of the Traffic Management Plans including schemes for the diversions of roads, footpaths, phasing of works construction, programme for implementations of schemes, temporary road markings, temporary barricading, temporary signage, temporary road lighting, temporary traffic lights, etc. and obtain the necessary approvals of the appropriate authorities on the proposals.	1%
B 1.5	Undertake site clearance to the satisfaction of the Engineer of all site areas including the removal of vegetation, tree felling, removal of refuse, removal of unsuitable soil, removal of surface water, demolition of existing structures if any, etc. Payment: i) 50% complete (50%) ii) 100% complete (100%)	2%
B 2.0	<b>Civil/Structural Works</b>	
B 2.1	Design, supply and install barricading to the satisfaction of the Engineer, including lighting, signage and painting with Pune Metro logo and maintain the same in satisfactory condition for the duration of the works.To be paid quarterly.	1%
B 2.2	Implementation and maintenance of traffic management schemes to the satisfaction of the Engineer/ Employers including provision of	

Price Centre	Description.	Percentage for Sub-Items
	temporary roads, footpaths, lighting, signage, traffic lights, road markings, etc. and arranging the diversion of traffic to be paid quarterly.	1%
B 2.3	Reinstatement of existing roads and footpaths after completion of works to the satisfaction of the Engineers together with the additional facilities identified on the approved Drawings including the provision of new pavements, drainage, road marking, signage, traffic lights, lighting, etc.	2%
B 2.4	Construction of RCC diaphragm walls/Secant-pile walls/RCC lining walls for Cut & Cover boxes at both ends complete in all respects including removal of excavated material from site, tests upon completion, etc. and provide as-built records.	10%
B 2.5	Station box Excavation within the diaphragm wall/Secant-piles walls and up to the required level in all kinds of soil/rock including the removal of the excavated material, the provision of temporary walers/ struts /supports/Rock Bolt/Rock Anchor, etc. to maintain stability including the preloading of struts if necessary, Chartered Utility supporting system and protection including removal of trees and surface furniture provision of temporary decking for temporary traffic and works areas and dewatering measures including cut off testing and recharging if necessary, etc. and Instrumentation, Monitoring & Reporting and EBS Protection, including preventive, protective and restoration measures/works for EBS likely to be affected or affected by the Works under the Contract , etc.	12%
B 2.6	Construction of the reinforced concrete base slab in cut & cover portion complete in all respects, including the provision of blinding, drainage and waterproofing layers and providing a watertight connection into the diaphragm wall/secant-piles wall/RCC lining wall, etc. and provide as-built records.	6%
B 2.7	Construction of the reinforced concrete columns, slabs and beams for the structure between the top of the base slab to the top of the mezzanine level slab including the provision of waterproofing and protection layers and provide as-built records.	4%
B 2.8	Construction of the reinforced concrete columns, slabs and beams for the structure between the top of the mezzanine slab to the top of the concourse level slab including the provision of waterproofing and protection layers and provide as-built records.	4%
B 2.9	Construction of the reinforced concrete columns, slabs and beams for the structure between the top of the concourse level slab to the	8%

Price Centre	Description.	Percentage for Sub-Items
	top of the roof slab including the provision of waterproofing and protection layers and provide as built records.	
B2.10	Construction of NATM tunnels connecting both ends of Cut & Cover box in all respect including the temporary and permanent lining with desired finished profile.	20%
B 2.11	Construction of internal walls and floors and other RCC works to form above ground structures, plant rooms, lobbies, toilets, ventilation shafts and other internal rooms and areas, and form breakthrough of the diaphragm walls/Head Walls/RCC lining Walls for external connections including the removal of debris and forming water tight connections.	4%
B 2.12	Construction of underground and above ground structures external to the station box including entrances, subways, walkways and ancillary plant buildings. To include all temporary works including excavation, excavation lateral support, dewatering, etc.	5%
B 2.13	Construction of the platform area structure complete with void for mechanical area and drainage beneath including PSD Supports and construction of the internal lining to the platform/track, concourse and mezzanine (where applicable) levels complete with drainage including construction of first stage concrete if required in track bed area.	4%
B 2.14	Construction of all lift shafts, escalator support structures and staircase structures including necessary inserts for installation and maintenance of lifts and escalators.	3%
B 2.15	Reinstatement of soft and hard landscape affected by the construction of the underground station including provision of additional soft and hard landscaping to integrate the station into its environment.	3%
B 2.16	Placement of compacted soil to reinstate the ground level above the station roof slab and reinstate drainage and other works affected by the construction.	2%
B 3.0	<b>All Remaining Works:</b>	
B 3.1	All remaining works as per Employer's requirement and as shown in the Employer's drawings and Specifications.	2%
	<b>Total for Price Centre B</b>	<b>100%</b>

The above total for Price Centre B shall be equal to 95% of the Sum inserted for Price Centre B in the Pricing Summary in Clause 1.7.1 above.

Price Centre	Description.	Percentage for Sub-Items
C	<b>Mandai Station</b>	
C1.0	<b>General</b>	
C1.1	Submission of detailed site and Ground investigation Reports, including, but not limited to, additional bore logs, laboratory testing and interpretive reports.	1%
C1.2	Submission of Detailed Survey Reports and Drawings, including topographic surveys and pre-condition surveys of adjacent buildings, structures, water wells, railway facilities, EBS ,etc.	1%
C1.3	Submit and obtain the Engineer's Notice of No Objection for Design Deliverables; Payment (at completion of): i) Submission of Preliminary Design and other design/durability related documents(30%) ii) Detailed Design (40%) iii) Good For Construction Drawings Issued (20%) iv) As Built Drawings (10%)	4%
C1.4	Submit and obtain the Engineer's Notice of No Objection of the Traffic Management Plans including schemes for the diversions of roads, footpaths, phasing of works construction, programme for implementations of schemes, temporary road markings, temporary barricading, temporary signage, temporary road lighting, temporary traffic lights, etc. and obtain the necessary approvals of the appropriate authorities on the proposals.	1%
C1.5	Undertake site clearance to the satisfaction of the Engineer of all site areas including the removal of vegetation, tree felling, removal of refuse, removal of unsuitable soil, removal of surface water, demolition of existing structures if any, etc. Payment: iii) 50% complete (50%) iv) 100% complete (100%)	2%
C2.0	<b>Civil/Structural Works</b>	
C2.1	Design, supply and install barricading to the satisfaction of the Engineer, including lighting, signage and painting with Pune Metro logo and maintain the same in satisfactory condition for the duration of the works.To be paid quarterly.	1%
C2.2	Implementation and maintenance of traffic management schemes to the satisfaction of the Engineer/ Employers including provision of	

Price Centre	Description.	Percentage for Sub-Items
	temporary roads, footpaths, lighting, signage, traffic lights, road markings, etc. and arranging the diversion of traffic to be paid quarterly.	1%
C2.3	Reinstatement of existing roads and footpaths after completion of works to the satisfaction of the Engineers together with the additional facilities identified on the approved Drawings including the provision of new pavements, drainage, road marking, signage, traffic lights, lighting, etc.	2%
C2.4	Construction of RCC diaphragm walls/Secant-pile walls/RCC lining walls for Cut & Cover boxes at both ends complete in all respects including removal of excavated material from site, tests upon completion, etc. and provide as-built records.	10%
C2.5	Station box Excavation within the diaphragm wall/Secant-piles walls and up to the required level in all kinds of soil/rock including the removal of the excavated material, the provision of temporary walers/ struts /supports/Rock Bolt/Rock Anchor, etc. to maintain stability including the preloading of struts if necessary, Chartered Utility supporting system and protection including removal of trees and surface furniture provision of temporary decking for temporary traffic and works areas and dewatering measures including cut off testing and recharging if necessary, etc. and Instrumentation, Monitoring & Reporting and EBS Protection, including preventive, protective and restoration measures/works for EBS likely to be affected or affected by the Works under the Contract , etc.	12%
C2.6	Construction of the reinforced concrete base slab in cut & cover portion complete in all respects, including the provision of blinding, drainage and waterproofing layers and providing a watertight connection into the diaphragm wall/secant-piles wall/RCC lining wall, etc. and provide as-built records.	6%
C2.7	Construction of the reinforced concrete columns, slabs and beams for the structure between the top of the base slab to the top of the mezzanine level slab including the provision of waterproofing and protection layers and provide as-built records.	4%
C2.8	Construction of the reinforced concrete columns, slabs and beams for the structure between the top of the mezzanine slab to the top of the concourse level slab including the provision of waterproofing and protection layers and provide as-built records.	4%
C2.9	Construction of the reinforced concrete columns, slabs and beams for the structure between the top of the concourse level slab to the	8%

Price Centre	Description.	Percentage for Sub-Items
	top of the roof slab including the provision of waterproofing and protection layers and provide as built records.	
C2.10	Construction of NATM tunnels connecting both end Cut & Cover box in all respect including the temporary and permanent lining with desired finished profile.	20%
C2.11	Construction of internal walls and floors and other RCC works to form above ground structures, plant rooms, lobbies, toilets, ventilation shafts and other internal rooms and areas, and form breakthrough of the diaphragm walls/Head Walls/RCC lining Walls for external connections including the removal of debris and forming water tight connections.	4%
C2.12	Construction of underground and above ground structures external to the station box including entrances, subways, walkways and ancillary plant buildings. To include all temporary works including excavation, excavation lateral support, dewatering, etc.	5%
C2.13	Construction of the platform area structure complete with void for mechanical area and drainage beneath including PSD Supports and construction of the internal lining to the platform/track, concourse and mezzanine (where applicable) levels complete with drainage including construction of first stage concrete if required in track bed area.	4%
C2.14	Construction of all lift shafts, escalator support structures and staircase structures including necessary inserts for installation and maintenance of lifts and escalators.	3%
C2.15	Reinstatement of soft and hard landscape affected by the construction of the underground station including provision of additional soft and hard landscaping to integrate the station into its environment.	3%
C2.16	Placement of compacted soil to reinstate the ground level above the station roof slab and reinstate drainage and other works affected by the construction.	2%
C3.0	<b>All Remaining Works:</b>	
C3.1	All remaining works as per Employer's requirement and as shown in the Employer's drawings and Specifications.	2%
	<b>Total for Price Centre C</b>	<b>100%</b>

The above total for Price Centre C shall be equal to 95% of the Sum inserted for Price Centre C in the Pricing Summary in Clause 1.7.1 above.

Price Centre	Description.	Percentage for Sub-Items
D	<b>Swargate Station</b>	
D1.0	<b>General</b>	
D1.1	Submission of the detailed site and Ground investigation Reports, including, but not limited to laboratory testing and interpretive reports.	1%
D1.2	Submission of Detailed Survey Reports and Drawings, including topographic surveys and pre-condition surveys of adjacent buildings, structures, water wells, railway facilities, EBS ,etc	1%
D1.3	Submit and obtain the Engineers Notice of No Objection for Design Deliverables; Payment (at completion of): i) Submission of Preliminary and other durability related documents (30%) ii) Detailed Design (40%) iii) Good For Construction Drawings Issued (20%) iv) As Built Drawings (10%)	4%
D1.4	Submit and obtain the Engineers Notice of No Objection of the Traffic Management Plans including schemes for the diversions of roads, footpaths, phasing of works construction, programme for implementations of schemes, temporary road markings, temporary barricading, temporary signage, temporary road lighting, temporary traffic lights, etc. and obtain the necessary approvals of the appropriate authorities on the proposals.	2%
D1.5	Undertake site clearance to the satisfaction of the Engineers Representative of all site areas including the removal of vegetation, tree felling, removal of refuse, removal of unsuitable soil, removal of surface water, demolition of existing structures if any, etc. Payment: i) 50% complete (50%) ii) 100% complete (100%)	2%
D2.0	<b>Civil/Structural Works</b>	
D2.1	Design, supply and install barricading to the satisfaction of the Engineer/Employer, including lighting, signage and painting with Pune Metro logo and maintain the same in satisfactory condition for the duration of the works.To be paid quarterly.	1%
D2.2	Implementation and maintenance of traffic management schemes to the satisfaction of the Engineer/ Employer including provision of	

Price Centre	Description.	Percentage for Sub-Items
	temporary roads, footpaths, lighting, signage, traffic lights, road markings, etc. and arranging the diversion of traffic to be paid quarterly.	1%
D2.3	Reinstatement of existing roads and footpaths after completion of works to the satisfaction of the Engineer together with the additional facilities identified on the approved Drawings including the provision of new pavements, drainage, road marking, signage, traffic lights, lighting, etc.	2%
D2.4	Construction of RCC diaphragm walls/Secant-pile walls/RCC lining walls complete in all respects including removal of excavated material from site, tests upon completion, etc. and provide as-built records.	10%
D2.5	Maintaining the Station Excavation the within the diaphragm wall/Secant-piles walls and up to the required level in all kinds of soil/rock including the removal of the excavated material, the provision of temporary walers/ struts /supports/Rock Bolt/Rock Anchor, etc. to maintain stability including the preloading of struts if necessary, Chartered Utility supporting system and protection including removal of trees and surface furniture provision of temporary decking for temporary traffic and works areas and dewatering measures including cut off testing and recharging if necessary, etc. and Instrumentation, Monitoring & Reporting and EBS Protection, including preventive, protective and restoration measures/works for EBS likely to be affected or affected by the Works under the Contract , etc.	12%
D2.6	Construction of the reinforced concrete base slab,cross-overs complete in all respects, including the provision of blinding, drainage and waterproofing layers and providing a watertight connection into the diaphragm wall/secant-piles wall/RCC lining wall, etc. and provide as-built records.	18%
D2.7	Construction of the reinforced concrete columns, slabs and beams for the structure between the top of the base slab to the top of the concourse level slab including the provision of waterproofing and protection layers and provide as-built records.	9%
D2.8	Construction of the reinforced concrete columns, slabs and beams for the structure between the top of the concourse level slab to the top of the roof slab including the provision of waterproofing and protection layers and provide as built records.	7%
D2.9	Construction of internal walls and floors and other RCC works to form	

Price Centre	Description.	Percentage for Sub-Items
	above ground structures, plant rooms, lobbies, toilets, ventilation shafts and other internal rooms and areas, and form breakthrough of the diaphragm walls/Head Walls/RCC lining Walls for external connections including the removal of debris and forming water tight connections.	5%
D2.10	Construction of underground and above ground structures external to the station box including entrances, subways, walkways and ancillary plant buildings. To include all temporary works including excavation, excavation lateral support, dewatering, etc.	9%
D2.11	Construction of the platform area structure complete with void for mechanical area and drainage beneath Including PSD Supports and construction of the internal lining to the platform/track, concourse levels complete with drainage including construction of first stage concrete if required if required in track bed area.	5%
D2.12	Construction of all lift shafts, escalator support structures and staircase structures including necessary inserts for installation and maintenance of lifts and escalators.	3%
D2.13	Reinstatement of soft and hard landscape affected by the construction of the underground station including provision of additional soft and hard landscaping to integrate the station into its environment.	2%
D2.14	Placement of compacted soil to reinstate the ground level above the station roof slab and reinstate drainage works and other works affected by the construction.	2%
D3.0	<b>All Remaining Works:</b>	
D3.1	All remaining works as per Employers Requirement and as shown in the Employer's drawings and Specifications.	4%
	<b>Total for Price Centre D</b>	100%

The above total for Price Centre D shall be equal to 95% of the Sum inserted for Price Centre D in the Pricing Summary in Clause 1.7.1 above.

Price Centre	Description	Percentage for Sub-Items
<b>E</b>	<b>Section (1) Tunnel Between Budhwar Peth Station and Swargate Station</b>	
E 1.0	General	
	<p>The design, procurement, delivery of the 2 numbers of Tunnel Boring Machines , plus site assembly of the TBMs at the base of the launching shaft. Design shall include submission of the design details and the proposed method of operation of the TBM which shall include an assessment of the impacts of the TBM operation on the environment through which it will pass, including the existing adjacent buildings, structures, water wells, railway facilities, etc. (EBS)</p> <p>Payment on:</p> <ul style="list-style-type: none"> <li>i) Confirmation of Procurement (30%)</li> <li>ii) Delivery to site (20%)</li> <li>iii) Full Assembly in position at Site (25%)</li> <li>iv) Trial working (after 20m) (25%)</li> </ul>	10%
E1.2	Establishment of Casting yard for manufacturing of Segments including design and Procurement of moulds and Steam curing arrangements	3%
E1.3	Casting of segments and curing of segments	2%
E1.4	<p>Submit and obtain the Engineer's Notice to proceed for Design Deliverables;</p> <p>Payment (at completion of):</p> <ul style="list-style-type: none"> <li>i) Production of Design Manuals and other design/durability related documents including Preliminary Design (30%)</li> <li>ii) Detailed Design (40%)</li> <li>iii) Good for Construction Drawings Issued (20%)</li> <li>iv) As Built Drawings (10%)</li> </ul>	3%
E1.5	Submission of Detailed Survey Reports and Drawings, including topographic surveys and establishment of the settlement control points.	2 %
E1.6	Submission of the pre-condition surveys of adjacent buildings, structures,open/closed wells, railway facilities, EBS ,etc.	2 %
E1.7	Submission of the detailed site and ground investigation Reports, including but not limited to, bore logs, laboratory testing and interpretive reports.	2 %
E2.0	<b>Tunnelling</b>	
E2.1	Establishment, including dismantling, moving and reestablishment as necessary, of all ancillary machinery,plant and equipment necessary to support the operation of the TBMs including decking, access walkways and stairs, lifting equipment, compressed air, grouting equipment, slurry tanks, muck removal equipment, means of liner delivery, etc.	6 %

Price Centre	Description	Percentage for Sub-Items
E2.2	Undertake tunnel boring, including, but not limited to, any necessary probing and pre-treatment of ground, excavation, muck removal, installation of linings complete in position including transportation of segments from casting yard and initial grouting. At all times the tunnel under construction shall be well lit and ventilated and shall have proper drainage and clean and safe access routes shall be maintained to the work face.	40%
E2.3	Undertake final pressure grouting to linings to the satisfaction of the Engineer.	10 %
E2.4	Undertake the construction of the cross passages complete in all respects including, but not limited to, all temporary/permanent support, lining, waterproofing, pressure grouting the lining, any probing and ground treatment ,dewatering, instrumentation, monitoring, reporting, EBS protection, excavation, removal of excavated material from site, drainage, etc. to obtain the required finished profile , and provide as-built records.	6 %
E2.5	Design, procure, install and maintain during operation to the satisfaction of the Engineer the temporary ventilation system for the tunnels.	1 %
E2.6	Design, procure, install and maintain during operation to the satisfaction of the Engineer the temporary lighting and drainage system for the tunnels.	1 %
E2.7	Monitor the settlement control points for the duration of the tunnel construction, including daily reporting to the Engineer plus real time monitoring where stipulated in the Contract.	2 %
E3.0	<b>All Remaining Works</b>	
E3.1	All remaining works as shown in the Employer's drawings and Specifications including walkways, drainage system, first pour concrete in tunnel invert, Chartered Utility supporting system and protection including removal of trees and surface furniture etc.	10 %
	<b>Total for Price Centre E</b>	100%

The above total for Price Centre E shall be equal to 95 % of the Sum inserted for Price Centre E in the Pricing Summary in Clause 1.7.1 above.

Price Centre	Description	Percentage for Sub-Items
<b>F</b>	<b>Section (2) Turn back/stabling siding tunnels (2 No.) at the southern end of Swargate Station</b>	
<b>F1.0</b>	<b>General</b>	
F1.1	Submit and obtain the Engineer's Notice to proceed for Design Deliverables; Payment (at completion of): v) Production of Design Manuals and other design/durability related documents including Preliminary Design (30%) vi) Detailed Design (40%) vii) Good for Construction Drawings Issued (20%) viii) As Built Drawings (10%)	4%
F1.2	Submission of Detailed Survey Reports and Drawings, including topographic surveys and establishment of the settlement control points.	2 %
F1.3	Submission of the pre-condition surveys of adjacent buildings, structures, open/closed wells, railway facilities, EBS etc.	2 %
F1.4	Submission of the detailed site and ground investigation Reports, including but not limited to, bore logs, laboratory testing and interpretive reports.	2 %
<b>F2.0</b>	<b>Tunnelling</b>	
F2.1	Establishment, including dismantling, moving and re-establishment as necessary, of all ancillary machinery, plant and equipment necessary to support the NATM operation including decking, access walkways and stairs, lifting equipment, grouting equipment, tanks, muck removal equipment, means of delivery, bolts, shotcretes etc.	10 %
F2.2	Undertake tunnel construction, including, but not limited to, any necessary probing and pre-treatment of ground, excavation, muck removal, installation of temporary and Permanent linings complete in position including transportation of muck and grouting. At all times the tunnel under construction shall be well lit and ventilated and shall have proper drainage and clean and safe access routes shall be maintained to the work face.	55%
F2.3	Undertake Waterproofing application and final grouting (if any) to the satisfaction of the Engineer.	10 %
F2.4	Design, procure, install and maintain during operation to the satisfaction of the Engineer the temporary ventilation system for the tunnels.	2 %
F2.5	Design, procure, install and maintain during operation to the satisfaction of the Engineer the temporary lighting and drainage system for the tunnels.	1 %

Price Centre	Description	Percentage for Sub-Items
F2.6	Monitor the settlement control points for the duration of the tunnel construction, including daily reporting to the Engineer plus real time monitoring where stipulated in the Contract.	2 %
F3.0	<b>All Remaining Works</b>	
F3.1	All remaining works as shown in the Employer's drawings and Specifications including walkways, drainage system, first pour concrete in tunnel invert, Chartered Utility supporting system and protection including removal of trees and surface furniture etc.	10 %
	<b>Total for Price Centre F</b>	100%

The above total for Price Centre F shall be equal to 95 % of the Sum inserted for Price Centre F in the Pricing Summary in Clause 1.7.1 above.

Price Centre	Description	Percentage for Sub-Items
<b>G</b>	<b>Section (3) Tunnel at Cross-over at the northern end of Swargate Station</b>	
<b>G1.0</b>	<b>General</b>	
G1.1	Submit and obtain the Engineer's Notice to proceed for Design Deliverables; Payment (at completion of): i) Production of Design Manuals and other design/durability related documents including Preliminary Design (30%) ii) Detailed Design (40%) iii) Good for Construction Drawings Issued (20%) iv) As Built Drawings (10%)	4%
G1.2	Submission of Detailed Survey Reports and Drawings, including topographic surveys and establishment of the settlement control points.	2 %
G1.3	Submission of pre-condition surveys of adjacent buildings, structures, open/closed wells, railway facilities, EBS etc.	2 %
G1.4	Submission of the detailed site and ground investigation Reports, including but not limited to, bore logs, laboratory testing and interpretive reports.	2 %
<b>G2.0</b>	<b>Tunnelling</b>	
G2.1	Establishment, including dismantling, moving and re-establishment as necessary, of all ancillary machinery, plant and equipment necessary to support the NATM operation including decking, access walkways and stairs, lifting equipment, grouting equipment, tanks, muck removal equipment, means of delivery, bolts, shotcretes etc.	10 %
G2.2	Undertake construction of NATM Tunnel at cross-over, including, but not limited to, any necessary probing and pre-treatment of ground, excavation, muck removal, installation of temporary and Permanent linings complete in position including transportation of muck and grouting. At all times the tunnel under construction shall be well lit and ventilated and shall have proper drainage and clean and safe access routes shall be maintained to the work face.	55%
G2.3	Undertake waterproofing application and final grouting (if any) to the satisfaction of the Engineer.	10 %
G2.4	Design, procure, install and maintain during operation to the satisfaction of the Engineer the temporary ventilation system for the tunnels.	2 %
G2.5	Design, procure, install and maintain during operation to the satisfaction of the Engineer the temporary lighting and drainage system for the tunnels.	1 %
G2.6	Monitor the settlement control points for the duration of the tunnel construction, including daily reporting to the Engineer plus real time	

Price Centre	Description	Percentage for Sub-Items
	monitoring where stipulated in the Contract.	2 %
G2.7	<b>All Remaining Works</b>	
G3.0	All remaining works as shown in the Employer's drawings and Specifications including walkways, drainage system, first pour concrete in tunnel invert, Chartered Utility supporting system and protection including removal of trees and surface furniture etc.	10 %
	<b>Total for Price Centre G</b>	100%

The above total for Price Centre G shall be equal to 95 % of the Sum inserted for Price Centre G in the Pricing Summary in Clause 1.7.1 above.

**Price Centre H: Architectural finishing and Hard Landscaping works for Budhwar Peth Station.**

SL No.	Description of Items	TOTAL AMOUNT(RUPEES)	
		In Figures	In Words
I.1	Masonry Works		
I.2	Concrete Works		
I.3	Granite & Stone Works		
I.4	Landscape & External Works		
I.5	Waterproofing Works		
I.6	Tile Works		
I.7	Access Raised Floor Works		
I.8	Wood Works & Iron Mongery		
I.9	Stainless Steel Works		
I.10	Aluminium Works		
I.11	Glass Works		
I.12	False Ceiling Works		
I.13	Painting Works		
I.14	Mild Steel Works		
I.15	Fire Door Works		
I.16	Special Items		
	<b>TOTAL</b>		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
1.0		<b>MASONRY WORKS</b>				
A		<b>LIGHT WEIGHT BLOCKS</b>				
1	NDSR	Providing and constructing wall with light weight concrete block masonry (Aerocon block or equivalent) of size 600 x 200 x 200mm (l,b,h) strength not less than 3N/Sqm with cement mortar 1:6 confirming to IS: 2185 ( Part III) 1984, (Specifications for AAC) and IS: 6041, and IS: 6441 1972 (Part I to Part V): including the cost of materials, labour, scaffolding, curing etc., complete as per the manufacturer's specifications for rectangular, curved or circular masonry works in pier or around the concrete columns/ walls etc., all as per specifications, drawings and as directed etc., complete at any height including all lead and lift. For 200mm thick wall.	Cum	50		
B		<b>CEMENT CONCRETE BLOCKS</b>				
2	NDSR	Providing and fixing precast cement concrete solid block (SIZE 400X200X200) with cement concrete 1:2:4 (1 Cement : 2 coarse sand : 4graded stone aggregate 20mm nominal size) including hoisting and setting in position with cement mortar 1:3 (1 Cement : 3 coarse sand), cost of required centering, shuttering etc. complete up to any height including making	Cum	4,686.92		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		Openings for duct of any size & shape& Finishing the same. up to 6 m.				
3	NDSR	Providing and fixing precast cement concrete solid block (SIZE 400X200X100) with cement concrete 1:2:4 (1 Cement : 2 coarse sand : 4graded stone aggregate 20mm nominal size) including hoisting and setting in position with cement mortar 1:3 (1 Cement : 3 coarse sand), cost of required centering, shuttering etc. complete up to any height including making Openings for duct of any size & shape & Finishing the same upto 6m.	Cum	50		
C		<b>PLASTERING WORK</b>				
4	13.1.1	Providing and applying 12 mm cement plaster of mix 1:4 (1 cement :2 parts coarse sand + 2 parts fine sand ) including providing galvanized chicken wire mesh at the junctions of concrete and masonry work including side laps of minimum 75mm and fixing in position with galvanized wire nails including scaffolding etc. complete.	Sqm	1,360		
5	13.1.2	Providing and applying 12 mm cement plaster of mix 1:6 (1 cement :3 parts coarse sand + 3 parts fine sand ) including providing galvanized chicken wire mesh at the junctions of concrete and masonry work including side laps	Sqm	272		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		of minimum 75mm and fixing in position with galvanized wire nails including scaffolding etc. complete.				
6	NDSR	Providing 12 mm thick cement plaster in single coat with cement mortar 1:6 to brick / Aerocon masonry/ concrete works including rounding off corners wherever required smooth rendering, providing and removing scaffolding, including cost of material, labour, curing complete as per specification for all heights.	Sqm	3,389.80		
		<b>TOTAL MASONRY WORKS</b>				
2.0		<b>CONCRETE WORKS</b>				
1	4.1	Providing and laying in position cement concrete of specified grade excluding the cost of centring and shuttering - All work upto plinth level:				
	4.1.10	1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size)	Cum	50		
2	4.2	Providing and laying in position ready mixed plain cement concrete, with cement content as per approved design mix and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for plain cement concrete work,				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		including pumping of R.M.C. from transit mixer to site of laying and curing, excluding the cost of centering, shuttering and finishing, including cost of curing, admixtures in recommended proportions as per IS : 9103 to accelerate/retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer-in-charge.” Note : Excess/less cement used than specified in this item is payable/recoverable separately.				
	<b>4.20.2</b>	All works above plinth and upto floor V level				
<b>3</b>	<b>4.20.2.1</b>	M-15 grade plain cement concrete. (cement content considered @ 240 kg. /cum)	Cum	884.29		
<b>4</b>	<b>NDSR</b>	Providing and fixing of Glass Reinforced Concrete(G.R.C)Jalli 40mm thick in approved size,patters,design,thickness and colour of M/S Unistone make or equivalent to be fixed on/between RCC/block work column or structural steel work with Dry fixing method with all appropriate steel frame work, stainless steel (SS-304) 'L' shaped clamps, dash fasteners and pins including anchoring,lifting,scaffolding etc. complete as per architectural drawing and manufacture specification The screens should be made from '53 grade'	Sqm	82.50		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		white portland cement manufactured by 'JK Cement' or equivalent, super plasticizers manufactured by 'BASF' or equivalent, polymers manufactured by 'BASF' or equivalent and UV resistant synthetic inorganic pigments should be used for pigmentation manufactured by 'BAYFERROX (Germany)' or equivalent. The material casting should take place in Synthetic rubber/FRP mould manufactured by Reckli or equivalent.				
5	NDSR	Providing and applying anti dust sealer (epoxy coating) 1000μ thick epoxy floor coating along with necessary floor preparation by ASIAN PAINTS PPG make or equivalent with use of APCPFLOR HFP 120 Two component, high solid, epoxy resin based floor primer @50 μ & then topcoat APCOFLOR SL2 Self levelling coatings with excellent flow & levelling characteristics, conforms to the Global Migration Standards laid down in US-FDA: 21CFR 175-300 and also having mechanical properties such as compressive strength 51 mpa (ASTM C 579), Flexural strength 12 mpa (ASTM C 580) & Tensile Strength 8 mpa (ASTM C 307) on floor as per approved colour and shade. Floor condition shall be of Trimix and the moisture content of the concrete flooring should be	Sqm	4,213		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		less than 5%				
6	NDSR	Providing and laying 50mm thick cement concrete granolithic flooring 1:2:4 (1 cement : 2 coarse sand: 4 graded stone with 20mm nominal size stone aggregate) finished with Non-metallic Monolithic surface using hardening compound such as Nitoflor Hardtop Standard of Fosroc or approved equivalent to Concrete floor to develop proper bonding and to seal, harden, water-proof, improve abrasion, chemical resistance and to form a dust free surface as per manufacturer's specifications. Using power trowel including aluminum strips 40mm wide and 2mm thick in joints of cement concrete floor etc. complete.	Sqm	4,213		
7	NDSR	Providing and laying concrete panels of M20 grade for compound walls as per drawing.	Cum	20		
8	NDSR	Providing and Laying of Foam Concrete under Raised Floor as / of density 1200kg/cum	Cum	50		
		<b>TOTAL CONCRETE WORKS</b>				
3.0		<b>GRANITE AND STONE WORKS</b>				
		<b>Note: All granite slabs shall be selected as per approved sample from Tamil Nadu / Karnataka / Rajasthan (Jhalore) of</b>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		<b>selected quality, uniform in colour, free from cracks, fissures and flakes with straight edges and perfect corners.</b>				
<b>A</b>		<b>GRANITE STONE</b>				
<b>1</b>	<b>NDSR</b>	Providing and fixing flamed finish Sadarahalli grey granite stone (bull nosed) of size 1200x600x60 mm at platform edge level using 5mm thick approved thick bed adhesive as per specification over prepared base on 20mm (average) thick base of cement mortar in 1:4 (1 cement : 4 total aggregate-sand and 10mm single sized aggregate) using 43 grade cement, water reducing admixture as per ISO 9103:1999 and jointing with white cement with matching colour pigment all complete in levelling course laid to proper slopes over screed base including, base preparation including movement joint in screed as per specification with 10mm thick compressible filler to edge of screed with two parts polysulphide sealant to top edge as per approved drawing and directions of engineer-in-charge.All Light color Granites to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum	Sqm	184.80		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
2	NDSR	Providing and laying 30mm thick HONED Red/Raw silk/Jet Black/Tan Brown/Kashmir Yellow/ Ikon Brown/ Multi Red/ Blue Pearl granite slab of sizes up to and including 1200X600mm on floor using 5mm thick approved thick bed adhesive as per specification over prepared base on 20mm (average) thick base of cement mortar 1:4 (1 Cement : 4 total aggregates - coarse sand and 10mm single sized aggregates) using 43 grade cement, water reducing admixture as per ISO 9103:1999 and jointing with white cement with matching colour pigment all complete (Colour of granite as approved by Engineer) in levelling course laid to proper slopes over screed base including base preparation, movement joint in screed as per specification with 10mm thick compressible filler to edge of screed/ blockwork junction with two parts polysulphide sealant to top edge, drainage gullies as per approved section, curing, testing etc. all complete as per specifications and relevant drawings. All Light color Granites to be fixed on White Cement. As per Approved	Sqm	1,311.93		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
3	NDSR	Providing and laying 30mm thick FLAMED Sadarhalli Grey Granite Stone flooring in treads and landings (including bull nosing, rounding the nose and making groove) of steps of approved colour, size and pattern, (sample of granite stone shall be approved by Engineer-in- charge) over 20mm (average) thick base of cement mortar 1:4 (1 cement : 4 core sand) laid and jointed with neat cement slurry mixed with pigment to match the shade of granite stone complete as per specifications and architectural drawings. Allow for cutting & finishing for handrails fixing as per design.All Light color Granites to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.	Sqm	982		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
4	NDSR	Providing and laying 20mm thick mirror polished Granite Stone in Risers of steps of approved colour, size and pattern, (sample of granite stone shall be approved by Engineer-in-charge) over 12 mm thick bed of cement mortar 1:4 (1 cement: 4 coarse sand) and jointed with neat cement slurry mixed with pigment to match the shade of granite stone complete as per specifications and relevant drawings.All Light color Granites to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.	Sqm	306.24		
5	NDSR	Providing and laying 30mm thick mirror polished Sadarhalli Grey/Cheema pink/Jhalore Beige granite stone work of up to and including sizes of 1200mm*600mm of approved colour/pattern with 4mm groove all around at all levels for wall linings/columns/skirting(veneer work) by mechanical arrangement with SS cramps/brackets (SS Grade 316), anchor bolts,5mm vertical SS pins (SS Grade 316) of approved make and inserts as per drawings and specifications. The cost of making necessary grooves all around stone pieces, chamfering of corner edges and	Sqm	1,922.25		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		polishing are included. Allow for cutting of holes and box outs for services etc...All Light color Granites to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
6	NDSR	Providing and laying 40mm polished Red/Raw silk/Black/Tan brown/Blue pearl granite slabs for trench cover with 25mm dia holes @ 75mm c/c spacing complete..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.	Sqm	20		
7	NDSR	Providing and installing counters of MS (with primer and 2 coats of enamel paint) carcass in TOM, EFO, SCR etc. with 30mm thick polished & moulded Jet Black Granite top with all cutouts/ openings including providing and fixing over 19mm thick commercial board & 19 x 3 mm teak wood lipping all complete of approved quality as per specifications and relevant drawings (Plan area shall be considered for measurement).The Granite shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is	Sqm	66.44		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		completed and handed over.				
8	NDSR	Providing and fixing stone slab with table rubbed, edges rounded and polished, of size 75x50 cm deep and 18mm thick, fixed in urinal partitions by cutting a chase of appropriate width with chase cutter and embedding the stone in the chase with epoxy grout or with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 6 mm nominal size) as per direction of Engineer-in charge and finished smooth. The Granite shall be covered with POP / Gypsum powder of 12mm thick / Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
8.1		Granite Stone of a approved shade	Each	5		
9	NDSR	Providing & Fixing of 20 mm thick Jet Black Granite counter top prepolished and premoulded & fixed over RCC slab with 20mm thick cement mortar 1:4 (1 cement : 4 Coarse sand) as / Architectural dwg inside Staff Mess room, First Aid room and toilet including cutting of hole for installation of wash basin/Sink.	Sqm	6.60		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
10	NDSR	Providing, laying, jointing, grouting including fixing in position to backing, prepolished, 20 mm thick granite, in sizes not less than 600x1200x20mm and rubbed to smooth mirror finish for Veneering/Cladding work to walls, beams, columns, pilasters, fascia, upstands, jambs, sills, copings, soffits of openings and beams, with grout mortar of thickness to be ascertained at site so as to achieve true lines, levels, plumb, planes etc. subject to a minimum thickness of 20 mm for the grout cement mortar 1:4, and making of openings for service and other machine cutting, providing machine drilled holes, recesses, rebates for stainless steel attachments/ fixings, providing movement joints etc. all as per drawings, specifications and as directed complete. Provision to be made for "V" groove as per drawing, design and as approved by engineer.	Sqm	50		
B		<b>KOTA STONE TREAD &amp; RISERS</b>				
11		Kota stone slabs 20 mm thick in risers of steps, skirting, dado and pillars laid on 12 mm (average) thick cement mortar 1:3 (1 cement 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, including rubbing and polishing complete.	Sqm	315.15		
C		<b>BASALT STONE WORK</b>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
12		Providing and laying 25mm thick POLISHED /SAND BLASTED/SHOT BLASTED BASALT stone work of up to and including sizes of 1200mm*600mm of approved colour/pattern with 4mm groove all around at all levels for wall linings/columns/skirting(veneer work) by mechanical arrangement with SS cramps/brackets (SS Grade 316), anchor bolts,5mm vertical SS pins (SS Grade 316) of approved make and inserts as per drawings and specifications. The cost of making necessary grooves all around stone pieces, chamfering of corner edges and polishing are included. Allow for cutting of holes and box outs for services etc...All Light color BASALT to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.	Sqm	863.50		
13		Providing and laying 40mm thick prepolished HONED/BUSH HAMMERED/SHOT BLAST finish BASALT STONE slab of sizes up to and including1200X600mm on floor using 5mm thick approved thick bed adhesive as per specification over prepared base on 20mm (average) thick base of cement mortar 1:4 (1 Cement : 4 total aggregates - coarse sand and	Sqm	1,311.93		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		10mm single sized aggregates) using 43 grade cement, water reducing admixture as per ISO 9103:1999 and jointing with white cement with matching colour pigment all complete (Colour of BASALT as approved by Engineer) in levelling course laid to proper slopes over screed base including base preparation, movement joint in screed as per specification with 10mm thick compressible filler to edge of screed/ blockwork junction with two parts polysulphide sealant to top edge, drainage gullies as per approved section, curing, testing etc. all complete as per specifications and relevant drawings.All Light color BASALT STONE to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
		<b>TOTAL OF GRANITE AND STONE WORKS</b>				
<b>4.0</b>		<b>LANDSCAPING AND EXTERNAL WORKS</b>				
<b>1</b>		Providing and laying factory made coloured chamfered edge Cement Concrete paver blocks of required strength, thickness & size/shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		compacted bed of fine sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with jamuna sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand in footpath, parks, lawns, drive ways or light traffic parking etc. complete as per manufacturer's specifications & direction of Engineer-in-Charge.				
1.1	16.94	80mm thick C.C. paver block of M-30 grade with approved colour,design & pattern.	Sqm	1,000		
2	16.69	Providing and laying at or near ground level factory made curb stone of M-25 grade cement concrete in position to the required line, level and curvature jointed with cement mortar 1:3 (1 cement : 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5 mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-Charge (length of finished curb edging shall be measured for payment). (Precast C.C. curb stone shall be approved by Engineer-in-Charge).	Cum	30		
3	4.9	Precasting and placing in position 125 mm dia Bollards 600 mm high of required shape including providing M.S. Pipe Sleeve 50 mm dia 300 mm long in the Bollardand M.S. Pipes	Each	200		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		40 mm dia and 450mm long with 150x150x6mm M.S. plate welded at bottom and embedded 150mm in cement concrete 1:3:6 (1 Cement : 3 coarse sand (zone-III) : 6 graded stone aggregate 20 mm nominal size), including necessary excavation of size 250x250x450mm deep for the same in bitumen/concrete pavement at specified spacing.Painting of MS bollard is to be done with two coats of yellow or white paint over MS pipes as per Architect/Engineer-in-charge				
		<b>TOTAL OF LANDSCAPING AND EXTERNAL WORKS</b>				
<b>5.0</b>		<b>WATERPROOFING WORKS</b>				
<b>1</b>	<b>22.3</b>	Providing and laying water proofing treatment to vertical and horizontal surfaces of depressed portions of W.C., kitchen and the like consisting of:(a) Ist course of applying cement slurry @ 4.4 kg/sqm mixed with water proofing compound conforming to IS 2645 in recommended proportions including rounding off junction of vertical and horizontal surface.(b) IInd course of 20 mm cement plaster 1:3 (1 cement : 3 coarse sand) mixed with water proofing compound in recommended proportion including rounding off junction of vertical and horizontal surface.(c) IIIrd course of applying blown or residual bitumen applied hot at 1.7 kg. per sqm of area.(d) IVth course of 400 micron thick PVC sheet. (Overlaps at joints of PVC sheet should be 100 mm wide and pasted to each	Sqm	300		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		other with bitumen @ 1.7 kg/sqm).				
2	NDSR	Providing and laying Brick bat water proofing treatment for terrace with the following including cleaning the RCC slab top surface. Providing on top of slab surface cement slurry mixed with water proofing compound thereafter providing cement mortar 1:4 (1 cement : 4 coarse sand) 20mm thick with polymer based water proofing compound and layer of new half broken bricks (coba) giving gaps of 15-20mm between broken bricks, providing necessary gradient for proper flow of water and providing cement slurry with water proofing compound spread over brick bat coba in cement mortar 1:4 (1 cement : 4 coarse sand) with water proofing compound filled in gaps of broken bricks and 20mm plaster in cement mortar 1:4 (1 cement : 4 coarse sand) mixed with polymer based water proofing compound, top finished smooth with neat cement and providing rope chequers including extending the water proof plaster 300mm on vertical surfaces with necessary chasing / treating of walls including providing and making gola as per drawing etc. Average thickness of the brick bat coba to be 125mm. The item also include providing and making khurrahs 450mm x 450mm/ 300mm x 300mm with average minimum thickness of 50mm cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm nominal	Sqm	2,662		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		size) finished with aluminum foil and 12mm cement plaster 1:3 (1 cement : 3 coarse sand) and a coat of neat cement rounding the edges and making and finishing the outlet complete. (Plan area will be measured and paid)				
		<b>TOTAL OF WATERPROOFING WORKS</b>				
<b>6.0</b>		<b>TILE WORKS</b>				
<b>A</b>		<b>VITRIFIED TILES</b>				
<b>1</b>	<b>NDSR</b>	Providing and laying matte finish vitrified tile of 1st quality of approved make conforming to IS :13755, The tiles shall be free from objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required, in all colors as per control sample at all levels in public & back-of-house areas and toilet floor and skirting over 20mm thick bed of cement mortar 1:4 (1 cement : 4 coarse sand) including pointing the joints with white cement and matching pigments- all complete as per relevant drawings and specifications laid over screed/ foam concrete as per relevant architectural drawing. Rates include coordination for cutouts, holes and finishing of the same. The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick /Plywood	Sqm	1,723.33		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		to ensure that the flooring is not damaged till the construction work is completed and handed over.				
		600x600x10 mmm thick				
2	NDSR	Providing and fixing 1st quality Vitrified wall tiles of approved make,conforming to IS :13755,The tiles shall be free from objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required,shade, colour and finish in all colours, shades, size in skirting, wall cladding, border tiles and dados over 20/12 mm thick bed of cement Mortar 1:4 (1 cement : 3 coarse sand) and jointing with approved grouting material with pointing in white cement mixed with pigment of matching shade complete.The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.	Sqm	1,083.39		
3	NDSR	Providing and fixing 10 mm thick acid and / or alkali resistant vitrified tiles of approved make and colour using acid and /or alkali resisting mortar bedding and joints filled with acid and / or alkali resisting cement as per IS:4457 complete as per the direction of Engineer-in- charge. On a flooring on a bed up to	Sqm	67.10		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		30mm thick mortar of 1:4 proportion.The tiles shall be free from objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required.The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
4	NDSR	Providing and fixing 1st quality 10mm thick acid and or / alkali resistant Vitrified wall tiles of approved make,conforming to IS :4457,The tiles shall be free from objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required,shade, colour and finish in all colours, shades, size in skirting, wall cladding, border tiles and dados over 20/12 mm thick bed of cement Mortar 1:4 (1 cement : 3 coarse sand) and jointing with approved grouting material with pointing in white cement mixed with pigment of matching shade complete.The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction	Sqm	73.90		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		work is completed and handed over.				
5	NDSR	Providing and laying yellow visibility vitrified tile as per control sample of size 200*100*8 mm thick at platform level over 20mm thk bed of cement mortar 1:4(1 cement : 4 coarse sand) in levelling coarse laid to proper slopes over screed base including base preparation including movement joint in screed as per specification with 10mm thick compressible filler to edge of screed with two parts polysulphide sealant to top edge as per approved drawing and directions of engineer-in-charge.The tiles shall be free from objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required.The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.	Sqm	30.80		
B		<b>TACTILE FLOORING</b>				
6	NDSR	Providing and laying 12mm (minimum)thick with 3mm(minimum)thick projection on surface yellow coloured directional vitrified porcelain tactile tile of pelican or equivalent(as per specification)laid on floor with laterite 111				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		crete filler powder mixed with laterite 73 latex admix and applied to a minimum thickness of 4.5mm(The mixing ratio shall be as follows:20kg bag (laterite 111):5.5 liter (Laterite 73).Spacer of 3mm shall be used between the tiles and joints filled using Laterite Latapoxy SP-100 epoxy grout in Inca Gold colour. The joint depth shall be 6mm.Laticrete product shall be as manufactured by Laterite India Pvt.ltd/Laterite International Inc.)over 20mm thick bed of cement mortar 1:4(1 cement:4 coarse sand) in levelling course laid to proper slopes over screed base including base preparation including movement joint in screed as per specification with 10mm thick compressible filler to edge of screed with two parts polysulphide sealant to top edge as per approved drawings and directions of engineer-in-charge.				
6.1		300*300 hazard warning and directional tactile tiles as per approved drawings	Each	2,000		
		<b>TOTAL OF TILES WORKS</b>				
7.0		<b>ACCESS RAISED FLOOR</b>				
1	NDSR	Providing and fixing access raised floor of light grade of minimum 15 KN/m2 UDL panels manufactured from pressed formed corrosion resistant galvanized steel with total overwrap of one piece top, sides and bottom flange encapsulating monolithic homogeneous totally premixed				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		fiber reinforced calcium silicate material with balanced density over panel, to cater in the size 600 x 600 x 41mm. The panel has to be placed on the pedestal made from all solid steel construction, galvanized plated consisting of stringers, an anti- vibrational head cap with cruciform upstands and four panels locating studs, positively clipped pedestal clipped to the steel base plate. The pedestal cap shall have an electrical conductor plate for dissipation of static electricity. The steel base plate of the pedestal shall be fixed on the sub-floor with Epoxy pedestal adhesive and/or mechanical fixing with fasteners (8mm X 75mm). The Access floor should be able to take a point load of minimum 2.5 KN over 25 mm sq. and UDL of minimum 15 KN/sq. meter. The panel shall be finished with high abrasion, anti static HPL				
1.1		Up to 450 mm high cavity floor	Sqm	182.66		
		<b>TOTAL OF ACCESS RAISED FLOOR</b>				
8.0		<b>WOOD WORKS AND IRON MONGREY</b>				
1	NDSR	Providing & fixing Toilet Cubicle (of following standard dimension which includes 900mm door size width) made of heat, bacteria, water,chemical,scratch, impact and anti bacterial resistant 12mm thick solid compact laminate panels tested in approved laboratory. Finish of the compact				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		laminate should be Suede, Raw silk model includes doors, pilasters & intermediate panels finished with approved texture/shade as per the detail drawings & as per IS 2046 (Indian standard) and as per fire retardant BS-476/97 standard. This also includes providing and fixing in position necessary hardware made out of stainless steel (Grade 304) as per manufacturers specifications & Architects instructions like (1)Door knob(2)Gravity hinges(3)Thumb turn lockset with occupancy indicators(4)Coat hooks with Door stopper(5)U-channels(6)Adjustable foot/pedestal(7)Top rail with corner connector(8) Rubber noise deafening tape(9)Screws & wall plugs. All screws will of 304 Grade in stainless steel with satin finish. All pilasters are supported by stainless steel bottom cladding. The base of the stainless steel bottom cladding will be anchored to the floor with a clearance height up to 150mm. the top fitting should consist of SS round top rail which will get fixed with pilasters, with SS panel tube holder, SS corner bend (connected with top rail) will be used on the corner of cubicle in absence of brick wall, SS wall fixing is used only on the wall which will hold the SS top rail.				
1.1		Toilet Cubicle with standard dimension of 2025mm Height x 1000mm width x 1550mm Depth, which includes up to 900mm door size width)	Nos	5		
		<b>TOTAL OF WOOD WORKS AND IRON MONGREY</b>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
9.0		STAINLESS STEEL WORKS				
A		STAINLESS STEEL RAILING				
1	NDSR	Supplying, fabricating, matt finished, erection of wall mounted handrail as per design comprising of 50mm dia Stainless steel Grade 304 including threading on both sides to receive grub screw on one side and rail holding barrel on the other side, 25mm dia rod upright threaded to receive 50mm dia handrail, 80mm OD 6mm thick SS plate, 50mm OD-3.15mm thick pipe fixing the same by cutting 49mm dia hole in granite/vitrified tile wall cladding in required position including angular assembly at every bend and fixing handrail in concrete/block with SS fasteners complete in all respect and making good the wall as per Specifications and Architect Drawing. Weight of finished product shall be measured. Rate is inclusive of all wastages. Adjustment for opening or cuttings is not allowed.	Kg	2,860		
2	NDSR	Supplying, fabricating, MATTE FINISH, erection of 1100mm high SS hand railing as per design comprising of 50mm dia, 3.15mm thick, Stainless steel Grade 304 with balustrades as per drawing, SS base plate, pipe adjuster M16X200mm SS fasteners for fixing railing in floor by cutting hole of required dia in floors/ landing/staircase complete in all respect and making good the floors as per Specifications and	Kg	1,188		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		Architectural Drawings.Weight of finished product shall be measured. Rate is inclusive of all wastages. Adjustment for opening or cuttings is not allowed.				
<b>B</b>		<b>STAINLESS STEEL GLASS RAILING</b>				
<b>3</b>		Supplying, fabricating, MATTE FINISH, erection of required height(900 to1100) mm high SS hand railing system, System comprising of 38mm Dia & 1.6mm thick Top-Rail Stainless steel Grade 304 connected to 50 mm Dia 3.15mm thick Baluster through Stainless Steel Saddle Plate connector. And a Grab Rail of 38mm Dia connected to Baluster through a Stainless Steel Stem Key. Baluster fixed to slab with GI Baseplate & M16x200 mm Fastener. A SS cover plate would be provided above GI Base Plate. Infill of 1 No. 12mm thick toughened glass connected to baluster with Stainless Steel Twin- arm Spider Clamp.	Rm	424.60		
<b>C</b>		<b>STAINLESS STEEL CLADDING</b>				
<b>4</b>	<b>NDSR</b>	Providing , Fabricating, Polishing & Erection of Required Height,Shape and Designing Comprising of 2 mm thick SS Grade 304 Sheet Cladding Over RCC Column on Aluminum Base frame of25x35x5mm and 5mm thk & 450 mm width Perforated (6mm perforations @ 12mm c/c) SS Grade 304 Matte Finished Sheet fixed on Frame 2 nos of 50 mm SS Grade 304 Dia Concentric Pipe, Bracing of 2 rings with 12 nos	Sqm	651.64		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		of 50 mm SS Grade 304 Dia pipe fixed on to the RCC Column with 3 nos. of 20 mm thick Arched shape Plate to support the Frame As / Drawing (for payment purpose only SS item shall be measured. Aluminum base frame shall be paid extra).				
<b>D</b>		<b>STAINLESS STEEL ARTICLES</b>				
<b>5</b>	<b>NDSR</b>	Fabricating and supply of stainless steel (conforming to grade SS 304 satin finish) four seater bench without backrest as per drawing and approved by Engineer-In-Charge. Weight of finished product shall be measured. Rate is inclusive of all wastages. Adjustment for opening or cuttings is not allowed.	Kg	300		
<b>6</b>	<b>NDSR</b>	Fabrication ,supply & erection of matte finish grade 304 SS sump covers of size 600mmX600mm suitably supported & fixed over MS frame along with granite stone matching with relevant floor finish, lifting hooks/keys etc. complete as per relevant architectural drawing.	Each	80		
<b>7</b>	<b>NDSR</b>	Fabrication, supply, erection and joining to relevant site of miscellaneous Matte finish grade 304 SS angle/ section/ pressed plate/ pipe etc. items like platform end gates etc. complete as per architectural drawings and directions of engineer-in-charge as per drawing.	Kg	300		
<b>8</b>	<b>NDSR</b>	Supplying, fabricating, MATTE FINISH, erection of 300mm high SS foot rail as per design comprising of 50mm dia, 3.15mm thick, Stainless steel Grade 304 with small height SS support as per drawing, SS base plate, pipe adjuster	Kg	400		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		M16X200mm SS fasteners for fixing railing in floor by cutting hole of required dia in floors/ landing/staircase complete in all respect and making good the floors as per Specifications and Architectural Drawings.Weight of finished product shall be measured. Rate is inclusive of all wastages. Adjustment for opening or cuttings is not allowed.				
		<b>TOTAL OF STAINLESS STEEL WORKS</b>				
<b>10.0</b>		<b>ALUMINIUM WORKS</b>				
<b>A</b>		<b>ALUMINIUM CLADDING</b>				
<b>1</b>	<b>NDSR</b>	Providing and fixing Aluminum Composite panels in all colours of approved brand for wall cladding at all heights and elevations including necessary aluminum composite panel consist of 3mm thermoplastic core of anti oxidant LDPE sandwiched between two skin of 0.5 mm thick alloy sheet making a total sheet thickness of 4 mm. The surface shall be finished with PDVF base coating on the top side and service coating on the reverse side shall be with a polymer paint. Coating shall confirm to ECCA of AAMA. The system shall design to withstand wind pressure of 200 Kg/Sqm and shall be fixed to the masonry/RCC walls with necessary clamps, bracket and anchor fasteners. All Clamps and brackets shall be hot dip galvanized minimum 80 micron thick and confirmed to IS : 4759 - 1996. The	Sqm	1,435.06		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		extruded aluminum sections shall be anodized in approved colour with anodic coating minimum 20 microns. Extruded section shall be of 6063 T5 or T6 alloy confirming to ASTM B 221. (items include cost of aluminum frame, ACP Panels, Cramps 110mm size, weather sealant, gasket, foam, fixtures, scaffolding, all machineries and any other fastening strips, nuts, bolts, rivets, washers, etc. complete).Item shall include to provide EPDM gaskets (Make:OSAKA/Satya or equivalent), open cell polyethylene backer rods, weather sealant etc. The weather sealant shall be Dow Corning 991 or equivalent and the width of the gap filled with sealant shall be as specified				
<b>B</b>		<b>ALUMINIUM LOUVERS</b>				
<b>2</b>	<b>NDSR</b>	Providing and fixing PVDF aluminum extruded single bank louvers with AMCA certification complete. The louvers should have hidden mullions and an insect screen and should be equivalent to C/S louver model RS-1605. All work to be complete with extruded aluminum sub frame extruded built up standard elliptical section conforming to IS 733 and IS 1285 fixed with raw plugs and stainless steel screws or with fixing clip or with expansion hold fasteners including necessary filling up of gaps at junctions at top bottom and sides with required PVC/neoprene felt complete in all respect.Alumnium sections shall be smooth rust free,	Sqm	170.50		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		straight as per architectural drawings and the direction of Engineer-in-charge etc. All structural steel support frame work shall be paid separately.				
<b>C</b>		<b>ALUMINIUM DOORS</b>				
<b>3</b>	<b>NDSR</b>	Providing and fixing Aluminum Door with frame of approved make with door frame / chowkhat of section 101.6 x 44.45 x 3.16 mm (2.508 kg/R.mt) and shutters with stiles and rails of aluminum sections 85 x 44.5 x 3 mm (2.1 Kg / R.mt) with bottom panel made of 12 mm thick prelaminate Novo pan or equivalent flat pressed three layered prelaminate particle board exterior grade ISI stamped IS:12823 grade, type-II, one side decorative and other balancing white and edges sealed with water resistant paint. Top panel with 6 mm thick clear glass. Both board and glass will be fixed with glazing clips and beadings / gaskets and necessary fittings all as per manufacturer's specifications and directions. EPDM rubber gasket and frame fixed in position with steel screws and rawl plugs. All visible steel screws shall be rust resistant and coloured as approved.				
		All aluminum sections shall be as per drawing and conforming to grade 63400 WP alloy as per IS:733 and IS: 1285 and colour 65 microns powder coated finish complete as approved and directed by the Engineer. The door to be complete with all	Sqm	30		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		necessary accessories such as aluminum handles, tower bolts, locks, pivot / hinges etc. complete.				
<b>D</b>		<b>ALUMINIUM WINDOWS &amp; GLAZING</b>				
<b>4</b>	<b>NDSR</b>	Providing, fabricating and installing in position, pure polyester powder coated aluminum doors, windows, curtain walling, skylights, partitions, grilles, glazing with extruded aluminum sections and profiles complete in all respects in straight or faceted profiles including arched angular in elevation including sub frames in tubular aluminum (having mill finish), outer frames, architraves, beading, wool pile 6mm thick clear float glass, gaskets, all complete. The minimum sizes, thickness and weights per unit length of the aluminum sections to be given by bidder, however, nothing extra shall be payable to the Contractor for using larger/heavier sections than those given, if found inadequate including all fittings.				
		<b>WINDOW TYPES</b>				
<b>4.1</b>		Fixed glazing	Sqm	88		
<b>4.2</b>		Extra for 12.76 mm thick (6mm + 0.76 + 6mm) PVB laminated glass, in place of 6 mm normal float glass.	Sqm	88		
<b>5</b>	<b>NDSR</b>	Design, Manufacture, Supply and Installation of dpi system, a complete assembly of co-extruded UV protected 14mm thick multilayered mesh wall polycarbonate panels incorporated	Sqm	92.95		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		into a complete system. Panels shall have 6 layers, different layers in soothing colors. Panels shall be with grip-lock notch standing seam running lengthways to allow the connectors to be attached. The installation of panels with connectors guarantee a guard of water with 10-15mm of height. The system shall ensure the mechanical strength, water tightness and air tightness of the roof as per below; Panel length 11980mm (Max.) Width 500-700mm. Panel shall be fixed over M S structural steel / MS purlin (paid separately) conforming to the detail				
		<b>TOTAL OF ALUMINIUM WORKS</b>				
<b>11.0</b>		<b>GLASS WORKS</b>				
<b>1</b>	<b>NDSR</b>	Providing and installing fixed glazed security wall assembly of stainless steel to ticket offices, Station Control Room, etc. with specified fixings and finish using 2 sheets of 6mm thick toughened glass with nominal gap silicone sealant joints. Glass shall be clear, toughened and laminated with 1.52mm thick polyvinyl butyral layer- all complete as per relevant architectural drawings and specification with cut out & holes.	Sqm	99.66		
<b>2</b>	<b>NDSR</b>	Providing and fixing of toughened laminated glass door in EFO (6mm + 1.52mm + 6mm) including stainless steel door handles, deadlock and Floor spring complete necessary cutting in granite flooring for housing of floor spring as /	Sqm	6.30		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		drawing				
3	NDSR	Designing, Providing, erecting and fixing structural glazing unitized using specially designed aluminum grade 63400 WP IS: 733 and ID: 1285 electro colour anodized 25 micron or pure polyester powder coated 65 microns in approved shade and colour through adequately designed MS galvanized / aluminum anchor brackets. The structural glazing design to be based on rain screen and pressure equalized drainage system. The complete drainage system to be incorporated in the design which drain water at every transom in the unlikely event that water penetrate the pressure seal. This include structural grade and weathering grade silicon sealant "Dow Corning" or "GE Silicon" or equivalent as per the design requirement. This includes structural designing, shop drawing complete. structural calculations and water penetration test as per (Structural Test ( Wind load serviceability) - ASTM E 330, Water Penetration Test - AAMA 501.2).The specified test is to be carried out only for location where executed qty will be more than 50Sqm in one go. The structure glazing shall be double glazed 23mm thick (6mm thick toughened blue/smoke grey on outer side, 12 mm air gap and 5 mm thick clear float glass on inner side). no members to visible from outside complete as per drawing and direction of engineer in charge. including required aluminum sub-	Sqm	290.95		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		frame Silicon filling all height i/c double height for straight / curve and scaffolding complete.				
4	NDSR	Providing and fixing toilet mirror in 6 mm thick clear float glass with beveled and polished at edge, fixed on wall with 6mm thick hard board backing fixed to wooden cleats with 8mm dia 38mm long stainless steel stud complete.	Sqm	10		
5	NDSR	Providing & installing Fixed glazed wall assembly for wall cladding with specified fixing of anodized aluminium sections & finish using 2 sheets of 6mm thick toughened glass with nominal gap silicon sealant joint. Glass shall be clear, toughened and laminated with 1.52mm thick polyvinyl butyral layer; all complete as per relevant architectural drawings and specification with cut out & holes.	Sqm	878.46		
		<b>TOTAL OF GLASS WORKS</b>				
12.0		<b>FALSE CEILING WORKS</b>				
A		<b>CALCIUM SILICATE BOARD CEILING</b>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
1	NDSR	Providing and installing suspended ceiling systems / vertical fascia as per controlled sample for concourse, 12mm thick Calcium Silicate Board panels with paint as per specification including supply of suspension system of galvanized steel as per manufacturer's recommendation, top fixing of SS expanding anchor bolts, rigid hangers, accessories inclusive of providing opening for electrical fixtures / fittings, fixed framing to support fixtures / fittings and providing secondary supporting system for cable tray and duct and all complete as per relevant drawings and the direction of Engineer-in-charge.	Sqm	364.10		
B		<b>FIRE RATED CEILING AND BULKHEAD</b>				
2		Providing and fixing of Grade 3003 Aluminum coil coated perforated metal silhouette false ceiling system using the grids of USG or CMC from their US plant or equivalent and tiles from USG/ CMC/Armstrong/Hunter Douglas or equivalent with the suspension system designed to suspend the entire false ceiling with the help of suspended rod of 4mm dia and clamps of size 26x26x2mm thick to be fastened with anchor fastener not less than 6mm dia to the soffit of slab beam. Minimum anchorage lengths shall be in the range of 50 to 60mm main runner 'Silhouette' profile or equivalent shall be suspended from the soffit of slab at an interval of 1200x600mm center to center and appropriate	Sqm	1,045		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		distance as required to sustain the suspended load including all the fixtures as shown RCP cross runner having 'Silhouette' profile shall be 600mm center to center with interlocking arrangements in such a way to form grid of 600x600mm and fix the lay in tile in the grid pattern and laying of false ceiling polyester powder coated metal tile of size 597x597mmx9mm MICRO PERFORATED of 1.5 mm dia in a 3mm diagonal square pattern given 22%perforated area. in correct line and levels as per the approved design and drawings submitted. All steel sections to be marked with the manufacturer's registered trademark and hologram. The rate shall include marking levels and grid of entire false ceiling as per the RCP necessary wall angles and profiles between gypsum and metal false ceiling as per the drawing, tools and tackles for installation of the complete system. The entire false ceiling system shall be supplied by the metal false ceiling supplier. The cutouts required for the down lighters, sprinklers, speakers etc. shall be made at factory only. The rate shall include providing and fixing of a thin nonwoven fabric made of cellulosic and glass fibers (weight 47 g/m2, thickness 0,2 mm) of approved make with a hot melt adhesive (15 g/m2) on back side of tile Rate incudes providing and fixing of M.S angle support for false ceiling at under the AC ducts or other equipment where ever required, Using 65mmx65mmx6mm thick and				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		<p>                     painted with two coats of red oxide primer of required length supported to the true ceiling through 12mm thick G.I treaded rod with necessary hanger fasteners. complete. Also the rate includes of providing all around wall step profile with black/white powder coated aluminum profile to get 50mm x50 mm grove , and with Gyp board 12mm groove                 </p>				
		<b>TOTAL FLASE CEILING WORKS</b>				
<b>13.0</b>		<b>PAINITING WORKS</b>				
<b>1</b>	<b>NDSR</b>	<p>                     Providing and applying two coats of Unitile's Rodeo or Spectrum Perlina fine or Heritage Granula Surface Texture paint after applying corresponding roller coat as primer on pre-plastered surface as per approved sample in approved shade. The composition of the texture paint should consist of ACRYLIC copolymer resigns combined with quartz ,silica, mineral, aggregates, synthetic inorganic pigments, bactericide, fungicides and various other additives, giving the product water repellant properties. The first coat to be applied by brush or wool roller as a base coat, diluted with sufficient water and the final coat (Undiluted) to be applied by trowel and finished with acrylic trowel to maintain with or without groves, as per details in drawings. The thickness of both coats should be 1.0 to 1.5mm. the water repellency of the product shall be <math>\geq 86\text{gm/m}^2</math> as per test method IS:5410-1969, complete as per manufacture's specifications and                 </p>	Sqm	517		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		instructions by Engineer in Charge at site. The rate shall include necessary scaffolding, labour and material complete				
2	NDSR	Applying epoxy based solvent free anti - dust concrete sealer(sealocote or equivalent) on fair faced blockwork/brickwork and concrete surfaces inclusive of surface preparation, over primer coat/ initial coat as per manufacturer's recommendation - all complete as per specification.				
2.1	NDSR	Applying epoxy based solvent free three coat clear sealer on fair faced blockwork/brickwork and concrete surfaces inclusive of surface preparation, over primer coat/ initial coat as per manufacturer's recommendation - all complete as per specification	Sqm	73,275.69		
3	NDSR	Providing and applying 3mm 1.5mm thick exterior Birla/JK or equivalent ready made putty in two coats over Brickwork/ Blockwork/ RCC surface of ceiling/beam/column etc. to prepare even and smooth surface including sand papering, grinding, scaffolding etc., complete as per direction of Engineer-in-Charge.	Sqm	3,390		
4	NDSR	Providing and applying Acrylic Emulsion to ceiling surfaces including necessary surface preparation, scaffolding / staging etc. All as per manufacturer's specifications and as directed by the Engineer	Sqm	364		
5	NDSR	Providing and applying Acrylic emulsion paint on new work	Sqm	3,389.80		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		with two or more coats of approved colour and shade to give an even shade .				
		<b>TOTAL OF PAINTING WORKS</b>				
<b>14.0</b>		<b>MILD STEEL WORKS</b>				
<b>1</b>	<b>10.26</b>	Providing and fixing hand rail of approved size by welding etc. to steel ladder railing, balcony railing, staircase railing and similar works, including applying a priming coat of approved steel primer.				
		M.S. tube	Kg	1,144		
<b>2</b>	<b>NDSR</b>	Supplying and fixing automatic galvanized industrial motorized rolling shutters made of required size MS lathe interlocked together (heavy duty) of approved make i.e. Indo-Germa Ltd. Chennai or equivalent made of required sizes and shape with G.I guides control box drive unit and with all other accessories complete as per manufacturer's specifications.	Sqm	69		
<b>2.1</b>		Extra for providing mechanical device chain & crank operation for operating rolling shutters for area exceeding 10sqm and up to 16.80 Sqm in area.	Sqm	69		
<b>3</b>	<b>NDSR</b>	Providing and fixing door with shutter fabricated from 18 gauge thick galvanised steel sheets press formed to provide a 46mm thick fully flushed double skin door with lock seam				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		joints at stile edge and infill insulation kraft core. Door frames 57x120 mm approx. to be double rebated made of 16 gauge galvanised steel. Door shutter and frame to be primed in stoving grade epoxy zincphosphate primer and finished in aliphatic grade u.v. resistance polyurethane paint. Door shutter and frames to have all hardware preparations, prepunctured at the factory all complete with and including filling of door frames with P.C.C. 1:5:10 (1 cement : 5 aggregate : 10 coarse sand).				
		(i)Single Leaf door shutter	Sqm	8.4		
		(ii)Double leaf door shutter	Sqm	21.6		
		(iii)Extra for 250 x 150 mm vision panel with 6mm thick clear toughened glass.	No.	15		
		(iv)Extra for provision of air transfer grille appx. 400x400 mm	No.	12		
		(v)Heavy Duty Door Closer	Each	27		
		(vi)Eurofile Mortice lock -240 with double pin cylinder having master arrangement and ss handles	Each	27		
		(vii)Concealed SS finish tower bolts (300mm)	Each	27		
		(viii)Magnum or equivalent make SS 4 Ball Bearing hinges	Each	96		
		(ix)SS handles Dorma or equivalent make for double leaf door	Each	5		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		(x)Dorma or equivalent make Panic Bar for Double leaf door	Each	5		
		(xi)Installation Charges	Sqm	30		
		<b>TOTAL OF MILD STEEL WORKS</b>				
<b>15.0</b>		<b>FIRE DOOR</b>				
<b>1</b>		<p>Fire Check doors design &amp; supply of approved make fire rated door fabricated and successfully tested at CBRI Roorkee in both direction satisfying two criteria (Stability and Integrity) confirming to BS:476 part II, IS3614 Part II as per schedule of requirement, complete with shutters, frames, hinges, conforming to the design intent. All fire doors must conform to the requirements of fire authority having jurisdiction and as per prototype tested by approved fire testing agency acceptable to fire authority having jurisdiction.</p> <p>Door shutter and frames to have all hardware preparations must be prepunctured at the factory for fixing of said hardware. Shutters &amp; frames to be filled with suitable fillers, insulation to meet the required fire resistance criteria as specified, with all grouting, reinforcements, flushed lock seam joints including all seals, washers, linings etc. complete. All fire doors to be primed and painted with approved painting system as per tested prototype and to approved colour. Provision of mortice sash lock (ML 100A) with S.S.</p>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		lever handles and door closers heavy duty (imported) LCN 1461 with standard arm on every leaf , stainless steel hinges as per approved shop drawing.				
1.1		60minutes (1 hour) fire rated metal door assembly	Sqm	30		
1.2		120 minutes (2 hour) fire rated metal door assembly	Sqm	294.48		
1.3		Clear Vision panel of 200mm*300mm per leaf with fire rating	Each	28		
1.4		Heavy Duty Door closer	Each	40		
1.5		Eurofile Mortice lock 240 with double pin cylinder master arrangement and SS handles	Each	40		
1.6		Concealed SS finish tower bolts (300mm)	Each	21		
1.7		SS handles Dorma or equivalent make for double leaf door	Each	66		
1.8		Dorma make panic bar for double leaf door or similar item or similar rate.	Each	23		
2		Providing and fixing 2 hour fire rated ACCESS DOOR fabricated in GMS Z sections with calcium silicate board 9mm thick infill inclusive of SS hardware and fire rated locks, fixed on GMS framework made of angles and channels as per drawing, complete for cutouts in walls. All assembly to be painted with fire retardant approved colour & shade.	Sqm	200		
3		Providing and fixing structural glass assembly of glazed smoke down stand using 2 sheets 6mm thick toughened glass with nominal gap silicon sealant joint. Glass shall be clear, toughened and laminated with 1.52mm thick polyvinyl	Sqm	105.6		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		butyral layer, as per specification and grade 304 stainless steel of hairline finish assembly fixing on bolted patch plate & SS Spider Fitting with counter sunk screw including down hang galvanized bracket support from structural slab using approved anchor as shown in the detailed drawing, including providing and fixing Rock Wool packing with 12mm thk calcium silicate board as per specification from 1500 to 2000 mm height above false ceiling and bottom edge finished with 3mm grade 304 SS pressed plate as per relevant architectural drawing, for fire separation. (for payment purposes area of glass only shall be measured)				
4		Providing, supply and fixing the a 2-hour fire rated floor/ceiling assembly access hatch door between various floor levels of the UG station. The product should include an optional UL Listed automatic rating of the door assembly ( finish flooring similar to adjacent architectural flooring or must be filled with 1" (25.4mm) resistant coating and a pan cover designed to accept architectural flooring materials. The access door should be made of 1/4" (6.35mm) cover and extruded aluminum frame, Cover-Aluminum plate reinforced for 150 psf (732 kg/m2) live load and Intumescent fire coating applied to the underside of the cover. Designed with 1" (25.4mm) fillable pan for field installation of architectural flooring material up to 1/2" (12.7mm) thickness . The	Sqm	150		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		remaining depth must be filled with concrete to maintain the fire of concrete).Frame-Extruded aluminum frame with built-in anchor flange around the perimeter. Intumescent fire coating applied on the interior surfaces of the frame. Hinges:Continuous heavy-duty Type 316 stainless steel hinge.Latch: Pneumatic self closing system that automatically closes the door in the event of a fire when heat parts a UL-listed 165°F (74°C) fusible link Lift Assistance Compression spring operators enclosed in telescopic tubes. Mechanical hold-open system with release button automatically holds the cover in the open position.				
		<b>TOTAL OF FIRE DOOR WORKS</b>				
<b>16.0</b>		<b>SPECIAL ITEMS</b>				
<b>1</b>	<b>NDSR</b>	Providing & installation of approved quality vertical linear baffle ceiling made out of folded Aluminum. The baffle units shall be in size of 50mm (W) x 150mm (H) and 1000mm x 4500mm x 1mm (thk), non-perforated. The ceiling baffle units shall be installed at a distance of 300mm c/c in one direction. The baffle units shall be attached to C-channel carriers spaced at 1200mm c/c. The C- channel carriers shall then be cross connected to perforated L-angle primary grid and suspended with M6 threaded rod hangers spaced at 1200mm and pertaining to Class A Fire Rated, as per ASTM E-84	Sqm	4,307.64		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
2	NDSR	Architectural items like stone Jalli , sandstone Jalli, Granite Cupola ,Sandstone Jalli, Granite and Sandstone cornice, Carved sandstone balcony , Granite Balcony as per Architectural Drawings for elevation purpose.	LS			
3	NDSR	Providing and fixing VMZINC Interlocking Panel system (thickness: 1.0mm) with 300mm panel width & 2400mm panel length depending on the direction of application (Horizontal / Vertical) fixed / screwed directly to the Aluminium section framing works.The zinc cladding system shall consist of the following elements to form a rigid, ventilated and rain screen system support base for installation of the VMZINC Quartz pre-weathered zinc cladding system.The cladding system shall comprise of the following described from top to bottom:i) Top Layer – VMZINC Quartz Interlocking panel from VM Building Solutions Bagnolet, France or equivalent profiled sheeting manufactured from Zinc alloy ZnTiCu as specified in EN 988, minimum thickness of 1.0 mm. ii) Aluminium box section / Galvanized Z section framing with all the required accessories like HDG brackets, Anchor fastners, Nut bolts etc.	Sqm	517		
		<b>MISCELLANEOUS ITEMS</b>				
4		<b>Expansion Joints ( Strip seal joint)</b>				
4.1		Providing and Installing in position approved building expansion joint at floor level between platform level slab,				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		concourse level slab or all location as shown in execution drawings or at locations approved by Engineer consisting of aluminium extrusions, anti-skid serrated top plate (Straight/Curved) with vapour barrier, sealant etc. as per details and specifications or as approved by Engineer. Entire installation is to be carried out strictly in the presence of manufacturer's representative at all times. No extra payment will be made for providing thermocoal at expansion joint between columns/beams/slabs or locations shown in drawing at the time of construction of RCC elements.				
		(i) Expansion /Contraction = +40mm/ -40mm Vertical seismic movement = +10mm/ -10mm	RM	50		
		(ii) Expansion /Contraction = +25mm/ -25mm Vertical seismic movement = +15mm/ -15mm	RM	50		
4.2		Providing and filling sheet covering over expansion joint with iron screws as per design to match the colour / shade of wall.				
		(i) Aluminium fluted strips 3.15mm thick and 150mm wide	RM	50		
		(ii) Aluminium fluted strips 3.15mm thick and 200mm wide	RM	50		
4.3		Polysulphide Sealent				
		Providing and applying Polysulphide sealent in 50mm gap incl back up material in the form of round shape Polyethylene foam at both faces of expansion joint .	m	50		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR BUDHWAR PETH STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate at par value (Rs.)	Par value amount (Rs.)
		TOTAL OF SPECIAL ITEMS				
		TOTAL OF ARCHITECTURAL WORKS FOR BUDHWARPETH STATION				

**Price Centre I: Architectural finishing and Hard Landscaping works for Mandai Station.**

SL No.	Description of Items	TOTAL AMOUNT(RUPEES)	
		In Figures	In Words
I.1	Masonry Works		
I.2	Concrete Works		
I.3	Granite & Stone Works		
I.4	Landscape & External Works		
I.5	Waterproofing Works		
I.6	Tile Works		
I.7	Access Raised Floor Works		
I.8	Wood Works & Iron Mongery		
I.9	Stainless Steel Works		
I.10	Aluminium Works		
I.11	Glass Works		
I.12	False Ceiling Works		
I.13	Painting Works		
I.14	Mild Steel Works		
I.15	Fire Door Works		
I.16	Special Items		
	<b>TOTAL</b>		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
<b>1.0</b>		<b>MASONRY WORKS</b>				
<b>A</b>		<b>LIGHT WEIGHT BLOCKS</b>				
<b>1</b>	<b>NDSR</b>	Providing and constructing wall with light weight concrete block masonry (Aerocon block or equivalent) of size 600 x 200 x 200mm (l,b,h) strength not less than 3N/Sqm with cement mortar 1:6 confirming to IS: 2185 ( Part III) 1984, (Specifications for AAC) and IS: 6041, and IS: 6441 1972 (Part I to Part V): including the cost of materials, labour, scaffolding, curing etc., complete as per the manufacturer's specifications for rectangular, curved or circular masonry works in pier or around the concrete columns/ walls etc., all as per specifications, drawings and as directed etc., complete at any height including all lead and lift. For 200mm thick wall.	Cum	50		
<b>B</b>		<b>CEMENT CONCRETE BLOCKS</b>				
<b>2</b>	<b>NDSR</b>	Providing and fixing precast cement concrete solid block (SIZE 400X200X200) with cement concrete 1:2:4 (1 Cement : 2 coarse sand : 4graded stone aggregate 20mm nominal size) including hoisting and setting in position with cement mortar 1:3 (1 Cement : 3 coarse sand), cost of required centering, shuttering etc. complete up to any height including making Openings for duct of any size & shape& Finishing the same. up to 6 m.	Cum	4,073.36		
<b>3</b>	<b>NDSR</b>	Providing and fixing precast cement concrete solid block (SIZE	Cum	20		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		400X200X100) with cement concrete 1:2:4 (1 Cement : 2 coarse sand : 4graded stone aggregate 20mm nominal size) including hoisting and setting in position with cement mortar 1:3 (1 Cement : 3 coarse sand), cost of required centering, shuttering etc. complete up to any height including making Openings for duct of any size & shape & Finishing the same upto 6m.				
<b>C</b>		<b>PLASTERING WORK</b>				
<b>4</b>	<b>NDSR</b>	<b>Proma seal or equivalent acrylic intumescent sealant 2 hours fire rated</b> in accordance with BS 476-Part 20, IS 1530 Part 4 to seal gap & joint in fire rated walls with roof slab and around service penetration for 25 mm gap and 12 mm depth with compressible filler backing.	Rm	4,686.92		
<b>5</b>	<b>NDSR</b>	20 mm water proofing cement plaster of mix 1:4 (1 cement : 4 coarse sand) in two coats for lining the drains, mixed with approved water proofing admixture for sunken areas of toilets, balconies or wherever directed by engineer in charge, including the neat cement punning over the base surface.	Sqm	1,000		
<b>6</b>	<b>NDSR</b>	Providing 12 mm thick cement plaster in single coat with cement mortar 1:6 to brick / Aerocon masonry/ concrete works including rounding off corners wherever required smooth rendering, providing and removing scaffolding, including cost of material, labour, curing complete as per specification for all heights.	Sqm	6,457.93		
		<b>TOTAL MASONRY WORKS</b>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
2.0		<b>CONCRETE WORKS</b>				
1	4.1	Providing and laying in position cement concrete of specified grade excluding the cost of centring and shuttering - All work upto plinth level:				
	4.1.10	1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size)	Cum	50		
2	4.2	Providing and laying in position ready mixed plain cement concrete, with cement content as per approved design mix and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for plain cement concrete work, including pumping of R.M.C. from transit mixer to site of laying and curing, excluding the cost of centering, shuttering and finishing, including cost of curing, admixtures in recommended proportions as per IS : 9103 to accelerate/retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer-in-charge.” Note : Excess/less cement used than specified in this item is payable/recoverable separately.				
	4.20.2	All Works above plinth and upto floor V level				
3	4.20.2.1	M-15 grade plain cement concrete. (cement content considered @ 240 kg. /cum)	Cum	937.64		
4	NDSR	Providing and fixing of Glass Reinforced Concrete(G.R.C)Jalli	Sqm	233.75		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		40mm thick in approved size,patters,design,thickness and colour of M/S Unistone make or equivalent to be fixed on/between RCC/block work column or structural steel work with Dry fixing method with all appropriate steel frame work, stainless steel (SS-304) 'L' shaped clamps, dash fasteners and pins including anchoring,lifting,scaffolding etc. complete as per architectural drawing and manufacture specification The screens should be made from '53 grade' white portland cement manufactured by 'JK Cement' or equivalent, super plasticizers manufactured by 'BASF' or equivalent, polymers manufactured by 'BASF' or equivalent and UV resistant synthetic inorganic pigments should be used fro pigmentation manufactured by 'BAYFERROX (Germany)' or equivalent . The material casting should take place in Synthetic rubber/FRP mould manufactured by Reckli or equivalent.				
5	NDSR	Providing and applying anti dust sealer (epoxy coating) 1000μ thick epoxy floor coating along with necessary floor preparation by ASIAN PAINTS PPG make or equivalent with use of APCPFLOR HFP 120 Two component, high solid, epoxy resin based floor primer @50 μ & then topcoat APCOFLOOR SL2 Self levelling coatings with excellent flow & levelling characteristics, conforms to the Global Migration Standards laid down in US-FDA: 21CFR 175-300 and also having mechanical properties such as compressive strength 51 mpa (ASTM C 579), Flexural strength 12 mpa (ASTM C 580) &	Sqm	4,895		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		Tensile Strength 8 mpa (ASTM C 307) on floor as per approved colour and shade. Floor condition shall be of Trimix and the moisture content of the concrete flooring should be less than 5%.				
6	NDSR	Providing and laying 50mm thick cement concrete granolithic flooring 1:2:4 (1 cement : 2 coarse sand: 4 graded stone with 20mm nominal size stone aggregate) finished with Non-metallic Monolithic surface using hardening compound such as Nitoflor Hardtop Standard of Fosroc or approved equivalent to Concrete floor to develop proper bonding and to seal, harden, water-proof, improve abrasion, chemical resistance and to form a dust free surface as per manufacturer's specifications. Using power trowel including aluminum strips 40mm wide and 2mm thick in joints of cement concrete floor etc. complete.	Sqm	4,895		
7	NDSR	Providing and laying concrete panels of M20 grade for compound walls as per drawing.	Cum	20		
8	NDSR	Providing and Laying of Foam Concrete under Raised Floor as / of density 1200kg/cum	Cum	50		
		<b>TOTAL CONCRETE WORKS</b>				
3.0		<b>GRANITE AND STONE WORKS</b>				
		<b>Note: All granite slabs shall be selected as per approved sample from Tamil Nadu / Karnataka / Rajasthan (Jhalore) of selected quality, uniform in colour, free from cracks, fissures and flakes with straight edges and perfect corners.</b>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
A		<b>GRANITE STONE</b>				
1	NDSR	Providing and fixing flamed finish Sadarahalli grey granite stone (bull nosed) of size 1200x600x60 mm at platform edge level using 5mm thick approved thick bed adhesive as per specification over prepared base on 20mm (average) thick base of cement mortar in 1:4 (1 cement : 4 total aggregate-sand and 10mm single sized aggregate) using 43 grade cement, water reducing admixture as per ISO 9103:1999 and jointing with white cement with matching colour pigment all complete in levelling course laid to proper slopes over screed base including, base preparation including movement joint in screed as per specification with 10mm thick compressible filler to edge of screed with two parts polysulphide sealant to top edge as per approved drawing and directions of engineer-in-charge.All Light color Granites to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.	Sqm	184.80		
2	NDSR	Providing and laying 30mm thick prepolished Sadarhalli Red/Raw silk/Jet Black/Tan Brown/Kashmir Yellow/ Ikon Brown/ Multi Red/ Blue Pearl granite slab of sizes up to and including 1200X600mm on floor using 5mm thick approved	Sqm	1,204.50		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		thick bed adhesive as per specification over prepared base on 20mm (average) thick base of cement mortar 1:4 (1 Cement : 4 total aggregates - coarse sand and 10mm single sized aggregates) using 43 grade cement, water reducing admixture as per ISO 9103:1999 and jointing with white cement with matching colour pigment all complete (Colour of granite as approved by Engineer) in levelling course laid to proper slopes over screed base including base preparation, movement joint in screed as per specification with 10mm thick compressible filler to edge of screed/ blockwork junction with two parts polysulphide sealant to top edge, drainage gullies as per approved section, curing, testing etc. all complete as per specifications and relevant drawings.All Light color Granites to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
3	NDSR	Providing and laying 30mm thick FLAMED Sadarhalli Grey Granite Stone flooring in treads and landings (including bull nosing, rounding the nose and making groove) of steps of approved colour, size and pattern, (sample of granite stone shall be approved by Engineer-in- charge) over 20mm (average) thick base of cement mortar 1:4 (1 cement : 4 core	Sqm	459.73		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		sand) laid and jointed with neat cement slurry mixed with pigment to match the shade of granite stone complete as per specifications and architectural drawings. Allow for cutting & finishing for handrails fixing as per design.All Light color Granites to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
4	NDSR	Providing and laying 20mm thick mirror polished Granite Stone in Risers of steps of approved colour, size and pattern, (sample of granite stone shall be approved by Engineer-in-charge) over 12 mm thick bed of cement mortar 1:4 (1 cement: 4 coarse sand) and jointed with neat cement slurry mixed with pigment to match the shade of granite stone complete as per specifications and relevant drawings.All Light color Granites to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.	Sqm	119.53		
5	NDSR	Providing and laying 30mm thick mirror polished	Sqm	1,575.92		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		Sadarhalli Grey/Cheema pink/Jhalore Beige granite stone work of up to and including sizes of 1200mm*600mm of approved colour/pattern with 4mm groove all around at all levels for wall linings/columns/skirting(veneer work) by mechanical arrangement with SS cramps/brackets (SS Grade 316), anchor bolts, 5mm vertical SS pins (SS Grade 316) of approved make and inserts as per drawings and specifications. The cost of making necessary grooves all around stone pieces, chamfering of corner edges and polishing are included. Allow for cutting of holes and box outs for services etc. All Light color Granites to be fixed on White Cement. As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124. The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
6	NDSR	Providing and laying 40mm polished Red/Raw silk/Black/Tan brown/Blue pearl granite slabs for trench cover with 25mm dia holes @ 75mm c/c spacing complete..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.	Sqm	20		
7	NDSR	Providing and installing counters of MS (with primer and 2 coats of enamel paint) carcass in TOM, EFO, SCR etc. with 30mm thick polished & moulded Jet Black Granite top with all	Sqm	69.96		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		cutouts/ openings including providing and fixing over 19mm thick commercial board & 19 x 3 mm teak wood lipping all complete of approved quality as per specifications and relevant drawings (Plan area shall be considered for measurement).				
8	NDSR	Providing and fixing stone slab with table rubbed, edges rounded and polished, of size 75x50 cm deep and 18mm thick, fixed in urinal partitions by cutting a chase of appropriate width with chase cutter and embedding the stone in the chase with epoxy grout or with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 6 mm nominal size) as per direction of Engineer-in charge and finished smooth. The Granite shall be covered with POP / Gypsum powder of 12mm thick / Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
8.1		Granite Stone of a approved shade	Each	5		
9		Providing & Fixing of 20 mm thick Jet Black Granite counter top prepolished and premoulded & fixed over RCC slab with 20mm thick cement mortar 1:4 (1 cement : 4 Coarse sand) as / Architectural dwg inside Staff Mess room, First Aid room and toilet including cutting of hole for installattion of wash basin/Sink	Sqm	6.6		
10		Providing, laying, jointing, grouting including fixing in position to backing, prepolished, 20 mm thick granite, in sizes not less than 600x1200x20mm and rubbed to smooth mirror finish for	Sqm	50		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		Veneering/Cladding work to walls, beams, columns, pilasters, fascia, upstands, jambs, sills, copings, soffits of openings and beams, with grout mortar of thickness to be ascertained at site so as to achieve true lines, levels, plumb, planes etc. subject to a minimum thickness of 20 mm for the grout cement mortar 1:4, and making of openings for service and other machine cutting, providing machine drilled holes, recesses, rebates for stainless steel attachments/ fixings, providing movement joints etc. all as per drawings, specifications and as directed complete. Provision to be made for "V" groove as per drawing, design and as approved by engineer				
<b>B</b>		<b>KOTA STONE TREAD &amp; RISERS</b>				
<b>11</b>		Kota stone slabs 20 mm thick in risers of steps, skirting, dado and pillars laid on 12 mm (average) thick cement mortar 1:3 (1 cement 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, including rubbing and polishing complete.	Sqm	211.07		
<b>C</b>		<b>BASALT STONE WORK</b>				
<b>12</b>		Providing and laying 25mm thick POLISHED /SAND BLASTED/SHOT BLASTED BASALT stone work of up to and including sizes of 1200mm*600mm of approved colour/pattern with 4mm groove all around at all levels for wall linings/columns/skirting(veneer work) by mechanical arrangement with SS cramps/brackets (SS Grade 316), anchor	Sqm	451.55		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		bolts,5mm vertical SS pins (SS Grade 316) of approved make and inserts as per drawings and specifications. The cost of making necessary grooves all around stone pieces, chamfering of corner edges and polishing are included. Allow for cutting of holes and box outs for services etc...All Light color BASALT to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
13		Providing and laying 40mm thick prepolished HONED/BUSH HAMMERED/SHOT BLAST finish BASALT STONE slab of sizes up to and including1200X600mm on floor using 5mm thick approved thick bed adhesive as per specification over prepared base on 20mm (average) thick base of cement mortar 1:4 (1 Cement : 4 total aggregates - coarse sand and 10mm single sized aggregates) using 43 grade cement, water reducing admixture as per ISO 9103:1999 and jointing with white cement with matching colour pigment all complete (Colour of BASALT as approved by Engineer) in levelling course laid to proper slopes over screed base including base preparation, movement joint in screed as per specification with 10mm thick compressible filler to edge of screed/ blockwork junction with two parts polysulphide sealant to	Sqm	1,204.50		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		top edge, drainage gullies as per approved section, curing, testing etc. all complete as per specifications and relevant drawings.All Light color BASALT STONE to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
		<b>TOTAL OF GRANITE AND STONE WORKS</b>				
<b>4.0</b>		<b>LANDSCAPING AND EXTERNAL WORKS</b>				
<b>1</b>		Providing and laying factory made coloured chamfered edge Cement Concrete paver blocks of required strength, thickness & size/shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of fine sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with jamuna sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand in footpath, parks, lawns, drive ways or light traffic parking etc. complete as per manufacturer's specifications & direction of Engineer-in-Charge.				
<b>1.1</b>	<b>16.94</b>	80mm thick C.C. paver block of M-30 grade with approved	Sqm	1,000		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		colour,design & pattern.				
2		Providing and placing in position 100mm thick factory made machine batched & machine mixed Precast RCC Rectangular Covers on drains of footpath of various sizes, of M-25 grade cement concrete for RCC work, including cost of centering, shuttering, reinforcement of 8mm dia TMT bars of Fe 500 grade @ maximum 100mm c/c on both ways , neat cement punning on finished surface, properly encased on all edges with 1.6 mm thick , 100mm wide MS sheet duly painted over priming coat , reinforcement to be welded at edges with MS sheet and providing 2 Nos. 12 mm dia bar for hooks etc. i/c cost of cartage ,all leads & lift, handling at site etc. all complete as per direction of Engineer-in-Charge	Sqm	200		
3	16.69	Providing and laying at or near ground level factory made curb stone of M-25 grade cement concrete in position to the required line, level and curvature jointed with cement mortar 1:3 (1 cement : 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5 mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-Charge (length of finished curb edging shall be measured for payment). (Precast C.C. curb stone shall be approved by Engineer-in-Charge).	Cum	40		
4	4.9	Precasting and placing in position 125 mm dia Bollards 600 mm high of required shape including providing M.S. Pipe Sleeve 50 mm dia 300 mm long in the Bollardand M.S. Pipes	Each	200		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		40 mm dia and 450mm long with 150x150x6mm M.S. plate welded at bottom and embedded 150mm in cement concrete 1:3:6 (1 Cement : 3 coarse sand (zone-III) : 6 graded stone aggregate 20 mm nominal size), including necessary excavation of size 250x250x450mm deep for the same in bitumen/concrete pavement at specified spacing.Painting of MS bollard is to be done with two coats of yellow or white paint over MS pipes as per Architect/Engineer-in-charge				
		<b>TOTAL OF LANDSCAPING AND EXTERNAL WORKS</b>				
<b>5.0</b>		<b>WATERPROOFING WORKS</b>				
<b>1</b>	<b>22.3</b>	Providing and laying water proofing treatment to vertical and horizontal surfaces of depressed portions of W.C., kitchen and the like consisting of:(a) Ist course of applying cement slurry @ 4.4 kg/sqm mixed with water proofing compound conforming to IS 2645 in recommended proportions including rounding off junction of vertical and horizontal surface.(b) IInd course of 20 mm cement plaster 1:3 (1 cement : 3 coarse sand) mixed with water proofing compound in recommended proportion including rounding off junction of vertical and horizontal surface.(c) IIIrd course of applying blown or residual bitumen applied hot at 1.7 kg. per sqm of area.(d) IVth course of 400 micron thick PVC sheet. (Overlaps at joints of PVC sheet should be 100 mm wide and pasted to each other with bitumen @ 1.7 kg/sqm).	Sqm	900		
<b>2</b>	<b>NDSR</b>	Providing and laying Brick bat water proofing treatment for	Sqm	473		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		terrace with the following including cleaning the RCC slab top surface. Providing on top of slab surface cement slurry mixed with water proofing compound thereafter providing cement mortar 1:4 (1 cement : 4 coarse sand) 20mm thick with polymer based water proofing compound and layer of new half broken bricks (coba) giving gaps of 15-20mm between broken bricks, providing necessary gradient for proper flow of water and providing cement slurry with water proofing compound spread over brick bat coba in cement mortar 1:4 (1 cement : 4 coarse sand) with water proofing compound filled in gaps of broken bricks and 20mm plaster in cement mortar 1:4 (1 cement : 4 coarse sand) mixed with polymer based water proofing compound, top finished smooth with neat cement and providing rope chequers including extending the water proof plaster 300mm on vertical surfaces with necessary chasing / treating of walls including providing and making gola as per drawing etc. Average thickness of the brick bat coba to be 125mm. The item also include providing and making khurrahs 450mm x 450mm/ 300mm x 300mm with average minimum thickness of 50mm cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm nominal size) finished with aluminum foil and 12mm cement plaster 1:3 (1 cement : 3 coarse sand) and a coat of neat cement rounding the edges and making and finishing the outlet complete. (Plan area will be measured and paid)				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		<b>TOTAL OF WATER PROOFING WORKS</b>				
<b>6.0</b>		<b>TILE WORKS</b>				
<b>A</b>		<b>VITRIFIED TILES</b>				
<b>1</b>	<b>NDSR</b>	Providing and laying matte finish vitrified tile of 1st quality of approved make conforming to IS :13755, The tiles shall be free from objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required, in all colors as per control sample at all levels in public & back-of-house areas and toilet floor and skirting over 20mm thick bed of cement mortar 1:4 (1 cement : 4 coarse sand) including pointing the joints with white cement and matching pigments- all complete as per relevant drawings and specifications laid over screed/ foam concrete as per relevant architectural drawing. Rates include coordination for cutouts, holes and finishing of the same. The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick / Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.	Sqm	1,686.30		
		600x600x10 mmm thick				
<b>2</b>	<b>NDSR</b>	Providing and fixing 1st quality Vitrified wall tiles of approved make, conforming to IS :13755, The tiles shall be free from	Sqm	649.38		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required, shade, colour and finish in all colours, shades, size in skirting, wall cladding, border tiles and dados over 20/12 mm thick bed of cement Mortar 1:4 (1 cement : 3 coarse sand) and jointing with approved grouting material with pointing in white cement mixed with pigment of matching shade complete. The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick / Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
3	NDSR	Providing and fixing 10 mm thick acid and / or alkali resistant vitrified tiles of approved make and colour using acid and / or alkali resisting mortar bedding and joints filled with acid and / or alkali resisting cement as per IS:4457 complete as per the direction of Engineer-in-charge. On a flooring on a bed up to 30mm thick mortar of 1:4 proportion. The tiles shall be free from objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required. The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick	Sqm	66		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		/Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
4	NDSR	Providing and fixing 1st quality 10mm thick acid and or / alkali resistant Vitrified wall tiles of approved make,conforming to IS :4457,The tiles shall be free from objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required,shade, colour and finish in all colours, shades, size in skirting, wall cladding, border tiles and dados over 20/12 mm thick bed of cement Mortar 1:4 (1 cement : 3 coarse sand) and jointing with approved grouting material with pointing in white cement mixed with pigment of matching shade complete.The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.	Sqm	71.59		
5	NDSR	Providing and laying yellow visibility vitrified tile as per control sample of size 200*100*8 mm thick at platform level over 20mm thk bed of cement mortar 1:4(1 cement : 4 coarse sand) in levelling coarse laid to proper slopes over screed base including base preparation including movement joint in screed as per specification with 10mm thick compressible filler to edge of screed with two parts polysulphide sealant to top edge as per approved drawing and directions of engineer-	Sqm	30.80		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		in-charge. The tiles shall be free from objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required. The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick / Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
6	NDSR	Providing & laying in position on floor, skirting and in bands, vitrified unglazed anti skid/Uni colour series floor tiles 300 x 300 x 7.3 mm thick of approved make conforming to IS :13755, specification and colours like terra cotta, polo, Mushroom, Nut brown laid over up to 30 mm thick bed of cement mortar 1:4 (1 cement: 4 coarse sand) to the pattern as called for including finishing the joints with matching pigment and approved grouting materials etc., complete.	Sqm	104.50		
7		Providing and laying Vitrified tiles in specified size (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in 300 mm high skirting using tiles of 600 mm x 600 mm cut to required size including cutting to required shape, over 12 mm thick bed of cement mortar 1:3 (1 cement: 3 coarse sand), including grouting the joint with white cement & matching pigments etc. complete (Finish Key : AS-03)	Sqm	120		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
<b>B</b>		<b>CERAMIC TILES</b>				
<b>8</b>	<b>NDSR</b>	Providing and laying glazed tile dadoing using glazed tiles conforming to IS.777-1970, 2.20 m high with tiles of 200x100 mm size and 6mm thick of approved quality, brand and colour for toilets, over 12 mm thick, 1:3 cement mortar backing, pointed neatly with white cement mixed with colouring pigment to match color of tile, properly cured and finished in all respects including cost of material and labour complete, at all levels including lead, lifts and descents	Sqm	152.77		
<b>C</b>		<b>TACTILE FLOORING</b>				
<b>9</b>	<b>NDSR</b>	Providing and laying 12mm (minimum)thick with 3mm(minimum)thick projection on surface yellow coloured directional vitrified porcelain tactile tile of pelican or equivalent(as per specification)laid on floor with laterite 111 crete filler powder mixed with laterite 73 latex admix and applied to a minimum thickness of 4.5mm(The mixing ratio shall be as follows:20kg bag (laterite 111):5.5 liter (Laterite 73).Spacer of 3mm shall be used between the tiles and joints filled using Laterite Latapoxy SP-100 epoxy grout in Inca Gold colour. The joint depth shall be 6mm.Laticrete product shall be as manufactured by Laterite India Pvt.ltd/Laterite International Inc.)over 20mm thick bed of cement mortar 1:4(1 cement:4 coarse sand) in levelling course laid to proper slopes over screed base including base preparation including movement joint in screed as per specification with 10mm				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		thick compressible filler to edge of screed with two parts polysulphide sealant to top edge as per approved drawings and directions of engineer-in-charge.				
9.1		300*300 hazard warning and directional tactile tiles as per approved drawings	Each	2,000		
		<b>TOTAL OF TILES WORKS</b>				
7.0		<b>ACCESS RAISED FLOOR</b>				
1	NDSR	Providing and fixing access raised floor of light grade of minimum 15 KN/m <sup>2</sup> UDL panels manufactured from pressed formed corrosion resistant galvanized steel with total overwrap of one piece top, sides and bottom flange encapsulating monolithic homogeneous totally premixed fiber reinforced calcium silicate material with balanced density over panel, to cater in the size 600 x 600 x 41mm. The panel has to be placed on the pedestal made from all solid steel construction, galvanized plated consisting of stringers, an anti- vibrational head cap with cruciform upstands and four panels locating studs, positively clipped pedestal clipped to the steel base plate. The pedestal cap shall have an electrical conductor plate for dissipation of static electricity. The steel base plate of the pedestal shall be fixed on the sub-floor with Epoxy pedestal adhesive and/or mechanical fixing with fasteners (8mm X 75mm). The Access floor should be able to take a point load of minimum 2.5 KN over 25 mm sq. and UDL of minimum 15 KN/sq. meter.				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		The panel shall be finished with high abrasion, anti static HPL				
1.1		Up to 450 mm high cavity floor	Sqm	136.4		
		<b>TOTAL OF ACCESS RAISED FLOOR</b>				
8.0		<b>WOOD WORKS AND IRON MONGREY</b>				
1		Providing & fixing Toilet Cubicle (of following standard dimension which includes 900mm door size width) made of heat, bacteria, water, chemical, scratch, impact and anti bacterial resistant 12mm thick solid compact laminate panels tested in approved laboratory. Finish of the compact laminate should be Suede, Raw silk model includes doors, pilasters & intermediate panels finished with approved texture/shade as per the detail drawings & as per IS 2046 (Indian standard) and as per fire retardant BS-476/97 standard. This also includes providing and fixing in position necessary hardware made out of stainless steel (Grade 304) as per manufacturers specifications & Architects instructions like (1)Door knob(2)Gravity hinges(3)Thumb turn lockset with occupancy indicators(4)Coat hooks with Door stopper(5)U-channels(6)Adjustable foot/pedestal(7)Top rail with corner connector(8) Rubber noise deafening tape(9)Screws & wall plugs. All screws will of 304 Grade in stainless steel with satin finish. All pilasters are supported by stainless steel bottom cladding. The base of the stainless steel bottom cladding will be anchored to the floor with a clearance height up to				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		150mm. the top fitting should consist of SS round top rail which will get fixed with pilasters, with SS panel tube holder, SS corner bend (connected with top rail) will be used on the corner of cubicle in absence of brick wall, SS wall fixing is used only on the wall which will hold the SS top rail.				
1.1		Toilet Cubicle with standard dimension of 2025mm Height x 1000mm width x 1550mm Depth, which includes up to 900mm door size width)	Nos	5		
		<b>TOTAL OF WOOD WORKS AND IRON MONGREY</b>				
9.0		<b>STAINLESS STEEL WORKS</b>				
A		<b>STAINLESS STEEL RAILING</b>				
1	NDSR	Supplying, fabricating, MATTE FINISH, erection of 1100mm high SS hand railing as per design comprising of 50mm dia, 3.15mm thick, Stainless steel Grade 304 with balustrades as per drawing, SS base plate, pipe adjuster M16X200mm SS fasteners for fixing railing in floor by cutting hole of required dia in floors/ landing/staircase complete in all respect and making good the floors as per Specifications and Architectural Drawings. Weight of finished product shall be measured. Rate is inclusive of all wastages. Adjustment for opening or cuttings is not allowed.	Kg	440		
2	NDSR	Supplying, fabricating, MATTE FINISH, erection of 1100mm high SS hand railing as per design comprising of 50mm dia, 3.15mm thick, Stainless steel Grade 304 with balustrades as per drawing, SS base plate, pipe adjuster M16X200mm SS	Kg	792		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		fasteners for fixing railing in floor by cutting hole of required dia in floors/ landing/staircase complete in all respect and making good the floors as per Specifications and Architectural Drawings.Weight of finished product shall be measured. Rate is inclusive of all wastages. Adjustment for opening or cuttings is not allowed.				
<b>B</b>		<b>STAINLESS STEEL GLASS RAILING</b>				
<b>3</b>	<b>NDSR</b>	Supplying, fabricating, MATTE FINISH, erection of required height(900 to1100) mm high SS hand railing system, System comprising of 38mm Dia & 1.6mm thick Top-Rail Stainless steel Grade 304 connected to 50 mm Dia 3.15mm thick Baluster through Stainless Steel Saddle Plate connector. And a Grab Rail of 38mm Dia connected to Baluster through a Stainless Steel Stem Key. Baluster fixed to slab with GI Baseplate & M16x200 mm Fastener. A SS cover plate would be provided above GI Base Plate. Infill of 1 No. 12mm thick toughened glass connected to baluster with Stainless Steel Twin- arm Spider Clamp.	Rm	349.36		
<b>C</b>		<b>STAINLESS STEEL CLADDING</b>				
<b>4</b>	<b>NDSR</b>	Providing , Fabricating, Polishing & Erection of Required Height,Shape and Designing Comprising of 2 mm thick SS Grade 304 Sheet Cladding Over RCC Column on Aluminum Base frame of25x35x5mm and 5mm thk & 450 mm width Perforated (6mm perforations @ 12mm c/c) SS Grade 304 Matte Finished Sheet fixed on Frame 2 nos of 50 mm SS	Sqm	215.78		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		Grade 304 Dia Concentric Pipe, Bracing of 2 rings with 12 nos of 50 mm SS Grade 304 Dia pipe fixed on to the RCC Column with 3 nos. of 20 mm thick Arched shape Plate to support the Frame As / Drawing (for payment purpose only SS item shall be measured. Aluminum base frame shall be paid extra).				
<b>D</b>		<b>STAINLESS STEEL ARTICLES</b>				
<b>5</b>	<b>NDSR</b>	Fabricating and supply of stainless steel (conforming to grade SS 304 satin finish) four seater bench without backrest as per drawing and approved by Engineer-In-Charge. Weight of finished product shall be measured. Rate is inclusive of all wastages. Adjustment for opening or cuttings is not allowed.	Kg	300		
<b>6</b>	<b>NDSR</b>	Fabrication ,supply & erection of matte finish grade 304 SS sump covers of size 600mmX600mm suitably supported & fixed over MS frame along with granite stone matching with relevant floor finish, lifting hooks/keys etc. complete as per relevant architectural drawing.	Each	80		
<b>7</b>	<b>NDSR</b>	Fabrication, supply, erection and joining to relevant site of miscellaneous Matte finish grade 304 SS angle/ section/ pressed plate/ pipe etc. items like platform end gates etc. complete as per architectural drawings and directions of engineer-in-charge as per drawing.	Kg	300		
<b>8</b>	<b>NDSR</b>	Supplying, fabricating, MATTE FINISH, erection of 300mm high SS foot rail as per design comprising of 50mm dia, 3.15mm thick, Stainless steel Grade 304 with small height SS support as per drawing, SS base plate, pipe adjuster M16X200mm SS fasteners for fixing railing in floor by cutting	Kg	400		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		hole of required dia in floors/ landing/staircase complete in all respect and making good the floors as per Specifications and Architectural Drawings. <b>Weight of finished product shall be measured. Rate is inclusive of all wastages. Adjustment for opening or cuttings is not allowed.</b>				
		<b>TOTAL OF STAINLESS STEEL WORKS</b>				
<b>10.0</b>		<b>ALUMINIUM WORKS</b>				
<b>A</b>		<b>ALUMINIUM CLADDING</b>				
<b>1</b>	<b>NDSR</b>	<p>Providing and fixing Aluminum Composite panels in all colours of approved brand for wall cladding at all heights and elevations including necessary aluminum composite panel consist of 3mm thermoplastic core of anti oxidant LDPE sandwiched between two skin of 0.5 mm thick alloy sheet making a total sheet thickness of 4 mm. The surface shall be finished with PDVF base coating on the top side and service coating on the reverse side shall be with a polymer paint. Coating shall confirm to ECCA of AAMA. The system shall design to withstand wind pressure of 200 Kg/Sqm and shall be fixed to the masonry/RCC walls with necessary clamps, bracket and anchor fasteners.</p> <p>All Clamps and brackets shall be hot dip galvanized minimum 80 micron thick and confirmed to IS : 4759 - 1996. The extruded aluminum sections shall be anodized in approved colour with anodic coating minimum 20 microns. Extruded section shall be of 6063 T5 or T6 alloy confirming to</p>	Sqm	742.38		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		ASTM B 221. (items include cost of aluminum frame, ACP Panels, Cramps 110mm size, weather sealant, gasket, foam, fixtures, scaffolding, all machineries and any other fastening strips, nuts, bolts, rivets, washers, etc. complete).Item shall include to provide EPDM gaskets (Make:OSAKA/Satya or equivalent), open cell polyethylene backer rods, weather sealant etc. The weather sealant shall be Dow Corning 991 or equivalent and the width of the gap filled with sealant shall be as specified				
<b>B</b>		<b>ALUMINIUM LOUVERS</b>				
<b>2</b>	<b>NDSR</b>	Providing and fixing PVDF aluminum extruded single bank louvers with AMCA certification complete. The louvers should have hidden mullions and an insect screen and should be equivalent to C/S louver model RS-1605. All work to be complete with extruded aluminum sub frame extruded built up standard elliptical section conforming to IS 733 and IS 1285 fixed with raw plugs and stainless steel screws or with fixing clip or with expansion hold fasteners including necessary filling up of gaps at junctions at top bottom and sides with required PVC/neoprene felt complete in all respect.Alumnium sections shall be smooth rust free, straight as per architectural drawings and the direction of Engineer-in-charge etc. All structural steel support frame work shall be paid separately.	Sqm	390.83		
<b>C</b>		<b>ALUMINUM DOORS</b>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
3	NDSR	Providing and fixing Aluminum Door with frame of approved make with door frame / chowkhat of section 101.6 x 44.45 x 3.16 mm (2.508 kg/R.mt) and shutters with stiles and rails of aluminum sections 85 x 44.5 x 3 mm (2.1 Kg / R.mt) with bottom panel made of 12 mm thick prelaminated Novo pan or equivalent flat pressed three layered prelaminated particle board exterior grade ISI stamped IS: 12823 grade, type-II, one side decorative and other balancing white and edges sealed with water resistant paint. Top panel with 6 mm thick clear glass. Both board and glass will be fixed with glazing clips and beadings / gaskets and necessary fittings all as per manufacturer's specifications and directions. EPDM rubber gasket and frame fixed in position with steel screws and rawl plugs. All visible steel screws shall be rust resistant and coloured as approved. All aluminum sections shall be as per drawing and conforming to grade 63400 WP alloy as per IS:733 and IS: 1285 and colour 65 microns powder coated finish complete as approved and directed by the Engineered finish complete as approved and directed by the Engineer. The door to be complete with all necessary accessories such as aluminum handles, tower bolts, locks, pivot / hinges etc. complete.	Sqm	50		
D		ALUMINIUM WINDOWS & GLAZING				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
4	NDSR	Providing, fabricating and installing in position, pure polyester powder coated aluminum doors, windows, curtain walling, skylights, partitions, grilles, glazing with extruded aluminum sections and profiles complete in all respects in straight or faceted profiles including arched angular in elevation including sub frames in tubular aluminum (having mill finish), outer frames, architraves, beading, wool pile 6mm thick clear float glass, gaskets, all complete. The minimum sizes, thickness and weights per unit length of the aluminum sections to be given by bidder, however, nothing extra shall be payable to the Contractor for using larger/heavier sections than those given, if found inadequate including all fittings.				
		<b>WINDOW TYPES</b>				
4.1		Openable / sliding / side hung / windows.	Sqm	50		
4.2		Fixed glazing	Sqm	50		
4.3		Extra for 12.76 mm thick (6mm + 0.76 + 6mm) PVB laminated glass, in place of 6 mm normal float glass.	Sqm	50		
5	NDSR	Design, Manufacture, Supply and Installation of dpi system, a complete assembly of co-extruded UV protected 14mm thick multilayered mesh wall polycarbonate panels incorporated into a complete system. Panels shall have 6 layers, different layers in soothing colors. Panels shall be with grip-lock notch	Sqm	275		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		standing seam running lengthways to allow the connectors to be attached. The installation of panels with connectors guarantee a guard of water with 10-15mm of height. The system shall ensure the mechanical strength, water tightness and air tightness of the roof as per below; Panel length 11980mm (Max.) Width 500-700mm. Panel shall be fixed over M S structural steel / MS purlin (paid separately) conforming to the detail.				
		<b>TOTAL OF ALUMINIUM WORKS</b>				
<b>11.0</b>		<b>GLASS WORKS</b>				
<b>1</b>	<b>NDSR</b>	Providing and installing fixed glazed security wall assembly of stainless steel to ticket offices, Station Control Room, etc. with specified fixings and finish using 2 sheets of 6mm thick toughened glass with nominal gap silicone sealant joints. Glass shall be clear, toughened and laminated with 1.52mm thick polyvinyl butyral layer- all complete as per relevant architectural drawings and specification with cut out & holes	Sqm	101.20		
<b>2</b>	<b>NDSR</b>	Providing and fixing of toughened laminated glass door in EFO (6mm + 1.52mm + 6mm) including stainless steel door handles, deadlock and Floor spring complete necessary cutting in granite flooring for housing of floor spring as / drawing	Sqm	4.20		
<b>3</b>	<b>NDSR</b>	Designing, Providing, erecting and fixing structural glazing unitized using specially designed aluminum grade 63400 WP IS: 733 and ID:1285 electro colour anodized 25 micron or pure	Sqm	723.80		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		polyester powder coated 65 microns in approved shade and colour through adequately designed MS galvanized / aluminum anchor brackets. The structural glazing design to be based on rain screen and pressure equalized drainage system. The complete drainage system to be incorporated in the design which drain water at every transom in the unlikely event that water penetrate the pressure seal. This include structural grade and weathering grade silicon sealant "Dow Corning" or "GE Silicon" or equivalent as per the design requirement. This includes structural designing, shop drawing complete. structural calculations and water penetration test as per (Structural Test ( Wind load serviceability) - ASTM E 330, Water Penetration Test - AAMA 501.2).The specified test is to be carried out only for location where executed qty will be more than 50Sqm in one go.				
		The structure glazing shall be double glazed 23mm thick (6mm thick toughened blue/smoke grey on outer side, 12 mm air gap and 5 mm thick clear float glass on inner side). no members to visible from outside complete as per drawing and direction of engineer in charge. including required aluminum sub-frame Silicon filling all height i/c double height for straight / curve and scaffolding complete.				
4	NDSR	Providing & installing Fixed glazed wall assembly for lift shaft with specified fixing of anodized aluminium sections & finish using 2 sheets of 6mm thick toughened glass with nominal gap silicon sealant joint. Glass shall be clear, toughened and	Sqm	257.66		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		laminated with 1.52mm thick polyvinyl butyral layer; all complete as per relevant architectural drawings and specification with cut out & holes.				
		<b>TOTAL OF GLASS WORKS</b>				
<b>12.0</b>		<b>FALSE CEILING WORKS</b>				
<b>A</b>		<b>CALCIUM SILICATE BOARD CEILING</b>				
<b>1</b>	<b>NDSR</b>	Providing and installing suspended ceiling systems / vertical fascia as per controlled sample for concourse, 12mm thick Calcium Silicate Board panels with paint as per specification including supply of suspension system of galvanized steel as per manufacturer's recommendation, top fixing of SS expanding anchor bolts, rigid hangers, accessories inclusive of providing opening for electrical fixtures / fittings, fixed framing to support fixtures / fittings and providing secondary supporting system for cable tray and duct and all complete as per relevant drawings and the direction of Engineer- in-charge.	Sqm	246.40		
<b>B</b>		<b>FIRE RATED CEILING AND BULKHEAD</b>				
<b>2</b>	<b>NDSR</b>	Providing and fixing of Grade 3003 Aluminum coil coated perforated metal silhouette false ceiling system using the grids of USG or CMC from their US plant or equivalent and tiles from USG/ CMC/Armstrong/Hunter Douglas or equivalent with the suspension system designed to suspend the entire false ceiling with the help of suspended rod of 4mm dia and clamps of size 26x26x2mm thick to be fastened	Sqm	336.05		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		with anchor fastener not less than 6mm dia to the soffit of slab beam. Minimum anchorage lengths shall be in the range of 50 to 60mm main runner 'Silhouette' profile or equivalent shall be suspended from the soffit of slab at an interval of 1200x600mm center to center and appropriate distance as required to sustain the suspended load including all the fixtures as shown RCP cross runner having 'Silhouette' profile shall be 600mm center to center with interlocking arrangements in such a way to form grid of 600x600mm and fix the lay in tile in the grid pattern and laying of false ceiling polyester powder coated metal tile of size 597x597mmx9mm MICRO PERFORATED of 1.5 mm dia in a 3mm diagonal square pattern given 22%perforated area. in correct line and levels as per the approved design and drawings submitted. All steel sections to be marked with the manufacturer's registered trademark and hologram. The rate shall include marking levels and grid of entire false ceiling as per the RCP necessary wall angles and profiles between gypsum and metal false ceiling as per the drawing, tools and tackles for installation of the complete system. The entire false ceiling system shall be supplied by the metal false ceiling supplier. The cutouts required for the down lighters, sprinklers, speakers etc. shall be made at factory only. The rate shall include providing and fixing of a thin nonwoven fabric made of cellulosic and glass fibers (weight 47 g/m <sup>2</sup> , thickness 0,2 mm) of approved make with a hot melt adhesive (15 g/m <sup>2</sup> ) on back side of tile. Rate incudes providing and fixing of M.S angle support for				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		false ceiling at under the AC ducts or other equipment where ever required, Using 65mmx65mmx6mm thick and painted with two coats of red oxide primer of required length supported to the true ceiling through 12mm thick G.I treaded rod with necessary hanger fasteners. complete. Also the rate includes of providing all around wall step profile with black/white powder coated aluminum profile to get 50mm x50 mm grove , and with Gyp board 12mm groove				
		Erection of false ceiling with lay in tile system with Aluminum Coil coated Grade 3003 of 600 x 600 x 9mm depth and 0.7mm thick tile with perforation with 1.5 mm thick approved quality non woven textile on back side for acoustic purpose in specified areas etc., and as per specification, drawings as directed.				
		<b>TOTAL FLASE CEILING WORKS</b>				
<b>12.0</b>		<b>PAINITING WORKS</b>				
<b>1</b>	<b>NDSR</b>	Providing and applying two coats of Unitile's Rodeo or Spectrum Perlina fine or Heritage Granula Surface Texture paint after applying corresponding roller coat as primer on pre-plastered surface as per approved sample in approved shade. The composition of the texture paint should consist of ACRYLIC copolymer resins combined with quartz ,silica, mineral, aggregates, synthetic inorganic pigments, bactericide, fungicides and various other additives, giving the product water repellant properties. The first coat to be applied by brush or wool roller as a base coat, diluted with	Sqm	458.32		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		sufficient water and the final coat (Undiluted) to be applied by trowel and finished with acrylic trowel to maintain with or without grooves, as per details in drawings. The thickness of both coats should be 1.0 to 1.5mm. the water repellency of the product shall be $\geq 86\text{gm/m}^2$ as per test method IS:5410-1969, complete as per manufacture's specifications and instructions by Engineer in Charge at site. The rate shall include necessary scaffolding, labour and material complete				
2	NDSR	Applying epoxy based solvent free anti - dust concrete sealer(sealocote or equivalent) on fair faced blockwork/brickwork and concrete surfaces inclusive of surface preparation, over primer coat/ initial coat as per manufacturer's recommendation - all complete as per specification.				
2.1	NDSR	Applying epoxy based solvent free three coat clear sealer on fair faced blockwork/brickwork and concrete surfaces inclusive of surface preparation, over primer coat/ initial coat as per manufacturer's recommendation - all complete as per specification	Sqm	78,648.84		
3	NDSR	Providing and applying 3mm 1.5mm thick exterior Birla/JK or equivalent ready made putty in two coats over Brickwork/ Blockwork/ RCC surface of ceiling/beam/column etc. to prepare even and smooth surface including sand papering, grinding, scaffolding etc., complete as per direction of Engineer-in-Charge.	Sqm	6,457.93		
4	NDSR	Providing and applying Acrylic Emulsion to ceiling	Sqm	246		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		surfaces including necessary surface preparation, scaffolding / staging etc. All as per manufacturer's specifications and as directed by the Engineer				
5	NDSR	Providing and applying Acrylic emulsion paint on new work with two or more coats of approved colour and shade to give an even shade .	Sqm	6,,457.93		
		<b>TOTAL OF PAINTING WORKS</b>				
13.0		<b>MILD STEEL WORKS</b>				
1	10.26	Providing and fixing hand rail of approved size by welding etc. to steel ladder railing, balcony railing, staircase railing and similar works, including applying a priming coat of approved steel primer.				
	10.26.1	M.S. tube	Kg	980.1		
2	NDSR	Supplying and fixing automatic galvanized industrial motorized rolling shutters made of required size MS lathe interlocked together (heavy duty) of approved make i.e. Indo-Germa Ltd. Chennai or equivalent made of required sizes and shape with G.I guides control box drive unit and with all other accessories complete as per manufacturer's specifications.	Sqm	24		
2.1		Extra for providing mechanical device chain & crank operation for operating rolling shutters for area exceeding 10sqm and up to 16.80 Sqm in area.	Sqm	24		
3	NDSR	Providing and fixing door with shutter fabricated from 18 gauge thick galvanised steel sheets press formed to provide a				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		46mm thick fully flushed double skin door with lock seam joints at stile edge and infill insulation kraft core. Door frames 57x120 mm approx. to be double rebated made of 16 gauge galvanised steel. Door shutter and frame to be primed in stoving grade epoxy zincphosphate primer and finished in aliphatic grade u.v. resistance polyurethane paint. Door shutter and frames to have all hardware preparations, prepunctured at the factory all complete with and including filling of door frames with P.C.C. 1:5:10 (1 cement : 5 aggregate : 10 coarse sand).				
		Single leaf door shutter	Sqm	8.4		
		Double leaf door shutter	Sqm	21.6		
		Extra for 250 x 150 mm vision panel with 6mm thick clear toughened glass.	No.	15		
		Extra for provision of air transfer grille appx. 400x400 mm	No.	12		
		Heavy Duty Door Closer	Each	27		
		Eurofile Mortice lock -240 with double pin cylinder having master arrangement and ss handles	Each	27		
		Concealed SS finish tower bolts (300mm)	Each	27		
		Magnum or equivalent make SS 4 Ball Bearing hinges	Each	96		
		SS handles Dorma or equivalent make for double leaf door	Each	5		
		Dorma or equivalent make Panic Bar for Double leaf door	Each	5		
		Installation Charges	Sqm	30		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		<b>TOTAL OF MILD STEEL WORKS</b>				
<b>15.0</b>		<b>FIRE DOOR WORKS</b>				
<b>1</b>		<p>Fire Check doors design &amp; supply of approved make fire rated door fabricated and successfully tested at CBRI Roorkee in both direction satisfying two criteria (Stability and Integrity) confirming to BS:476 part II, IS3614 Part II as per schedule of requirement, complete with shutters, frames, hinges, conforming to the design intent. All fire doors must conform to the requirements of fire authority having jurisdiction and as per prototype tested by approved fire testing agency acceptable to fire authority having jurisdiction.</p> <p>Door shutter and frames to have all hardware preparations must be prepunctured at the factory for fixing of said hardware. Shutters &amp; frames to be filled with suitable fillers, insulation to meet the required fire resistance criteria as specified, with all grouting, reinforcements, flushed lock seam joints including all seals, washers, linings etc. complete. All fire doors to be primed and painted with approved painting system as per tested prototype and to approved colour. Provision of mortice sash lock (ML 100A) with S.S. lever handles and door closers heavy duty (imported) LCN 1461 with standard arm on every leaf, stainless steel hinges as per approved shop drawing.</p>				
<b>1.1</b>		120 minutes (2 hour) fire rated metal door assembly	Sqm	414.72		
<b>2</b>		Clear Vision panel of 200mm*300mm per leaf with fire rating	Each	113		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
3		Heavy Duty Door closer	Each	113		
4		Concealed SS finish tower bolts (300mm)	Each	57		
5		SS handles Dorma or equivalent make for double leaf door	Each	114		
6		Dorma make panic bar for double leaf door or similar item or similar rate.	Each	170		
7		Providing and fixing 2 hour fire rated ACCESS DOOR fabricated in GMS Z sections with calcium silicate board 9mm thick infill inclusive of SS hardware and fire rated locks, fixed on GMS framework made of angles and channels as per drawing, complete for cutouts in walls. All assembly to be painted with fire retardant approved colour & shade.	Sqm	200		
8		Providing and fixing structural glass assembly of glazed smoke down stand using 2 sheets 6mm thick toughened glass with nominal gap silicon sealant joint. Glass shall be clear, toughened and laminated with 1.52mm thick polyvinyl butyral layer, as per specification and grade 304 stainless steel of hairline finish assembly fixing on bolted patch plate & SS Spider Fitting with counter sunk screw including down hang galvanized bracket support from structural slab using approved anchor as shown in the detailed drawing, including providing and fixing Rock Wool packing with 12mm thk calcium silicate board as per specification from 1500 to 2000 mm height above false ceiling and bottom edge finished with 3mm grade 304 SS pressed plate as per relevant architectural drawing, for fire separation. (for payment purposes area of glass only shall be measured)	Sqm	105.6		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
9		Providing, supply and fixing the a 2-hour fire rated floor/ceiling assembly access hatch door between various floor levels of the UG station. The product should include an optional UL Listed automatic rating of the door assembly ( finish flooring similar to adjacent architectural flooring or must be filled with 1" (25.4mm) resistant coating and a pan cover designed to accept architectural flooring materials. The access door should be made of 1/4" (6.35mm) cover and extruded aluminum frame, Cover-Aluminum plate reinforced for 150 psf (732 kg/m <sup>2</sup> ) live load and Intumescent fire coating applied to the underside of the cover. Designed with 1" (25.4mm) fillable pan for field installation of architectural flooring material up to 1/2" (12.7mm) thickness . The remaining depth must be filled with concrete to maintain the fire of concrete). Frame-Extruded aluminum frame with built-in anchor flange around the perimeter. Intumescent fire coating applied on the interior surfaces of the frame. Hinges: Continuous heavy-duty Type 316 stainless steel hinge. Latch: Pneumatic self closing system that automatically closes the door in the event of a fire when heat parts a UL-listed 165°F (74°C) fusible link Lift Assistance Compression spring operators enclosed in telescopic tubes. Mechanical hold-open system with release button automatically holds the cover in the open position.	Sqm	150		
		<b>TOTAL OF FIRE DOOR WORKS</b>				
16.0		<b>SPECIAL ITEMS</b>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
1	NDSR	Providing & installation of approved quality vertical linear baffle ceiling made out of folded Aluminum. The baffle units shall be in size of 50mm (W) x 150mm (H) and 1000mm x 4500mm x 1mm (thk), non-perforated. The ceiling baffle units shall be installed at a distance of 300mm c/c in one direction. The baffle units shall be attached to C-channel carriers spaced at 1200mm c/c. The C-channel carriers shall then be cross connected to perforated L-angle primary grid and suspended with M6 threaded rod hangers spaced at 1200mm and pertaining to Class A Fire Rated, as per ASTM E-84	Sqm	4,204.20		
2	NDSR	Architectural items like stone Jalli , sandstone Jalli, Granite Cupola ,Sandstone Jalli, Granite and Sandstone cornice, Carved sandstone balcony , Granite Balcony as per Architectural Drawings for elevation purpose.	LS			
3	NDSR	Providing and fixing VMZINC Interlocking Panel system (thickness: 1.0mm) with 300mm panel width & 2400mm panel length depending on the direction of application (Horizontal / Vertical) fixed / screwed directly to the Aluminium section framing works.The zinc cladding system shall consist of the following elements to form a rigid, ventilated and rain screen system support base for installation of the VMZINC Quartz pre-weathered zinc cladding system.The cladding system shall comprise of the following described from top to bottom:i) Top Layer – VMZINC Quartz Interlocking panel from VM Building Solutions	Sqm	458.32		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		Bagnolet, France or equivalent profiled sheeting manufactured from Zinc alloy ZnTiCu as specified in EN 988, minimum thickness of 1.0 mm. ii) Aluminium box section / Galvanized Z section framing with all the required accessories like HDG brackets, Anchor fasteners, Nut bolts etc.				
<b>4</b>		<b>MISCELLANEOUS ITEMS</b>				
<b>4.1</b>		Expansion Joints ( Strip seal joint)				
		Providing and Installing in position approved building expansion joint at floor level between platform level slab, concourse level slab or all location as shown in execution drawings or at locations approved by Engineer consisting of aluminium extrusions, anti-skid serrated top plate (Straight/Curved) with vapour barrier, sealant etc. as per details and specifications or as approved by Engineer. Entire installation is to be carried out strictly in the presence of manufacturer's representative at all times. No extra payment will be made for providing thermocoal at expansion joint between columns/beams/slabs or locations shown in drawing at the time of construction of RCC elements.				
		(i) Expansion /Contraction = +40mm/ -40mm Vertical seismic movement = +10mm/ -10mm	RM	50		
		(ii) Expansion /Contraction = +25mm/ -25mm Vertical seismic movement = +15mm/ -15mm	RM	50		
<b>4.2</b>		Providing and filling sheet covering over expansion joint with iron screws as per design to match the colour /shade of wall.				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR MANDAI STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		(i) Aluminium fluted strips 3.15mm thick and 150mm wide	RM	50		
		(ii) Aluminium fluted strips 3.15mm thick and 200mm wide	RM	50		
4.3		Polysulphide Sealent				
		Providing and applying Polysulphide sealent in 50mm gap incl back up material in the form of round shape Polyethylene foam at both faces of expansion joint .	m	50		
		<b>TOTAL OF SPECIAL ITEMS</b>				
		<b>TOTAL OF ARCHITECTURAL WORKS FOR MANDAI STATION</b>				

**Price Centre J: Architectural finishing and Hard Landscaping works for Swargate Station.**

SL No.	Description of Items	TOTAL AMOUNT(RUPEES)	
		In Figures	In Words
J.1	Masonry Works		
J.2	Concrete Works		
J.3	Granite & Stone Works		
J.4	Landscape & External Works		
J.5	Waterproofing Works		
J.6	Tile Works		
J.7	Access Raised Floor Works		
J.8	Wood Works & Iron Mongery		
J.9	Stainless Steel Works		
J.10	Aluminium Works		
J.11	Glass Works		
J.12	False Ceiling Works		
J.13	Painting Works		
J.14	Mild Steel Works		
J.15	Fire Door Works		
J.16	Special Items		
	<b>TOTAL</b>		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
1.0		<b>MASONRY WORKS</b>				
A		<b>CEMENT CONCRETE BLOCKS</b>				
1	NDSR	Providing and fixing precast cement concrete solid block (SIZE 400X200X200) with cement concrete 1:2:4 (1 Cement : 2 coarse sand : 4graded stone aggregate 20mm nominal size) including hoisting and setting in position with cement mortar 1:3 (1 Cement : 3 coarse sand), cost of required centering, shuttering etc. complete up to any height including making Openings for duct of any size & shape& Finishing the same. up to 6 m.	Cum	3,438.85		
B		<b>PLASTERING WORK</b>				
2	13.1.1	Providing and applying 12 mm cement plaster of mix 1:4 (1 cement :2 parts coarse sand + 2 parts fine sand ) including providing galvanized chicken wire mesh at the junctions of concrete and masonry work including side laps of minimum 75mm and fixing in position with galvanized wire nails including scaffolding etc. complete.	Sqm	1,360		
3	13.1.2	Providing and applying 12 mm cement plaster of mix 1:6 (1 cement :3 parts coarse sand + 3 parts fine sand ) including providing galvanized chicken wire mesh at the junctions of concrete and masonry work including side laps of minimum 75mm and fixing in position with galvanized wire nails including scaffolding etc. complete.	Sqm	272		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
4	NDSR	<b>Proma seal or equivalent acrylic intumescent sealant 2 hours fire rated</b> in accordance with BS 476-Part 20, IS 1530 Part 4 to seal gap & joint in fire rated walls with roof slab and around service penetration for 25 mm gap and 12 mm depth with compressible filler backing.	Rm	3,438.85		
5	NDSR	Providing 12 mm thick cement plaster in single coat with cement mortar 1:6 to brick / Aerocon masonry/ concrete works including rounding off corners wherever required smooth rendering, providing and removing scaffolding, including cost of material, labour, curing complete as per specification for all heights.	Sqm	4,270.08		
		<b>TOTAL MASONRY WORKS</b>				
2.0		<b>CONCRETE WORKS</b>				
1	4.1	Providing and laying in position cement concrete of specified grade excluding the cost of centring and shuttering - All work upto plinth level:				
	4.1.10	1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size)	Cum	50		
2	4.2	Providing and laying in position ready mixed plain cement concrete, with cement content as per approved design mix and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for plain cement concrete				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		work, including pumping of R.M.C. from transit mixer to site of laying and curing, excluding the cost of centering, shuttering and finishing, including cost of curing, admixtures in recommended proportions as per IS : 9103 to accelerate/retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer-in-charge.” Note : Excess/less cement used than specified in this item is payable/recoverable separately.				
	<b>4.20.2</b>	All Works above plinth and upto floor V level				
<b>3</b>	<b>4.20.2.1</b>	M-15 grade plain cement concrete. (cement content considered @ 240 kg. /cum)	Cum	1384.57		
<b>4</b>	<b>NDSR</b>	Providing and fixing of Glass Reinforced Concrete(G.R.C)Jalli 40mm thick in approved size,patters,design,thickness and colour of M/S Unistone make or equivalent to be fixed on/between RCC/block work column or structural steel work with Dry fixing method with all appropriate steel frame work, stainless steel (SS-304) 'L' shaped clamps, dash fasteners and pins including anchoring,lifting,scaffolding etc. complete as per architectural drawing and manufacture specification The screens should be made from '53 grade' white portland cement manufactured by 'JK Cement' or equivalent, super plasticizers manufactured by 'BASF' or equivalent, polymers manufactured by 'BASF' or equivalent and UV resistant synthetic inorganic pigments should be	Sqm	105.60		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		used fro pigmentation manufactured by 'BAYFERROX (Germany) or equivalent . The material casting should take place in Synthetic rubber/FRP mould manufactured by Reckli or equivalent.				
5	NDSR	Providing and applying anti dust sealer (epoxy coating) 1000μ thick epoxy floor coating along with necessary floor preparation by ASIAN PAINTS PPG make or equivalent with use of APCPFLO R HFP 120 Two component, high solid, epoxy resin based floor primer @50 μ & then topcoat APCOFLO R SL2 Self levelling coatings with excellent flow & levelling characteristics, conforms to the Global Migration Standards laid down in US-FDA: 21CFR 175-300 and also having mechanical properties such as compressive strength 51 mpa (ASTM C 579), Flexural strength 12 mpa (ASTM C 580) & Tensile Strength 8 mpa (ASTM C 307) on floor as per approved colour and shade. Floor condition shall be of Trimix and the moisture content of the concrete flooring should be less than 5%	Sqm	4,763		
6	NDSR	Providing and laying 18mm thick cement plaster skirting (up to 45cm height) with cement mortar 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement.	Sqm	810.15		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
7	NDSR	Providing and laying 50mm thick cement concrete granolithic flooring 1:2:4 (1 cement : 2 coarse sand: 4 graded stone with 20mm nominal size stone aggregate) finished with Non-metallic Monolithic surface using hardening compound such as Nitoflor Hardtop Standard of Fosroc or approved equivalent to Concrete floor to develop proper bonding and to seal, harden, water-proof, improve abrasion, chemical resistance and to form a dust free surface as per manufacturer's specifications. Using power trowel including aluminum strips 40mm wide and 2mm thick in joints of cement concrete floor etc. complete.	Sqm	4,763		
8	NDSR	Providing and laying concrete panels of M20 grade for compound walls as per drawing.	Cum	20		
9	NDSR	Providing and Laying of Foam Concrete under Raised Floor as / of density 1200kg/cum	Cum	50		
		<b>TOTAL CONCRETE WORKS</b>				
3.0		<b>GRANITE AND STONE WORKS</b>				
		<b>Note: All granite slabs shall be selected as per approved sample from Tamil Nadu / Karnataka / Rajasthan (Jhalore) of selected quality, uniform in colour, free from cracks, fissures and flakes with straight edges and perfect corners.</b>				
A		<b>GRANITE STONE</b>				
1	NDSR	Providing and fixing flamed finish Sadarahalli grey granite stone (bull nosed) of size 1200x600x60 mm at platform edge	Sqm	184.80		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		level using 5mm thick approved thick bed adhesive as per specification over prepared base on 20mm (average) thick base of cement mortar in 1:4 (1 cement : 4 total aggregate-sand and 10mm single sized aggregate) using 43 grade cement, water reducing admixture as per ISO 9103:1999 and jointing with white cement with matching colour pigment all complete in levelling course laid to proper slopes over screed base including, base preparation including movement joint in screed as per specification with 10mm thick compressible filler to edge of screed with two parts polysulphide sealant to top edge as per approved drawing and directions of engineer-in-charge.All Light color Granites to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
2	NDSR	Providing and laying 30mm thick prepolished Sadarhalli Red/Raw silk/Jet Black/Tan Brown/Kashmir Yellow/ Ikon Brown/ Multi Red/ Blue Pearl granite slab of sizes up to and including1200X600mm on floor using 5mm thick approved thick bed adhesive as per specification over prepared base on 20mm (average) thick base of cement mortar 1:4 (1 Cement :	Sqm	2,802.43		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		4 total aggregates - coarse sand and 10mm single sized aggregates) using 43 grade cement, water reducing admixture as per ISO 9103:1999 and jointing with white cement with matching colour pigment all complete (Colour of granite as approved by Engineer) in levelling course laid to proper slopes over screed base including base preparation, movement joint in screed as per specification with 10mm thick compressible filler to edge of screed/ blockwork junction with two parts polysulphide sealant to top edge, drainage gullies as per approved section, curing, testing etc. all complete as per specifications and relevant drawings.All Light color Granites to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
3	NDSR	Providing and laying 30mm thick FLAMED Sadarhalli Grey Granite Stone flooring in treads and landings (including bull nosing, rounding the nose and making groove) of steps of approved colour, size and pattern, (sample of granite stone shall be approved by Engineer-in- charge) over 20mm (average) thick base of cement mortar 1:4 (1 cement : 4 core sand) laid and jointed with neat cement slurry mixed with	Sqm	1,523.21		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		pigment to match the shade of granite stone complete as per specifications and architectural drawings. Allow for cutting & finishing for handrails fixing as per design.All Light color Granites to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
4	NDSR	Providing and laying 20mm thick mirror polished Granite Stone in Risers of steps of approved colour, size and pattern, (sample of granite stone shall be approved by Engineer-in-charge) over 12 mm thick bed of cement mortar 1:4 (1 cement: 4 coarse sand) and jointed with neat cement slurry mixed with pigment to match the shade of granite stone complete as per specifications and relevant drawings.All Light color Granites to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.	Sqm	367.49		
5	NDSR	Providing and laying 30mm thick mirror polished	Sqm	2,973.53		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		Sadarhalli Grey/Cheema pink/Jhalore Beige granite stone work of up to and including sizes of 1200mm*600mm of approved colour/pattern with 4mm groove all around at all levels for wall linings/columns/skirting(veneer work) by mechanical arrangement with SS cramps/brackets (SS Grade 316), anchor bolts,5mm vertical SS pins (SS Grade 316) of approved make and inserts as per drawings and specifications. The cost of making necessary grooves all around stone pieces, chamfering of corner edges and polishing are included. Allow for cutting of holes and box outs for services etc.All Light color Granites to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
6	NDSR	Providing and laying 40mm polished Red/Raw silk/Black/Tan brown/Blue pearl granite slabs for trench cover with 25mm dia holes @ 75mm c/c spacing complete..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.	Sqm	20		
7	NDSR	Providing and installing counters of MS (with primer and 2 coats of enamel paint) carcass in TOM, EFO, SCR etc. with	Sqm	55		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		30mm thick polished & moulded Jet Black Granite top with all cutouts/ openings including providing and fixing over 19mm thick commercial board & 19 x 3 mm teak wood lipping all complete of approved quality as per specifications and relevant drawings (Plan area shall be considered for measurement).				
8	NDSR	Providing and fixing stone slab with table rubbed, edges rounded and polished, of size 75x50 cm deep and 18mm thick, fixed in urinal partitions by cutting a chase of appropriate width with chase cutter and embedding the stone in the chase with epoxy grout or with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 6 mm nominal size) as per direction of Engineer-in charge and finished smooth.				
8.1		Granite Stone of a approved shade	Each	5		
9		Providing & Fixing of 20 mm thick Jet Black Granite counter top prepolished and premoulded & fixed over RCC slab with 20mm thick cement mortar 1:4 (1 cement : 4 Coarse sand) as / Architectural dwg inside Staff Mess room, First Aid room and toilet including cutting of hole for installattion of wash basin/Sink	Sqm	5.28		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
10		Providing, laying, jointing, grouting including fixing in position to backing, prepolished, 20 mm thick granite, in sizes not less than 600x1200x20mm and rubbed to smooth mirror finish for Veneering/Cladding work to walls, beams, columns, pilasters, fascia, upstands, jambs, sills, copings, soffits of openings and beams, with grout mortar of thickness to be ascertained at site so as to achieve true lines, levels, plumb, planes etc. subject to a minimum thickness of 20 mm for the grout cement mortar 1:4, and making of openings for service and other machine cutting, providing machine drilled holes, recesses, rebates for stainless steel attachments/ fixings, providing movement joints etc. all as per drawings, specifications and as directed complete. Provision to be made for "V" groove as per drawing, design and as approved by engineer	Sqm	50		
B		<b>KOTA STONE TREAD &amp; RISERS</b>				
11		Kota stone slabs 20 mm thick in risers of steps, skirting, dado and pillars laid on 12 mm (average) thick cement mortar 1:3 (1 cement 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, including rubbing and polishing complete.	Sqm	238		
C		<b>BASALT STONE WORK</b>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
12		Providing and laying 25mm thick POLISHED /SAND BLASTED/SHOT BLASTED BASALT stone work of up to and including sizes of 1200mm*600mm of approved colour/pattern with 4mm groove all around at all levels for wall linings/columns/skirting(veneer work) by mechanical arrangement with SS cramps/brackets (SS Grade 316), anchor bolts,5mm vertical SS pins (SS Grade 316) of approved make and inserts as per drawings and specifications. The cost of making necessary grooves all around stone pieces, chamfering of corner edges and polishing are included. Allow for cutting of holes and box outs for services etc...All Light color BASALT to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.	Sqm	1,172.77		
13		Providing and laying 40mm thick prepolished HONED/BUSH HAMMERED/SHOT BLAST finish BASALT STONE slab of sizes up to and including1200X600mm on floor using 5mm thick approved thick bed adhesive as per specification over prepared base on 20mm (average) thick base of cement mortar 1:4 (1 Cement : 4 total aggregates - coarse sand and 10mm single sized aggregates) using 43 grade cement, water	Sqm	2,802.43		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		reducing admixture as per ISO 9103:1999 and jointing with white cement with matching colour pigment all complete (Colour of BASALT as approved by Engineer) in levelling course laid to proper slopes over screed base including base preparation, movement joint in screed as per specification with 10mm thick compressible filler to edge of screed/ blockwork junction with two parts polysulphide sealant to top edge, drainage gullies as per approved section, curing, testing etc. all complete as per specifications and relevant drawings.All Light color BASALT STONE to be fixed on White Cement.As per Approved Adhesive..Minimum Compressive strength shall be as per IS 1121(part 1) .Water absorption Test shall be carried out as per IS 1124.The flooring shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
		<b>TOTAL OF GRANITE AND STONE WORKS</b>				
<b>4.0</b>		<b>LANDSCAPING AND EXTERNAL WORKS</b>				
<b>1</b>		Providing and laying factory made coloured chamfered edge Cement Concrete paver blocks of required strength, thickness & size/shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of fine sand, compacting and proper embedding/laying of inter locking paver blocks into the				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with jamuna sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand in footpath, parks, lawns, drive ways or light traffic parking etc. complete as per manufacturer's specifications & direction of Engineer-in-Charge.				
1.1	16.94	80mm thick C.C. paver block of M-30 grade with approved colour, design & pattern.	Sqm	1,000		
2	16.69	Providing and laying at or near ground level factory made curb stone of M-25 grade cement concrete in position to the required line, level and curvature jointed with cement mortar 1:3 (1 cement : 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5 mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-Charge (length of finished curb edging shall be measured for payment). (Precast C.C. curb stone shall be approved by Engineer-in-Charge).	Cum	25		
3		Precasting and placing in position 125 mm dia Bollards 600 mm high of required shape including providing M.S. Pipe Sleeve 50 mm dia 300 mm long in the Bollard and M.S. Pipes 40 mm dia and 450mm long with 150x150x6mm M.S. plate welded at bottom and embedded 150mm in cement concrete 1:3:6 (1 Cement : 3 coarse sand (zone-III) : 6 graded stone	Each	200		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		aggregate 20 mm nominal size), including necessary excavation of size 250x250x450mm deep for the same in bitumen/concrete pavement at specified spacing.Painting of MS bollard is to be done with two coats of yellow or white paint over MS pipes as per Architect/Engineer-in-charge				
		<b>TOTAL OF LANDSCAPING AND EXTERNAL WORKS</b>				
<b>5.0</b>		<b>WATERPROOFING WORKS</b>				
<b>1</b>	<b>22.3</b>	Providing and laying water proofing treatment to vertical and horizontal surfaces of depressed portions of W.C., kitchen and the like consisting of:(a) Ist course of applying cement slurry @ 4.4 kg/sqm mixed with water proofing compound conforming to IS 2645 in recommended proportions including rounding off junction of vertical and horizontal surface.(b) IInd course of 20 mm cement plaster 1:3 (1 cement : 3 coarse sand) mixed with water proofing compound in recommended proportion including rounding off junction of vertical and horizontal surface.(c) IIIrd course of applying blown or residual bitumen applied hot at 1.7 kg. per sqm of area.(d) IVth course of 400 micron thick PVC sheet. (Overlaps at joints of PVC sheet should be 100 mm wide and pasted to each other with bitumen @ 1.7 kg/sqm).	Sqm	300		
<b>2</b>	<b>NDSR</b>	Providing and laying Brick bat water proofing treatment for terrace with the following including cleaning the RCC slab top surface. Providing on top of slab surface cement slurry	Sqm	500		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		<p>mixed with water proofing compound thereafter providing cement mortar 1:4 (1 cement : 4 coarse sand) 20mm thick with polymer based water proofing compound and layer of new half broken bricks (coba) giving gaps of 15-20mm between broken bricks, providing necessary gradient for proper flow of water and providing cement slurry with water proofing compound spread over brick bat coba in cement mortar 1:4 (1 cement : 4 coarse sand) with water proofing compound filled in gaps of broken bricks and 20mm plaster in cement mortar 1:4 (1 cement : 4 coarse sand) mixed with polymer based water proofing compound, top finished smooth with neat cement and providing rope chequers including extending the water proof plaster 300mm on vertical surfaces with necessary chasing / treating of walls including providing and making gola as per drawing etc. Average thickness of the brick bat coba to be 125mm. The item also include providing and making khurrahs 450mm x 450mm/ 300mm x 300mm with average minimum thickness of 50mm cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm nominal size) finished with aluminum foil and 12mm cement plaster 1:3 (1 cement : 3 coarse sand) and a coat of neat cement rounding the edges and making and finishing the outlet complete. (Plan area will be measured and paid)</p>				
		<b>TOTAL OF WATERPROOFING WORKS</b>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
6.0		<b>TILE WORKS</b>				
A		<b>VITRIFIED TILES</b>				
1	NDSR	Providing and laying matte finish vitrified tile of 1st quality of approved make conforming to IS :13755, The tiles shall be free from objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required, in all colors as per control sample at all levels in public & back-of-house areas and toilet floor and skirting over 20mm thick bed of cement mortar 1:4 (1 cement : 4 coarse sand) including pointing the joints with white cement and matching pigments- all complete as per relevant drawings and specifications laid over screed/ foam concrete as per relevant architectural drawing. Rates include coordination for cutouts, holes and finishing of the same. The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick / Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.	Sqm	3,112.63		
2	NDSR	Providing and fixing 1st quality Vitrified wall tiles of approved make, conforming to IS :13755, The tiles shall be free from objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall	Sqm	2,470.72		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required,shade, colour and finish in all colours, shades, size in skirting, wall cladding, border tiles and dados over 20/12 mm thick bed of cement Mortar 1:4 (1 cement : 3 coarse sand) and jointing with approved grouting material with pointing in white cement mixed with pigment of matching shade complete.The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
3	NDSR	Providing and fixing 10 mm thick acid and / or alkali resistant vitrified tiles of approved make and colour using acid and /or alkali resisting mortar bedding and joints filled with acid and / or alkali resisting cement as per IS:4457 complete as per the direction of Engineer-in- charge. On a flooring on a bed up to 30mm thick mortar of 1:4 proportion.The tiles shall be free from objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required.The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the	Sqm	55		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		construction work is completed and handed over.				
4	NDSR	Providing and fixing 1st quality 10mm thick acid and or / alkali resistant Vitrified wall tiles of approved make,conforming to IS :4457,The tiles shall be free from objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required,shade, colour and finish in all colours, shades, size in skirting, wall cladding, border tiles and dados over 20/12 mm thick bed of cement Mortar 1:4 (1 cement : 3 coarse sand) and jointing with approved grouting material with pointing in white cement mixed with pigment of matching shade complete.The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.	Sqm	73.92		
5	NDSR	Providing and laying yellow visibility vitrified tile as per control sample of size 200*100*8 mm thick at platform level over 20mm thk bed of cement mortar 1:4(1 cement : 4 coarse sand) in levelling coarse laid to proper slopes over screed base including base preparation including movement joint in screed as per specification with 10mm thick compressible filler to edge of screed with two parts polysulphide sealant to top edge as per approved drawing and directions of engineer-	Sqm	30.80		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		in-charge.The tiles shall be free from objectionable surface blemishes such as projections, depressions, flakes, hairline cracks and bubbles. The tiles shall be level and regular in size with properly formed corners and shall not be warped or deformed in any manner laid at right angles as per design and pattern if required.The flooring/Tiles shall be covered with POP / Gypsum powder of 12mm thick /Plywood to ensure that the flooring is not damaged till the construction work is completed and handed over.				
6	NDSR	Providing & laying in position on floor, skirting and in bands, vitrified unglazed anti skid/Uni colour series floor tiles 300 x 300 x 7.3 mm thick of approved make conforming to IS :13755, specification and colours like terra cotta, polo, Mushroom, Nut brown laid over up to 30 mm thick bed of cement mortar 1:4 (1 cement: 4 coarse sand) to the pattern as called for including finishing the joints with matching pigment and approved grouting materials etc. complete.	Sqm	94.60		
B		<b>CERAMIC TILES</b>				
7	NDSR	Providing and laying glazed tile dadoing using glazed tiles conforming to IS.777-1970, 2.20 m high with tiles of 200x100 mm size and 6mm thick of approved quality, brand and colour for toilets, over 12 mm thick, 1:3 cement mortar backing, pointed neatly with white cement mixed with colouring pigment to match color of tile, properly cured and finished in all respects including cost of material and labour	Sqm	79.20		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		complete, at all levels including lead, lifts and descents				
<b>C</b>		<b>TACTILE FLOORING</b>				
<b>8</b>	<b>NDSR</b>	Providing and laying 12mm (minimum)thick with 3mm(minimum)thick projection on surface yellow coloured directional vitrified porcelain tactile tile of pelican or equivalent(as per specification)laid on floor with laterite 111 crete filler powder mixed with laterite 73 latex admix and applied to a minimum thickness of 4.5mm(The mixing ratio shall be as follows:20kg bag (laterite 111):5.5 liter (Laterite 73).Spacer of 3mm shall be used between the tiles and joints filled using Laterite Latapoxy SP-100 epoxy grout in Inca Gold colour. The joint depth shall be 6mm.Laticrete product shall be as manufactured by Laterite India Pvt.ltd/Laterite International Inc.)over 20mm thick bed of cement mortar 1:4(1 cement:4 coarse sand) in levelling course laid to proper slopes over screed base including base preparation including movement joint in screed as per specification with 10mm thick compressible filler to edge of screed with two parts polysulphide sealant to top edge as per approved drawings and directions of engineer-in-charge.				
<b>8.1</b>		300*300 hazard warning and directional tactile tiles as per approved drawings	Each	7,651.11		
		<b>TOTAL OF TILES WORKS</b>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
7.0		<b>ACCESS RAISED FLOOR</b>				
1	NDSR	Providing and fixing access raised floor of light grade of minimum 15 KN/m <sup>2</sup> UDL panels manufactured from pressed formed corrosion resistant galvanized steel with total overwrap of one piece top, sides and bottom flange encapsulating monolithic homogeneous totally premixed fiber reinforced calcium silicate material with balanced density over panel, to cater in the size 600 x 600 x 41mm. The panel has to be placed on the pedestal made from all solid steel construction, galvanized plated consisting of stringers, an anti- vibrational head cap with cruciform upstands and four panels locating studs, positively clipped pedestal clipped to the steel base plate. The pedestal cap shall have an electrical conductor plate for dissipation of static electricity. The steel base plate of the pedestal shall be fixed on the sub-floor with Epoxy pedestal adhesive and/or mechanical fixing with fasteners (8mm X 75mm). The Access floor should be able to take a point load of minimum 2.5 KN over 25 mm sq. and UDL of minimum 15 KN/sq. meter. The panel shall be finished with high abrasion, anti static HPL				
1.1		Up to 450 mm high cavity floor	Sqm	110		
		<b>TOTAL OF ACCESS RAISED FLOOR</b>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
8.0		<b>WOOD WORKS AND IRON MONGREY</b>				
1		Providing & fixing Toilet Cubicle (of following standard dimension which includes 900mm door size width) made of heat, bacteria, water, chemical, scratch, impact and anti bacterial resistant 12mm thick solid compact laminate panels tested in approved laboratory. Finish of the compact laminate should be Suede, Raw silk model includes doors, pilasters & intermediate panels finished with approved texture/shade as per the detail drawings & as per IS 2046 (Indian standard) and as per fire retardant BS-476/97 standard. This also includes providing and fixing in position necessary hardware made out of stainless steel (Grade 304) as per manufacturers specifications & Architects instructions like (1)Door knob(2)Gravity hinges(3)Thumb turn lockset with occupancy indicators(4)Coat hooks with Door stopper(5)U-channels(6)Adjustable foot/pedestal(7)Top rail with corner connector(8) Rubber noise deafening tape(9)Screws & wall plugs. All screws will of 304 Grade in stainless steel with satin finish. All pilasters are supported by stainless steel bottom cladding. The base of the stainless steel bottom cladding will be anchored to the floor with a clearance height up to 150mm. the top fitting should consist of SS round top rail which will get fixed with pilasters, with SS panel tube holder, SS corner bend (connected with top rail) will be used on the corner of cubicle in absence of brick wall, SS wall fixing is used				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		only on the wall which will hold the SS top rail.				
1.1		Toilet Cubicle with standard dimension of 2025mm Height x 1000mm width x 1550mm Depth, which includes up to 900mm door size width)	Nos	5		
		<b>TOTAL OF WOOD WORKS AND IRON MONGREY</b>				
9.0		<b>STAINLESS STEEL WORKS</b>				
A		<b>STAINLESS STEEL RAILING</b>				
1	NDSR	Supplying, fabricating, MATTE FINISH, erection of 1100mm high SS hand railing as per design comprising of 50mm dia, 3.15mm thick, Stainless steel Grade 304 with balustrades as per drawing, SS base plate, pipe adjuster M16X200mm SS fasteners for fixing railing in floor by cutting hole of required dia in floors/ landing/staircase complete in all respect and making good the floors as per Specifications and Architectural Drawings. Weight of finished product shall be measured. Rate is inclusive of all wastages. Adjustment for opening or cuttings is not allowed.	Kg	3,954.72		
2	NDSR	Supplying, fabricating, MATTE FINISH, erection of 1100mm high SS hand railing as per design comprising of 50mm dia, 3.15mm thick, Stainless steel Grade 304 with balustrades as per drawing, SS base plate, pipe adjuster M16X200mm SS fasteners for fixing railing in floor by cutting hole of required dia in floors/ landing/staircase complete in all respect and	Kg	4,207.90		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		making good the floors as per Specifications and Architectural Drawings.Weight of finished product shall be measured. Rate is inclusive of all wastages. Adjustment for opening or cuttings is not allowed.				
<b>B</b>		<b>STAINLESS STEEL GLASS RAILING</b>				
<b>3</b>	<b>NDSR</b>	Supplying, fabricating, MATTE FINISH, erection of required height(900 to1100) mm high SS hand railing system, System comprising of 38mm Dia & 1.6mm thick Top-Rail Stainless steel Grade 304 connected to 50 mm Dia 3.15mm thick Baluster through Stainless Steel Saddle Plate connector. And a Grab Rail of 38mm Dia connected to Baluster through a Stainless Steel Stem Key. Baluster fixed to slab with GI Baseplate & M16x200 mm Fastener. A SS cover plate would be provided above GI Base Plate. Infill of 1 No. 12mm thick toughened glass connected to baluster with Stainless Steel Twin- arm Spider Clamp.	Rm	562.54		
<b>C</b>		<b>STAINLESS STEEL CLADDING</b>				
<b>4</b>	<b>NDSR</b>	Providing , Fabricating, Polishing & Erection of Required Height,Shape and Designing Comprising of 2 mm thick SS Grade 304 Sheet Cladding Over RCC Column on Aluminum Base frame of25x35x5mm and 5mm thk & 450 mm width Perforated (6mm perforations @ 12mm c/c) SS Grade 304 Matte Finished Sheet fixed on Frame 2 nos of 50 mm SS Grade 304 Dia Concentric Pipe, Bracing of 2 rings with 12 nos	Sqm	1,884.34		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		of 50 mm SS Grade 304 Dia pipe fixed on to the RCC Column with 3 nos. of 20 mm thick Arched shape Plate to support the Frame As / Drawing (for payment purpose only SS item shall be measured. Aluminum base frame shall be paid extra).				
<b>D</b>		<b>STAINLESS STEEL ARTICLES</b>				
<b>5</b>	<b>NDSR</b>	Fabricating and supply of stainless steel (conforming to grade SS 304 satin finish) four seater bench without backrest as per drawing and approved by Engineer-In-Charge. Weight of finished product shall be measured. Rate is inclusive of all wastages. Adjustment for opening or cuttings is not allowed.	Kg	300		
<b>6</b>	<b>NDSR</b>	Fabrication ,supply & erection of matte finish grade 304 SS sump covers of size 600mmX600mm suitably supported & fixed over MS frame along with granite stone matching with relevant floor finish, lifting hooks/keys etc. complete as per relevant architectural drawing.	Each	80		
<b>7</b>	<b>NDSR</b>	Fabrication, supply, erection and joining to relevant site of miscellaneous Matte finish grade 304 SS angle/ section/ pressed plate/ pipe etc. items like platform end gates etc. complete as per architectural drawings and directions of engineer-in-charge as per drawing.	Kg	300		
<b>8</b>	<b>NDSR</b>	Supplying, fabricating, MATTE FINISH, erection of 300mm high SS foot rail as per design comprising of 50mm dia, 3.15mm thick, Stainless steel Grade 304 with small height SS support as per drawing, SS base plate, pipe adjuster M16X200mm SS fasteners for fixing railing in floor by cutting	Kg	400		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		hole of required dia in floors/ landing/staircase complete in all respect and making good the floors as per Specifications and Architectural Drawings.Weight of finished product shall be measured. Rate is inclusive of all wastages. Adjustment for opening or cuttings is not allowed.				
		<b>TOTAL OF STAINLESS STEEL WORKS</b>				
<b>10.0</b>		<b>ALUMINIUM WORKS</b>				
<b>A</b>		<b>ALUMINIUM CLADDING</b>				
<b>1</b>	<b>NDSR</b>	<p>Providing and fixing Aluminum Composite panels in all colours of approved brand for wall cladding at all heights and elevations including necessary aluminum composite panel consist of 3mm thermoplastic core of anti oxidant LDPE sandwiched between two skin of 0.5 mm thick alloy sheet making a total sheet thickness of 4 mm. The surface shall be finished with PDVF base coating on the top side and service coating on the reverse side shall be with a polymer paint. Coating shall confirm to ECCA of AAMA. The system shall design to withstand wind pressure of 200 Kg/Sqm and shall be fixed to the masonry/RCC walls with necessary clamps, bracket and anchor fasteners.</p> <p>All Clamps and brackets shall be hot dip galvanized minimum 80 micron thick and confirmed to IS : 4759 - 1996. The extruded aluminum sections shall be anodized in approved colour with anodic coating minimum 20 microns.</p>	Sqm	637.30		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		Extruded section shall be of 6063 T5 or T6 alloy confirming to ASTM B 221. (items include cost of aluminum frame, ACP Panels, Cramps 110mm size, weather sealant, gasket, foam, fixtures, scaffolding, all machineries and any other fastening strips, nuts, bolts, rivets, washers, etc. complete).Item shall include to provide EPDM gaskets (Make:OSAKA/Satya or equivalent), open cell polyethylene backer rods, weather sealant etc. The weather sealant shall be Dow Corning 991 or equivalent and the width of the gap filled with sealant shall be as specified				
<b>B</b>		<b>ALUMINIUM LOUVERS</b>				
<b>2</b>	<b>NDSR</b>	Providing and fixing PVDF aluminum extruded single bank louvers with AMCA certification complete. The louvers should have hidden mullions and an insect screen and should be equivalent to C/S louver model RS-1605. All work to be complete with extruded aluminum sub frame extruded built up standard elliptical section conforming to IS 733 and IS 1285 fixed with raw plugs and stainless steel screws or with fixing clip or with expansion hold fasteners including necessary filling up of gaps at junctions at top bottom and sides with required PVC/neoprene felt complete in all respect.Alumnum sections shall be smooth rust free, straight as per architectural drawings and the direction of Engineer-in-charge etc. All structural steel support frame work shall be paid separately.	Sqm	293.48		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
C		<b>ALUMINIUM DOORS</b>				
3	NDSR	Providing and fixing Aluminum Door with frame of approved make with door frame / chowkhat of section 101.6 x 44.45 x 3.16 mm (2.508 kg/R.mt) and shutters with stiles and rails of aluminum sections 85 x 44.5 x 3 mm (2.1 Kg / R.mt) with bottom panel made of 12 mm thick prelaminated Novo pan or equivalent flat pressed three layered prelaminated particle board exterior grade ISI stamped IS: 12823 grade, type-II, one side decorative and other balancing white and edges sealed with water resistant paint. Top panel with 6 mm thick clear glass. Both board and glass will be fixed with glazing clips and beadings / gaskets and necessary fittings all as per manufacturer's specifications and directions. EPDM rubber gasket and frame fixed in position with steel screws and rawl plugs. All visible steel screws shall be rust resistant and coloured as approved. All aluminum sections shall be as per drawing and conforming to grade 63400 WP alloy as per IS:733 and IS: 1285 and colour 65 microns powder coated finish complete as approved and directed by the Engineer. The door to be complete with all necessary accessories such as aluminum handles, tower bolts, locks, pivot / hinges etc. complete.	Sqm	40.50		
D		<b>ALUMINIUM WINDOWS &amp; GLAZING</b>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
4	NDSR	Providing, fabricating and installing in position, pure polyester powder coated aluminum doors, windows, curtain walling, skylights, partitions, grilles, glazing with extruded aluminum sections and profiles complete in all respects in straight or faceted profiles including arched angular in elevation including sub frames in tubular aluminum (having mill finish), outer frames, architraves, beading, wool pile 6mm thick clear float glass, gaskets, all complete. The minimum sizes, thickness and weights per unit length of the aluminum sections to be given by bidder, however, nothing extra shall be payable to the Contractor for using larger/heavier sections than those given, if found inadequate including all fittings.				
		<b>WINDOW TYPES</b>				
3.1		Fixed glazing	Sqm	187.88		
3.2		Extra for 12.76 mm thick (6mm + 0.76 + 6mm) PVB laminated glass, in place of 6 mm normal float glass.	Sqm	187.88		
4	NDSR	Design, Manufacture, Supply and Installation of dpi system, a complete assembly of co-extruded UV protected 14mm thick multilayered mesh wall polycarbonate panels incorporated into a complete system. Panels shall have 6 layers, different layers in soothing colors. Panels shall be with grip-lock notch standing seam running lengthways to allow the connectors to be attached. The installation of panels with connectors	Sqm	110		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		guarantee a guard of water with 10-15mm of height. The system shall ensure the mechanical strength, water tightness and air tightness of the roof as per below; Panel length 11980mm (Max.)Width 500-700mm. Panel shall be fixed over M S structural steel / MS purlin (paid separately) conforming to the detail				
		<b>TOTAL OF ALUMINIUM WORKS</b>				
<b>10.0</b>		<b>GLASS WORKS</b>				
<b>1</b>	<b>NDSR</b>	Providing and installing fixed glazed security wall assembly of stainless steel to ticket offices, Station Control Room, etc. with specified fixings and finish using 2 sheets of 6mm thick toughened glass with nominal gap silicone sealant joints. Glass shall be clear, toughened and laminated with 1.52mm thick polyvinyl butyral layer- all complete as per relevant architectural drawings and specification with cut out & holes	Sqm	77.55		
<b>2</b>	<b>NDSR</b>	Providing and fixing of toughened laminated glass door in EFO (6mm + 1.52mm + 6mm) including stainless steel door handles, deadlock and Floor spring complete necessary cutting in granite flooring for housing of floor spring as / drawing	Sqm	4.20		
<b>3</b>	<b>NDSR</b>	Designing, Providing, erecting and fixing structural glazing unitized using specially designed aluminum grade 63400 WP IS: 733 and ID:1285 electro colour anodized 25 micron or pure polyester powder coated 65 microns in approved shade and	Sqm	1,123.76		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		<p>colour through adequately designed MS galvanized / aluminum anchor brackets. The structural glazing design to be based on rain screen and pressure equalized drainage system. The complete drainage system to be incorporated in the design which drain water at every transom in the unlikely event that water penetrate the pressure seal. This include structural grade and weathering grade silicon sealant "Dow Corning" or "GE Silicon" or equivalent as per the design requirement. This includes structural designing, shop drawing complete. structural calculations and water penetration test as per (Structural Test ( Wind load serviceability) - ASTM E 330, Water Penetration Test - AAMA 501.2).The specified test is to be carried out only for location where executed qty will be more than 50Sqm in one go.</p> <p>The structure glazing shall be double glazed 23mm thick (6mm thick toughened blue/smoke grey on outer side, 12 mm air gap and 5 mm thick clear float glass on inner side). no members to visible from outside complete as per drawing and direction of engineer in charge. including required aluminum sub-frame Silicon filling all height i/c double height for straight / curve and scaffolding complete.</p>				
4	NDSR	Providing and fixing toilet mirror in 6 mm thick clear float glass with beveled and polished at edge, fixed on wall with 6mm thick hard board backing fixed to wooden cleats with 8mm dia 38mm long stainless steel stud complete	Sqm	5.28		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
5	NDSR	Providing & installing Fixed glazed wall assembly for lift shaft with specified fixing of anodized aluminium sections & finish using 2 sheets of 6mm thick toughened glass with nominal gap silicon sealant joint. Glass shall be clear, toughened and laminated with 1.52mm thick polyvinyl butyral layer; all complete as per relevant architectural drawings and specification with cut out & holes.	Sqm	513.37		
		<b>TOTAL OF GLASS WORKS</b>				
12.0		<b>FALSE CEILING WORKS</b>				
A		<b>CALCIUM SILICATE BOARD CEILING</b>				
1	NDSR	Providing and installing suspended ceiling systems / vertical fascia as per controlled sample for concourse, 12mm thick Calcium Silicate Board panels with paint as per specification including supply of suspension system of galvanized steel as per manufacturer's recommendation, top fixing of SS expanding anchor bolts, rigid hangers, accessories inclusive of providing opening for electrical fixtures / fittings, fixed framing to support fixtures / fittings and providing secondary supporting system for cable tray and duct and all complete as per relevant drawings and the direction of Engineer- in-charge.	Sqm	188.10		
B		<b>FIRE RATED CEILING AND BULKHEAD</b>				
2	NDSR	Providing and fixing of Grade 3003 Aluminum coil coated perforated metal silhouette false ceiling system using the	Sqm	4,532.51		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		<p>grids of USG or CMC from their US plant or equivalent and tiles from USG/ CMC/Armstrong/Hunter Douglas or equivalent with the suspension system designed to suspend the entire false ceiling with the help of suspended rod of 4mm dia and clamps of size 26x26x2mm thick to be fastened with anchor fastener not less than 6mm dia to the soffit of slab beam. Minimum anchorage lengths shall be in the range of 50 to 60mm main runner 'Silhouette' profile or equivalent shall be suspended from the soffit of slab at an interval of 1200x600mm center to center and appropriate distance as required to sustain the suspended load including all the fixtures as shown RCP cross runner having 'Silhouette' profile shall be 600mm center to center with interlocking arrangements in such a way to form grid of 600x600mm and fix the lay in tile in the grid pattern and laying of false ceiling polyester powder coated metal tile of size 597x597mmx9mm MICRO PERFORATED of 1.5 mm dia in a 3mm diagonal square pattern given 22%perforated area. in correct line and levels as per the approved design and drawings submitted. All steel sections to be marked with the manufacturer's registered trademark and hologram.The rate shall include marking levels and grid of entire false ceiling as per the RCP necessary wall angles and profiles between gypsum and metal false ceiling as per the drawing, tools and tackles for installation of the complete system. The entire false ceiling system shall be supplied by the metal false ceiling supplier. The cutouts</p>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		required for the down lighters, sprinklers, speakers etc. shall be made at factory only. The rate shall include providing and fixing of a thin nonwoven fabric made of cellulosic and glass fibers (weight 47 g/m <sup>2</sup> , thickness 0.2 mm) of approved make with a hot melt adhesive (15 g/m <sup>2</sup> ) on back side of tile. Rate includes providing and fixing of M.S angle support for false ceiling at under the AC ducts or other equipment where ever required, Using 65mmx65mmx6mm thick and painted with two coats of red oxide primer of required length supported to the true ceiling through 12mm thick G.I treaded rod with necessary hanger fasteners. complete. Also the rate includes of providing all around wall step profile with black/white powder coated aluminum profile to get 50mm x50 mm groove , and with Gyp board 12mm groove				
		Erection of false ceiling with lay in tile system with Aluminum Coil coated Grade 3003 of 600 x 600 x 9mm depth and 0.7mm thick tile with perforation with 1.5 mm thick approved quality non woven textile on back side for acoustic purpose in specified areas etc., and as per specification, drawings as directed.				
		<b>TOTAL FALSE CEILING WORKS</b>				
<b>12.0</b>		<b>PAINTING WORKS</b>				
<b>1</b>	<b>NDSR</b>	Providing and applying two coats of Unitile's Rodeo or Spectrum Perlina fine or Heritage Granula Surface Texture paint after applying corresponding roller coat as primer on	Sqm	113.37		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		pre-plastered surface as per approved sample in approved shade. The composition of the texture paint should consist of ACRYLIC copolymer resins combined with quartz ,silica, mineral, aggregates, synthetic inorganic pigments, bactericide, fungicides and various other additives, giving the product water repellant properties. The first coat to be applied by brush or wool roller as a base coat, diluted with sufficient water and the final coat (Undiluted) to be applied by trowel and finished with acrylic trowel to maintain with or without grooves, as per details in drawings. The thickness of both coats should be 1.0 to 1.5mm. the water repellency of the product shall be $\geq 86\text{gm/m}^2$ as per test method IS:5410-1969, complete as per manufacture's specifications and instructions by Engineer in Charge at site. The rate shall include necessary scaffolding, labour and material complete				
2	NDSR	Applying epoxy based solvent free anti - dust concrete sealer(sealocote or equivalent) on fair faced blockwork/brickwork and concrete surfaces inclusive of surface preparation, over primer coat/ initial coat as per manufacturer's recommendation - all complete as per specification.				
2.1	NDSR	Applying epoxy based solvent free three coat clear sealer on fair faced blockwork/brickwork and concrete surfaces inclusive of surface preparation, over primer coat/ initial coat as per manufacturer's recommendation - all complete as per	Sqm	78,861.16		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		specification				
3	NDSR	Providing and applying 3mm 1.5mm thick exterior Birla/JK or equivalent ready made putty in two coats over Brickwork/ Blockwork/ RCC surface of ceiling/beam/column etc. to prepare even and smooth surface including sand papering, grinding, scaffolding etc., complete as per direction of Engineer-in-Charge.	Sqm	4,270.08		
4	NDSR	Providing and applying Acrylic Emulsion to ceiling surfaces including necessary surface preparation, scaffolding / staging etc. All as per manufacturer's specifications and as directed by the Engineer	Sqm	188.10		
5	NDSR	Providing and applying Acrylic emulsion paint on new work with two or more coats of approved colour and shade to give an even shade .	Sqm	4,270.08		
		<b>TOTAL OF PAINTING WORKS</b>				
13.0		<b>MILD STEEL WORKS</b>				
1	10.26	Providing and fixing hand rail of approved size by welding etc. to steel ladder railing, balcony railing, staircase railing and similar works, including applying a priming coat of approved steel primer.				
		M.S. tube	Kg	1432.2		
2	NDSR	Supplying and fixing automatic galvanized industrial motorized rolling shutters made of required size MS lathe interlocked together (heavy duty) of approved make i.e. Indo-Germa Ltd. Chennai or equivalent made of required	Sqm	150		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		sizes and shape with G.I guides control box drive unit and with all other accessories complete as per manufacturer's specifications.				
2.1		Extra for providing mechanical device chain & crank operation for operating rolling shutters for area exceeding 10sqm and up to 16.80 Sqm in area.	Sqm	150		
3	NDSR	Providing and fixing door with shutter fabricated from 18 gauge thick galvanised steel sheets press formed to provide a 46mm thick fully flushed double skin door with lock seam joints at stile edge and infill insulation kraft core. Door frames 57x120 mm approx. to be double rebated made of 16 gauge galvanised steel. Door shutter and frame to be primed in stoving grade epoxy zincphosphate primer and finished in aliphatic grade u.v. resistance polyurethane paint. Door shutter and frames to have all hardware preparations, prepunctured at the factory all complete with and including filling of door frames with P.C.C. 1:5:10 (1 cement : 5 aggregate : 10 coarse sand).				
		Single leaf door shutter	Sqm	18.90		
		Double leaf door shutter	Sqm	21.60		
		Extra for 250 x 150 mm vision panel with 6mm thick clear toughened glass.	No.	12		
		Extra for provision of air transfer grille appx. 400x400 mm	No.	10		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		Heavy Duty Door Closer	Each	27		
		Eurofile Mortice lock -240 with double pin cylinder having master arrangement and ss handles	Each	27		
		Concealed SS finish tower bolts (300mm)	Each	27		
		Magnum or equivalent make SS 4 Ball Bearing hinges	Each	96		
		SS handles Dorma or equivalent make for double leaf door	Each	5		
		Dorma or equivalent make Panic Bar for Double leaf door	Each	5		
		Installation Charges	Each	40.5		
		<b>TOTAL OF MILD STEEL WORKS</b>				
<b>15.0</b>		<b>FIRE DOOR WORKS</b>				
<b>1</b>		Fire Check doors design & supply of approved make fire rated door fabricated and successfully tested at CBRI Roorkee in both direction satisfying two criteria (Stability and Integrity) confirming to BS:476 part II, IS3614 Part II as per schedule of requirement, complete with shutters, frames, hinges, conforming to the design intent. All fire doors must conform to the requirements of fire authority having jurisdiction and as per prototype tested by approved fire testing agency acceptable to fire authority having jurisdiction. Door shutter and frames to have all hardware preparations must be prepunctured at the factory for fixing of said hardware. Shutters & frames to be filled with suitable fillers,				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		insulation to meet the required fire resistance criteria as specified, with all grouting, reinforcements, flushed lock seam joints including all seals, washers, linings etc. complete. All fire doors to be primed and painted with approved painting system as per tested prototype and to approved colour. Provision of mortice sash lock (ML 100A) with S.S. lever handles and door closers heavy duty (imported) LCN 1461 with standard arm on every leaf , stainless steel hinges as per approved shop drawing.				
1.1		60minutes (1 hour) fire rated metal door assembly	Sqm	30		
1.2		120 minutes (2 hour) fire rated metal door assembly	Sqm	322.80		
2		Clear Vision panel of 200mm*300mm per leaf with fire rating	Each	28		
3		Heavy Duty Door Closer	Each	40		
4		Eurofile Mortice lock 240 with double pin cylinder master arrangement and SS handles	Each	40		
5		Concealed SS finish tower bolts (300mm)	Each	21		
6		SS handles Dorma or equivalent make for double leaf door	Each	66		
7		Dorma make panic bar for double leaf door or similar item or similar rate.	Each	23		
8		Providing and fixing 2 hour fire rated ACCESS DOOR fabricated in GMS Z sections with calcium silicate board 9mm thick infill inclusive of SS hardware and fire rated locks, fixed on GMS framework made of angles and channels as per	Sqm	200		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		drawing, complete for cutouts in walls. All assembly to be painted with fire retardant approved colour & shade.				
9		Providing and fixing structural glass assembly of glazed smoke down stand using 2 sheets 6mm thick toughened glass with nominal gap silicon sealant joint. Glass shall be clear, toughened and laminated with 1.52mm thick polyvinyl butyral layer, as per specification and grade 304 stainless steel of hairline finish assembly fixing on bolted patch plate & SS Spider Fitting with counter sunk screw including down hang galvanized bracket support from structural slab using approved anchor as shown in the detailed drawing, including providing and fixing Rock Wool packing with 12mm thk calcium silicate board as per specification from 1500 to 2000 mm height above false ceiling and bottom edge finished with 3mm grade 304 SS pressed plate as per relevant architectural drawing, for fire separation. (for payment purposes area of glass only shall be measured)	Sqm	158.4		
10		Providing, supply and fixing the a 2-hour fire rated floor/ceiling assembly access hatch door between various floor levels of the UG station. The product should include an optional UL Listed automatic rating of the door assembly ( finish flooring similar to adjacent architectural flooring or must be filled with 1" (25.4mm) resistant coating and a pan cover designed to accept architectural flooring materials. The access door should be made of 1/4" (6.35mm) cover and	Sqm	150		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		extruded aluminum frame, Cover-Aluminum plate reinforced for 150 psf (732 kg/m <sup>2</sup> ) live load and Intumescent fire coating applied to the underside of the cover. Designed with 1" (25.4mm) fillable pan for field installation of architectural flooring material up to 1/2" (12.7mm) thickness . The remaining depth must be filled with concrete to maintain the fire of concrete).Frame-Extruded aluminum frame with built-in anchor flange around the perimeter. Intumescent fire coating applied on the interior surfaces of the frame. Hinges:Continuous heavy-duty Type 316 stainless steel hinge.Latch: Pneumatic self closing system that automatically closes the door in the event of a fire when heat parts a UL-listed 165°F (74°C) fusible link Lift Assistance Compression spring operators enclosed in telescopic tubes. Mechanical hold-open system with release button automatically holds the cover in the open position.				
		<b>TOTAL OF FIRE DOOR WORKS</b>				
<b>16.0</b>		<b>SPECIAL ITEMS</b>				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
1	NDSR	Providing & installation of approved quality vertical linear baffle ceiling made out of folded Aluminum. The baffle units shall be in size of 50mm (W) x 150mm (H) and 1000mm x 4500mm x 1mm (thk), non-perforated. The ceiling baffle units shall be installed at a distance of 300mm c/c in one direction. The baffle units shall be attached to C-channel carriers spaced at 1200mm c/c. The C- channel carriers shall then be cross connected to perforated L-angle primary grid and suspended with M6 threaded rod hangers spaced at 1200mm and pertaining to Class A Fire Rated, as per ASTM E-84	Sqm	4,511.10		
2	NDSR	Architectural items like stone Jalli , sandstone Jalli, Granite Cupola ,Sandstone Jalli, Granite and Sandstone cornice, Carved sandstone balcony , Granite Balcony as per Architectural Drawings for elevation purpose.	LS			
3		Providing,bending to required curved profile and fixings in gleskin clip lock concealed system Profiled Sheeting 500-770mm cover width,43mm crests@186-333mm c/c manufactured out 0.45mm BMT(base metal thickness)Hi-tensile Zincalume/Galvalume steel.The sheets shall have wide pans with stiffening ribs for effective water shedding & strength.Special male/female ends withfull return legs on side laps for Purlin supports and anti-capillaryflute in side lap.The				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		<p>sheets shall have hot-dippedmetallicZinc-Aluminium alloy coating (150gms/sqm,Zinc 45%,Aluminium 55%).Coating mass total on both sides AZ-150 or equivalent as per AS1397-1993 Minimum 550Mpa yield strength with Super durable Polyester XRW/SMP quality paint coat of approved colour.Coating shall be as per AS/NZS-2728-1997,Category 3-4 Total coating thickness of 35 microns,comprising of 20micr on sexterior coat of Super Durable Polyester XRW/SMP on top surfac eand 5micron polyester reverse on back surface over 5 micron primer coats on both surfaces including side and end laps The Sheets shall be fixed using approved continious clip KL-70 or equivalent manufactured from Hi-tensile Zincalume/Galvalume steel base and galvanised hooks as approved by Engineer-In-Charge,The clips hall be fastened by polymer coated hot dip galvanized hexhead self drilling fasteners as per AS3566 class3 with EPDM was her son each crest of sheets for connection with Purlins and polymer coated hot dipped stitching fasteners @ regular Intervalon all sides and end laps</p>				
		As per item No.2 for Roof Sheeting / Side Cladding including for flashing etc in complete	Sqm	1,069.20		
4	NDSR	Providing and fixing VMZINC Interlocking Panel system (thickness: 1.0mm) with 300mm panel width & 2400mm panel length depending on the direction of application (Horizontal / Vertical) fixed / screwed directly to the	Sqm	113.37		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		Aluminium section framing works.The zinc cladding system shall consist of the following elements to form a rigid, ventilated and rain screen system support base for installation of the VMZINC Quartz pre-weathered zinc cladding system.The cladding system shall comprise of the following described from top to bottom:i) Top Layer – VMZINC Quartz Interlocking panel from VM Building Solutions Bagnolet, France or equivalent profiled sheeting manufactured from Zinc alloy ZnTiCu as specified in EN 988, minimum thickness of 1.0 mm. ii) Aluminium box section / Galvanized Z section framing with all the required accessories like HDG brackets, Anchor fasteners, Nut bolts etc.				
5	NDSR	Providing and fixing VMZINC or equivalent, 25/430 double lock standing seam roofing system (thickness: 0.7mm) with crest height of 25 mm thick consisting of fixing clips ZnTiCu as specified in EN 988, minimum thickness of 0.7 mm and The zinc roof sheets shall have a protection on its underside consisting of a 60 micron thick composite acryl ate-urethane protective coating. The protective coating eliminates any risks related to possible corrosion due to made of stainless steel to connect the zinc panel to the Hat section.,Comprising of the following layers. The zinc roof cladding system shall consist of the following elements to form a rigid, non-ventilated and watertight support base for installation of the VMZINC QUARTZ pre-weathered zinc roofing sheets. The roof system	Sqm	1,069.20		

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		shall comprise of the following described from top to bottom: i) Top Layer – VMZINC 25/430 from VM Building Solutions Bagnolet, France or equivalent profiled sheeting manufactured from Zinc alloy contact with incompatible materials and where the underside of the roof sheets is not ventilated and finish as approved by Engineer-in-Charge. ii) Ant abrasive breathable membrane laid at the underside of zinc panels. iii) 0.47mm TCT Hi-Tensile steel sheets profile with nominal 3.5 mm deep ribs at pitch of nominal 48 mm centre to centre distance 550 MPa Yield Strength. iv) GI Strips 1mm thick 100mm wide v) GI Top Hat Z Section 1.5 mm thick vi) One side Aluminium Foil Rockwool Insulation layer with 100 mm thickness having 64 Kg /m <sup>3</sup> Density vii) Solid Steel liner type Trapezoidal sheeting 28-25/198-250, 0.50 mm thick 550MPa, 25 microns polyester coated hot dip galvanized steel With all required system accessories such as fixing clips, flashings, eaves, gables, etc., as per shop drawings, specifications and as directed by the Engineer-in-Charge.				
<b>6</b>		<b>MISCELLANEOUS ITEMS</b>				
<b>6.1</b>		<b>Expansion Joints ( Strip seal joint)</b>				
		Providing and Installing in position approved building expansion joint at floor level between platform level slab, concourse level slab or all location as shown in execution drawings or at locations approved by Engineer consisting of aluminium extrusions, anti-skid serrated top plate				

DETAILED ITEMWISE AND GROUPWISE SCHEDULE						
BILL OF QUANTITIES FOR SWARGATE STATION						
ITEM		DESCRIPTION	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
		(Straight/Curved) with vapour barrier, sealant etc. as per details and specifications or as approved by Engineer. Entire installation is to be carried out strictly in the presence of manufacturer's representative at all times. No extra payment will be made for providing thermocoal at expansion joint between columns/beams/slabs or locations shown in drawing at the time of construction of RCC elements.				
		(i) Expansion /Contraction = +40mm/ -40mm Vertical seismic movement = +10mm/ -10mm	RM	50		
		(ii) Expansion /Contraction = +25mm/ -25mm Vertical seismic movement = +15mm/ -15mm	RM	50		
6.2		Providing and filling sheet covering over expansion joint with iron screws as per design to match the colour /shade of wall.				
		(i) Aluminium fluted strips 3.15mm thick and 150mm wide	RM	50		
		(ii) Aluminium fluted strips 3.15mm thick and 200mm wide	RM	50		
6.3		Polysulphide Sealant				
		Providing and applying Polysulphide sealant in 50mm gap incl back up material in the form of round shape Polyethylene foam at both faces of expansion joint .	m	50		
		<b>TOTAL OF SPECIAL ITEMS</b>				
		<b>TOTAL OF ARCHITECTURAL WORKS FOR SWARGATE STATION</b>				

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**Price Centre K : Electrical and Mechanical works for Budhwar Peth station**

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SL No.	Description of items	TOTAL AMOUNT(IN RUPEES)	
		In Figures	In Words
PART-A	Electrical Works		
PART-B	Fire protection System		
PART-C	Plumbing Works		
	TOTAL		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	<b>SUB-MAIN SIWTHBOARDS AND LOCAL ELECTRICAL PANELS</b>				
<b>E.01</b>	<b>Switch Boards/panels</b>				
a	Supply, installation, testing and commissioning of front operated, front / back access, cubicle type, indoor duty, floor / wall / recess / surface mounted (as specified below), totally enclosed dust and vermin proof switchboards / panels with minimum Ingress protection classification of IP 54, fabricated from 2 mm thick CRCA sheets with dip coat priming and epoxy powder coated finish. The panels must be suitable for 415 volts 3 phase, 4 wire, 50 Hz, system, must be able to withstand symmetrical fault level of (as specified for various panels) for 1 sec at 415 V and must include all interconnections, earthing and bonding requirements etc. The panels must conform to Drawings& Standards specified in relevant specifications, as required and as given below.				
b	Main LV Switchboards must conform the relevant Section of the M & W specifications				
c	All the items mentioned in relevant Sections / Clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates				
d	In case of any contradiction between BOQ / M & W Specifications and Drawings, the most stringent conditions of the above will apply.				
e	The Switchboards shall be provided with detachable gland plates for entry of cables from the top / bottom as required.				
f	All live accessible parts shall be shrouded and all equipment shall be finger touch proof. SMC / DMC shrouds and busbar supports suitably spaced shall be used. Hinged doors with padlocking facility shall be provided on all outgoing feeders with switch handles lockable in OFF position.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
g	All accessories & supporting structures such as channels, ISMC-100 base frame, mounting brackets, lifting lugs, panel heaters, ventilation arrangement etc shall be provided as required.				
h	Each incomer and outgoing feeder shall be provided with LED type status indication lamps suitable for 240 V, AC, as approved.				
i	Space provision as specified in M & W Specifications for future expansion.				
j	Components and accessories shall be same for switchboards and panels for uniformity, standardisation and replaceability and shall be applicable to all panels/ boards under the scope of work				
k	All interconnections, labelling, earthing, associated foundation / masonry work, sealing of gaps around the panels by chequered plates & erection etc. complete shall be executed as required.				
l	MCCB's shall be as per relevant Section of M & W Specifications and shall be current limiting type with front adjustable electronic releases for required protections against fault, suitable for isolation as per Annexure 7.1.2 of IEC 60947 – 2, with Ics and Icu values as specified in relevant clauses of M & W Specifications and conforming to latest IEC 60947. The operating voltage (Ue) shall be 415 V and insulation voltage (Ui) 690V with trip free mechanism, handle indicating ON / OFF / tripped positions. The breaking capacity as mentioned in items of BOQ below, shall be Ics values and shall not be less than 35 kA. Breakers must have Ics = 100% Icu. Electronic trip units shall comply with the requirements as specified in Appendix F (EMC /EMI Compatibility) of IEC 60947-2 or EN 60947-2.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
m	MCCBs for Network / Feeder Protection shall have adjustable protection against Overload and adjustable protection against Short Circuit as specified in M & W Specifications, whether specifically asked in BOQ or not. MCCB's for Network / Feeder Protection shall have releases with Earth Fault protection feature, wherever and as indicated in Bill of Quantities or Drawings. However, on completion of Cable Sizing Calculations and Fault calculations by the Contractor, if Earth Fault releases are required for additional feeders, where this requirement is not indicated in the BOQ, same shall be provided at no extra cost to the Employer. For Motor Protection MCCB's, requirements of M & W Specifications shall be followed.				
n	ACBs/MCCBs shall be compact, suitably designed to provide protection of motors, cables, busbars to suit rated current, unbalanced power distribution, as required.				
o	Panel / Switchboard board design shall be compact and components / accessories of compact sizes shall be used to economise the room space available. Employer reserve the right to seek compact items in place of larger ones.				
p	Incomer ACB'S / MCCBs / MCBs of switchboards / panels shall be provided with NO / NC contacts as specified in specifications for interface with SCADA System and for manual / auto and local / remote operation.				
q	ACB's shall have Microprocessor based releases as specified in the M & W Specifications.				
r	In case higher frame sizes (than those specified in the BOQ) are required to be provided to achieve the requirement of Total Discrimination mentioned in relevant Section of M & W Specifications, due to selection of a particular make, the same shall be provided at no extra cost if other makes are able to achieve the same with the specified frame size.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
s	Contractor must carry out Cable Sizing based on actual lengths of cables and Discrimination study for selection of trip units and settings for the releases during production of Working Drawings.				
t	All Motor feeders, having separate Thermal Over - load relay, shall be provided with Reset push button.				
u	Even though, ratings of MPCB / Contactors for Motor Feeders are mentioned in BOQ items below, after Selection of a particular make of Switchgear, MPCB / Contactors with ratings as per tested Type II Coordination from the selected manufacturer, only shall be provided.				
v	Description of Various panels/boards covered under this BOQ is as given below:				
w	All the panel shall be form form 4b type and shall be Suitable for Built- in CLEAN AGENT fire trace tube gas flooding system.				
<b>E.01.1</b>	<b>Local Motor Control Panels for Sewage Pumps, for both the side (North &amp; south end) as per M &amp; W Specifications &amp; Drawing complete and as per the following details:</b>	No's	1		
	Incomer				
a	Automatic Transfer Switch (ATS) with 2 Nos. 160/40A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
b	LED phase indication lamp for R-Y-B.				
B.	BUS BAR				
	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in relevant section of M & W Specifications) rated 100 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
C.	OUTGOING				
1	2 Sets of Star Delta starter unit for Sewage Pumps (3.7 KW each) with one Pump as Working and One as Standby. Each Starter Unit shall be equipped with the following.				
a	1 No. 3 pole,10 A, MPCB (with inbuilt Single Phasing Preventer) having 6 - 10 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
b	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
c	1 No. Digital Ammeter, CT operated.				
d	1 No. CT, 10/5A, 10VA, class - I for metering.				
e	Auto / Local / Remote Selector Switch key operated.				
f	Door mounted push buttons for Start and Stop functions.				
g	Emergency Stop push button lockable type.				
h	LED indication lamp for ON, OFF, Trip.				
i	3 No. 18A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
J	One No. Star Delta Timer.				
k	One No. timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
l	Running hour meter.				
m	Auxiliary Contactors for Auto/Local/Remote Operation.				
n	Power & Control terminals for cable connections.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
	Equipment common for all feeders is indicated below:				
a)	1 No Working / Standby Selector Switch.				
b)	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
<b>E.01.2</b>	<b>Local Motor Control Panel for Seepage Pumps, for both the ends (north &amp; south) as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	No's	2		
	Incomer				
	Automatic Transfer Switch (ATS) with 2 Nos. 250/160A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
a	LED indication lamp for the following-				
b	ON, OFF, TRIP (each for both the supplies)				
c	LED phase indication lamp for R-Y-B.				
d	BUS BAR				
e	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 200 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
	OUTGOING				
f	3 Sets of Star Delta starter unit for Seepage Pumps (11 KW each) with Three Pumps as Working . Each Starter Unit shall be equipped with the following:				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
g	ss				
h	1 No. 4 Pole RCCB 40A rating and 100mA sensitivity.				
i	1 No. Digital Ammeter, CT operated.				
j	1 No. CT 30/5A, 10VA, class - I for metering.				
k	Auto / Local / Remote Selector Switch key operated.				
l	Door mounted push buttons for Start and Stop functions.				
m	Emergency stop push button lockable type.				
n	LED indication lamp for ON, OFF, Trip.				
o	3 No. 25A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 230 VAC.				
p	One No. Star Delta Timer.				
q	One No. timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
r	Running hour meter.				
s	Auxiliary Contactors for Auto/Local/Remote Operation.				
t	Power & Control terminals for cable connections.				
	Equipment common for all feeders is indicated below:				
u	1 No. 3 Position Selector Switch with all other accessories and auxiliary contactors (for level indication multiplication) to change the sequence of operation of three motors automatically.				
v	1 Nos. Feeders with 100/40 A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit .Feeder shall be equipped with the following:				
w	LED indication lamp for ON, OFF & TRIP.				
x	Phase Indication for R, Y and B				
	Metering				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
y	1 No Digital Voltmeter with Inbuilt Selector Switch.				
z	1 No Digital Ammeter with Inbuilt Selector Switch.				
aa	3 Nos. CTs, 40/5A, 10VA, CL-1 for metering.				
<b>E.01.3</b>	<b>Local Motor Control Panel for Mid tunnel Pumps, as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	No's	1		
	INCOMER				
a	100/40 A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit .				
b	LED phase indication lamp for R-Y-B.				
	BUS BAR				
c	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 100 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
	OUTGOING				
d	2 Sets of Star Delta starter unit for Sump Pumps (3.70 KW each) with one Pump as Working and One as Standby. Each Starter Unit shall be equipped with the following.				
e	1 No. 3 pole, 10 A, MPCB (with inbuilt Single Phasing Preventer) having 6 - 10 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
f	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
g	1 No. Digital Ammeter, CT operated.				
h	1 No. CT, 10/5A, 10VA, class - I for metering.				
i	Auto / Local / Remote Selector Switch key operated.				
j	Door mounted push buttons for Start and Stop functions.				
k	Emergency Stop push button lockable type.				
l	LED indication lamp for ON, OFF, Trip.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
m	3 No. 18A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
n	One No. Star Delta Timer.				
o	One No. timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
p	Running hour meter.				
q	Auxiliary Contactors for Auto/Local/Remote Operation.				
r	Power & Control terminals for cable connections.				
s	1 No Working / Standby Selector Switch.				
t	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
<b>E.01.4</b>	<b>SMDB for Lighting distribution panels as per Technical Specifications and as per the following details.</b>	No's	2		
	INCOMING				
a	1 No. 400 A/400 A, 415V, 65kA, 3P motorised MCCB having (1) Electronic Trip Unit with adjustable Overload, adjustable Short Circuit and adjustable Earth Fault (All with adjustable time delays) protection; (2) Provision for remote tripping of MCCB; (3) NO/NC contacts for operation and (4) Neutral sensor for earth fault protection.				
b	TNC switch				
c	LED indication lamp for ON, OFF & TRIP.				
d	Phase Indication for R, Y and B				
	Metering				
e	1 No Digital Voltmeter with Inbuilt Selector Switch.				
f	1 No Digital Ammeter with Inbuilt Selector Switch.				
g	3 Nos. CTs, 400/5A, 10VA, CL-1 for metering.				
	BUS-BARS				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
h	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars rated 400 Amps, suitable to withstand symmetrical fault level of 50kA 65KA for 1 second at 415 volts.				
	OUTGOINGS				
i	14 Nos. Feeders with 100A/100 A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit.				
j	Scada/BMS Connectivity at the separate Marshelling box in the panel with provision of all necessary I/O points & Transducers mounting prewired upto marshelling box terminal boards from the factory itself and audited in factory from the BMS provider				
<b>E.01.5</b>	<b>SMDB for Small power distribution panels as per Technical Specifications and as per the following details.</b>	No's	2		
	INCOMING				
a	1 No. 630 A / 630 A, 415V, 65kA, 3P motorised MCCB having (1) Electronic Trip Unit with adjustable Overload, adjustable Short Circuit and adjustable Earth Fault (All with adjustable time delays) protection; (2) Provision for remote tripping of MCCB; (3) NO/NC contacts for operation and (4) Neutral sensor for earth fault protection.				
b	TNC switch				
c	LED indication lamp for ON, OFF & TRIP.				
d	Phase Indication for R, Y and B				
	Metering				
e	1 No Digital Voltmeter with Inbuilt Selector Switch.				
f	1 No Digital Ammeter with Inbuilt Selector Switch.				
g	3 Nos. CTs, 630/5A, 10VA, CL-1 for metering.				
	BUS-BARS				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
h	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars rated 630 Amps, suitable to withstand symmetrical fault level of 50 KA for 1 second at 415 volts.				
	OUTGOING				
i	25 Nos. Feeders with 100A/100A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				
j	4 Nos. Feeder with 250A/160A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				
k	Scada/BMS Connectivity at the separate Marshelling box in the panel with provision of all necessary I/O points & Transducers mounting prewired upto marshelling box terminal boards from the factory itself and audited in factory from the BMS provider				
<b>E.01.6</b>	<b>Retail Panel-1</b>	No's	1		
	Incoming				
a	100 amp TPN 50KA MCCB with built in microprocessor based release unit for short circuit, over current and earth fault protection with adjustable setting and with the following accessories :				
b	0-500 volts, digital voltmeter with 2 amps MCB's.				
c	0 – 100 amps digital ammeter and 100/5 amps 15 VA burden,CL 1 CTs				
d	Phase indicating lights protected by 2 amps MCB's.				
e	Each 1 no. NO/NC Auxiliary Contacts (ON/OFF Status) and Trip alarm contact (Trip status) for BMS Monitor (Potential free contacts)				
	Bus Bars				
f	100 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Goings				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
g	4 Nos. 63 amp 50kA TPN MCCB each with microprocessor based releases control unit for protection with site settable over current, short circuit, instantaneous short circuit , earth fault fault protection and indicating lamps, Each 1 no. NO/NC Auxillary Contacts (ON/OFF Status) and Trip alarm contact (Trip status) for BMS Monitor (Potential free contacts)				
h	1 no's 63 amp 690 volts TPN 50 kA MCCBs as spare				
	Metering				
i	1 No., 230V, AC operated integral type Digital meter with RS-485 port for measuring Amps ,Voltage, Energy, frequency & power factor conforming to specifications, latest IEC/ EMC and EMI standards/criterion, with necessary Circuit MCBs and suitable size summing CTs for above two incomer metering supporting SCADA/BMS connectivity				
	Special Features:				
j	BMS compatibility for all incomers, Bus couplers and outgoing breakers including meters, BMS Control / Monitor Parameters (Potential free contacts)				
k	Suitability for Built- in CLEAN AGENT gas flooding system.				
<b>E.01.7</b>	<b>Fire Pump Panel, as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	No's	1		
	INCOMER				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	Automatic Transfer Switch (ATS) with 2 Nos. 400/400A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
b	LED indication lamp for the following-				
c	ON, OFF, TRIP (each for both the supplies)				
d	LED phase indication lamp for R-Y-B.				
	METERING				
e	1 No Digital Voltmeter with Inbuilt Selector Switch.				
f	1 No Digital Ammeter with Inbuilt Selector Switch.				
g	3 Nos. CTs, 400/5A, 10VA, CL-1 for metering.				
	BUS BAR				
h	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in of M & W Specifications) rated 400 Amps, suitable to withstand symmetrical fault level of 50kA for 1 second at 415 volts.				
	OUTGOING				
i	2 Sets of Star Delta starter unit for Fire Hydrant Pumps (116 KW each) with One Pump as Working and One as Standby. Each Starter Unit shall be equipped with the following.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
j	1 No. 3 Pole, 415V, 250 A, 50kA, 3P Motor Duty MCCB with Magnetic Trip Unit Only (having short circuit protection only) and auxiliary Contacts.				
k	1 No. Digital Ammeter, CT operated.				
l	1 No. CT, 160 /5A, 10VA, class - I for metering.				
m	Auto / Local / Remote Selector Switch key operated.				
n	Door mounted push buttons for Start and Stop functions.				
o	Emergency stop push button lockable type.				
p	LED indication lamp for ON, OFF, Trip.				
q	3 No. 150A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
r	One No. Star Delta Timer.				
s	Auxiliary Contactors for Auto/Local/Remote Operation.				
t	Triple pole, Suitable C.T. operated, bimetal Over Load relays (with in built single phasing protection) suitable for above mentioned motor feeder having arrangement for by - passing the Over Load relay in case the pump is running during an emergency scenario with all accessories including 3 Nos. Suitable C.T.s, Auxiliary Contactors etc.				
u	Power & Control terminals for cable connections.				
	Equipment common for all feeders is indicated below:				
v	1 No. Working / Standby Selector Switch.				
w	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
x	2 Sets of Star Delta starter unit for Fire Sprinkler Pumps (45 KW each) with One Pump as Working and One as Standby & 1 no spare. Each Starter Unit shall be equipped with the following.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
y	1 No. 3 Pole, 415V, 250A, 50kA, 3P Motor Duty MCCB with Magnetic Trip Unit Only (having short circuit protection only) and auxiliary Contacts.				
z	1 No. Digital Ammeter, CT operated.				
aa	1 No. CT, 160 /5A, 10VA, class - I for metering.				
ab	Auto / Local / Remote Selector Switch key operated.				
ac	Door mounted push buttons for Start and Stop functions.				
ad	Emergency stop push button lockable type.				
ae	LED indication lamp for ON, OFF, Trip.				
af	3 No. 150A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
ag	One No. Star Delta Timer.				
ah	Auxiliary Contactors for Auto/Local/Remote Operation.				
ai	Triple pole, Suitable C.T. operated, bimetal Over Load relays (with in built single phasing protection) suitable for above mentioned motor feeder having arrangement for by - passing the Over Load relay in case the pump is running during an emergency scenario with all accessories including 3 Nos. Suitable C.T.s, Auxiliary Contactors etc.				
aj	Power & Control terminals for cable connections.				
ak	Equipment common for all feeders is indicated below:				
al	1 No. Working / Standby Selector Switch.				
am	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
an	3 Sets of Star Delta Starter Unit (One Set for Hydrant Jockey Pump, One Set for Sprinkler Jockey Pump & One Set as spare) of 11 KW. Each Starter Unit shall be equipped with the followings:				
ao	1 No. 3 Pole, 415V, 100 A, 50kA, 3P Motor Duty MCCB with Magnetic Trip Unit Only (having short circuit protection only) and auxiliary Contacts.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
ap	1 No. Digital Ammeter, CT operated.				
aq	1 No. CT, 30/5A, 10VA, class - I for metering.				
ar	Auto / Local / Remote Selector Switch key operated.				
as	Door mounted push buttons for Start and Stop functions.				
at	Emergency stop push button lockable type.				
au	LED indication lamp for ON, OFF, Trip.				
av	3 No. 40A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
aw	One No. Star Delta Timer.				
ax	Auxiliary Contactors for Auto/Local/Remote Operation.				
ay	Triple pole, Suitable C.T. operated, bimetal Over Load relays (with in built single phasing protection) suitable for above mentioned motor feeder having arrangement for by - passing the Over Load relay in case the pump is running during an emergency scenario with all accessories including 3 Nos. Suitable C.T.s, Auxiliary Contactors etc.				
az	Power & Control terminals for cable connections.				
<b>E.01.8</b>	<b>Local Motor Control Panel for Water Treatment System, Pump Room as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	No's	1		
	Incomer				
a	2 Nos. 250/160 A, 415V, 35kA, 4P MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and having NO/NC contacts for operation. The MCCB's must be mechanically and electrically interlocked such that it is possible to manually close one of them at a time.				
b	LED phase indication lamp for R-Y-B.				
c	LED indication lamp for the following-				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
d	ON, OFF, TRIP				
e	BUS BAR				
f	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 200 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
	Outgoing				
g	2 Sets of Star - Delta Starter Unit of 7.5 KW (one for Borewell Pump and one as spare). Each Starter Unit shall be equipped with the following:				
h	1 No. 3 pole, 18 A, MPCB (with inbuilt Single Phasing Preventer) having 13 - 18 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
i	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
j	1 No. Digital Ammeter, CT operated.				
k	1 No. CT, 25/5A, 10VA, class - I for metering.				
l	Auto / Local / Remote Selector Switch key operated.				
m	Door mounted push buttons for Start and Stop functions.				
n	Emergency stop push button lockable type.				
o	LED indication lamp for ON, OFF, Trip.				
p	3 No. 25A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
q	One No. Star Delta Timer.				
r	Running Hour meter.				
s	Auxiliary Contactors for Auto/Local/Remote Operation.				
t	Power & Control terminals for cable connections.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
u	9 Sets of Star - Delta Starter Unit of 3.75kW each for Filter Feed Pump (1 Working + 1 Standby), Raw Water Pump (1 Working + 1 Standby), Soft Water Pump (1 Working + 1 Standby), Domestic Water Pump (1 Working + 1 Standby), and 1 nos Spare feeder. Each Starter Unit shall be equipped with the following:				
v	1 No. 3 pole, 10 A, MPCB (with inbuilt Single Phasing Preventer) having 6 - 10 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
w	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
x	1 No. Digital Ammeter, CT operated.				
y	1 No. CT, 10/5A, 10VA, class - I for metering.				
z	Auto / Local / Remote Selector Switch key operated.				
aa	Door mounted push buttons for Start and Stop functions.				
ab	LED indication lamp for ON, OFF, Trip.				
ac	Emergency stop push button lockable type.				
ad	3 No. 18A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
ae	One No. Star Delta Timer.				
af	Running Hour meter.				
ag	Auxiliary Contactors for Auto/Local/Remote Operation.				
ah	Power & Control terminals for cable connections.				
	Equipment common for both feeders in each set of pumps (1 Working & 1 Standby) are indicated below Total Five Sets of such equipment shall be provided:				
ai	1 No Working / Standby Selector Switch.				
aj	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
ak	4Sets of DOL starter unit for Sump Pumps (2.2 KW each) with Two Pump as Working and Two as Standby. Each Starter Unit shall be equipped with the following.				
al	1 No. 3 pole,6.3 A, MPCB (with inbuilt Single Phasing Preventer) having 4 - 6.3 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
am	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
an	1 No. Digital Ammeter, CT operated.				
ao	1 No. CT, 10/5A, 10VA, class - I for metering.				
ap	Auto / Local / Remote Selector Switch key operated.				
aq	Door mounted push buttons for Start and Stop functions.				
ar	Emergency Stop push button lockable type.				
as	LED indication lamp for ON, OFF, Trip.				
at	1 No. 18A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
au	One No. timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
av	Running hour meter.				
aw	Auxiliary Contactors for Auto/Local/Remote Operation.				
ax	Power & Control terminals for cable connections.				
ay	2 Nos. Feeders with 160/100 A, 3 pole, 35kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				
az	3 Nos. Feeders with 100/100 A, 3 pole, 35kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>E.01.9</b>	<b>Local Control Panels, for UPS as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	No's	2		
a	2 Nos. 250/160 A, 415V, 35kA, 4P MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and having NO/NC contacts for operation.				
b	LED indication lamp for the following-				
c	ON, OFF, TRIP (each for both the supplies)				
d	LED phase indication lamp for R-Y-B.				
	Metering				
e	1 No Digital Voltmeter with Inbuilt Selector Switch.				
f	1 No Digital Ammeter with Inbuilt Selector Switch.				
g	3 Nos. CTs, 250/5A, 10VA, CL-1 for metering.				
	BUS-BARS				
h	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in M & W Specifications rated 250 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
	OUTGOINGS				
i	12 Nos. 40A, 4P, MCB (C curve ) .				
j	4Nos. Feeders with 100 / 40 A, 3 pole, 35kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit.				
<b>E.01.10</b>	<b>Auto Transfer Switch for UPS as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	Sets	2		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	Automatic Transfer Switch (ATS) with 2 Nos. 400/250A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
b	LED indication lamp for the following-				
c	ON, OFF, TRIP (each for both the supplies)				
d	LED phase indication lamp for R-Y-B.				
e	Out going terminals for cable collection to be provided.				
<b>E.01.11</b>	<b>Sub Main Distribution Boards for escalator power as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	Nos	2		
	INCOMER				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Automatic Transfer Switch (ATS) with 2 Nos. 400/250A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
	LED indication lamp for the following-				
	ON, OFF, TRIP (each for both the supplies)				
	LED phase indication lamp for R-Y-B.				
	Metering				
	1 No Digital Voltmeter with Inbuilt Selector Switch.				
	1 No Digital Ammeter with Inbuilt Selector Switch.				
	3 Nos. CTs, 250/5A, 10VA, CL-1 for metering.				
	BUS BAR				
	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 250 Amps, suitable to withstand symmetrical fault level of 50kA for 1 second at 415 volts.				
	OUTGOING				
	10 Nos. Feeder with 160/100 A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>E.01.12</b>	<b>Lift Power panel/DB as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	No's	8		
a	Automatic Transfer Switch (ATS) with 2 Nos. 160/100A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
b	LED indication lamp for the following-				
c	ON, OFF, TRIP (each for both the supplies)				
d	LED phase indication lamp for R-Y-B.				
e	1 No 6A, DP, MCB ( B curve) for Lift control supply (UPS supply) local isolation.				
f	Out going terminals for cable collection to be provided as per the lift load & protection requirement.				
<b>E.01.13</b>	<b>DG Set Power, Control &amp; Synchronizing panel DB as per M&amp;W specifications &amp; Drawing complete and as per the following details.</b>	No's	1		
A	From DG Panel to Main Distribution Board				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	1 No. 3200A, 415V, 65kA, 4 Pole, Electrically operated Draw Out type, ACB complete with safety shutters, 240V AC shunt trip coil & closing coil and having microprocessor based releases with (1) Communication capability (2) Provision for measurement of three phase and neutral current (3) Protection against long time + short time + earth fault (all with adjustable time delays) + instantaneous (4) Zone Selective Interlocking Unit for Total Discrimination (5) Communication options to remotely read and set parameters for the protection functions, transmission of ammeter measurements (6) Signalling of the cause of tripping and alarms, maximeter reset etc (7) NO / NC contacts for interlocks and indications. (8) Status Indication ON, OFF, TRIP.				
b	TNC switch				
c	Auto / Local / Remote Selector Switch key operated.				
d	LED indication lamp for ON, OFF & TRIP.				
e	ON, OFF, TRIP, spring charged & phase indication R-Y-B.				
f	Digital Ammeter with Inbuilt Selector Switch				
g	3 Nos. CTs, 3200/5A, 15VA, CL-1 for metering.				
B	D.G. INCOMER				
	2 Nos DG incomer with each consisting of the following-				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	1 No. 1600/ 1600A, 415V, 65kA, 3 Pole, Electrically operated Draw Out type ACB, complete with safety shutters, 240V AC shunt trip coil & closing coil and having microprocessor based releases with (1) Communication capability (2) Provision for measurement of V, A, W, VAR, VA, Wh, VARh, Hz, power factor etc (3) Protection against long time + short time + instantaneous + earth fault (all with adjustable time delays), over and under voltage, minimum and maximum frequency, voltage and current imbalance, phase sequence, load shedding and reconnection & reverse power protection (4) Measurement of interrupted currents, differentiated fault indications, maintenance indicators (5) Last few trippings and event histories and time stamping with facility for consulting the history file, maintenance indicator register etc (6) Communication options to remotely read and set parameters for the protection functions, transmission of all the calculated indicators and measurements (7) Signalling of the cause of tripping and alarms (8) NO / NC contacts for interlocks and indications.				
b	TNC switch				
c	Selector switch for following operation-				
d	Auto / Local / Remote operation of Breaker, Manual / Auto Synchronization, On line set selection.				
e	LED indication lamp for the following-				
f	ON, OFF, TRIP, spring charged & phase indication R-Y-B.				
g	Push Buttons for the following functions-				
h	Fault Accept, Annunciator Reset, Lamp test.				
	Metering				
i	Multifunction energy meter for measurement of voltage, line current, power factor, power & energy				
j	4 Nos. CTs, 2000/5A, 15VA, CL-1 for metering.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
k	Protection-				
l	Microprocessor base restricted earth fault relay.				
m	Microprocessor base differential protection relay.				
n	Master Trip Lockout Relay.				
o	4 Nos. CTs, 1600/5A, 15VA, CL-PS.(3 Nos in Panel and One No in DG neutral) for REF protection.				
p	6 Nos. CTs, 1600/5A, 15VA, CL-PS. (3 Nos in Panel and 3 Nos in Alternator Winding) for Differential protection.				
q	8 Window Annunciator with Hooter.				
r					
s	1 No 250A, AC-3 duty, Power Contactor with Auxiliary Contacts for neutral.				
t	Synchronizing equipment-				
u	Provision & Installation of Auto Synchronising Module for each DG Set with AMF, Active & Reactive Auto load sharing & Auto Load Management, with 16 Nos. Digital Inputs & Digital Outputs, with provision for BMS / SCADA connectivity.				
v	1 No Double Voltmeter, 1 No Double frequency Meter, 1 No Synchronoscope, 1 No Synchro Check Relay, Set of dark lamps with auxiliary transformer, 1 No Selector Switch for set to be synchronised (One set for Total No of DG sets)				
w	Voltage Raise / Lower & Frequency Raise / Lower Switch.				
x	Solid state / Motorised Potentiometer for AVR and Speed control ( as per manufacturer's requirement).				
y	1 No 24V DC source unit, 24V DC battery (for 8 hours back up) with battery charging circuit. (Common for all DG synchronization system).				
z	BUS BAR				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
z	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in of M & W Specifications) rated 4000 Amps, suitable to withstand symmetrical fault level of 65kA for 1 second at 415 volts.				
aa	OUTGOING FEEDERS				
ab	2 nos. 400A/400A, 415V, 65kA, 3P, MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and Earth Fault (With Adjustable time delay); having NO/NC contacts for operation and neutral sensor for earth fault protection.				
ac	LED phase indication lamp for R-Y-B.				
ad	Digital Ammeter with Inbuilt Selector Switch				
ae	3 Nos. CTs, 400/5A, 10VA, CL-1 for metering.				
af	2 no. 160A/100A, 415V, 65kA, 3P, MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and Earth Fault (With Adjustable time delay); having NO/NC contacts for operation and neutral sensor for earth fault protection.				
ag	Digital Ammeter with Inbuilt Selector Switch				
ah	3 Nos. CTs, 100/5A, 10VA, CL-1 for metering.				
<b>E.01.14</b>	<b>D.G. Auxiliary panel as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	Nos	1		
a	Incoming				
b	1No. 160 / 100 A, 415V, 35kA, 3P MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and Earth fault and having NO/NC contacts for operation and neutral sensor for earth fault protection.				
c	LED phase indication lamp for R-Y-B.				
d	Metering				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
e	1 No Digital Ammeter with Inbuilt Selector Switch.				
	3 Nos. CTs, 100/5A, 10VA, CL-1 for metering.				
f	Bus bars				
	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 100 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
g	Outgoings				
h	3 Sets of DOL Starter units of 0.75 kW each for Engine Lub-oil Priming Pump (2 Working + 1 Spare) & each shall be equipped as detailed below.				
i	1 No. 3 pole 2.5 Amps MPCB (with inbuilt single Phasing Preventer) having 1.6 - 2.4A Over - load release and having contacts for indications - On, Off, Trip.				
j	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
k	Auto / Local / Remote Selector Switch key operated.				
l	Door mounted push buttons for Start and Stop functions.				
m	Emergency stop push button lockable type.				
n	LED indication lamp for ON, OFF, Trip.				
o	1 No. 9A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
p	Auxiliary Contactors for Auto/Local/Remote Operation.				
q	Power & Control terminals for cable connections.				
r	2 Sets of DOL Starter units for Fuel Transfer Pumps (2.2 KW each) 1 Working + 1 Standby & each shall be equipped as detailed below.				
s	1 No. 3 pole 6.3 Amps MPCB (with inbuilt single Phasing Preventer) having 4 - 6.3A Over - load release and having contacts for indications - On, Off, Trip.				
t	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
u	1 No. Digital Ammeter, CT operated.				
v	1 No. CT, 10/5A, 10VA, class - I for metering.				
w	Auto / Local / Remote Selector Switch key operated.				
x	Door mounted push buttons for Start and Stop functions.				
y	Emergency stop push button lockable type.				
z	LED indication lamp for ON, OFF, Trip.				
aa	1 No. 9A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 VAC.				
ab	One No timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
ac	Running hour meter.				
ad	Auxiliary Contactors for Auto/Local/Remote Operation.				
ae	Power & Control terminals for cable connections.				
af	Equipment common for all feeders as below:				
ag	1 No Working / Standby Selector Switch.				
ah	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
ai	3No. 100 / 40 A, 415V, 50kA, 3P MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and Earth fault and having NO/NC contacts for operation and neutral sensor for earth fault protection. Breaker shall be equipped as detailed below.				
aj	LED phase indication lamp for R-Y-B.				
ak	LED indication lamp for the following-				
	ON, OFF, TRIP				
	<b>TOTAL FOR SUB-MAIN SWITCHBOARDS AND LOCAL ELECTRICAL PANELS</b>				
<b>E.02</b>	<b>DISTRIBUTION BOARDS</b>				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	The Distribution Boards specified herein, must conform to relevant section of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the specified conditions will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
	Supply, Installation, Testing & Commissioning of front operated, indoor, front access cubicle type, dead rear, wall / recess / surface mounted Distribution Boards, (confirming to specifications given in Section E06 of M & W Specifications). The Distribution Boards must have Ingress Protection Classification of IP 54, current rating of 100 Amps, and must be suitable to withstand symmetrical fault current level of 10 KA for 1 sec at 415 volts, with the configurations detailed below. Distribution boards must be provided with electrolytic, high conductivity, TPN copper bus-bars as specified in M & W specifications (with full sized Neutral busbar), gland plates at both ends, blanking plates etc. as required. All internal wiring within the Distribution boards must be with Copper Conductor, LSZH wires (conforming to BS 7211 and Section E02 of M & W Specifications) for Normal Lighting and Socket Distribution Boards and with Fire Resistant / Survival wires (conforming to BS 7846 and Section E02 of M & W Specifications) for Emergency Lighting Distribution Boards.				
<b>E.02.1</b>	<b>SMALL POWER (SOCKET) TPN DISTRIBUTION BOARDS FOR UC., PL. BOH</b>	NOS	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	24 Nos. 25A, SP MCB				
f	6 Nos. 32A, 4P MCB + RCCB (30 mA Sensitivity)				
g	Terminals blocks for power & control cables.				
<b>E.02.2</b>	<b>SMALL POWER TPN DISTRIBUTION BOARDS FOR PL. PUBLIC AREA (SPDB - 2, 4 as per Drawing ).</b>	NOS	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	12 Nos. 25A, SP MCB				
f	2 Nos. 32A, 4P MCB + RCCB (30 mA Sensitivity)				
h	Terminals blocks for power & control cables.				
<b>E.02.3</b>	<b>SMALL POWER TPN DISTRIBUTION BOARDS FOR CONC., &amp; GROUND AREA</b>	NOS	4		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	24 Nos. 25A, SP MCB				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
f	4 Nos. 32A, 4P MCB + RCCB (30 mA Sensitivity)				
h	Terminals blocks for power & control cables.				
<b>E.02.4</b>	<b>SMALL POWER TPN DISTRIBUTION BOARDS FOR TUNNEL NORTH</b>	NOS	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	36 Nos. 25A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.5</b>	<b>SMALL POWER TPN DISTRIBUTION BOARDS FOR TUNNEL SOUTH</b>	NOS	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	36 Nos. 25A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.6</b>	<b>ADVIRTISEMENT DISTRIBUTION TPN DISTRIBUTION BOARDS</b>	NOS	4		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
d	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
e	OUTGOING				
f	24 Nos. 25A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.7</b>	<b>NORMAL LIGHTING TPN DISTRIBUTION BOARDS FOR PUBLIC AREAS</b>	Nos	4		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 32A, TPN MCB				
d	3 Nos. 25A, 4 Pole MCB + RCCB (30 mA Sensitivity)				
e	3 Nos. 25A, 3 pole AC-3 duty Contactor.				
	Auxiliary Contactors, 4 nos push buttons, indication lamp for 50%, 75% and 100% selection, Local / Remote selector switch for Auto/Local Operation and lighting control from control desk located at Station control room or through SCADA.				
f	OUTGOING				
g	18 Nos. 10A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.8</b>	<b>NORMAL LIGHTING TPN DISTRIBUTION BOARDS FOR PL BOH</b>	Nos	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 25A, TPN MCB				
	3 Nos. 25A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	18 Nos. 10A, SP MCB				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
h	Terminals blocks for power & control cables.				
<b>E.02.9</b>	<b>NORMAL LIGHTING TPN DISTRIBUTION BOARDS FOR CONC. BOH</b>	Nos	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 25A, TPN MCB				
	3 Nos. 25A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	36 Nos. 10A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.10</b>	<b>EMERGENCY LIGHTING TPN DISTRIBUTION BOARDS</b>	Nos	6		
a	INCOMER				
b	1 No. 32A, TPN MCB				
c	OUTGOING				
d	9 Nos. Of 10A DP MCB + DP RCCB (30mA Sensitivity)				
e	Terminals blocks for power & control cables.				
<b>E.02.11</b>	<b>EMERGENCY LIGHTING TPN DISTRIBUTION BOARDS</b>	Nos	6		
a	INCOMER				
b	1 No. 32A, TPN MCB				
c	OUTGOING				
d	12 Nos. Of 10A DP MCB + DP RCCB (30mA Sensitivity)				
e	Terminals blocks for power & control cables.				
<b>E.02.12</b>	<b>TPN EMERGENCY LIGHTING DISTRIBUTION BOARD UDB - (for tunnels)</b>	Nos	2		
	INCOMER				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	One no 100 / 40 A, 3 pole, 35kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit. The MCCB should be suitable for remote ON and OFF and auxiliary ON and OFF contacts should be provided for remote monitoring.				
b	OUTGOING				
c	30 Nos. Of 10A DP MCB + DP RCCB (30mA Sensitivity)				
d	Terminals blocks for power & control cables.				
<b>E.02.13</b>	<b>SPN EMERGENCY DISTRIBUTION BOARD FOR SCADA (5 Nos)</b>	Nos	4		
a	INCOMER				
b	1 No. 32A, DP MCB				
c	OUTGOING				
d	8 Nos. Of 10A DP MCB + DP RCCB (30mA Sensitivity)				
e	Terminals blocks for power & control cables.				
<b>E.02.14</b>	<b>SPN EMERGENCY DISTRIBUTION BOARD FOR UTILITY BUILDING UPS</b>	Nos	1		
a	INCOMER				
b	1 No. 20A, DP MCB				
c	OUTGOING				
d	9 Nos. Of 6A DP MCB + DP RCCB (30mA Sensitivity)				
e	Terminals blocks for power & control cables.				
<b>E.02.15</b>	<b>SMALL POWER (SOCKET) TPN DISTRIBUTION BOARDS</b>	NOS	1		
a	INCOMER				
b	1 No. 50A, TPN MCB				
c	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	24 Nos. 25A, SP MCB				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
f	6 Nos. 32A, 4P MCB + RCCB (30 mA Sensitivity)				
g	Terminals blocks for power & control cables.				
<b>E.02.16</b>	<b>NORMAL LIGHTING TPN DISTRIBUTION BOARDS</b>	NOS	1		
a	INCOMER				
b	1 No. 25A, TPN MCB				
c	3 Nos. 25A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	15 Nos. 10A, SP MCB				
f	Terminals blocks for power & control cables.				
	TOTAL FOR DISTRIBUTION BOARDS				
<b>E.03</b>	<b>CABLES, CABLE TRAYS &amp; STEELWORK</b>				
	The Cable and Cable Containment System specified herein, must conform to relevant Section of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
	It may be noted that Contractor will be required to carry out cable sizing based on actual cable lengths, as per Working Drawings developed by him and after incorporating any changes in load requirements from the tendering stage. Optimisation must be carried out during cable sizing to reduce the cable requirement and size. Further, Contractor must obtain Engineer's approval on the Cable Sizing Calculation.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.03.1	Supply at the site of work of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen Type Cables conforming to BS 6724 and relevant Section of the M&W specifications of the following sizes:				
	(Note: In case of any contradiction between BS 6724 and Specification , the stringent conditions of the two will apply)				
a	4 x 300 Sq.mm	RM	1040		
b	4 x 240 Sq.mm	RM	160		
c	4 x 185 Sq.mm	RM	560		
d	4 x 150 Sq.mm	RM	320		
e	4 x 120 Sq.mm	RM	RO		
f	4 x 95 Sq.mm	RM	97		
g	3 x 95 Sq.mm	RM	RO		
g	4 x 70 Sq.mm	RM	1200		
h	3 x 70 Sq.mm	RM	120		
i	4 x 50 Sq.mm	RM	880		
j	3 x 50 Sq.mm	RM	80		
k	4 x 35 Sq.mm	RM	800		
l	3 x 35 Sq.mm	RM	RO		
m	4 x 25 Sq.mm	RM	3360		
n	3 x 25 Sq.mm	RM	RO		
o	4 x 16 Sq.mm	RM	6600		
p	3 x 16 Sq.mm	RM	800		
q	4 x 10 Sq.mm	RM	4000		
r	3 x 10 Sq.mm	RM	431		
s	4 x 6 Sq.mm	RM	80		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
t	3 x 6 Sq.mm	RM	434		
u	4 x 4 Sq.mm	RM	80		
v	3 x 4 Sq.mm	RM	480		
w	4 x 2.5 Sq.mm	RM	80		
x	3 x 2.5 Sq.mm	RM	RO		
y	2 x 2.5 Sq.mm	RM	RO		
z	2 x 4Sq.mm	RM	RO		
<b>E.03.2</b>	<b>Supply at the site of work of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen, Fire Resistant / Survival Type Cables conforming to BS 7846 and revevant Section of M&amp;W Specifications , of the following sizes:</b>				
	(Note: In case of any contradiction between BS 7846 and Specification, the stringent conditions of the two will apply)				
a	4 x240Sq.mm	RM	20		
b	4 x185Sq.mm	RM	30		
c	4 x 95 Sq.mm	RM	50		
d	3 x 95 Sq.mm	RM	RO		
e	3 x 70 Sq.mm	RM	100		
f	4 x 50 Sq.mm	RM	50		
g	3 x 50 Sq.mm	RM	240		
h	4 x 25 Sq.mm	RM	120		
i	3 x 16 Sq.mm	RM	42		
j	4 x 10 Sq.mm	RM	1022		
k	3 x 10 Sq.mm	RM	80		
l	4 x 6 Sq.mm	RM	120		
m	4 x 2.5 Sq.mm	RM	RO		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
n	3 x 2.5 Sq.mm	RM	RO		
o	2 x 2.5 Sq.mm	RM	352		
p	2 x 4 Sq.mm	RM	RO		
<b>E.03.3</b>	<b>Supply at the site of work of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen Type Control Cables conforming to BS 6724 &amp; relevant section of M&amp;W Specifications, of the following sizes:</b>				
	(Note: In case of any contradiction between BS 6724 and Specification , the stringent conditions of the two will apply)				
a	2 C x 2.5 Sq. mm Copper cable	RM	24		
b	3 C x 2.5 Sq. mm Copper cable	RM	24		
c	4 C x 2.5 Sq. mm Copper cable	RM	28		
d	5 C x 2.5 Sq. mm Copper cable	RM	28		
e	7 C x 2.5 Sq. mm Copper cable	RM	20		
f	9 C x 2.5 Sq. mm Copper cable	RM	28		
g	12 C x 2.5 Sq. mm Copper cable	RM	28		
h	16 C x 2.5 Sq. mm Copper cable	RM	28		
l	19 C x 2.5 Sq. mm Copper cable	RM	36		
<b>E.03.4</b>	<b>Supply at the site of work of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen, Fire Resistant / Survival Type Auxiliary / Control Cables conforming to BS 7846 and relevant Section of M&amp;W Specifications , of the following sizes:</b>				
	(Note: In case of any contradiction between BS 7846 and Specification , the stringent conditions of the two will apply)				
a	2 C x 2.5 Sq. mm Copper cable	RM	1056		
a	3 C x 2.5 Sq. mm Copper cable	RM	264		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
b	4 C x 2.5 Sq. mm Copper cable	RM	2200		
c	5 C x 2.5 Sq. mm Copper cable	RM	1320		
d	7 C x 2.5 Sq. mm Copper cable	RM	1056		
e	9 C x 2.5 Sq. mm Copper cable	RM	132		
f	12 C x 2.5 Sq. mm Copper cable	RM	88		
g	16 C x 2.5 Sq. mm Copper cable	RM	88		
h	19 C x 2.5 Sq. mm Copper cable	RM	264		
<b>E.03.5</b>	<b>Laying, testing and commissioning of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen Type and Fire Resistant / Survival Type Cables (as specified in Schedule 3.01 &amp; 3.02) on existing trays/ walls/ columns/ indoor/ trenches with suitable clamps, saddles, hooks, bolts etc.</b>				
a	4 x 300 Sq.mm	RM	1040		
b	4 x 240 Sq.mm	RM	176		
c	4 x 185 Sq.mm	RM	584		
d	4 x 150 Sq.mm	RM	320		
e	4 x 120 Sq.mm	RM	RO		
f	4 x 95 Sq.mm	RM	137		
g	3 x 95 Sq.mm	RM	RO		
g	4 x 70 Sq.mm	RM	1200		
h	3 x 70 Sq.mm	RM	200		
i	4 x 50 Sq.mm	RM	920		
j	3 x 50 Sq.mm	RM	320		
k	4 x 35 Sq.mm	RM	800		
l	3 x 35 Sq.mm	RM	RO		
m	4 x 25 Sq.mm	RM	3480		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
n	3 x 25 Sq.mm	RM	RO		
o	4 x 16 Sq.mm	RM	6600		
p	3 x 16 Sq.mm	RM	842		
q	4 x 10 Sq.mm	RM	5022		
r	3 x 10 Sq.mm	RM	511		
s	4 x 6 Sq.mm	RM	200		
t	3 x 6 Sq.mm	RM	434		
u	4 x 4 Sq.mm	RM	80		
v	3 x 4 Sq.mm	RM	480		
w	4 x 2.5 Sq.mm	RM	80		
x	3 x 2.5 Sq.mm	RM	RO		
y	2 x 2.5 Sq.mm	RM	352		
z	2 x 4Sq.mm	RM	RO		
<b>E.03.6</b>	<b>Laying, testing and commissioning of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen Type and Fire Resistant / Survival Type Control Cables on existing trays/walls/columns/ indoor/ trenches with suitable clamps, saddles, hooks, bolts etc.</b>				
a	2 C x 2.5 sqmm	RM	984		
b	3 C x 2.5 sqmm	RM	264		
c	4 C x 2.5 sqmm	RM	2028		
d	5 C x 2.5 sqmm	RM	1228		
e	7 C x 2.5 sqmm	RM	980		
f	9 C x 2.5 sqmm	RM	148		
g	12 C x 2.5 sqmm	RM	108		
h	16 C x 2.5 sqmm	RM	108		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
I	19 C x 2.5 sqmm	RM	276		
E.03.7	Supply and providing terminations conforming to relevant Section of M & W Specifications for XLPE insulated, LSZH and Fire Survival (as specified in Schedule 3.02) armoured / unarmoured cables of sizes given below including the cost of supplying, fixing and crimping copper lugs, double compression Flame proof brass glands, insulation tape etc. This also includes making holes in gland plate complete as per specifications and as required.				
a	4 x 300 Sq.mm	RM	98		
b	4 x 240 Sq.mm	RM	26		
c	4 x 185 Sq.mm	RM	13		
d	4 x 150 Sq.mm	RM	18		
e	4 x 120 Sq.mm	RM	1		
f	4 x 95 Sq.mm	RM	4		
g	3 x 95 Sq.mm	RM	2		
g	4 x 70 Sq.mm	RM	8		
h	3 x 70 Sq.mm	RM	4		
i	4 x 50 Sq.mm	RM	10		
j	3 x 50 Sq.mm	RM	4		
k	4 x 35 Sq.mm	RM	4		
l	3 x 35 Sq.mm	RM	2		
m	4 x 25 Sq.mm	RM	30		
n	3 x 25 Sq.mm	RM	2		
o	4 x 16 Sq.mm	RM	98		
p	3 x 16 Sq.mm	RM	3		
q	4 x 10 Sq.mm	RM	30		
r	3 x 10 Sq.mm	RM	30		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
s	4 x 6 Sq.mm	RM	3		
t	3 x 6 Sq.mm	RM	24		
u	4 x 4 Sq.mm	RM	2		
v	3 x 4 Sq.mm	RM	4		
w	4 x 2.5 Sq.mm	RM	2		
x	3 x 2.5 Sq.mm	RM	2		
y	2 x 2.5 Sq.mm	RM	20		
z	2 x 4Sq.mm	RM	2		
<b>E.03.8</b>	<b>Supply and Providing terminations conforming to relevant Section of M &amp; W Specifications for XLPE, LSZH, armoured / unarmoured cables of sizes given below including the cost of supplying, fixing and crimping copper lugs, double compression Flame proof brass glands, insulation tape etc. This also includes making holes in gland plate complete as per specifications and as required.</b>				
a	3 C x 2.5 Sq.mm Cu. Cable	Nos	6		
b	4 C x 2.5 Sq.mm Cu. Cable	Nos	32		
c	5 C x 2.5 Sq.mm Cu. Cable	Nos	32		
d	7 C x 2.5 Sq.mm Cu. Cable	Nos	10		
e	9 C x 2.5 Sq.mm Cu. Cable	Nos	6		
f	12 C x 2.5 Sq.mm Cu. Cable	Nos	6		
g	16 C x 2.5 Sq.mm Cu. Cable	Nos	6		
h	19 C x 2.5 Sq.mm Cu. Cable	Nos	8		
i	2 C x 2.5 sqmm Cu. Cable	Nos	48		
<b>E.03.9</b>	<b>CABLE TRAY</b>				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Supply & installation of Prefabricated, perforated GI cable trays made of minimum 2mm thick GI sheets continuously connected including horizontal and vertical bends, reducers, tees, coupling plate and nut bolts washers, securing the support to the structure by dash fasteners, minor civil work, etc. duly suspended from the ceiling with 12mm dia vertical G.I rods supported by 40 mm X40 mm X5mm G.I angle etc. (or installed on wall supported on suitable brackets as required & approved) , conforming to M & W relevant Specifications Section .				
	With return flange				
a	600 mm wide x 50 mm deep	Meters	560		
b	450 mm wide x 50 mm deep	Meters	80		
c	300 mm wide x 50 mm deep	Meters	1200		
d	150mm wide x 50mm deep	Meters	1840		
e	100mm wide x 50mm deep	Meters	80		
	Without return flange				
a	600 mm wide x 50 mm deep	Meters	240		
b	450 mm wide x 50 mm deep	Meters	40		
c	300 mm wide x 50 mm deep	Meters	2640		
d	150mm wide x 50mm deep	Meters	1680		
e	100mm wide x 50mm deep	Meters	1200		
<b>E.03.10</b>	<b>CABLE LADDER</b>				
	Supply & installation of prefabricated, GI, ladder type cable tray conforming to M & W Specifications , continuously connected including horizontal & vertical bends reducers, tees, coupling plate, nut bolts washers etc. The side runners shall be 100 x 20 x 2.5 mm and centre rungs shall be of size 30 x 15 x 2.5 mm with centre to centre distance of 250 mm, as required.				
a	600 mm wide	Meters	2040		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
b	450 mm wide	Meters	160		
c	300 mm wide	Meters	528		
d	150 mm wide	Meters	120		
e	100 mm wide	Meters	80		
E.03.11	Supply, fabrication & installation of fabricated GI steel work conforming to M & W specification, to support GI cable trays, bus duct, light fixtures, conduit wirings , Bracket ,& other electrical works including Tunnel servicesetc, as required. This includes all the fixing accessories like fasteners and all masonry works.	Kgs	25600		
	<b>TOTAL FOR CABLES, CABLE TRAYS &amp; STEELWORK</b>				
E.04	<b>WIRING &amp; ACCESSARIES</b>				
	Whether explicitly stated in the schedules below or not, the following must be complied with:				
	For supply and installation of conduits, cable trunking, raceway, flexible conduits and wiring, relevant clauses of M & W Specifications must be followed				
	Wires supplied must conform to relevant clauses of M & W Specifications				
	Wiring accessories must conform to relevant Section of the M & W Specifications				
	In case of any contradiction between BOQ and M & W specifications, the most stringent condition of the two will apply.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.1	Supply, Installation, Testing and Commissioning of conducting & wiring for primary point (MCB to first point) for light / fan / exhaust fan / call bell point with 2.5 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.	Points	48		
E.04.2	Supply, Installation, Testing and Commissioning of conducting & wiring for secondary point for light / fan / exhaust fan / call bell point with 2.5 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.	Points	325		
E.04.3	Supply, Installation, Testing and Commissioning of conducting& wiring for primary point (MCB to first point) for light / fan / exhaust fan / call bell point with 2.5 sq. mm single core, copper conductor, Fire Survival Type, LSZH wires, conforming to BS 7846 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.	Points	16		
E.04.4	Supply, Installation, Testing and Commissioning of conducting& wiring for secondary point for light / fan / exhaust fan / call bell point with 2.5 sq. mm single core, copper conductor, Fire Survival Type, LSZH wires, conforming to BS 7846 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.	Points	109		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.5	Supply, Installation, Testing and Commissioning of conducting & wiring for primary point (MCB to first point) for light / fan / exhaust fan / call bell point with 4 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.(For Flood lighting)	Points	6		
E.04.6	Supply, Installation, Testing and Commissioning of conducting & wiring for secondary point for light / fan / exhaust fan / call bell point with 4 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.(For Flood lighting)	Points	13		
E.04.7	Supply, Installation, Testing and Commissioning of conducting & wiring for primary point (From DB to switchboard & switch board to first point) for light / fan / exhaust fan / call bell point with 3 x 2.5 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in hot dipped galvanized welded steel conduit / flexible conduit, recessed / surface mounted complete with accessories such as bends, junction boxes, flexible conduit, pull boxes, saddles including cutting, chasing and refilling etc. complete, as required, with modular type switch, front plate, box etc. as per M & W specifications.				
a	First point controlled by 16A switch\10A MCB	Nos.	53		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.8	Supply, Installation, Testing and Commissioning of wiring for primary point (From DB to switchboard & switch board to first point) for light / fan / exhaust fan / call bell point with 3 x 2.5 sq. mm single core, copper conductor, Fire Survival Type, LSZH wires, conforming to BS 7846 and Section E02 of M & W Specifications, in hot dipped galvanized welded steel conduit / flexible conduit, recessed / surface mounted complete with accessories such as bends, junction boxes, flexible conduit, pull boxes, saddles including cutting, chasing and refilling etc. complete, as required, with modular type switch, front plate, box etc. as per M & W specifications.				
a	First point controlled by 16A switch\10A MCB	Nos.	20		
E.04.9	Supply, Installation, Testing and Commissioning of conducting & wiring for secondary / loop point for light / fan / exhaust fan / call bell point with 3 x 2.5 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in hot dipped galvanized welded steel conduit / flexible conduit, recessed / surface mounted complete with accessories such as bends, junction boxes, flexible conduit, pull boxes, saddles including cutting, chasing and refilling etc. complete, as required, with modular type switch, front plate, box etc. as per M & W specifications.	Nos.	265		
E.04.10	Supply, Installation, Testing and Commissioning of conducting & wiring for secondary / loop point for light / fan / exhaust fan / call bell point with 3 x 2.5 sq. mm single core, copper conductor, Fire Survival Type, LSZH wires, conforming to BS 6387 and relevant Section of M & W Specifications, in hot dipped galvanized welded steel conduit / flexible conduit, recessed / surface mounted complete with accessories such as bends, junction boxes, flexible conduit, pull boxes, saddles including cutting, chasing and refilling etc. complete, as required, with modular type switch, front plate, box etc. as per M & W specifications.	Nos.	86		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.11	Supply, Installation, Testing and commissioning of wiring for Tunnel light with 3 core x 4 sq.mm, armoured, XLPE insulated, Low Smoke Zero Halogen, Fire Resistant / Survival Type Cables conforming to BS 7846 and relevant Section of M & W specifications, for tunnel lights including termination, saddles, earthing etc. complete as required.				
a	Primary Point	Nos.	48		
b	Secondary point	Nos.	392		
E.04.12	Supply and fixing of M.S. electro-galvanised box in recess / surface for power points including providing and fixing of moulded plate type, universal 6 pin, 6 / 16A shrouded socket outlet (shuttered) as specified in M & W Specifications, with 16A switch including connections, earthing and testing etc as required.	Nos	120		
E.04.13	Supplying and fixing of 3 Phase, 5 pin, 32A industrial switch, (as specified in M & W specifications), controlled socket outlet with straight plugs in IP - 65 enclosure including connections, earthing and testing etc. Complete as required	Nos	17		
E.04.14	Supplying and fixing of 1 Phase, 3 pin, 16A industrial switch, (as specified in M & W specifications), controlled socket outlet with straight plugs in IP - 65 enclosure for tunnel & station area including termination, earthing and testing etc. Complete as required	Nos	62		
E.04.15	Supplying & fixing of 50 mm x 200 mm(w), rectangular, G.I. Cable trunking including pull boxes as required at site, 2 mm thick, as specified in relevant section of M & W Specifications, with one side having continuous hinged cover with locking arrangement, earthing arrangement including provision of earthing strips at joints etc. complete as required.	Mtr.	400		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
E.04.16	Supplying & fixing of 50 mm x 50 mm(w), rectangular, G.I. Cable trunking including pull boxes as required at site, 2 mm thick, as specified in section E03 of M & W Specifications with one side having continuous hinged cover with locking arrangement, earthing arrangement including provision of earthing strips at joints etc. complete as required.	Mtr.	640		
E.04.17	Supply and installation of following sizes of hot dipped galvanised welded steel conduit in surface / recess with GI junction boxes, pull box, saddles including cutting, chasing and refilling etc. complete as required.				
a	25mm dia conduit	Mtr.	1600		
b	32mm dia conduit	Mtr.	240		
E.04.18	Supply and installation of following sizes of GI flexible conduit in surface / recess with coupler, saddles including cutting, chasing and refilling etc. complete as required.				
a	25mm dia conduit	Mtr.	480		
b	32mm dia conduit	Mtr.	160		
E.04.19	Supply, Laying, Installation, Testing & commissioning of wiring for Advertisement point with 3 core x 4 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable\wire as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.				
a	Primary Point	Nos.	12		
b	Secondary point	Nos.	48		
E.04.20	Supply, Laying, Installation, Testing & commissioning of wiring for single phase 3 pin 16A industrial socket outlet with 3 core x 6 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.				
a	Primary Point	Nos.	11		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
b	Secondary point	Nos.	11		
4.22	Supply, Laying, Installation, Testing & commissioning of wiring for single phase 6 pin 6\16A socket outlet with 3 core x 4 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable\wire as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.				
a	Primary Point	Nos.	60		
b	Secondary point	Nos.	60		
E.04.21	Supply, Laying, Installation, Testing & commissioning of wiring for three phase, 5 pin, 32A industrial socket outlet with 4 core x 6 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.	No.	17		
E.04.22	Supply, Laying, Installation, Testing & commissioning of wiring for single phase 3 pin 16A industrial socket outlet in Tunnel with 3 core x 6 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.(Inside tunnel)				
a	Primary Point	Nos.	20		
b	Secondary point	Nos.	20		
E.04.23	Supply, Laying, Testing & commissioning of 4 core x 4 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, for bus trunking connections including terminations, saddles, earthing etc. complete as required.	Meter	640		
E.04.24	Supply, Laying, Testing & commissioning of 2 core x 4 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, for bus trunking connections including terminations, saddles, earthing etc. complete as required.	Meter	40		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.25	Supply, Laying, Testing & commissioning of 3 core x 2.5 sq.mm, LSZH, copper wire as per BS 7211 and relevant Section of M & W specifications, from Tap off boxes to Lighting Fixture including connections, earthing etc. complete as required.	Meter	800		
E.04.26	Supply, installation & testing of 25 A, Copper, Lighting Bus Trunking System in easy detachable and convenient assembly suitable for 415 +-10% Volts, 3 Phase+ Single Phase, 8 Wire, 50 Hz A C System with Cu Bus Conductors of minimum 2.5 sq mm section and stainless steel / hot galvanised steel enclosure, with tap off provision every 0.5 mtr. The Lighting Bus Trunking shall be confirming to latest IEC Standards. It shall be with IP-55 Protection, halogen free and Fault Level Withstand Capacity of 2.5 kA min for 0.1 Sec (Icw) and 9.6 kA (Ipk). The Bus Trunking shall be complete with accessories like supporting clamps for Installation at Site, Fixing Clamps for luminaries and cable & one run of Cu earthing of 25x3 sqmm. equal to phase etc as required.				
a	Straight Feeder 25 A (3 Mtrs Length)	Nos	224		
b	End Feed Unit	Nos	13		
c	End Covers	Nos	13		
d	Flexible Joints	Nos	4		
e	10/16 A Single Phase Tap Off Boxes with fuse and indication.	Nos	224		
	<b>TOTAL FOR WIRING &amp; ACCESSORIES</b>				
<b>E.05</b>	<b>INDOOR LIGHTING AND FANS</b>				
	The Lighting System specified herein, must conform to relevant Section of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
	Supply, Installation, Testing and Commissioning of the following LED Luminaires complete with LED chip, housing, heat sink and electronic driver, surface/recess mounting arrangement and all fixing accessories. All luminaries and accessories shall be as per Specification E08.				
	All wiring within the luminaries must be with Low Smoke Zero Halogen Type and / or Fire Survival Type Wires, as per requirements of section E 08 of M & W Specifications.				
E.05.1	Supply, installation, testing and commissioning of surface mounted LED Batten - 38 Watt (Similar to Philips Catalogue no. BN 108C LED 40S PSU CDL WH 919515810658 or equivalent), with a system lumen output of 4000 lumens and a minimum system efficacy of 100 lumen/watt. The luminaire shall have a CRI of greater than 80 with rated system lifetime of 50,000 hours at L70. The luminaire is made of CRCA housing and shall have diffused optics. (BOH without False Ceiling Area)	Nos.	360		
E.05.2	Supply, installation, testing and commissioning of LED 2X2 recess mounted fixture - 40 Watt that delivers 3500 nominal lumens at a system efficacy of >90 lumen/watt for a design ambient temperature of 45 deg C (Similar to Philips Catalogue no. RC380 LED35 6500 PSU – OD WH or equivalent). The luminaire shall have a CRCA powder coated body and a high efficiency diffuser. The light output shall have a CRI>80 and the luminaire shall be made available with a CCT 6500K. The electronic driver shall operate a power factor>0.9 and a THD<10%. (BOH with False Ceiling Area)	Nos.	37		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.3	Supply, installation, testing and commissioning of LED trunking system - 40 Watt , with a system lumen output of 4000 lumens and a minimum system efficacy of 100 lumen/watt (Similar to Philips Catalogue no. LL199X 1XDLED40-6500 PSE OD WH or equivalent). The luminaire shall have a extrusion housing and light emitted shall have a CRI>80 with rated system lifetime of 50,000 hours at L70. The extrusion housing shall be available in 4', 8' and 12' sections. (Platform Public Area, Entry Corridor)	Nos.	245		
E.05.4	Supply, Installation, Testing & commissioning of luminaire - 70 Watt (similar to Philips Catalogue No. BY400V LED72S CW SK PSU S2 FG WH (Greenbay) or equivalent) as per approved make of list. Fitting should have a aluminium pressure die cast housing with dedicated optics with protected LED's giving a lumen output of 7200 lumens with efficacy of more than 100 lm/W giving optimal light distribution for symmetric/asymmetrical configuration and used for height levels between 5-9 metres.A system efficacy of at least 100 lm/W with a lumen output of 7000 lumens and a CCT of 5700K with a power factor of >.90.It is designed to meet IP65 specifications ensuring L70 for 50000 burning hours with a TDH<20%.The luminaire complies with requirements of CE ,CISPR 15Ed72 , IEC 61347-2-13, IEC 61547, IEC 62384. (Concourse Double Height Area)	Nos.	16		
E.05.5	Supply installation testing and commissioning of surface mounted LED Batten with 18 watt input wattage (Similar to Philips Catalogue no.TCW450 P 1XTLED or equivalent). Luminaire should be dust, jet and shock proof luminaire . Should have Polycarbonate	Nos.	93		
	housing and cover with all the accessories mounted in a CRCA Gear Plate. It has an IP rating of IP 65. (Undercroft)				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.6	Supply, installation, testing and commissioning of LED Downlighter - 12 Watt with a system lumen output of 1000 nominal lumens at a minimum system efficacy of 95 lm/W (Similar to Philips Catalogue no. DN392B LED10S-6500PSU WH or equivalent). The luminaire shall have a CRI greater than 80 with rated system lifetime of 50,000 hours at L70. The luminaire optics shall have a high efficiency diffuser with more than 85% transmittance. Height of luminaire shall not be more than 70mm. (Toilets)	Nos.	11		
E.05.7	Supply, installation, testing and commissioning of LED Linear 1x4 recessed fixture - 42 Watt, with a system lumen output of 3000 lumens at an efficacy of >65 lm/W (Similar to Philips Catalogue no. RC869 B W30 L120 LED or equivalent). The luminaire shall have powder coated CRCA housing and light output is by means of Semi High Gloss optics with 3D Lamellae and High Purity Anodized Aluminium mirrors. (Concourse Public Area)	Nos.	112		
E.05.8	Supply, installation, testing and commissioning of surface mounted LED Bulkhead - 10 Watt with a system lumen output of 600 lumens and a system efficacy of 60 lumen/watt (Similar to Philips Catalogue no. WT 202W LED 6S PSU S1 PC or equivalent). The luminaire shall be IP66 & IK09 rated and shall have a CRI of 70. The housing of luminaire is made of high pressure die cast aluminium with front cover made of polycarbonate diffuser. (Shaft Area)	Nos.	16		
E.05.9	Recess mounted luminaire suitable for TLED 18W lamps for vertical lighting with asymmetric light distribution for indoor application, Housing made up of CRCA sheet steel, powder coated white accommodating all electrical accessories prewired upto a terminal block (Similar to Philips Catalogue no. TBS207 1xTLED 18W or equivalent). Asymmetric light distribution offers high vertical light levels for rack/shelf and suitable for single TLED in single lamp version (wall washer)	Nos.	8		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.10	Supply, installation, testing and commissioning of surface mounted LED Batten - 42 watt, with a system lumen output of 3500 lumens and a minimum system efficacy of 80 lumen/watt (Similar to Philips Cat no - WT550C LED35SCWPSU). The luminaire shall have a CRI of greater than 80 with rated system lifetime of 50,000 hours at L70. The luminaire is made of CRCA housing and shall have diffused optics. (Platform Walkway)	Nos.	24		
E.05.11	Supply, installation, testing and commissioning of Luminaire - 19 Watt consist of extruded Aluminium alloy body sealed on to an extruded polycarbonate Prismatic protector having impact resistance IK 10 with a removable sliding plate equipped with control gear on one side and lamp on the other; one or two frames made out of injection moulded polycarbonate sealed on to the ends of the Luminaire with one or two polycarbonate covers closed with 2 stainless steel screws (Similar to Schreder Cat No MY1 LED or similar). System ensures a tightness of IP 67 for the whole luminaire suitable for 8 LEDs with all mounting accessories and 2 numbers of glands (suitable for loop in and loop out). (Tunnel)	Nos.	440		
E.05.12	Supply, installation, testing and commissioning of surface mounted LED flood light - 137 Watt with a system lumen output of 14400 lumens (Similar to Philips Catalogue no. BVP410 LED 144 CW HE NB FG S3 XT or equivalent). The luminaire shall have a aluminium pressure die-cast housing and a minimum system efficacy of >100 lumen/watt. The luminaire shall have a CRI greater than 70 with rated system lifetime of 50,000 hours at L70. (Outdoor DG & Cooling Tower Area)	Nos.	8		
E.05.13	Supply, installation, testing and commissioning of surface mounted LED flood light - 140 watt with a system lumen output of 14000 lumens (Similar to Philips Catalogue no. BVP410 LED 144 CW HE NB FG S3 XT or equivalent). The luminaire shall have a aluminium pressure die-cast housing and a minimum system efficacy of >100 lumen/watt. The luminaire shall have a CRI greater than 70 with rated system lifetime of 50,000 hours at L70.	Nos.	2		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.14	LED Trunking with System Efficacy > 90 Lumens / Watt , CRI > 80 , with Lumen output of 4000 Lumens with 40 Watt , SDCM < 3.5 , with Xitanium Driver , Class 1 , Optics - Frosted Diffuser, Injection moulded Plastic Cap, Option of Symmetric, LED TRUNK;LP3.1X2;5000K, PHILIPS make LED TRUNK or equivalent		10		
E.05.15	Extruded Aluminum Housing with High Efficiency Extruded Polycarbonate Diffuser with provision of End to End connection and life class of 40 K Hours @ L70 and Efficacy of 80 Lm / Watt and wattage of 8 Watts with Voltage Range - 160 – 270 Watts , Driver Efficiency > 80 % , Power Factor > .9 , THD < 33 % , and High Cut off Protection at 270 Volts , PHILIPS make BN550 - 1 ft or equivalent	No	8		
E.05.16	Down light with LEDs of Lumileds make which have non replaceble High Wattage LED. Color temperature =5700K. Constant current electronic driver. CRI>70. High efficiency white reflector. System Wattage of luminarie=15W.Voltage range of operation= 160V to 270V. Power factor> 0.9 System efficacy = 60 lumens per watt. Completely sealed from bottom with Polycarbonate Diffuser, Cut out =165mm. 40,000 hours burning life. Zero Maintenance , Zero mercury . The outer diameter of the front frame should not be more than 180mm made from high quality engineering plastic and the overall depth of the luminaire should not exceed 75mm, PHILIPS make BBS170 1XDLED 5000 PSU WH LED or equivalent	No	8		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.17	Recessed mounted led down light luminaire with pressure die cast aluminum housing which acts as a proper heat sink to ensure a long service life. The total power consumption should not exceed 10W (including driver). The Luminaire should have an integrated electronic driver delivering constant current output. The luminaire should have a matt finished high efficiency aluminum reflector with polycarbonate diffuser . Led should have life of 40K with minimum 70% lumen maintenance. The outer diameter of the front frame should not be more than 110mm made from high quality engineering plastic and the overall depth of the luminaire should not exceed 75mm Color Temperature 5000K CRI>70. LM80-08 For LED Source & LM79-08 test report must be submitted, PHILIPS make BBS150 LED or equivalent	No	10		
E.05.18	LED Batten with System Efficacy > 90 Lumens / Watt , CRI > 80 , with Lumen output of 3800 Lumens with 40 Watt , SDCM < 3.5 , with Xitanium Driver, output of 3800 Lumens with 40 Watt , SDCM < 3.5 , with Xitanium Driver, Class 1 , Optics - Frosted Diffuser, Injection moulded Plastic Cap , Option of Class 1 , Optics - Frosted Diffuser, Injection moulded Plastic Cap , Option of Symmetric / Asymmetric in. PHILIPS make BN208C LED40/CDL L1200 (Green Perform) FR or equivalent	No	10		
E.05.19	LED 2X2 with Mid flux LED using efficient optics , System lumen efficacy > 80Lumen/Watt , System Luminous flux of 3450 lumens, System Wattage =43W . 50,000 hours burning life. . Color rendering index > 70 %. Color temperature 5000K. CRCA housing with high efficiency opal diffuser. Luminaire sealed from bottom. Inbuilt gear . Zero maintenance, Zero mercury. Offers 0.15w/sq ft /100Lux. LED efficacy>110 lumen/watt. LED binning code is 5SDCM. Lumen output >3500 from fixture level. Luminaire efficacy>80lumen/watt. Driver Surge protection available. Grey/white frame option. PHILIPS make RC365,CIRRUS;65W DRIVER or equivalent.	No	4		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.20	2 x 2 Direct Indirect LED Luminaire with Life Class of 40 K Burning Hours @ L70 ,Stepped optics with Lumens of 2900 Lumens at System level , Lumen Efficacy of 76 Lumens / Watt , CRI > 70 , with built in Electronic Driver , PF > .9 , THD < 15 % , IEC Complint for Safety Performance & EMI , CRCA Housing and High Efficiency Diffuser. PHILIPS make RC140 B (Green Square ) or equivalent	NO	24		
E.05.21	Integral LED luminaire with a pressure die cast housing with dedicated opticsfor optimal light distribution. A specially designed heat management system to ensure system luminous efficacy > 90 lm/ W and ensure lumen depreciation upto 30% over 50k burning hours. The luminaire is designed to meet IP 65 classification and is compliant with relevant immunity, safety and performance and EMI standards. System wattage of 80 Watts , Lumen – 7300 lumens , CCT – 5700 K , CRI > 70 , Pf > .9 , THD < 20 % , PHILIPS make BY400V LED70S CW SK PSU S1 FG WH or equivalent	NO	24		
E.05.22	Endura LED- Bulkhead can be installed as ceiling mounted and wall mounted. It serves as a simple energy efficient alternative to CFL/incandescent bulkhead luminaires. The luminaire is designed to meet IP 66 and IK 09 classification and is compliant with relevant immunity, safety and performance and EMI standards. System wattage of 10 Watts , Lumen – 600 lumens , CCT – cool white , CRI > 70 , Pf > .9 , THD < 20 % , PHILIPS make WT202W LED6S CW PSU S1 PC or equivalent.	NO	40		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.23	Down light with LEDs of Lumileds make which have non replaceable High Wattage LED. Color temperature =5700K. Constant current electronic driver.CRI>70. High efficiency white reflector. System Wattage of luminarie=15W.Voltage range of operation= 160V to 270V. Power factor> 0.9 System efficacy = 60 lumens per watt. Completely sealed from bottom with Polycarbonate Diffuser, Cut out =165mm. 40,000 hours burning life. Zero Maintenance , Zero mercury . The outer diameter of the front frame should not be more than 180mm made from high quality engineering plastic and the overall depth of the luminaire should not exceed 75mm, PHILIPS make DN170C LED10S-6500 PSU WH or equivalent .	NO	16		
E.05.24	EnduraalLED Waterproof can be installed as surface mounted and suspended mounted. It serves as a simple energy efficient alternative to Fluorescent waterproof luminaires. The luminaire is designed to meet IP 65 classification and is compliant with relevant immunity, safety and performance and EMI standards. System wattage of 43 Watts , Lumen – 3500 lumens , CCT – 6500K , CRI > 80 , Pf > .9 , THD < 20 % , PHILIPS make WT550C LED 35 CWPSU S1PC or equivalent.	NO	10		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.25	SITC of Suspended Linear LED75 mm wide fitting with housing made of Extruded Aluminum and anodized finish. The diffuser should be Extruded Polycarbonate and the heat sink should be made of CRCA. The luminaire should have options for standalone(8ft and 4ft) unit lengths and should also have provision for continuous mounting. LED Used shall be SMD type and fixture should have minimum efficacy at System level (Not Chip Level) $\geq 110$ lumens/watt, Life of fixture 50000hrs@L70B50 Lumen maintenance, CCT choice available in 4000K and 6500K, CRI $>80$ , SDCM $<5$ , PF $>0.95$ , THD $<10\%$ , an operating Voltage Range of 140 - 270 V, 50Hz, and should have class B serviceability . Minimum Internal Surge Protection 2.5KV. The luminaire shall have a CRCA gear tray with reflectors for mounting of driver and this should ensure lower glare ratings for the fixture. The luminaire shall have movable suspension points for ease of installation. The fixture should comply with the parameters as per IS10322 and IEC60598, EMC / EMI compliance, Minimum system Lumens 4400 for a 8ft luminaire equivalent to Philips Pure line Slim SP780	NO	40		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.26	SITC of recess Mounted Linear LED 75 mm wide fitting with housing made of Extruded Aluminum and anodized finish. The diffuser should be Extruded Polycarbonate and the heat sink should be made of CRCA. The luminaire should have options for standalone(8ft and 4ft) unit lengths and should also have provision for continuous mounting. LED Used shall be SMD type and fixture should have minimum efficacy at System level (Not Chip Level) $\geq 110$ lumens/watt, Life of fixture 50000hrs@L70B50 Lumen maintenance, CCT choice available in 4000K and 6500K, CRI $>80$ , SDCM $<5$ , PF $>0.95$ , THD $<10\%$ , an operating Voltage Range of 140 - 270 V, 50Hz, and should have class B serviceability . Minimum Internal Surge Protection 2.5KV. The luminaire shall have a CRCA gear tray with reflectors for mounting of driver and this should ensure lower glare ratings for the fixture. The fixture should comply with the parameters as per IS10322 and IEC60598, EMC / EMI compliance, Minimum system Lumens 4400 for a 8ft luminaire equivalent to Philips Pure line Slim RC780	NO	10		
E.05.27	SITC of LED indirect output light to ensure soft and uniform light for visual comfort. The LED light source should not be directly visible to avoid any kind of glare to users. The luminaire shall have a UGR $<22$ when installed at a general height of 10ft from the ground. The Luminaire shall be available in CCT of 6500K with a CRI $>80$ and SDCM of 4. THD $<10\%$ PF $>0.9$ Lifetime of atleast 50000 burning hours at L70B50 at an ambient temperature of 25 degreeC for reliable performance. There should be no flicker in the operation of the light. The luminaire shall have a lumen output of atleast 3600lumens with a system efficacy of 100lm/W. Should have an option of DALI dimming. it should have a Class B serviceability. LM79 and LM80 reports of the fixture to support the technical requirement equivalent to Philips Coreview RC420B	NO	30		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.28	SITC of LED light with semi high gloss optics with 3D lamella D8 office compliant fixture . The Luminaire shall be available in CCT of 6500K with a CRI>80 and SDCM of 4. THD<10% PF>0.9 Lifetime of atleast 50000 burning hours at L70B50 at an ambient temperature of 25 degreeC for reliable performance. There should be no flicker in the operation of the light. The luminaire shall have a lumen output of atleast 2800lumens with a system efficacy of 65lm/W. Powder coated CRCA housing high pure anodized reflective mirrors. Should have an option of DALI dimming. it should have a Class B servability. LM79 and LM80 reports of the fixture to support the technical requirement equivalent to Philips Sereno RC869	NO	20		
E.05.29	SITC of High Pressure Die Cast Aluminium Alloy housing LED High Bay Luminaire with specially designed heat sinks dust free. for high ceiling heights having beam Angle 60 deg / 110Degree,PMMA material Lens Lenses for effective light distribution, minimum Luminous flux (Lumen)16500 with a system 120lm/W .Correlated Color Temp 6500K,CRI>80,Maintenance of lumen L70 (Hrs) 50K@L70,Ambient temperature (Ta) 45Degree,optics narrow or widebeam optics, optical cover glass. Aluminium PDC Housing. Protection of Fixture:- IP65,IK08,Class I, power factor >0.95, Surge protection 4KV,Voltage range 120-277V AC, Lumen standard /Test certificate as per IEC 60598 and IS10322. LM 79 and LM80 reports needs to be submitted from a NABL/UL Approved Laboratory. The luminaire should be DALI Dimmable. Driver should be as per BIS approved. Spare driver should be easily replaceable at the site. Similar to Philips Maxored BY415	NO	10		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.30	SITC of LED Flood light fixture with high power LEDs , IP66 and IK05 protection made of single LM6 high pressure die cast aluminum housing capable of delivering a nominal system lumen output in the range of 14000- 22000 lumens at a minimum system efficacy of 105lumen/watt and a CRI at least 70. The luminaire shall have options of rotationally symmetrical beam as well as a narrow and asymmetric beam with the help of secondary lenses on the LED light source. The lens plate should not be glued to the body of the luminaire but should be screwed. The fitting shall have a defined system of heat dissipation with the help of vertical fins to abstain from accumulation of dust/dirt on the luminaire. It should have a universal bracket and a graduation disk for aiming to ensure proper installation. The luminaire shall have a life class of 50,000 hours @ L70 for a design ambient of 35 Deg. C and driver efficiency of >85%. THD < 20% and minimum power factor of 0.9 at full load. The luminaire shall be Class I protection enabled. The overall height of the luminaire shall not be more than 165mm. LM-79/LM-80 report should be supplied for LED luminaire/LED chip. luminaire should comply with IS10322 and IEC60598 similar to Philips BVP410	NO	10		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.31	SITC of interior rated cove lighting fixtures with beam options of washing as well as grazing applications. The luminaire to have an asymmetric wash for better uniformity with a uniformity ratio of less than 3:1 on a 3 m (9 ft) wall with an 0.5 m (1.5 ft) setback. The fixture should be available in standard sizes of 1/4ft with system lumen output of 880lm/ft at a CCT of 4000K and CRI of 81 and a system lumen efficacy of atleast 76lm/W. Lifetime of atleast 50000 burning hours at L70 at 25degC. The luminaire shall have a powerfactor of 0.99 at 120V supply. The luminaire shall be dimmable by the available ELV type dimmers. The width of the fixture to be not more than 41mm for ease of installation. UL / cUL, FCC Class B, CE, C-Tick, CCC certified. IP20 rated fixture for indoor use. Operating temperature range of minus 40 to 50degC and humidity of 0-95%. Die cast aluminium housing with polycarbonate lens. Operating voltage range of 100-277V AC equivalent to Philips Evenbalance	NO	10		
E.05.32	SITC of LED lights with textile to create a white light ceiling surface for daylight experience that hides the source of light completely. Dimension of one panel luminaire dimension should not be greater than 2.7x1.8mt with the smallest dimension being 0.9x0.9mt with a depth of 155mm. Depth is considered with e-box. The weight of the luminaire should be greater than 42kg. The light output should be at least 3200lm/sq mt. The CCT should be 3000k or 4000k. The CRI of the luminaire should be not less than 85. The luminaire should have life of 50k hrs for L70. The luminaire should have acoustics properties of $\alpha_w$ 0.6 class C EN 11654, also the noise reduction coefficient of NRC 0.6 ASTM C423 – 99. The luminaire driver should be compatible for DALI or 0-10V. The luminaire should be compatible for ambient temp of 5 to 35 °C. Approved for fire rating of fabric by (EN 13501) B-s1, d0 and panel at (EN 13501) B-s2, d0. CE certified luminaire. Similar to Philips One Space PreFab.	NO	10		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.33	SITC of wall or ceiling mounted textile panels with high quality industrial fabric of Class B-s2,d0 (EN 13501-2 Euroclass) fire rating with multi-colored LED with the ability to display dynamic content remotely controlled and managed. Maximum size of panel possible 6.4x1.2mt. Possibility of wall(surface/recessed) or ceiling mounting ( surface,recess or suspended).Solution to have customised dimensions as per site requirement .The fixture shall have thickness of not more than 127mm, including mounting elements. It should be available in different sizes to suit the applications. Suitable for indoor use, IP20 rated. Maximum weight is 19.3kg/m2.The panel shall have a power consumption of not more than 55W/ sqmt and luminance of upto 170Cd/sqmt for specific textiles. Pixel pitch of 60mm with RGB LEDs with an integrated playback controller. Should be compatible with content manager software for programming and content source to be .wmv files. It should be controllable through all of the below mentioned features- DiscoverME LTP mobile applications/Remote control/Integrated scheduler/ access through any computer connected to the luminous textile panel network. There should not be any limit to the number of panels connected in a system. It should have a sound absorption coefficient of 0.45. Main power connection with IEC connectors, RJ45 Ethernet connector for Data. Operating voltage range of 100-240VAC, operating frequency range of 50-60Hz and operating temperature range of 5-35degC. Lifetime to be atleast 60000 hours at L70 at an ambient temp of 25 degC. Class B-s2,d0 (EN 13501-2 Euroclass) rated for fire safety. EN13501-2 rated. CE/UL/CCC/ GOST-R approved. Similar to Philips Luminous Textile	NO	10		
E.05.34	LED Step-Light BWG150, Low-power white-light LED light source, available in a choice of warm white (3000 K) or neutral white (4000 K), Long lifetime of 25,000 hours (70% lumen maintenance @ Tc = 25°C), IP67 protection PHILIPS make BWG150 LED50/WW PSU 2 or equivalent.	NO	10		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>E.06</b>	<b>Temporary Lighting at Station</b>				
E.06.1	Installation & Commissioning of 40Watt tube lights with cover 350 No. approx. along with the necessary wiring & power supply arrangement to provide general lighting at concourse, Platform ,Undercroft and Tunnel area during construction period.	per tube light for 240 days	160		
E.06.2	Cost (Addition/deletion) of Installation and Commissioning of 40 watt tube lights with cover 10No/day approx. along with the necessary wiring and power supply arrangement , to provide general lighting at concourse, Platform, Unddercroft& Tunnel area during construction period.	L/s	1		
<b>E.07</b>	<b>External Station Lighting</b>				
E.07.1	9.0 meter hot dipped galvanised Octagonal with single overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	No.	10		
E.07.2	9.0 meter hot dipped galvanised Octagonal with double overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	No.	10		
E.07.3	7.0 meter hot dipped galvanised Octagonal with single overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	NO	10		
E.07.4	7.0 meter hot dipped galvanised Octagonal with double overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	NO	10		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.07.5	Supply, installation, testing and commissioning of LED Street light fixture - 70 watt with IP66 protected LM6 high pressure aluminium die cast housing capable of delivering a nominal system lumen output of 7200 lumens with a minimum system efficacy of 85 lumen/watt and a CRI greater than 70. The luminaire shall have a life class of 50,000 hours @ L70 and driver efficiency of >85%. (Similar to Philips Cat. No. BRP410 LED CW 072 MR FG S1 PSU or equivalent)	NO	10		
E.07.6	Supply of 75mm dia HDPE pipe confirming to PN-4 boring of road channel area by using open trench method and laying of HDPE pipe properly continuously jointed restoring the surface where pitting is done ,to original position.	mtr	10		
E.07.7	Supply of 75mm dia HDPE pipe confirming to PN-4 boring of road channel area by using trench less method and laying of HDPE pipe properly continuously jointed restoring the surface where pitting is done ,to original position.	mtr	10		
E.07.8	Supply and laying of 6 SWG wire along with the cable	mtr	100		
E.07.9	Providing and fixing thermo plastic poly carbonate pole boxex confirming to IP-65 degree of protection, along with 16A MCB and 5 way connector and 2 No. cable gland suitable for 4x25 sq.mm cable.	no	1040		
E.07.10	wiring for luminaries in existing poles with following sizes of unarmoured cu cables from pole box to each fittings.				
a	3x2.5 sq mm	Meters	2160		
	<b>TOTAL FOR INDOOR LIGHTING AND FANS</b>				
<b>E.08</b>	<b>PROTECTIVE, CLEAN EARTH AND LIGHTING PROTECTION SYSTEM</b>				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	The Earthing and Lightning Protection System specified herein, must conform to relevant Section of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
E.08.1	Earthmat	Sets	2		
a	Supply, laying, testing and commissioning of 20 mm dia Cu rod for earth mat (at 500mm or deeper as per the final approved design as per the site condition) as per specifications including lap (of not less than 150mm) & cross braced joints and providing bitumin coat at every joint as required. Risers from earth mat to be brought out as per approved drawings and specifications. (Cost of risers not included in this item).				
b	Supply, laying, testing and commissioning of 16 mm dia Cu rod, laying of vertical earth electrodes 3 m deep from earth mat including braced joints with earth mat as per approved drawings and specifications. The weld joints to be provided with bitumin coats.				
c	Supply, laying, testing and commissioning of 240 sqmm Cu flexible conductor, for each electrode up to 1.5 mtr above the undercroft finished floor level				
d	50 mm dia HDPE pipe for mechanical protection of flexible rised				
e	Copper U clamp for fixing the rod/rised at a certain interval as specified the employer requirement.				
E.08.2	Clean Earthmat	Sets	1		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	Supply, laying, testing and commissioning of 13 mm dia Cu rod for earth mat (at 500mm or deeper as per the final approved design as per the site condition) as per specifications including lap (of not less than 150mm) & cross braced joints and providing bitumin coat at every joint as required. Risers from earth mat to be brought out as per approved drawings and specifications. (Cost of risers not included in this item).				
b	Supply, laying, testing and commissioning of 13 mm dia Cu rod, laying of vertical earth electrodes 3 m deep from earth mat including braced joints with earth mat as per approved drawings and specifications. The weld joints to be provided with bitumin coats.				
c	Supply, laying, testing and commissioning of 185 sqmm Cu flexible conductor, lfor each electrode up to 1.5 mtr above the undercroft finished floor level				
	Supply and laying,Testing and commissioning of copper/wire for interconnecting the earthing stations ,panels,DBs etc. of the following sizes in built up trenches /surface/wall/ground complete with holes & fixing,jointing / terminating accessories as per specifications & drawing as required. (Quantity shall be paid as per the actual measurement as executed, however direct measurement shall not exceed the quantity indicated in drawing approved .				
d	50 mm x 6 mm Cu strip	Meters	2000		
e	50 mm x 4 mm Cu strip	Meters	1200		
f	25mm x 3 mm Cu strip	Meters	3200		
	Supply of GI strips / rods / wires (minimum 97% conductivity) of the following sizes for provision in Earthing System.				
g	75 mm x 10 mm GI strip	Meters	160		
h	50 mm x 10 mm GI strip	Meters	160		
i	50 mm x 6 mm GI strip	Meters	1200		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
j	32 mm x 5 mm GI strip	Meters	80		
k	25 mm x 6 mm GI strip	Meters	800		
l	8 SWG / 4 mm diameter, copper Wire	Meters	400		
	Supply, laying and testing of unarmoured, stranded copper conductor, Low Smoke Zero Halogen, green coloured cables of following sizes, conforming to BS 7211, for earthing, including termination of the same by copper lugs at both ends.				
m	1 x 6 sq. mm	Meters	80		
n	1 x 10 sq. mm	Meters	80		
o	1 x 16 sq. mm	Meters	80		
p	1 x 70 sq. mm	Meters	400		
q	1 x 150 sq. mm		100		
E.08.3	Supply and making of G.I Main earth connection / terminal of size 75 mm x 10 mm, 600 mm mounted on 2 Nos. SMC / DMC insulator for connection with Principal earth Terminal / Connection including copper nut-bolts, washers etc. complete as per M & W specifications and drawings for protective earthing.	Nos.	32		
E.08.4	Supply and making of G.I Main earth connection / terminal of size 32 mm x 5 mm, 300 mm mounted on 2 Nos. SMC / DMC insulator for connection with Principal earth Terminal / connection including G.I nuts-bolts, washers etc complete as per drawings for clean earthing.	Nos.	8		
E.08.9	Supplying & making of test joints with the following sizes of G.I Strip with bimetallic test link of length 125 mm ,4 nos. bolts, nuts and washers of brass, DMC support, as required, and as per M & W specifications and drawings etc.				
a	75 mm x 10 mm G.I strip	Nos.	10		
b	50 mm x 6 mm G.I strip	Nos.	5		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
E.08.10	Providing and making plate earthing station with 600 x 600 x 6 mm copper plate earth electrode, 50 mm dia GI watering pipe, reducer & CI funnel with wire mesh, 150 mm coke / charcoal and salt around plate earth, all earth work, masonry enclosure with frame & cast iron hinged cover plate as per IS 3043.	Nos.	5		
	<b>TOTAL FOR PROTECTIVE, CLEAN EARTH AND LIGHTING PROTECTION SYSTEM</b>				
<b>E.09</b>	<b>UPS</b>				
	Supply, Installation, Testing and Commissioning of 2 x 80KVA, True Online Double Conversion, Parallel Redundant, 3 Phase AC Input & 3 Phase AC Output, UPS System having an Ingress protection Rating of IP 33 consisting of the following:	Sets	2		
	One Nos of 80kVA, 415V UPS.				
	Galvanic Isolation Transformer at Inverter output with Delta Connection of primary to separate input and Output neutral.				
	IGBT Rectifier Modules to achieve less than 5% Input Current Distortion and greater than 0.9 Power Factor at Input				
	Completely Microprocessor based with Diagnostics capability				
	Input phase Reversal Correction without switching to batteries				
	Maintenance by-pass module.				
	Two sets of SMF VRLA battery each having 30 minutes back up time at full load with interconnecting cables, racks and standard accessories (2V Cells with 20 Years Design life).				
	Isolation switches / MCCB for UPS as per Drawings & Specification and MCCB box with 2 pole DC MCCB of suitable rating for battery bank.				
	<b>TOTAL FOR UPS</b>				
<b>E.10</b>	<b>Diesel Generator Sets</b>				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Design, Manufacture & Supply of DG set (Radiator cooled - cooling system designed for 50°C ambient) of following aggregate capacity / rating, comprising of Diesel Engines coupled to Alternator both mounted on common base frame suitable for 3-phase, 415 volts, 50 Hz, 1500 RPM, Standby Power rated output with other standard accessories i.e. Fuel tank (990 Litres) with necessary medium class M.S. fuel piping (25mm size) with necessary fittings from DG set to Fuel Tank, automotive Batteries with leads as per manufacturer recommendations.				
	DG sets shall be suitable for auto starting & auto synchronising with auto load sharing and remote monitoring & control arrangement compatible with the existing electrical system as per particular specifications, complete as required.				
	Suitable number of silencers per DG set along with the insulation / aluminium cladding for sound attenuation as per specifications.				
	Supply of rubber mat in front and back of DG Control Panel (/ AMF panel)/ Isolation panel as per latest standards (IS:15652:2006) amended upto date.				
	Detailed, Maintenance & Operation manuals, to be supplied after 3 months of Date of vendor approval of DG sets complete as per the specifications.				
	2000 KVA (comprising of 2 DG sets of minimum 1000 kVA capacity each).	Sets	1		
E.10.1	INSTALLATION of DG sets				
	Installation/Erection, Testing & Commissioning including Integrated Testing with all systems for the DG sets along with all accessories for the following Capacity DG sets complete as per specifications as required.				
	2000 KVA (comprising of 2 DG sets of minimum 1000 kVA capacity each).	Sets	1		
E.10.11	Exhaust System				
	Supply, installation of following sizes of MS Piping for Exhaust system as per IS: 3589 and 1239 (part - I) including providing suitable bends, reducers etc.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	350mm (NB) MS ERW pipe 4.85 mm	RM	80		
	250mm (NB) MS ERW pipe 4.85 mm	RM	20		
	The rate for the MS exhaust pipe should be inclusive of supply & fixing of SS expansion joints (Bellows) according to size of horizontal / vertical exhaust pipes of DG sets as required at site. It shall not be payable separately.				
	Measurement for MS Exhaust piping will be taken excluding the length of Expansion Joints (SS bellows) and silencer.				
	Supply, installation, testing and commissioning of 75 mm thick Rockwool LRB mattress insulation (of 150 Kg/m <sup>3</sup> density) over the exhaust pipes of following diameter including cladding with aluminium sheet of 24 SWG and covering from outside complete as required suitable for DG exhaust pipe temp. upto 450°C etc.				
	350mm (NB)	RM	80		
	250mm (NB)	RM	20		
	Supply & Fixing of miscellaneous structural support for horizontal / vertical exhaust piping including fabrication, hardwares and painting as per requirement.	KG	15000		
	Portable Oil Filling pump- Electrical Type necessary to deliver the oil upto height of 10 mtrs.	No	2		
	Providing & fixing of pre- fabricated 22SWG GI sheet ducting (120 gsm galvanisation) for hot air discharge /supply air intake complete including supports, bends, flanges etc. as required.	sqm	50		
	EARTHING				
E.10.12	Providing Earth pits with 600 X 600 X 6.3 mm GI plate electrode complete as per IS: 3043. (For Body Earthing).	No	12		
	Providing Earth pits with 600 X 600 X 3 mm Copper plate electrode complete as per IS: 3043. (For Neutral Earthing).	No	12		

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Supply, laying, testing and commissioning of Copper / GI strips for interconnecting the earthing station, panels, DG set etc. of following sizes in trench/surface/wall/ground complete with holes and fixing, jointing/termination accessories with holes and fixing, jointing/termination accessories .				
	50 mm x 5 mm GI strip (For Body Earthing).	RM	80		
	50 mm x 5 mm Copper strip (For Neutral Earthing).	RM	36		
	Civil works				
E.10.13	Civil work for cable trench / hume pipes from DG Sets to existing cable trench and making the same in good condition at station.	Job	1		
	Civil foundation for 1010 KVA DG set (only PCC raft of 300 mm) for the existing site condition.	Cum	20		
	Provision of making cable trenches, cut outs, finishing works etc as per the works required for the DG sets Installation	Cum	20		
	Supplying and laying of GI pipes of 150 mm Nominal Bore 4.85 mm thick as per IS 1239 to accommodate all cables, earthing strips and fuel pipe lines as utility to DG set.	M	10		
	ACOUSTIC TREATMENT FOR DG ROOM				
E.10.14	Providing and fixing Acoustic Treatment lining on walls and ceiling of DG room by means of Mineral rock wool slab of minimum density 64 Kgs/m <sup>3</sup> , confirming to IS 8183 and with minimum thickness of 75mm covered by fire resistant fibre tissue confirming to AWWA C – 203, specifications and with inside cover of 0.6 mm thick perforated Aluminium sheet, complete as required. The Rock wool shall be laid on a 600 X 600 mm grid, 50 mm GI channel frame work fixed to walls and ceiling.	Sqmtr	750		
	Acoustically Lined Louvers as per above material specifications				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Providing and fixing Acoustic Doors for DG room comprising of ISMC 100 frame, clad on both side of 0.5 mm thick MS sheets with cavity fill of required thickness (minimum 75 mm thickness) of resin bonded 64 kg/m <sup>3</sup> density glass wool to achieve noise levels, as specified in the specifications including Nitrile rubber / Neoprene rubber gasket between MS sheet cladding and frame, heavy Duty Hardware / Locking mechanism complete as required.				
	Note:- 1. Payment will be based on per Sqmtr size of the Door.				
	2. Sliding Door with Self lubricating sliding mechanism (Roller ball Bearing) in MS channels in floor to be proposed only after suitable consideration to noise criteria.				
	Supply, Installation, Testing and commissioning of Intake / Exhaust Fans complete, as required of suitable sizes for ventilation of Air requirements of DG Sets of following sizes (Calculations to prove adequacy of the rating of the selected Fans must be submitted). The system should be designed to provide suitable ventilation for efficient air circulation, to ensure that the temperature rise in the DG room with respect to the ambient is less than 5°C. There should be specially designed circuitry to ensure that the fan(s) starts when the Genset is in operation and when the Genset has been switched off the fan(s) automatically switch over to main supply and run for 5 – 15 minutes (programmable) before stopping to ensure that set is ready to start in case of another failure.				
	2x1000 KVA	Job	1		
	Note:-				
	Drawing for the acoustic treatment of room to be submitted for approval of Engineer - in - charge before procuring the material for Acoustic treatment.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Providing noise barrier of suitable inclination and projected length, for installation around DG set installation in the Ancillary building, fabricated out of 2 mm thick polycarbonate sheet with minimum surface density of 10 kg/Sqm. to ensure adequate transmission loss of sound to achieve noise control as per CPCB norms for public area, including saturatory of Installation, complete as per required as per specifications				
	Operation & Maintenance Training for the Staff complete as per the M&W specifications.				
	OPERATION & MAINTENANCE OF DG SET BEFORE REVENUE OPERATION DATE.				
	Providing of maintenance and operating services for different "aggregate capacities" of DG sets installed at a station as specified below. (before the Revenue Operation of the Corridor / DG set is taken over by Client/employer).				
	2000 KVA (comprising of 2 DG sets of minimum 1000 kVA capacity each).	Days	90		
	Note:-				
	1. The above items includes the cost of providing skilled DG set operator, all Consumables ( like battery water, Lubricating Oil, Coolant, etc) except Diesel. (Diesel as per requirement shall be supplied by Client/employer).				
	2. Based on the hours of operation, the firm will be responsible for complying with the requirements of timely maintenance as per the recommendations of Engine Manufacturer.				
	3. The operation of DG set will not affect the warranty conditions of the DG sets supplied in this tender. The warranty clause will be applied from the date of Taking over of DG set by Client/employer/Employer.				
	4. Permission for Operating the DG set and period of its operation will be specifically approved by Engineer- In- Charge.				

PART-A - ELECTRICAL WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	COMPREHENSIVE MAINTENANCE OF DG SET AFTER DEFECT LIABILITY PERIOD.				
	Providing of Comprehensive maintenance services (Inclusive of all preventive maintenance spares and consumables, site visits, attending to breakdown calls etc. but excluding cost of breakdown spares) for "3- years" After Defect Liability period for different capacities of DG sets for the capacities of DG sets as specified below.				
	2000 KVA (comprising of 2 DG sets of minimum 1000 kVA capacity each).	Sets	1		
	Note:-				
	1. In the above item, Rates quoted by the Firm should be for each DG set for 3-years maintenance.				
	2. The above item includes cost of providing skilled service personal for the maintenance, Tools and Plant etc. for preventive maintenance. (Diesel is are not to be included in the rates.)				
	3. Breakdown maintenance staff, Tools, and equipment etc. for carrying out the maintenance to the Employers satisfaction.				
	4. Contractor will be required to maintain a fully equipped" 24 - hour Complaint Centre" in Pune and after receiving the Complaint the site should be attended by the maintenance staff within one hour.				
	<b>TOTAL FOR DIESEL GENERATOR SETS</b>	Sets	1		

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>F.11</b>	<b>PUMPS FOR FIRE PROTECTION SYSTEM</b>				
	Note:				
i)	Whether explicitly specified or not, the Pumps for Fire Protection System specified herein, must conform to respective Sections of the M & W Specifications, in addition to the description given in respective items of BOQ. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
ii)	The motor HP to be confirmed by the supplier for the duty mentioned for each pump.				
iii)	Rates quoted shall be inclusive of all structural supports, clamps etc. as per approved design/specifications.				
(iv)	All Main Fire Pumps shall be capable of delivering 150% of the rated flow at a head not less than 65% of the rated head. Also the shut-off head shall not exceed 120% of the rated head.				
(v)	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
11.1	Providing and fixing horizontal Fire Pumping Set with CI body, Bronze Impeller, Stainless Steel Shaft and connected by a flexible coupling to a totally enclosed, fan cooled induction motor, mounted on common structural base plate with all pump accessories complete as per Specifications including mechanical seal & neoprene lined vibration eliminators. Motors shall be suitable for 415 volts, 3 phase, 50 cycles, A/C supply as per Section E12 of M & W Specifications.				
a)	MAIN FIRE PUMPS FOR COMBINED SYSTEM.				
	Horizontal Split Casing				

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Capacity - 3785 LPM				
	Head - 112 M				
	HP - To suit power requirements for flow at 150% of the duty point				
	RPM - 1450/2950	Nos	2		
c)	JOCKEY PUMP (FOR COMBINED SYSTEM)				
	Capacity - 180 LPM				
	Head - 112 M				
	HP - As required	Nos	1		
	<b>TOTAL OF PUMPS FOR FIRE PROTECTION SYSTEM</b>				
<b>F.12</b>	<b>PIPE WORK FOR FIRE SYSTEM</b>				
	The Pipe Work specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
F.12.1	Providing and fixing of heavy duty Galvanised Steel Pipe (conforming to Specifications) with all fittings viz. flanges, bends, tees, elbows, reducers, as specified, including cutting, welding / making threaded joint and fixing to floor / wall with approved structural supports such as clamps, hangers etc. This further includes (1) Cutting holes / chases in brick or RCC walls / slabs and making good the same (2) Painting with two or more coats of synthetic enamel paint of approved shade as per pipe colour code over two coats of primer (3) Painting of legends with direction arrows complete as per specifications.				

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.12.1.1	25mm	RM	80		
F.12.1.2	32mm	RM	128		
F.12.1.3	40 mm	RM			
F.12.1.4	50mm	RM	104		
F.12.1.5	65mm	RM	8		
F.12.1.6	80mm	RM	500		
F.12.1.7	100mm	RM	232		
F.12.1.8	150mm	RM	2560		
F.12.1.9	200mm	RM	36		
F.12.1.10	250 mm	RM	1		
F.12.2	Providing and fixing Heavy Duty galvanised steel pipes, embeded in earth shall be conforming to Specifications with all fittings like couplings, bends, elbows, tees, flanges, CAF gaskets etc., including welding as required. This also includes necessary excavation in all kinds of soil (including hard rock) up to the required depth and providing 150 mm thick sand layer all around the pipes, refilling, ramming, removal and disposal of surplus earth complete in all respects as per the specifications. This further includes provision of corrosion protection by wrapping two layers of 400 microne thick polythene sheet over two coats of bitumen.				
F.12.2.1	80mm	RM	28		
F.12.2.2	100mm	RM	1		
F.12.2.3	150mm	RM	8		
F.12.2.4	200mm	RM	1		
	<b>TOTAL OF PIPE WORK FOR FIRE SYSTEM</b>				
<b>F.13</b>	<b>PIPING ANCILLARIES FOR FIRE SYSTEMS</b>				

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	The piping ancillaries specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
F.13.1	Providing and fixing Butterfly Valves of the following sizes (conforming to BS: 5155 and Specifications), suitable for pressure rating of 16 Kg / Sq. cm, with gaskets, flanges, nuts, bolts and washers including painting complete as required.				
F.13.1.1	65mm dia.	Each	2		
F.13.1.2	80mm dia.	Each	24		
F.13.1.3	100mm dia	Each	3		
F.13.1.4	150mm dia	Each	16		
F.13.1.5	200mm dia	Each	5		
F.13.2	Providing and fixing Wafer type Double Plate Check Valves of the following sizes (conforming to API-594 and Specifications), suitable for pressure rating of 16 Kg / Sq. cm with cast iron body conforming to BS 1452, including gasket, flanges, nuts, bolts and washers including painting complete as per M & W Specifications.				
F.13.2.1	65mm	Each	2		
F.13.2.2	100mm	Each	2		
F.13.2.3	150mm	Each	4		

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.13.3	Providing and fixing Cast Iron Double Flanged 'Y' type Strainers of the following sizes with nuts, bolts, gaskets etc. complete in all respect as described in Specifications.				
F.13.3.1	200 mm dia	Each	3		
F.13.3.2	80 mm dia	Each	2		
F.13.4	Providing and fixing Gate Valves of the following sizes (conforming to BS: 5154 and Specifications) having Bronze body conforming to BS 1400 with screwed ends suitable for pressure rating of 16 bars.				
F.13.4.1	25mm dia	Each	4		
F.13.4.2	32mm dia	Each	6		
F.13.4.3	40 mm dia	Each	1		
F.13.5	Providing and fixing Gun metal Air Release Valve as per Specifications.	Each	1		
F.13.6	Providing and fixing 150 mm diameter, Bourden type, Brass, Dial type Pressure Gauge calibrated for 0 - 15 kg / Sq. mm range with brass isolation valve complete as per Specifications.	Each	8		
F.13.7	Providing and fixing 80 mm dia Pressure Relieving Valve and Gate Valve to be fixed on Hydrants Pump Delivery Line with by pass connection to pump suction line.	Each	2		
F.13.8	Supply and installation of stainless steel Expansion Bellow				
F.13.8.1	200 mm dia	Each	3		
F.13.8.2	150 mm dia	Each	3		
F.13.8.3	80 mm dia	Each	2		
F.13.8.4	65 mm dia	Each	2		
F.13.9	Supply and installation of Orifice Plate 80mm OD(Brass)	Each	21		
	<b>TOTAL OF PIPING ANCILLARIES FOR FIRE SYSTEMS</b>				

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>F.14</b>	<b>FIRE HYDRANT SYSTEM</b>				
	The Fire Hydrant System specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
F.14.1	Providing and fixing Vertical Air Vessel of size 450 mm diameter and 1.50 m high, fabricated out of 6 mm thick M.S. plate having dish ends of 8 mm thick MS plate, complete with pressure switches (for every individual pump to operate at drop of pre - set pressure).This includes Bronze Air Release Valve, GM Gate Valves, pressure gauge, safety valve, drain valve etc. complete in all respects. Air Vessel must be painted with two coats of synthetic enamel paint of approved shade over one coat of primer,	Nos.	2		
F.14.2	Providing and fixing following types of Fire Hydrant Valves conforming to IS : 5290 and Specifications having female instantaneous type connection with matching flange, gaskets, nuts and bolts complete in all respects.				
F.14.2.1	Single headed	Each	22		
F.14.2.2	Double headed	Each	24		
F.14.3	Providing and fixing 63 mm diameter, 15 metre long, synthetic non percolating hose (conforming to IS 636/88 type-B with UL listed and Specifications) having Stainless steel male and female Instantaneous type coupling, machine wound with copper wire complete in all respects.	Each	141		

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.14.4	Providing and fixing of standard size Stainless steel 63 mm diameter short branch pipe with nozzle, conforming to IS 903 and Specifications	Each	25		
F.14.5	Providing and fixing Fire Man Axe conforming to IS : 926 : 1985 with Clamps.	Each	3		
F.14.6	Providing and fixing Wall mounted Swinging type First - Aid Fire Hose Reel conforming to (IS 12585 : 1988 & IS : 884 : 1985 for drum) and as per Specifications having 20 mm diameter and 30 M length. The Hose Reel must be non kinking type made up of Thermo Plastic Synthetic, must be suitable for with - standing a bursting pressure of not less than 27 bars and must include Brass Jet & Spray type Nozzle having Shut - Off valve complete in all respect.	Each	19		
F.14.7	Providing and fixing Fire Hose Cabinet made up of fully welded construction of size 750 x 600 x 250 mm, fabricated from 14 SWG GI sheet, having hinged double front door with locking arrangements and partially glazed with 5 mm thick glass. Cabinet must have Stove enamelled Fire Red finish with "FIRE HOSE" written on front and must be suitable for housing 2 Nos. 15m long synthetic Hose with couplings, 1 No. Branch Pipe, Fire Man Axe complete as specified in drawing.	Each	6		

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.14.8	Providing and fixing of Fire Hose Cabinet Shutter made up of MS 50 x 50 x 2 mm tubular steel section ( shutter framing ), rebated section framing of 2 mm thick MS sheet for fixing of shutter framing and fully welded construction of Hose Cabinet Size of 1200 x 2100 mm approximately, having hinged double front door with locking arrangements and partially glazed with 5 mm thick glass. Glass shall be fixed by MS beading screwed to shutter frame. Cabinet Shutter and steel parts must be powder coated to Fire Red finish with "FIRE HOSE" painted on glazing ( for internal Hydrants). The width & height of the cabinet shall depend upon the actual size of the fire niche available. Contractor shall make shop drawings and get these approved before fabrication. Shutter and frame shall have provision for fixing of Magnetic Contact.	Each	12		
F.14.8a	Providing and fixing of Fire Hose Cabinet Shutter as per description at 14.8 (above) but of Stainless steel SS-304 construction (only for FHCs in public areas)	Each	7		
F.14.9	Providing and fixing Stainless steel, four way, Collecting Head conforming to IS 904 with 63 mm diameter Instantaneous type Inlet with built - in Check Valve for Fire Brigade connection to fire water.	Each	1		
F.14.1	Providing and fixing Four way, Stainless steel Collecting Head conforming to IS 904 : 1983 for Fire Brigade connection to Sprinkler and Hydrant Mains with hood Butterfly Valve and 100 mm diameter C.I. Double flanged Non - return Valve including nuts, bolts, gaskets etc. complete in all respect.	Each	2		
14.11	Providing and fixing standard Draw Out connection with 63 mm diameter Instantaneous type coupling conforming to relevant standards for installation at Main Fire Water Tank.	Each	1		

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
14.12	Providing and fixing Butterfly Valve of 150 mm dia conforming to BS : 5155 with limit switches for remote indication of 'OPEN' and 'CLOSE' positions suitable for pressure rating of 16 kg/sq.cm. With gasket, flanges,nuts, bolts etc.(but excluding signal wire or indication devices).	Each	1		
	<b>TOTAL OF FIRE HYDRANT SYSTEM</b>				
<b>F.15</b>	<b>FIRE SPRINKLER SYSTEM</b>				
	The Fire Sprinkler System specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
F.15.1	Providing, Fixing, Testing and Commissioning of 15 mm diameter Quartzoid Bulb type Sprinkler Set designed to operate at 68 Degree Centigrade including UL listed Sprinkler Guard. (UL / FM / FOC listed or approved).				
F.15.1.1	Pendant type Standard Response K80	Nos.	8		
F.15.1.2	Sidewall Sprinkler Standard Response K80	Nos.	6		
F15.2	Not used				
F.15.3	Providing and fixing 150 mm diameter Deluge Valve, Electrical release Trim type (UL Listed), suitable for working pressure of 12.5 bars with flange connection, complete in all respects.	Each	0		
F.15.4	Providing and fixing 150 mm diameter Motorised Butterfly valve complete as required.	Each	2		

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.15.5	Providing and fixing electrically operated Flow Indicating switches including 1.5 mm thick gasket, nuts and bolts complete as per M & W Specification.				
F.15.5.1	For 25mm dia pipes	Nos.	4		
F.15.5.2	For 50mm dia pipes	Nos.	6		
F.15.5.3	For 80mm to 150 mm dia pipes	Nos.	23		
F.15.6	Providing and fixing MS cabinet of size 600 x 300 x 150mm, fabricated from 16 SWG MS sheet, with double front glass door and locking arrangement, having suitable shelves with space for 6 spare sprinklers and 6 spare medium velocity spray nozzle including one spanner properly fixed in the shelf. Cabinet shall be painted with enamel paint of approved shade, complete as per drawing.	Each	1		
F.15.7	Providing and fixing 150 mm diameter Installation Control Valve conforming to BS: 5153 or equivalent with water turbine type automatic alarm. This includes all standard fittings & valves like drain valve, test valve assembly, non return valve, stop valve, 'Y' strainer, pressure gauges etc. complete as per M & W Specification	Each	1		
	<b>TOTAL OF FIRE SPRINKLER SYSTEM</b>				
<b>F.16</b>	<b>MISCELLANEOUS FIRE SERVICES EQUIPMENT</b>				
	The Miscellaneous Fire Services Equipment specified herein, must conform to Section E33 of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.16.1	Providing and fixing fully charged Portable Fire Extinguisher of 9 litres capacity, Water type (Gas Cartridge) complete with Standard Discharge Valve and tube including CI bracket for wall mounting etc. conforming to IS 15683 : 2006	Each	19		
F.16.2	Providing and fixing portable fire extinguisher, dry powder type (gas cartridge) with cylinder initially fully charged with dry powder (ABC type) of 6 Kg, complete with standard discharge valve with tube, CI bracket for wall mounting etc. conforming to relevant standard IS 15683 : 2006)	Each	5		
F.16.3	Providing and fixing initially fully charged Portable Fire Extinguisher of 4.5 Kg. capacity, carbon dioxide type with cylinder with CO2 gas, complete with squeeze lever Discharge Valve, Pressure Gauge, Discharge Tube Horn including CI bracket for wall mounting etc. conforming to IS 15683 : 2006	Nos.	35		
F.16.4	Fire protective clothing & breathing apparatus				
F.16.4.1	Set of protective clothing containing 2 nos.	Nos.	2		
	Each following items ;				
	a. Coat				
	b. Trouser				
	c. Gloves				
	d. Anti-Flash Hood				
	e. Helmets				
	f. Boots				
	g. FRP/stainless steel case for storage of Fire Suits				
F.16.4.2	Self- contained open circuit type compressed air Breathing apparatus set confirming to EN-137: 2006, standard complete with one spare cylinders	Nos.	2		
	a) Air cylinder with valve				
	b) Back plate with body harness				

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	c) Face mask				
	d) Pressure reducer				
	e) Lung demand valve				
	f) Pressure gauge & warning whistle				
	g) Hoses				
	h) Carrying case				
	i) Spare air cylinder				
	j) Wall mount cabinet for Breathing Apparatus				
F.16.4.3	Water-jel fire blanket consisting scientifically formulated cooling gel and a carrier in size 96" * 72" n canister.	Nos.	1		
F.16.4.4	Water-jel fire blanket consisting scientifically formulated cooling gel and a carrier in size 72" * 60" n canister.	Nos.	1		
F.16.4.5	Snap light emergency evacuation system complete with two high intensity yellow klcolourcyalumelightsticsk (light proof, water proof, wind proof, non explosive, and non toxic) with temper proof pin on a all mounted unit.	Nos.	2		
	<b>TOTAL OF MISCELLANEOUS FIRE SERVICES EQUIPMENT</b>				
<b>F.17</b>	<b>CLEAN AGENT GAS BASED HIGH TEMPERATURE POLYMER TUBE SYSTEM</b>				
	Supply, fixing, testing and commissioning of Polymer Tube Detection based Clean Agent System for Electrical Panels (Polymer Tube Panel Protection System), for 2 Nos. ASS Room consisting of the following components:				
F.17.1	10 LB capacity Clean Agent system, complete with all necessary Clean Agent gas, fitting, support and accessories, connected with valve.	No.	6		
F.17.2	5 LB capacity Clean Agent system, complete with all necessary Clean Agent gas, fitting, support and accessories, connected with valve.	No.	4		
F.17.3	End of Line adapter	No.	10		
F.17.4	Pressure Switch	No.	10		

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.17.5	Polymer Detection Tube with all necessary fittings & support	M	522		
F.17.6	Master Control Unit for controlling each system, buzzers and electronic hooters, including all necessary accessories + electrical wiring to make each entire system functional	No.	10		
	Note: The items indicated above are notable items. The vendor to include all allied and implied items in required quantity at no extra cost.				
	TOTAL OF CLEAN AGENT GAS BASED HIGH TEMPERATURE POLYMER TUBE SYSTEM				
F.18	INERGENT / CLEAN GAS FLOODING				
F.18.1	Clean agent IG 541 (300 bar) system complying with NFPA 2007 gas suppression system for signaling equipment room, Telecom equipment room, UPS room based on NFPA 2007. Including pipe headers, nozzles, pressure relief vents and other accessories for the each room with facilities for manual override; predischage alarm and Abort switch for each room sizes given below.				
a)	Signaling equipment room, Telecom equipment room, S&T UPS room	M3	480		
	<b>Total of INERGENT / CLEAN GAS FLOODING System</b>				
F.19	<b>FIRE ALARM AND DETECTION SYSTEM</b>				
	The Fire Alarm and Detection System specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specification and description in BOQ, the most stringent of the condition will prevail.				

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
	All the items not specifically mentioned here but necessary to make the system complete and suitable for desired application as per M & W Specifications and Drawings will be deemed to be included in the quoted prices				
F.19.01	Supply, Installation, Testing and Commissioning of 8 Loop Addressable Main Fire Alarm Control Panel (MFACP) complete with capacity to connect Devices & Detectors (in zoned manner) as per M & W Specifications & Drawings but not limited to the following:	Set	1		
F.19.1.1	8 Loop Panel				
F.19.1.2	Repeater Driver Board				
F.19.1.3	Communication Board				
F.19.1.4	Software & Graphics				
F.19.1.5	PC with 21" TFT + 80column Printer.				
F.19.1.6	Nicl. Batteries & Battery Charger.				
F.19.1.7	Amplifier card				
F.19.1.8	Provision for interfacing with other systems such as SCADA / BMS with all required Hardware & Software.				
F19.02	Supply, Installation, Testing and Commissioning of Repeater Annunciator Panel with Mimic panel as per M & W Specifications and Drawings.	Set	1		
F19.03	Supply, Installation, Testing & Commissioning of Signal Initiating (Intelligent Analogue Addressable) devices complete with Detector Base etc. as per M & W Specifications.				
F19.03.1	Intelligent Addressable Multi Sensor Smoke Detector.	Nos.	360		

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F19.03.2	Addressable Fault Isolator Base	Nos.	1		
F19.03.3	Addressable Fault Isolator	Nos.	25		
F19.03.4	Addressable Mannual Glass Break Unit	Nos.	17		
F19.03.5	Sounder with strobe light	Nos.	17		
F19.03.6	Addressable Loop Sounder 6.8 W.	Nos.			
F19.03.7	Response Indicator	Nos.	111		
F19.03.8	Intelligent Addressable Duct Detector.	Nos.	3		
F19.03.9	Intelligent Addressable Control Module.	Nos.	17		
F19.03.10	Intelligent Addressable Monitoring Modules	Nos.	1		
F19.03.11	Intelligent Addressable water Flow Monitoring Modules	Nos.	21		
F19.03.12	Magnetic Lock Assembly for mimimum 400 Kg. Load	Nos.	1		
F19.03.13	Magnetic Contact	Nos.	1		
F19.03.14	Emergency Door Release Switch	Nos.	1		
F19.03.15	Power supply unit for Powering Magnetic Door Lock	Nos.	1		
F19.03.16	High Temperature (min. 80 C degree trip) Heat detector	Nos.	6		

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F19.04	Supplying, Laying, Termination, Testing & Commissioning of Fire Survival Cables (confirming to BS: 7846 and specifications for performance requirements of Fire Survival Cables) armoured, 1 pair 2.5 sq.mm, screened / shielded, Copper conductor (one pair shielded and one pair unshielded) cable or Mineral Insulated cable complying the CWZ category.	Metre	872		
F19.05	Supplying, Laying, Termination, Testing & Commissioning of Fire Survival Cables (confirming to BS: 7846 and specifications for performance requirements of Fire Survival Cables) armoured, 1 twisted pair 1.5 sq.mm, screened / shielded copper conductor cable or Mineral Insulated cable complying the CWZ category for looping of detection units etc.	Metre	2980		
	<b>TOTAL OF FIRE ALARM AND DETECTION SYSTEM</b>				
<b>F.20</b>	<b>Continuous Fibre Optic Distributed Linear Heat Sensing System to be installed in the entire length of the tunnels and trackway with redundancy complete with temperature monitoring capabilities.</b>				
F.20.1	Linear Heat Detection controller with Measurement Range 4 km integrated Relay Board having TCP/IP Interface including: 2 Sensor Channel with HD I/O Connection Set with	Set	1		
F.20.2	Linear Heat Detection System Software-for Commissioning and Configuration Software	Set	1		
F.20.3	Power Converter for Linear Heat Detection controller - AC Input 85-264 VAC, 45-65 Hz - DC Input 90-350 VDC - Output 24 VDC 2.5 A	Set	1		
F.20.4	Outdoor Housing: - IP66 Std. Display - Multicolor LCD (Alarm, Status, Operation)	Set	1		

PART –B – FIRE PROTECTION SYSTEM FOR BUDHWAR PETH STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	- Coated Steel, RAL 7035, Wall Mount				
	- IP66 Rated (NEMA4)				
	LINEAR HEAT SENSOR CABLE – FIBER OPTICAL & ACCESSORIES				
F.20.5	Sensor Cable - Thermoplastic	Metre	2560		
	- Tight Buffered Design				
	- Flame Retardant Non Corrosive Jacket				
	- 4 x Multimode Graded Index 50/125 µmFibers				
F.20.6	E2000 8° Pigtail for Multimode Graded Index 50/125µm,	Set	2		
F.20.7	Heavy Duty Splice Box	Set	2		
	- IP67 aluminum				
	- Indoor / Outdoor Use				
	<b>TOTAL OF LINEAR HEAT DETECTION SYSTEM</b>				
F.21	<b>Supply, installation, testing and commissioning of UL/FM approved VESDA System for Signaling equipment room, Telecom equipment room, S&amp;T UPS room, E&amp;M UPS room and ASS rooms including VLP panels associated aspirating devices and piping, integrating devices with the main fire alarm system.</b>	set	7		
F.21.1	Supply , installtion, testing and commissioning of SCADA/ control system network etc for VESDA system including of PCN network cabling etc	lot	1		
	<b>TOTAL OF VESDA SYSTEM</b>				

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
<b>1</b>	<b>PIPE WORKS FOR HYDRAULIC SERVICES</b>				
	The Pipe Work specified herein, must conform to Plumbing, Drainage and Water Supply Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between Plumbing, Drainage and Water Supply specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the Plumbing, Drainage and Water Supply specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
1.1	Providing and fixing Heavy Duty GI pipes of the following sizes conforming to IS:1239 and Plumbing, Drainage and Water Supply Specifications complete with all fittings and specials such as bends, tees, unions, reducers, flanges & plugs etc. conforming to IS:1879 and Plumbing, Drainage and Water Supply Specifications including fixing at wall / ceiling level supported by structural supports, clamps, hangers etc. This also includes threading, jointing, making connections, cutting holes in wall / floor / slab and making good the same with cement concrete 1:2:4, complete in all respect as per specifications.				
a	15 mm dia	R.M.	24		
b	20 mm dia	R.M.	192		
c	25 mm dia	R.M.	80		
d	32 mm dia	R.M.	24		
e	40 mm dia	R.M.	48		
f	50 mm dia	R.M.	80		

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
g	65 mm dia	R.M.	16		
1.2	Painting of GI pipe and fittings of the following sizes with two or more coats of synthetic enamel paint, of approved quality and shade, as per pipe colour code over a coat of primer. This includes painting of legends with direction arrows complete as per specifications.				
a)	15 mm dia	R.M.	24		
b)	20 mm dia	R.M.	192		
c)	25 mm dia	R.M.	80		
d)	32 mm dia	R.M.	24		
e)	40 mm dia	R.M.	48		
f)	50 mm dia	R.M.	80		
g)	65 mm dia	R.M.	16		
1.3	Providing protection to embedded G.I. Pipes and fittings of the following sizes, in wall chases, by wrapping two layers of 400 micron thick polythene sheet over two coats of bitumen. This includes proper overlaps on joints complete as per specifications.				
a)	15 mm dia	R.M.	24		
b)	20 mm dia	R.M.	80		
c)	25 mm dia	R.M.	24		
d)	32 mm dia	R.M.	16		

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
1.4	Providing and fixing insulation to hot water pipes of the following sizes (exposed) with 13 mm thick, flexible, closed cell, EPDM and low density elastomeric thermal insulation tube of expanded synthetic rubber, jointed with self-adhesive rubber insulation tape including making good the walls as required.				
a)	15 mm dia	R.M.	24		
b)	20 mm dia	R.M.	36		
1.5	Providing and fixing centrifugally cast iron (spun) soil, waste & vent pipe of the following sizes conforming to IS 3989 and Plumbing, Drainage and Water Supply Specifications with all fittings such as access door, tees, bends, cowls etc. This includes jointing of 25 mm deep lead joint with refined pig lead, provision of structural supports as required, cutting chases or holes in wall and floors and making good the same with 1:3 cement mortar or 1:2:4 cement concrete wherever required.				
a)	75mm dia	R.M.	216		
b)	100mm dia	R.M.	320		
c)	150mm dia	R.M.	60		
1.6	DI pipes and fittings				

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Supply and Installation of DI Pipes (K9) Including supply, storage, transportation and handling of all pipes, fittings and accessories (including all types of bends, adaptors, short piece sockets and spigots, collars, tees, flexible couplings, reducers, blind flanges, puddle flanges, dismantling joints...etc.), jointing materials, PE protective sleeving throughout, and all other materials required; excavation at any depth in any kind of soil and rock, any type of surface, natural, asphalt, concrete ...etc., laying of pipes including all jointing, any ancillary necessary for proper laying and jointing of pipes; supply from any distance placing and compaction of bedding, embedment (sand fill), backfilling and surface reinstatement, including warning tape and electronic identifiers or warning tape with ferrous strip ; testing; flushing and disinfection; all to the approval of the Engineer.				
	Class K7				
a)	100mm dia	R.M.	248		
b)	200mm dia	R.M.	208		
	Class K9				
a)	100mm dia	R.M.	80		
b)	150mm dia	R.M.	24		
c)	200mm dia	R.M.	272		
1.6	Providing and laying Cement Concrete 1:2:4 (1 cement: 2 coarse sand : 4 graded stone aggregate 40mm nominal size), of 75mm thick (average), around Cast Iron soil and waste pipes of the following sizes, below floor, including necessary shuttering and timbering etc. complete as required.				
a)	100mm dia pipe	R.M.	40		
b)	150mm dia pipe	R.M.	80		

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
1.7	Constructing brick masonry channel with F.P.S. bricks of class designation 75 in cement mortar 1:4 (1 cement : 4 sand) including necessary excavation, 10 cm thick cement concrete 1:5:10 (1 cement : 5 sand : 10 graded stone aggregate 40 mm nominal size) for foundation and 25 mm thick cement concrete 1:2:4 (1 cement : 2 sand : 4 graded stone aggregate 12.5 nominal size) for filling haunches, including 12 mm cement plaster 1:4 (1 cement : 4 sand) with a floating coat of neat cement inside the drain, its top and exposed side including providing cast iron grating and fixing to the drain complete as required.				
a)	150mm wide channel 200 mm average depth (For Pump Room)	R.M.	21		
1.8	Providing and fixing UV stabilized UPVC rain water pipe (SWR) with one end plain and other end socketed with injection moulded/fabricated fittings such as tees, bends, doors etc. and provided with square grooved along with V shaped rubber ring including making good wall and flooring wherever necessary. The wall thickness of the pipe and other technical characteristics shall be conforming to IS: 13592/92 Type A. The jointing is to be completed with rubber lubricant.				
a)	100 mm (OD)	R.M.	32		
b)	150 mm (OD)	R.M.	60		
	<b>TOTAL</b>				
<b>2</b>	<b>PIPING ANCILLARIES FOR HYDRAULIC SERVICES</b>				

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	The Pipe Ancillaries specified herein, must conform to Plumbing, Drainage and Water Supply Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between Plumbing, Drainage and Water Supply specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the Plumbing, Drainage and Water Supply specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
2.1	Providing and fixing Brass Ball Valves of the following sizes conforming to BS 5351 and Plumbing, Drainage and Water Supply Specifications, suitable for pressure rating of 10 kg / Sq.cm, with lever and fittings viz. flanges / union, nuts, bolts, washer etc. complete as per Plumbing, Drainage and Water Supply specification.				
a)	20 mm dia	Each	10		
b)	25 mm dia	Each	8		
c)	32 mm dia	Each	4		
d)	40 mm dia	Each	6		
e)	50 mm dia	Each	4		
f)	65 mm dia	Each	2		

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
2.2	Providing and fixing Butterfly Valves of the following sizes conforming to BS: 5155 and Plumbing, Drainage and Water Supply Specifications, suitable for pressure rating of 10 kg / Sq.cm, with hand lever operation, rubber gaskets, flanges, nuts, bolts and washers including painting complete as per Plumbing, Drainage and Water Supply specification.				
a)	65 mm dia	Each	5		
b)	100 mm dia	Each	6		
c)	150 mm dia	Each	10		
2.3	Providing and fixing Wafer type Double Plate Check Valves of the following sizes conforming to API-594 and Plumbing, Drainage and Water Supply Specifications, suitable for pressure rating of 10 kg / Sq.cm with cast iron body conforming to BS 1452, rubber gasket, flanges, union, nuts, bolts and washers including painting complete as per M & W Specifications.				
a)	50 mm dia	Each	2		
c)	100 mm dia	Each	2		
d)	150 mm dia	Each	10		
2.4	Providing and fixing Double Flanged Flexible Rubber Expansion Joint of standard length with Unit Control as described on Section 5.3.14 of the Plumbing, Drainage and Water Supply Specification, of the following sizes, complete with all accessories including rubber gaskets, flanges nuts, bolts and washers tested to a pressure of 10 kg / Sq.cm.				
a)	50 mm dia	Each	2		

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
2.5	Providing and fixing Cast Iron Double Flanged 'Y' type Strainers of the following sizes with nuts, bolts, gaskets etc. complete in all respect as described in the Plumbing, Drainage and Water Supply Specification.				
a)	65 mm dia	Each	2		
b)	100 mm dia	Each	2		
2.6	Providing and fixing C.I. Sluice valves of the following sizes conforming to BS : 5150 and Plumbing, Drainage and Water Supply specifications complete with bolts, nuts, rubber insertions etc.				
	100 mm dia	Each	2		
2.7	Providing and fixing in position Float Valve with Copper Ball Float and Brass Rod of required length conforming to BS 1212 and Plumbing, Drainage and Water Supply Specifications suitable for pressure of 10 kg / Sq.cm.				
	100 mm dia	Each	6		
2.8	Providing and fixing 100 mm diameter, Brass Dial Type Pressure Gauge as described in Plumbing, Drainage and Water Supply Specifications suitable for 0 - 15 kg / Sq.cm pressure range with isolation cock and complete in all respects.	Each	8		
2.9	Providing and fixing air vent for Domestic water supply risers with Ball Valve as described in Plumbing, Drainage and Water Supply Specifications suitable for pressure of 10 kg / Sq.cm complete, as per specifications.				
a)	20 mm dia	Each	3		

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	<b>TOTAL</b>				
<b>3</b>	<b>MISCELLANEOUS PLUMBING AND DRAINAGE EQUIPMENT</b>				
	Whether explicitly specified or not, the Miscellaneous Plumbing and Drainage Equipment specified herein, in addition to the description given in respective items of BOQ.				
	All the items / parts mentioned in relevant clauses of the Plumbing, Drainage and Water Supply specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
3.1	Providing and fixing CI “P” or “S” trap (conforming to IS: 3989) of self-cleaning design, with or without vent arm, complete including cost of cutting and making good the walls and floors.				
a)	100 mm inlet and 100 mm outlet.	Each	8		
b)	100 mm inlet and 75 mm outlet.	Each	6		
3.2	Providing and fixing WC connector (straight or bend type) of 100 mm diameter and required length including proper connection to C.I. pipe complete as required.	Each	8		
3.3	Providing and fixing floor drain with 4mm thick stainless steel gratings (100 mm diameter) with frame including fixing to the floor with cement mortar.	Each	12		

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
3.4	Providing and fixing Stainless Steel 'Cockroach' Trap with 150 mm x 150 mm stainless steel grating fixed on top of floor trap. The cost includes the cost of all ancillary works as required to complete the work.	Each	16		
3.5	Providing and fixing Stainless Steel grating, Grade 304 on top of floor trap. The rate includes the cost of all ancillary works and material as required to complete the work.				
a)	125 x 125 x 1mm or 125mm dia x 1 mm	Each	16		
3.6	Providing and fixing floor clean out plug for Cast Iron Soil or waste pipes of the following sizes comprising of C.I. Plug, nipples, bends including lead jointing etc. complete.				
a)	150mm diameter	Each	10		
b)	100mm diameter	Each	3		
3.7	Providing and fixing of 200 mm X 200 mm C.I. Square grating at terrace RWP complete in all respect.	Each	16		
3.8	Providing and fixing 100 mm dia G.I. Vent pipe at the roof level of water tanks with anti-mosquito brass grating, bends as required complete in all respects as per drawing.	Each	6		
	<b>TOTAL</b>				
<b>4</b>	<b>EXTERNAL SEWAGE &amp; STORM WATER DRAINAGE:</b>				

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
4.1	Providing and laying non-pressure NP4 class RCC pipes with collars jointed with stiff mixture of Cement mortar in the proportion of 1:2 (1 cement: 2 fine sand) including testing of joints etc. complete. This also includes excavation in all kinds of soil (including hard rock), dewatering, refilling, watering, ramming, removing and disposal of the surplus excavated material and making good the same, complete as required.				
a)	250 mm dia RCC pipe	R.M.	72		
b)	200 mm dia RCC pipe	R.M.	32		
c)	150 mm dia RCC pipe	R.M.	40		
4.2	Providing and laying Cement Concrete in the proportion 1:4:8 (1 cement : 4 course sand : 8 graded stone aggregate of 40 mm nominal size) for NP 4 class RCC pipes with concrete bedding and haunches up to the center of pipe including shuttering & timbering complete as required.				
a)	For 250 mm dia pipe – 150mm thick PCC bedding	R.M.	72		
b)	For 200 mm dia pipe – 150mm thick PCC bedding	R.M.	32		
c)	For 150 mm dia pipe – 100mm thick PCC bedding	R.M.	40		

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
4.3	Providing, fixing, jointing and testing in position, the following C.I. Class (LA) Pipes, conforming to IS:1536 and cut to required lengths for drainage. This also includes making proper connections with refined pig lead of required depths. The pipe must be laid below ground level in trenches up to the required depth including excavation in all kind of soils (including hard rock), dewatering, refilling, watering, ramming, removing and disposal of the surplus excavated material as per instructions by site in charge and making good the same, complete as required.				
a)	150 mm dia	R.M.	120		
4.4	Constructing rectangular manhole of the following types in brick masonry with Class 75 designation bricks of approved quality in Cement Mortar in the proportion 1:4 (1 cement : 4 coarse sand) having RCC top slab with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), foundation with cement concrete 1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size), inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) and finished with a floating coat of neat cement, outer plaster 15 mm thick with cement concrete 1:4 (1 cement : 4 coarse sand) including making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) and finished with a floating coat of neat cement, fixing of foot rests made up of 20 mm M.S. square bar in 1:2:4 cement concrete (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm nominal size) block of size 200 mm x 200 mm x 100 mm. This also includes excavation in all kinds of soil (including hard rock), dewatering, refilling, watering,				

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	ramming, removing and disposing surplus excavated material, complete as required.				
a)	Inside size 900 mm x 800 mm and 600 mm depth with 560 mm diameter SFRC, heavy duty perforated cover with frame conforming to IS:12592 fixed in top slab.	Each	10		
b)	Inside size 1200 mm x 900 mm and 900 mm depth with 560 mm diameter SFRC, heavy duty perforated cover with frame conforming to IS:12592 fixed in top slab.	Each	12		
4.5	Making connection of storm water drain / sewer line with Municipal external storm water / sewer line including necessary excavation in all kinds of soil up to required depth, breaking the wall / floor of municipal manhole / nallah and making good the same with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20mm nominal size), plastering on both sides with cement mortar 1:4 (1 cement : 4 coarse sand) finished with a floating coat of neat cement and making necessary channels for drain etc. complete. This also includes the liasoning work such as filling necessary applications, submission of forms for approval to the municipal authorities, depositing the necessary fees and other amounts as required for getting the premises / installations inspected and approved and all other formalities required till the connection is obtained. All the expenses incurred in this regard shall be borne by the contractor except for the payments to be made for any security deposits which will be reimbursed on actual.				
a)	For Sewer connection	Job	1		

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
b)	For Storm water connection	Job	2		
<b>20</b>	<b>PUMPS FOR WATER SUPPLY / SEWAGE/ SEEPAGE WATER</b>				
	Whether explicitly specified or not, the Pumps for Water Supply / Water Treatment specified herein, must conform to Specifications and Motors must conform to Specifications, in addition to the description given in respective items of BOQ. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
	The motor HP to be confirmed by the supplier for the duty mentioned for each pump.				
	Rates quoted shall be inclusive of all structural supports, clamps etc. as per approved design / specifications.				
20.1	Supply, Installation, Testing and Commissioning of following Hydropneumatically operated pumping set (pressure switch operated fully automatic) with C.I. Body, bronze Impeller, stainless steel shaft and induction motor, vibration eliminating pads and accessories including pressure tank, pressure switches, automatic control panel etc.mounted on a common skid complete in all respect.				
a)	Not Used				
b)	For domestic water supply to station				
	Type of pump : Centrifugal				
	Capacity :6 Cum/Hr				

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Head : 15 m				
	Motor RPM : 2900				
	Each set consists of 2 pumps and 1 pressure tank. At any given time, only one pump need operate. Both the pumps must operate alternatively in service.	Set	1		
20.2	Supply, Installation, Testing and Commissioning of the following horizontal single / multistage centrifugal pump pit with CI body, baring impeller, SS shaft and induction motor mounted on a comon base frame, vibration eliminating pads accessories complete				
a)	Filter Feed Pump				
	Capacity :15 Cum/Hr				
	Head : 30 m				
	Motor-RPM- 2900				
	Each set consists of 2 pumps (1 Working + 1 Standby). At any given time, only one pump need operate. Both the pumps must operate alternatively in service.	Set	1		
20.3	Supply, Installation, Testing and Commisioning the following Submersible Sump Pumps conforming to M & W Specifiactions with motors conforming M & W Specifiactions for waste water drainage, free standing type, complete with				
a)	For Main Sewage Sumps at concourse level / Undercroft level				
	Solid handling Capacity 40 mm				
	Flow Rate - 120 LPM				
	Head - 30 M				
	RPM - 2900				

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Each set consists of 2 pumps (1 Working + 1 Standby). At any given time, only one pump must operate. Both the pumps must operate alternatively in service.	Set	1		
b)	For Sump at basement of Ancillary building				
	Solid handling Capacity 40 mm				
	Flow Rate - 300 LPM				
	Head -20 M				
	RPM - 2900				
	Each set consists of 2 pumps (1 Working + 1 Standby). At any given time, only one pump must operate. Both the pumps must operate alternatively in service.	Set	1		
c)	For Main Seepage Sumps at Undercroft level				
	Solid handling Capacity 40 mm				
	Flow Rate - 600 LPM				
	Head - 30M				
	RPM - 2900				
	Each set consists of 3 pumps (1 Working + 1 Standby + 1 Assisting Pump). However in case of operation of fire pumps all the three pumps may operate simultaneously.	Set	2		
d)	For Main Seepage Sumps at middle of tunnel				
	Solid handling Capacity 40 mm				
	Flow Rate - 600 LPM				
	Head - 30M				
	RPM - 2900				
	Each set consists of 2 pumps (1 Working + 1 Standby). However in case of operation of fire pumps all the two pumps may operate simultaneously.	Set	1		

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
e)	For Seepage Sumps at Entry / Exit at Undercroft Level				
	Solid handling Capacity 40 mm				
	Flow Rate - 300 LPM				
	Head - 20 M				
	RPM - 2900				
	Each set consists of 2 pumps (1 Working + 1 Standby). However in case of operation of fire pumps all the two pumps may operate simultaneously.	Set	4		
20.4	Supply, Installation, Testing and commissioning of level controller switches for automatic operation of seepage/sewage pumps with S.S. probes 2X1.5 sq.mm conductor cables from motors control center to probes.	Set	10		
	<b>TOTAL OF PUMPS FOR WATER SUPPLY / SEWAGE/ SEEPAGE WATER</b>				
<b>21</b>	<b>WATER TREATMENT PLANT</b>				
	Whether explicitly specified or not, the Water Treatment Plant and Pumps specified herein, must conform to Section E26 & E27 of the M & W Specifications and Motors must conform to Section E12 of the M & W Specifications, in addition to the description given in respective items of BOQ. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
	The motor HP to be confirmed by the manufacturer for the duty mentioned for each pump along with performance characteristic curve.				
	Rates quoted shall be inclusive of all structural supports, clamps etc. as per approved design / specifications.				
21.1	DUAL MEDIA FILTER				

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Providing and fixing of mild steel (rubber Lined) pressure vessel confirming to IS:2825 dual media filter complete in all respects as	NO.	1		
	1) Capacity = 15Cum / hr				
	2) Rate of flow = Not more than 12.5 Cum / hr / sqm of surface area				
	3) Wall thickness of shell and of dished ends as per IS:2825				
	4) Initial charge of media.				
	5) Sample valves				
	6) Sockets and valve for dosing chemicals.				
	7) Pressure gauge at inlet and outlet with isolating cocks and supports.				
21.2	SOFTENER UNITS				
	Providing and fixing of mild steel (rubber Lined) pressure vessel confirming to IS:2825 dual media filter complete in all respects as per M & W specifications, having following	NO.	1		
	1) Capacity = 15Cum / hr				
	2) Rate of flow = Not more than 15 Cum / hr / sqm of surface area				
	3) Wall thickness of shell and of dished ends as per IS:2825				
	4) Initial charge of media.				
	5) Sample valves				
	6) OBR (13 Hrs) 200 cum				
	7) Pressure gauge at inlet and outlet with isolating cocks and supports.				
	8) All Face piping and diaphragm valve etc..				
	9) Thickness of rubber lining not less than 3mm				
	10) All pipes to be as per IS : 1239 class "c"				
	11) Ejector for regeneration				

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	12) For resin quantity and design purpose consider hardness of water as 350 ppm,quality of outgoing water - commercial Zero hardness.				
21.3	IRON REMOVAL FILTER				
	Providing and fixing of mild steel (rubber Lined) pressure vessel confirming to IS:2825 dual media filter complete in all respects as per M & W specifications,having following	NO.	1		
	1) Capacity = 15Cum / hr				
	2) Rate of flow = Not more than 10 Cum / hr / sqm of surface area				
	3) Wall thickness of shell and of dished ends as per IS:2825				
	4) Initial charge of media.				
	5) Sample valves				
	6) OBR (13 Hrs) 200 cum				
	7) Pressuregauge at inlet and outlet with isolating cocks and supports.				
	8) All Face piping and diaphragm valve etc..				
	9) Thickness of rubber lining not less then 3mm				
	10) All pipes to be as per IS : 1239 class "c"				
	11) Ejector for regeneration				
	12) For resin quantity and design purpose consider hardness of water as 350 ppm,quality of outgoing water - commercial Zero hardness.				
21.4	REGENERATION TANK / SALT DILUTION TANK				
	Providing and fixing HDPE tank of Capacity 2000 litres to store and measure brine for regeneration of softening plant.Tank shall be complete with all interconnecting MS / HDPE pipes and other assemblies / accessories required for commissioning.				
a)	Brine Measuring Tank - 2000 litres capacity	NO.	1		
21.5	CHEMICAL DOSING PUMP				

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Providing , fixing ,Instalation and comissioning of chemical dosing pump capacity 6 lph with 250 ltrs capacity chemical tank.	NO.	1		
21.6	LEVEL CONTROLLERS / LEVEL INDICATORS				
	Supply, Installation, Testing and Commisioning of Magnetic Float type Level Controllers / Indicators having adequete number of switches (Minimum 5 Nos.) for the services mentioned below. Contoller Equipment shall be mounted inside the electrical panels				
a)	For Domestic Water tanks for the following levels.				
i)	High High level to trigger alarm.				
ii)	High Level to switch OFF the Tube well.				
iii)	Raw Water Tank 1/2 full				
v)	Low Low level to trigger alarm	Set	1		
b)	For Fire Water Tanks, one set for each of the tanks for the following levels.				
i)	High Level to trigger alarm				
ii)	Full Fire Water Tank indication				
iii)	Low low level in fire water tank to trigger alarm	Set	2		
c)	For Treated Water Tank for the following levels				
i)	High High level to trigger alarm				
ii)	High Level to switch OFF the Filter Feed Pumps.				
iii)	Treate Water Tank 1/2 full				
iv)	Low Level to switch ON the Filter Feed Pumps				
v)	Low Low level to trigger alarm	Set	1		
	<u>Note:</u>				

PART-C – PLUMBING WORKS FOR BUDHWAR PETH STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	All above level Controllers / Indicators to be complete with sensors, switches, relays, all wiring from the sensors to the Control Unit, Control Units to Motor Control Centers of the various Pumps and to the various alarm and indicating devices.				
	Sensors Terminal Units would be in weather proof enclosures (IP-56).				
	<b>TOTAL OF WATER TREATMENT PLANT</b>				

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**Price Centre L : Electrical and Mechanical works for Mandai station**

SL No.	Description of items	TOTAL AMOUNT(IN RUPEES)	
		In Figures	In Words
PART-A	Electrical Works		
PART-B	Fire protection System		
PART-C	Plumbing Works		
	TOTAL		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	<b>SUB-MAIN SWITCHBOARDS AND LOCAL ELECTRICAL PANELS</b>				
<b>E.01</b>	<b>Switch Boards/panels</b>				
a	Supply, installation, testing and commissioning of front operated, front / back access, cubicle type, indoor duty, floor / wall / recess / surface mounted (as specified below), totally enclosed dust and vermin proof switchboards / panels with minimum Ingress protection classification of IP 54, fabricated from 2 mm thick CRCA sheets with dip coat priming and epoxy powder coated finish. The panels must be suitable for 415 volts 3 phase, 4 wire, 50 Hz, system, must be able to withstand symmetrical fault level of (as specified for various panels) for 1 sec at 415 V and must include all interconnections, earthing and bonding requirements etc. The panels must conform to Drawings& Standards specified in relevant specifications, as required and as given below.				
b	Main LV Switchboards must conform the relevant Section of the M & W specifications				
c	All the items mentioned in relevant Sections / Clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates				
d	In case of any contradiction between BOQ / M & W Specifications and Drawings, the most stringent conditions of the above will apply.				
e	The Switchboards shall be provided with detachable gland plates for entry of cables from the top / bottom as required.				
f	All live accessible parts shall be shrouded and all equipment shall be finger touch proof. SMC / DMC shrouds and busbar supports suitably spaced shall be used. Hinged doors with padlocking facility shall be provided on all outgoing feeders with switch handles lockable in OFF position.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
g	All accessories & supporting structures such as channels, ISMC-100 base frame, mounting brackets, lifting lugs, panel heaters, ventilation arrangement etc shall be provided as required.				
h	Each incomer and outgoing feeder shall be provided with LED type status indication lamps suitable for 240 V, AC, as approved.				
i	Space provision as specified in M & W Specifications for future expansion.				
j	Components and accessories shall be same for switchboards and panels for uniformity, standardisation and replaceability and shall be applicable to all panels/ boards under the scope of work				
k	All interconnections, labelling, earthing, associated foundation / masonry work, sealing of gaps around the panels by chequered plates & erection etc. complete shall be executed as required.				
l	MCCB's shall be as per relevant Section of M & W Specifications and shall be current limiting type with front adjustable electronic releases for required protections against fault, suitable for isolation as per Annexure 7.1.2 of IEC 60947 – 2, with Ics and Icu values as specified in relevant clauses of M & W Specifications and conforming to latest IEC 60947. The operating voltage (Ue) shall be 415 V and insulation voltage (Ui) 690V with trip free mechanism, handle indicating ON / OFF / tripped positions. The breaking capacity as mentioned in items of BOQ below, shall be Ics values and shall not be less than 35 kA. Breakers must have Ics = 100% Icu. Electronic trip units shall comply with the requirements as specified in Appendix F (EMC /EMI Compatibility) of IEC 60947-2 or EN 60947-2.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
m	MCCBs for Network / Feeder Protection shall have adjustable protection against Overload and adjustable protection against Short Circuit as specified in M & W Specifications, whether specifically asked in BOQ or not. MCCB's for Network / Feeder Protection shall have releases with Earth Fault protection feature, wherever and as indicated in Bill of Quantities or Drawings. However, on completion of Cable Sizing Calculations and Fault calculations by the Contractor, if Earth Fault releases are required for additional feeders, where this requirement is not indicated in the BOQ, same shall be provided at no extra cost to the Employer. For Motor Protection MCCB's, requirements of M & W Specifications shall be followed.				
n	ACBs/MCCBs shall be compact, suitably designed to provide protection of motors, cables, busbars to suit rated current, unbalanced power distribution, as required.				
o	Panel / Switchboard board design shall be compact and components / accessories of compact sizes shall be used to economise the room space available. Employer reserve the right to seek compact items in place of larger ones.				
p	Incomer ACB'S / MCCBs / MCBs of switchboards / panels shall be provided with NO / NC contacts as specified in specifications for interface with SCADA System and for manual / auto and local / remote operation.				
q	ACB's shall have Microprocessor based releases as specified in the M & W Specifications.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
r	In case higher frame sizes (than those specified in the BOQ) are required to be provided to achieve the requirement of Total Discrimination mentioned in relevant Section of M & W Specifications, due to selection of a particular make, the same shall be provided at no extra cost if other makes are able to achieve the same with the specified frame size.				
s	Contractor must carry out Cable Sizing based on actual lengths of cables and Discrimination study for selection of trip units and settings for the releases during production of Working Drawings.				
t	All Motor feeders, having separate Thermal Over - load relay, shall be provided with Reset push button.				
u	Even though, ratings of MPCB / Contactors for Motor Feeders are mentioned in BOQ items below, after Selection of a particular make of Switchgear, MPCB / Contactors with ratings as per tested Type II Coordination from the selected manufacturer, only shall be provided.				
v	Description of Various panels/boards covered under this BOQ is as given below:				
w	All the panel shall be form form 4b type and shall be Suitable for Built- in CLEAN AGENT fire trace tube gas flooding system.				
<b>E.01.1</b>	<b>Local Motor Control Panels for Sewage Pumps, for both the side (North &amp; south end) as per M &amp; W Specifications &amp; Drawing complete and as per the following details:</b>	No's	2		
	Incomer				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	Automatic Transfer Switch (ATS) with 2 Nos. 160/40A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
b	LED phase indication lamp for R-Y-B.				
B.	BUS BAR				
	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in relevant section of M & W Specifications) rated 100 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
C.	OUTGOING				
1	2 Sets of Star Delta starter unit for Sewage Pumps (3.7 KW each) with one Pump as Working and One as Standby. Each Starter Unit shall be equipped with the following.				
a	1 No. 3 pole, 10 A, MPCB (with inbuilt Single Phasing Preventer) having 6 - 10 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
b	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
c	1 No. Digital Ammeter, CT operated.				
d	1 No. CT, 10/5A, 10VA, class - I for metering.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
e	Auto / Local / Remote Selector Switch key operated.				
f	Door mounted push buttons for Start and Stop functions.				
g	Emergency Stop push button lockable type.				
h	LED indication lamp for ON, OFF, Trip.				
i	3 No. 18A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
J	One No. Star Delta Timer.				
k	One No. timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
l	Running hour meter.				
m	Auxiliary Contactors for Auto/Local/Remote Operation.				
n	Power & Control terminals for cable connections.				
	Equipment common for all feeders is indicated below:				
a)	1 No Working / Standby Selector Switch.				
b)	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
<b>E.01.2</b>	<b>Local Motor Control Panel for Seepage Pumps, for both the ends (north &amp; south) as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	No's	2		
	Incomer				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Automatic Transfer Switch (ATS) with 2 Nos. 250/160A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
a	LED indication lamp for the following-				
b	ON, OFF, TRIP (each for both the supplies)				
c	LED phase indication lamp for R-Y-B.				
d	BUS BAR				
e	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 200 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
	OUTGOING				
f	3 Sets of Star Delta starter unit for Seepage Pumps (11 KW each) with Three Pumps as Working . Each Starter Unit shall be equipped with the following:				
g	ss				
h	1 No. 4 Pole RCCB 40A rating and 100mA sensitivity.				
i	1 No. Digital Ammeter, CT operated.				
j	1 No. CT 30/5A, 10VA, class - I for metering.				
k	Auto / Local / Remote Selector Switch key operated.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
l	Door mounted push buttons for Start and Stop functions.				
m	Emergency stop push button lockable type.				
n	LED indication lamp for ON, OFF, Trip.				
o	3 No. 25A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 230 VAC.				
p	One No. Star Delta Timer.				
q	One No. timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
r	Running hour meter.				
s	Auxiliary Contactors for Auto/Local/Remote Operation.				
t	Power & Control terminals for cable connections.				
	Equipment common for all feeders is indicated below:				
u	1 No. 3 Position Selector Switch with all other accessories and auxiliary contactors (for level indication multiplication) to change the sequence of operation of three motors automatically.				
v	1 Nos. Feeders with 100/40 A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit .Feeder shall be equipped with the following:				
w	LED indication lamp for ON, OFF & TRIP.				
x	Phase Indication for R, Y and B				
	Metering				
y	1 No Digital Voltmeter with Inbuilt Selector Switch.				
z	1 No Digital Ammeter with Inbuilt Selector Switch.				
aa	3 Nos. CTs, 40/5A, 10VA, CL-1 for metering.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>E.01.3</b>	<b>Local Motor Control Panel for Mid tunnel Pumps, as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	No's	1		
	INCOMER				
a	100/40 A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit .				
b	LED phase indication lamp for R-Y-B.				
	BUS BAR				
c	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 100 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
	OUTGOING				
d	2 Sets of Star Delta starter unit for Sump Pumps (3.70 KW each) with one Pump as Working and One as Standby. Each Starter Unit shall be equipped with the following.				
e	1 No. 3 pole, 10 A, MPCB (with inbuilt Single Phasing Preventer) having 6 - 10 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
f	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
g	1 No. Digital Ammeter, CT operated.				
h	1 No. CT, 10/5A, 10VA, class - I for metering.				
i	Auto / Local / Remote Selector Switch key operated.				
j	Door mounted push buttons for Start and Stop functions.				
k	Emergency Stop push button lockable type.				
l	LED indication lamp for ON, OFF, Trip.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
m	3 No. 18A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
n	One No. Star Delta Timer.				
o	One No. timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
p	Running hour meter.				
q	Auxiliary Contactors for Auto/Local/Remote Operation.				
r	Power & Control terminals for cable connections.				
s	1 No Working / Standby Selector Switch.				
t	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
<b>E.01.4</b>	<b>SMDB for Lighting distribution panels as per Technical Specifications and as per the following details.</b>	No's	2		
	INCOMING				
a	1 No. 400 A/400 A, 415V, 65kA, 3P motorised MCCB having (1) Electronic Trip Unit with adjustable Overload, adjustable Short Circuit and adjustable Earth Fault (All with adjustable time delays) protection; (2) Provision for remote tripping of MCCB; (3) NO/NC contacts for operation and (4) Neutral sensor for earth fault protection.				
b	TNC switch				
c	LED indication lamp for ON, OFF & TRIP.				
d	Phase Indication for R, Y and B				
	Metering				
e	1 No Digital Voltmeter with Inbuilt Selector Switch.				
f	1 No Digital Ammeter with Inbuilt Selector Switch.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
g	3 Nos. CTs, 400/5A, 10VA, CL-1 for metering.				
	BUS-BARS				
h	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars rated 400 Amps, suitable to withstand symmetrical fault level of 50kA 65KA for 1 second at 415 volts.				
	OUTGOINGS				
i	14 Nos. Feeders with 100A/100 A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit.				
j	Scada/BMS Connectivity at the separate Marshelling box in the panel with provision of all necessary I/O points & Transducers mounting prewired upto marshelling box terminal boards from the factory itself and audited in factory from the BMS provider				
<b>E.01.5</b>	<b>SMDB for Small power distribution panels as per Technical Specifications and as per the following details.</b>	No's	2		
	INCOMING				
a	1 No. 630 A / 630 A, 415V, 65kA, 3P motorised MCCB having (1) Electronic Trip Unit with adjustable Overload, adjustable Short Circuit and adjustable Earth Fault (All with adjustable time delays) protection; (2) Provision for remote tripping of MCCB; (3) NO/NC contacts for operation and (4) Neutral sensor for earth fault protection.				
b	TNC switch				
c	LED indication lamp for ON, OFF & TRIP.				
d	Phase Indication for R, Y and B				
	Metering				
e	1 No Digital Voltmeter with Inbuilt Selector Switch.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
f	1 No Digital Ammeter with Inbuilt Selector Switch.				
g	3 Nos. CTs, 630/5A, 10VA, CL-1 for metering.				
	BUS-BARS				
h	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars rated 630 Amps, suitable to withstand symmetrical fault level of 50 KA for 1 second at 415 volts.				
	OUTGOING				
i	25 Nos. Feeders with 100A/100A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				
j	4 Nos. Feeder with 250A/160A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				
k	Scada/BMS Connectivity at the separate Marshelling box in the panel with provision of all necessary I/O points & Transducers mounting prewired upto marshelling box terminal boards from the factory itself and audited in factory from the BMS provider				
<b>E.01.6</b>	<b>Retail Panel-1</b>	No's	1		
	Incoming				
a	100 amp TPN 50KA MCCB with built in microprocessor based release unit for short circuit, over current and earth fault protection with adjustable setting and with the following accessories :				
b	0-500 volts, digital voltmeter with 2 amps MCB's.				
c	0 – 100 amps digital ammeter and 100/5 amps 15 VA burden,CL 1 CTs				
d	Phase indicating lights protected by 2 amps MCB's.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
e	Each 1 no. NO/NC Auxiliary Contacts (ON/OFF Status) and Trip alarm contact (Trip status) for BMS Monitor (Potential free contacts)				
	Bus Bars				
f	100 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Goings				
g	4 Nos. 63 amp 50kA TPN MCCB each with microprocessor based releases control unit for protection with site settable over current, short circuit, instantaneous short circuit , earth fault fault protection and indicating lamps, Each 1 no. NO/NC Auxillary Contacts (ON/OFF Status) and Trip alarm contact (Trip status) for BMS Monitor (Potential free contacts)				
h	1 no's 63 amp 690 volts TPN 50 kA MCCBs as spare				
	Metering				
i	1 No., 230V, AC operated integral type Digital meter with RS-485 port for measuring Amps ,Voltage, Energy, frequency & power factor conforming to specifications, latest IEC/ EMC and EMI standards/criterion, with necessary Circuit MCBs and suitable size summing CTs for above two incomer metering supporting SCADA/BMS connectivity				
	Special Features:				
j	BMS compatibility for all incomers, Bus couplers and outgoing breakers including meters, BMS Control / Monitor Parameters (Potential free contacts)				
k	Suitability for Built- in CLEAN AGENT gas flooding system.				
<b>E.01.7</b>	<b>Fire Pump Panel, as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	No's	1		
	INCOMER				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	Automatic Transfer Switch (ATS) with 2 Nos. 400/400A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
b	LED indication lamp for the following-				
c	ON, OFF, TRIP (each for both the supplies)				
d	LED phase indication lamp for R-Y-B.				
	METERING				
e	1 No Digital Voltmeter with Inbuilt Selector Switch.				
f	1 No Digital Ammeter with Inbuilt Selector Switch.				
g	3 Nos. CTs, 400/5A, 10VA, CL-1 for metering.				
	BUS BAR				
h	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in of M & W Specifications) rated 400 Amps, suitable to withstand symmetrical fault level of 50kA for 1 second at 415 volts.				
	OUTGOING				
i	2 Sets of Star Delta starter unit for Fire Hydrant Pumps (116 KW each) with One Pump as Working and One as Standby. Each Starter Unit shall be equipped with the following.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
j	1 No. 3 Pole, 415V, 250 A, 50kA, 3P Motor Duty MCCB with Magnetic Trip Unit Only (having short circuit protection only) and auxiliary Contacts.				
k	1 No. Digital Ammeter, CT operated.				
l	1 No. CT, 160 /5A, 10VA, class - I for metering.				
m	Auto / Local / Remote Selector Switch key operated.				
n	Door mounted push buttons for Start and Stop functions.				
o	Emergency stop push button lockable type.				
p	LED indication lamp for ON, OFF, Trip.				
q	3 No. 150A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
r	One No. Star Delta Timer.				
s	Auxiliary Contactors for Auto/Local/Remote Operation.				
t	Triple pole, Suitable C.T. operated, bimetal Over Load relays (with in built single phasing protection) suitable for above mentioned motor feeder having arrangement for by - passing the Over Load relay in case the pump is running during an emergency scenario with all accessories including 3 Nos. Suitable C.T.s, Auxiliary Contactors etc.				
u	Power & Control terminals for cable connections.				
	Equipment common for all feeders is indicated below:				
v	1 No. Working / Standby Selector Switch.				
w	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
x	2 Sets of Star Delta starter unit for Fire Sprinkler Pumps (45 KW each) with One Pump as Working and One as Standby & 1 no spare. Each Starter Unit shall be equipped with the following.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
y	1 No. 3 Pole, 415V, 250A, 50kA, 3P Motor Duty MCCB with Magnetic Trip Unit Only (having short circuit protection only) and auxiliary Contacts.				
z	1 No. Digital Ammeter, CT operated.				
aa	1 No. CT, 160 /5A, 10VA, class - I for metering.				
ab	Auto / Local / Remote Selector Switch key operated.				
ac	Door mounted push buttons for Start and Stop functions.				
ad	Emergency stop push button lockable type.				
ae	LED indication lamp for ON, OFF, Trip.				
af	3 No. 150A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
ag	One No. Star Delta Timer.				
ah	Auxiliary Contactors for Auto/Local/Remote Operation.				
ai	Triple pole, Suitable C.T. operated, bimetal Over Load relays (with in built single phasing protection) suitable for above mentioned motor feeder having arrangement for by - passing the Over Load relay in case the pump is running during an emergency scenario with all accessories including 3 Nos. Suitable C.T.s, Auxiliary Contactors etc.				
aj	Power & Control terminals for cable connections.				
ak	Equipment common for all feeders is indicated below:				
al	1 No. Working / Standby Selector Switch.				
am	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
an	3 Sets of Star Delta Starter Unit (One Set for Hydrant Jockey Pump, One Set for Sprinkler Jockey Pump & One Set as spare) of 11 KW. Each Starter Unit shall be equipped with the followings:				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
ao	1 No. 3 Pole, 415V, 100 A, 50kA, 3P Motor Duty MCCB with Magnetic Trip Unit Only (having short circuit protection only) and auxiliary Contacts.				
ap	1 No. Digital Ammeter, CT operated.				
aq	1 No. CT, 30/5A, 10VA, class - I for metering.				
ar	Auto / Local / Remote Selector Switch key operated.				
as	Door mounted push buttons for Start and Stop functions.				
at	Emergency stop push button lockable type.				
au	LED indication lamp for ON, OFF, Trip.				
av	3 No. 40A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
aw	One No. Star Delta Timer.				
ax	Auxiliary Contactors for Auto/Local/Remote Operation.				
ay	Triple pole, Suitable C.T. operated, bimetal Over Load relays (with in built single phasing protection) suitable for above mentioned motor feeder having arrangement for by - passing the Over Load relay in case the pump is running during an emergency scenario with all accessories including 3 Nos. Suitable C.T.s, Auxiliary Contactors etc.				
az	Power & Control terminals for cable connections.				
<b>E.01.8</b>	<b>Local Motor Control Panel for Water Treatment System, Pump Room as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	No's	1		
	Incomer				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	2 Nos. 250/160 A, 415V, 35kA, 4P MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and having NO/NC contacts for operation. The MCCB's must be mechanically and electrically interlocked such that it is possible to manually close one of them at a time.				
b	LED phase indication lamp for R-Y-B.				
c	LED indication lamp for the following-				
d	ON, OFF, TRIP				
e	BUS BAR				
f	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 200 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
	Outgoing				
g	2 Sets of Star - Delta Starter Unit of 7.5 KW (one for Borewell Pump and one as spare). Each Starter Unit shall be equipped with the following:				
h	1 No. 3 pole, 18 A, MPCB (with inbuilt Single Phasing Preventer) having 13 - 18 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
i	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
j	1 No. Digital Ammeter, CT operated.				
k	1 No. CT, 25/5A, 10VA, class - I for metering.				
l	Auto / Local / Remote Selector Switch key operated.				
m	Door mounted push buttons for Start and Stop functions.				
n	Emergency stop push button lockable type.				
o	LED indication lamp for ON, OFF, Trip.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
p	3 No. 25A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
q	One No. Star Delta Timer.				
r	Running Hour meter.				
s	Auxiliary Contactors for Auto/Local/Remote Operation.				
t	Power & Control terminals for cable connections.				
u	9 Sets of Star - Delta Starter Unit of 3.75kW each for Filter Feed Pump (1 Working + 1 Standby), Raw Water Pump (1 Working + 1 Standby), Soft Water Pump (1 Working + 1 Standby), Domestic Water Pump (1 Working + 1 Standby), and 1 nos Spare feeder. Each Starter Unit shall be equipped with the following:				
v	1 No. 3 pole, 10 A, MPCB (with inbuilt Single Phasing Preventer) having 6 - 10 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
w	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
x	1 No. Digital Ammeter, CT operated.				
y	1 No. CT, 10/5A, 10VA, class - I for metering.				
z	Auto / Local / Remote Selector Switch key operated.				
aa	Door mounted push buttons for Start and Stop functions.				
ab	LED indication lamp for ON, OFF, Trip.				
ac	Emergency stop push button lockable type.				
ad	3 No. 18A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
ae	One No. Star Delta Timer.				
af	Running Hour meter.				
ag	Auxiliary Contactors for Auto/Local/Remote Operation.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
ah	Power & Control terminals for cable connections.				
	Equipment common for both feeders in each set of pumps (1 Working & 1 Standby) are indicated below Total Five Sets of such equipment shall be provided:				
ai	1 No Working / Standby Selector Switch.				
aj	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
ak	4Sets of DOL starter unit for Sump Pumps (2.2 KW each) with Two Pump as Working and Two as Standby. Each Starter Unit shall be equipped with the following.				
al	1 No. 3 pole,6.3 A, MPCB (with inbuilt Single Phasing Preventer) having 4 - 6.3 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
am	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
an	1 No. Digital Ammeter, CT operated.				
ao	1 No. CT, 10/5A, 10VA, class - I for metering.				
ap	Auto / Local / Remote Selector Switch key operated.				
aq	Door mounted push buttons for Start and Stop functions.				
ar	Emergency Stop push button lockable type.				
as	LED indication lamp for ON, OFF, Trip.				
at	1 No. 18A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
au	One No. timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
av	Running hour meter.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
aw	Auxiliary Contactors for Auto/Local/Remote Operation.				
ax	Power & Control terminals for cable connections.				
ay	2 Nos. Feeders with 160/100 A, 3 pole, 35kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				
az	3 Nos. Feeders with 100/100 A, 3 pole, 35kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				
<b>E.01.9</b>	<b>Local Control Panels, for UPS as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	No's	2		
a	2 Nos. 250/160 A, 415V, 35kA, 4P MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and having NO/NC contacts for operation.				
b	LED indication lamp for the following-				
c	ON, OFF, TRIP (each for both the supplies)				
d	LED phase indication lamp for R-Y-B.				
	Metering				
e	1 No Digital Voltmeter with Inbuilt Selector Switch.				
f	1 No Digital Ammeter with Inbuilt Selector Switch.				
g	3 Nos. CTs, 250/5A, 10VA, CL-1 for metering.				
	BUS-BARS				
h	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in M & W Specifications rated 250 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
	OUTGOINGS				
i	12 Nos. 40A, 4P, MCB (C curve) .				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
j	4Nos. Feeders with 100 / 40 A, 3 pole, 35kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit.				
<b>E.01.10</b>	<b>Auto Transfer Switch for UPS as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	Sets	2		
a	Automatic Transfer Switch (ATS) with 2 Nos. 400/250A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
b	LED indication lamp for the following-				
c	ON, OFF, TRIP (each for both the supplies)				
d	LED phase indication lamp for R-Y-B.				
e	Out going terminals for cable collection to be provided.				
<b>E.01.11</b>	<b>Sub Main Distribution Boards for escalator power as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	Nos	2		
	INCOMER				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Automatic Transfer Switch (ATS) with 2 Nos. 400/250A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
	LED indication lamp for the following-				
	ON, OFF, TRIP (each for both the supplies)				
	LED phase indication lamp for R-Y-B.				
	Metering				
	1 No Digital Voltmeter with Inbuilt Selector Switch.				
	1 No Digital Ammeter with Inbuilt Selector Switch.				
	3 Nos. CTs, 250/5A, 10VA, CL-1 for metering.				
	BUS BAR				
	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 250 Amps, suitable to withstand symmetrical fault level of 50kA for 1 second at 415 volts.				
	OUTGOING				
	10 Nos. Feeder with 160/100 A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>E.01.12</b>	<b>Lift Power panel/DB as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	No's	8		
a	Automatic Transfer Switch (ATS) with 2 Nos. 160/100A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
b	LED indication lamp for the following-				
c	ON, OFF, TRIP (each for both the supplies)				
d	LED phase indication lamp for R-Y-B.				
e	1 No 6A, DP, MCB ( B curve) for Lift control supply (UPS supply) local isolation.				
f	Out going terminals for cable collection to be provided as per the lift load & protection requirement.				
<b>E.01.13</b>	<b>DG Set Power, Control &amp; Synchronizing panel DB as per M&amp;W specifications &amp; Drawing complete and as per the following details.</b>	No's	1		
A	From DG Panel to Main Distribution Board				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	1 No. 3200A, 415V, 65kA, 4 Pole, Electrically operated Draw Out type, ACB complete with safety shutters, 240V AC shunt trip coil & closing coil and having microprocessor based releases with (1) Communication capability (2) Provision for measurement of three phase and neutral current (3) Protection against long time + short time + earth fault (all with adjustable time delays) + instantaneous (4) Zone Selective Interlocking Unit for Total Discrimination (5) Communication options to remotely read and set parameters for the protection functions, transmission of ammeter measurements (6) Signalling of the cause of tripping and alarms, maximeter reset etc (7) NO / NC contacts for interlocks and indications. (8) Status Indication ON, OFF, TRIP.				
b	TNC switch				
c	Auto / Local / Remote Selector Switch key operated.				
d	LED indication lamp for ON, OFF & TRIP.				
e	ON, OFF, TRIP, spring charged & phase indication R-Y-B.				
f	Digital Ammeter with Inbuilt Selector Switch				
g	3 Nos. CTs, 3200/5A, 15VA, CL-1 for metering.				
B	D.G. INCOMER				
	2 Nos DG incomer with each consisting of the following-				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	1 No. 1600/ 1600A, 415V, 65kA, 3 Pole, Electrically operated Draw Out type ACB, complete with safety shutters, 240V AC shunt trip coil & closing coil and having microprocessor based releases with (1) Communication capability (2) Provision for measurement of V, A, W, VAR, VA, Wh, VARh, Hz, power factor etc (3) Protection against long time + short time + instantaneous + earth fault (all with adjustable time delays), over and under voltage, minimum and maximum frequency, voltage and current imbalance, phase sequence, load shedding and reconnection & reverse power protection (4) Measurement of interrupted currents, differentiated fault indications, maintenance indicators (5) Last few trippings and event histories and time stamping with facility for consulting the history file, maintenance indicator register etc (6) Communication options to remotely read and set parameters for the protection functions, transmission of all the calculated indicators and measurements (7) Signalling of the cause of tripping and alarms (8) NO / NC contacts for interlocks and indications.				
b	TNC switch				
c	Selector switch for following operation-				
d	Auto / Local / Remote operation of Breaker, Manual / Auto Synchronization, On line set selection.				
e	LED indication lamp for the following-				
f	ON, OFF, TRIP, spring charged & phase indication R-Y-B.				
g	Push Buttons for the following functions-				
h	Fault Accept, Annunciator Reset, Lamp test.				
	Metering				
i	Multifunction energy meter for measurement of voltage, line current, power factor, power & energy				
j	4 Nos. CTs, 2000/5A, 15VA, CL-1 for metering.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
k	Protection-				
l	Microprocessor base restricted earth fault relay.				
m	Microprocessor base differential protection relay.				
n	Master Trip Lockout Relay.				
o	4 Nos. CTs, 1600/5A, 15VA, CL-PS.(3 Nos in Panel and One No in DG neutral) for REF protection.				
p	6 Nos. CTs, 1600/5A, 15VA, CL-PS. (3 Nos in Panel and 3 Nos in Alternator Winding) for Differential protection.				
q	8 Window Annunciator with Hooter.				
r					
s	1 No 250A, AC-3 duty, Power Contactor with Auxiliary Contacts for neutral.				
t	Synchronizing equipment-				
u	Provision & Installation of Auto Synchronising Module for each DG Set with AMF, Active & Reactive Auto load sharing & Auto Load Management, with 16 Nos. Digital Inputs & Digital Outputs, with provision for BMS / SCADA connectivity.				
v	1 No Double Voltmeter, 1 No Double frequency Meter, 1 No Synchronoscope, 1 No Synchro Check Relay, Set of dark lamps with auxiliary transformer, 1 No Selector Switch for set to be synchronised (One set for Total No of DG sets)				
w	Voltage Raise / Lower & Frequency Raise / Lower Switch.				
x	Solid state / Motorised Potentiometer for AVR and Speed control ( as per manufacturer's requirement).				
y	1 No 24V DC source unit, 24V DC battery (for 8 hours back up) with battery charging circuit. (Common for all DG synchronization system).				
z	BUS BAR				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
z	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in of M & W Specifications) rated 4000 Amps, suitable to withstand symmetrical fault level of 65kA for 1 second at 415 volts.				
aa	OUTGOING FEEDERS				
ab	2 nos. 400A/400A, 415V, 65kA, 3P, MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and Earth Fault (With Adjustable time delay); having NO/NC contacts for operation and neutral sensor for earth fault protection.				
ac	LED phase indication lamp for R-Y-B.				
ad	Digital Ammeter with Inbuilt Selector Switch				
ae	3 Nos. CTs, 400/5A, 10VA, CL-1 for metering.				
af	2 no. 160A/100A, 415V, 65kA, 3P, MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and Earth Fault (With Adjustable time delay); having NO/NC contacts for operation and neutral sensor for earth fault protection.				
ag	Digital Ammeter with Inbuilt Selector Switch				
ah	3 Nos. CTs, 100/5A, 10VA, CL-1 for metering.				
<b>E.01.14</b>	<b>D.G. Auxiliary panel as per M &amp; W Specifications &amp; Drawing complete and as per the following details.</b>	Nos	1		
a	Incoming				
b	1No. 160 / 100 A, 415V, 35kA, 3P MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and Earth fault and having NO/NC contacts for operation and neutral sensor for earth fault protection.				
c	LED phase indication lamp for R-Y-B.				
d	Metering				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
e	1 No Digital Ammeter with Inbuilt Selector Switch.				
	3 Nos. CTs, 100/5A, 10VA, CL-1 for metering.				
f	Bus bars				
	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 100 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
g	Outgoings				
h	3 Sets of DOL Starter units of 0.75 kW each for Engine Lub-oil Priming Pump (2 Working + 1 Spare) & each shall be equipped as detailed below.				
i	1 No. 3 pole 2.5 Amps MPCB (with inbuilt single Phasing Preventer) having 1.6 - 2.4A Over - load release and having contacts for indications - On, Off, Trip.				
j	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
k	Auto / Local / Remote Selector Switch key operated.				
l	Door mounted push buttons for Start and Stop functions.				
m	Emergency stop push button lockable type.				
n	LED indication lamp for ON, OFF, Trip.				
o	1 No. 9A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
p	Auxiliary Contactors for Auto/Local/Remote Operation.				
q	Power & Control terminals for cable connections.				
r	2 Sets of DOL Starter units for Fuel Transfer Pumps (2.2 KW each) 1 Working + 1 Standby & each shall be equipped as detailed below.				
s	1 No. 3 pole 6.3 Amps MPCB (with inbuilt single Phasing Preventer) having 4 - 6.3A Over - load release and having contacts for indications - On, Off, Trip.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
t	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
u	1 No. Digital Ammeter, CT operated.				
v	1 No. CT, 10/5A, 10VA, class - I for metering.				
w	Auto / Local / Remote Selector Switch key operated.				
x	Door mounted push buttons for Start and Stop functions.				
y	Emergency stop push button lockable type.				
z	LED indication lamp for ON, OFF, Trip.				
aa	1 No. 9A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 VAC.				
ab	One No timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
ac	Running hour meter.				
ad	Auxiliary Contactors for Auto/Local/Remote Operation.				
ae	Power & Control terminals for cable connections.				
af	Equipment common for all feeders as below:				
ag	1 No Working / Standby Selector Switch.				
ah	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
ai	3No. 100 / 40 A, 415V, 50kA, 3P MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and Earth fault and having NO/NC contacts for operation and neutral sensor for earth fault protection. Breaker shall be equipped as detailed below.				
aj	LED phase indication lamp for R-Y-B.				
ak	LED indication lamp for the following-				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	ON, OFF, TRIP				
	<b>TOTAL FOR SUB-MAIN SWITCHBOARDS AND LOCAL ELECTRICAL PANELS</b>				
<b>E.02</b>	<b>DISTRIBUTION BOARDS</b>				
	The Distribution Boards specified herein, must conform to relevant section of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the specified conditions will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
	Supply, Installation, Testing & Commissioning of front operated, indoor, front access cubicle type, dead rear, wall / recess / surface mounted Distribution Boards, (confirming to specifications given in Section E06 of M & W Specifications). The Distribution Boards must have Ingress Protection Classification of IP 54, current rating of 100 Amps, and must be suitable to withstand symmetrical fault current level of 10 KA for 1 sec at 415 volts, with the configurations detailed below. Distribution boards must be provided with electrolytic, high conductivity, TPN copper bus-bars as specified in M & W specifications (with full sized Neutral busbar), gland plates at both ends, blanking plates etc. as required. All internal wiring within the Distribution boards must be with Copper Conductor, LSZH wires (conforming to BS 7211 and Section E02 of M & W Specifications) for Normal Lighting and Socket Distribution Boards and with Fire Resistant / Survival wires (conforming to BS 7846 and Section E02 of M & W Specifications) for Emergency Lighting Distribution Boards.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>E.02.1</b>	<b>SMALL POWER (SOCKET) TPN DISTRIBUTION BOARDS FOR UC., PL. BOH</b>	NOS	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	24 Nos. 25A, SP MCB				
f	6 Nos. 32A, 4P MCB + RCCB (30 mA Sensitivity)				
g	Terminals blocks for power & control cables.				
<b>E.02.2</b>	<b>SMALL POWER TPN DISTRIBUTION BOARDS FOR PL. PUBLIC AREA (SPDB - 2, 4 as per Drawing ).</b>	NOS	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	12 Nos. 25A, SP MCB				
f	2 Nos. 32A, 4P MCB + RCCB (30 mA Sensitivity)				
h	Terminals blocks for power & control cables.				
<b>E.02.3</b>	<b>SMALL POWER TPN DISTRIBUTION BOARDS FOR CONC., &amp; GROUND AREA</b>	NOS	4		
a	INCOMER				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	24 Nos. 25A, SP MCB				
f	4 Nos. 32A, 4P MCB + RCCB (30 mA Sensitivity)				
h	Terminals blocks for power & control cables.				
<b>E.02.4</b>	<b>SMALL POWER TPN DISTRIBUTION BOARDS FOR TUNNEL NORTH</b>	NOS	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	36 Nos. 25A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.5</b>	<b>SMALL POWER TPN DISTRIBUTION BOARDS FOR TUNNEL SOUTH</b>	NOS	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	36 Nos. 25A, SP MCB				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
h	Terminals blocks for power & control cables.				
<b>E.02.6</b>	<b>ADVIRTISEMENT DISTRIBUTION TPN DISTRIBUTION BOARDS</b>	NOS	4		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
d	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
e	OUTGOING				
f	24 Nos. 25A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.7</b>	<b>NORMAL LIGHTING TPN DISTRIBUTION BOARDS FOR PUBLIC AREAS</b>	Nos	4		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 32A, TPN MCB				
d	3 Nos. 25A, 4 Pole MCB + RCCB (30 mA Sensitivity)				
e	3 Nos. 25A, 3 pole AC-3 duty Contactor.				
	Auxiliary Contactors, 4 nos push buttons, indication lamp for 50%, 75% and 100% selection, Local / Remote selector switch for Auto/Local Operation and lighting control from control desk located at Station control room or through SCADA.				
f	OUTGOING				
g	18 Nos. 10A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.8</b>	<b>NORMAL LIGHTING TPN DISTRIBUTION BOARDS FOR PL BOH</b>	Nos	2		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 25A, TPN MCB				
	3 Nos. 25A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	18 Nos. 10A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.9</b>	<b>NORMAL LIGHTING TPN DISTRIBUTION BOARDS FOR CONC. BOH</b>	Nos	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 25A, TPN MCB				
	3 Nos. 25A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	36 Nos. 10A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.10</b>	<b>EMERGENCY LIGHTING TPN DISTRIBUTION BOARDS</b>	Nos	6		
a	INCOMER				
b	1 No. 32A, TPN MCB				
c	OUTGOING				
d	9 Nos. Of 10A DP MCB + DP RCCB (30mA Sensitivity)				
e	Terminals blocks for power & control cables.				
<b>E.02.11</b>	<b>EMERGENCY LIGHTING TPN DISTRIBUTION BOARDS</b>	Nos	6		
a	INCOMER				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
b	1 No. 32A, TPN MCB				
c	OUTGOING				
d	12 Nos. Of 10A DP MCB + DP RCCB (30mA Sensitivity)				
e	Terminals blocks for power & control cables.				
<b>E.02.12</b>	<b>TPN EMERGENCY LIGHTING DISTRIBUTION BOARD UDB - (for tunnels)</b>	Nos	2		
	INCOMER				
a	One no 100 / 40 A, 3 pole, 35kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit. The MCCB should be suitable for remote ON and OFF and auxiliary ON and OFF contacts should be provided for remote monitoring.				
b	OUTGOING				
c	30 Nos. Of 10A DP MCB + DP RCCB (30mA Sensitivity)				
d	Terminals blocks for power & control cables.				
<b>E.02.13</b>	<b>SPN EMERGENCY DISTRIBUTION BOARD FOR SCADA (5 Nos)</b>	Nos	4		
a	INCOMER				
b	1 No. 32A, DP MCB				
c	OUTGOING				
d	8 Nos. Of 10A DP MCB + DP RCCB (30mA Sensitivity)				
e	Terminals blocks for power & control cables.				
<b>E.02.14</b>	<b>SPN EMERGENCY DISTRIBUTION BOARD FOR UTILITY BUILDING UPS</b>	Nos	1		
a	INCOMER				
b	1 No. 20A, DP MCB				
c	OUTGOING				
d	9 Nos. Of 6A DP MCB + DP RCCB (30mA Sensitivity)				
e	Terminals blocks for power & control cables.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>E.02.15</b>	<b>SMALL POWER (SOCKET) TPN DISTRIBUTION BOARDS</b>	NOS	1		
a	INCOMER				
b	1 No. 50A, TPN MCB				
c	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	24 Nos. 25A, SP MCB				
f	6 Nos. 32A, 4P MCB + RCCB (30 mA Sensitivity)				
g	Terminals blocks for power & control cables.				
<b>E.02.16</b>	<b>NORMAL LIGHTING TPN DISTRIBUTION BOARDS</b>	NOS	1		
a	INCOMER				
b	1 No. 25A, TPN MCB				
c	3 Nos. 25A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	15 Nos. 10A, SP MCB				
f	Terminals blocks for power & control cables.				
	TOTAL FOR DISTRIBUTION BOARDS				
<b>E.03</b>	<b>CABLES, CABLE TRAYS &amp; STEELWORK</b>				
	The Cable and Cable Containment System specified herein, must conform to relevant Section of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	It may be noted that Contractor will be required to carry out cable sizing based on actual cable lengths, as per Working Drawings developed by him and after incorporating any changes in load requirements from the tendering stage. Optimisation must be carried out during cable sizing to reduce the cable requirement and size. Further, Contractor must obtain Engineer's approval on the Cable Sizing Calculation.				
<b>E.03.1</b>	<b>Supply at the site of work of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen Type Cables conforming to BS 6724 and relevant Section of the M&amp;W specifications of the following sizes:</b>				
	(Note: In case of any contradiction between BS 6724 and Specification , the stringent conditions of the two will apply)				
a	4 x 300 Sq.mm	RM	1040		
b	4 x 240 Sq.mm	RM	160		
c	4 x 185 Sq.mm	RM	560		
d	4 x 150 Sq.mm	RM	320		
e	4 x 120 Sq.mm	RM	RO		
f	4 x 95 Sq.mm	RM	97		
g	3 x 95 Sq.mm	RM	RO		
g	4 x 70 Sq.mm	RM	1200		
h	3 x 70 Sq.mm	RM	120		
i	4 x 50 Sq.mm	RM	880		
j	3 x 50 Sq.mm	RM	80		
k	4 x 35 Sq.mm	RM	800		
l	3 x 35 Sq.mm	RM	RO		
m	4 x 25 Sq.mm	RM	3360		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
n	3 x 25 Sq.mm	RM	RO		
o	4 x 16 Sq.mm	RM	6600		
p	3 x 16 Sq.mm	RM	800		
q	4 x 10 Sq.mm	RM	4000		
r	3 x 10 Sq.mm	RM	431		
s	4 x 6 Sq.mm	RM	80		
t	3 x 6 Sq.mm	RM	434		
u	4 x 4 Sq.mm	RM	80		
v	3 x 4 Sq.mm	RM	480		
w	4 x 2.5 Sq.mm	RM	80		
x	3 x 2.5 Sq.mm	RM	RO		
y	2 x 2.5 Sq.mm	RM	RO		
z	2 x 4Sq.mm	RM	RO		
<b>E.03.2</b>	<b>Supply at the site of work of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen, Fire Resistant / Survival Type Cables conforming to BS 7846 and revevant Section of M&amp;W Specifications , of the following sizes:</b>				
	(Note: In case of any contradiction between BS 7846 and Specification, the stringent conditions of the two will apply)				
a	4 x240Sq.mm	RM	20		
b	4 x185Sq.mm	RM	30		
c	4 x 95 Sq.mm	RM	50		
d	3 x 95 Sq.mm	RM	RO		
e	3 x 70 Sq.mm	RM	100		
f	4 x 50 Sq.mm	RM	50		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
g	3 x 50 Sq.mm	RM	240		
h	4 x 25 Sq.mm	RM	120		
i	3 x 16 Sq.mm	RM	42		
j	4 x 10 Sq.mm	RM	1022		
k	3 x 10 Sq.mm	RM	80		
l	4 x 6 Sq.mm	RM	120		
m	4 x 2.5 Sq.mm	RM	RO		
n	3 x 2.5 Sq.mm	RM	RO		
o	2 x 2.5 Sq.mm	RM	352		
p	2 x 4 Sq.mm	RM	RO		
<b>E.03.3</b>	<b>Supply at the site of work of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen Type Control Cables conforming to BS 6724 &amp; relevant section of M&amp;W Specifications, of the following sizes:</b>				
	(Note: In case of any contradiction between BS 6724 and Specification , the stringent conditions of the two will apply)				
a	2 C x 2.5 Sq. mm Copper cable	RM	24		
b	3 C x 2.5 Sq. mm Copper cable	RM	24		
c	4 C x 2.5 Sq. mm Copper cable	RM	28		
d	5 C x 2.5 Sq. mm Copper cable	RM	28		
e	7 C x 2.5 Sq. mm Copper cable	RM	20		
f	9 C x 2.5 Sq. mm Copper cable	RM	28		
g	12 C x 2.5 Sq. mm Copper cable	RM	28		
h	16 C x 2.5 Sq. mm Copper cable	RM	28		
l	19 C x 2.5 Sq. mm Copper cable	RM	36		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>E.03.4</b>	<b>Supply at the site of work of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen, Fire Resistant / Survival Type Auxiliary / Control Cables conforming to BS 7846 and relevant Section of M&amp;W Specifications , of the following sizes:</b>				
	(Note: In case of any contradiction between BS 7846 and Specification , the stringent conditions of the two will apply)				
a	2 C x 2.5 Sq. mm Copper cable	RM	1056		
a	3 C x 2.5 Sq. mm Copper cable	RM	264		
b	4 C x 2.5 Sq. mm Copper cable	RM	2200		
c	5 C x 2.5 Sq. mm Copper cable	RM	1320		
d	7 C x 2.5 Sq. mm Copper cable	RM	1056		
e	9 C x 2.5 Sq. mm Copper cable	RM	132		
f	12 C x 2.5 Sq. mm Copper cable	RM	88		
g	16 C x 2.5 Sq. mm Copper cable	RM	88		
h	19 C x 2.5 Sq. mm Copper cable	RM	264		
<b>E.03.5</b>	<b>Laying, testing and commissioning of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen Type and Fire Resistant / Survival Type Cables (as specified in Schedule 3.01 &amp; 3.02) on existing trays/ walls/ columns/ indoor/ trenches with suitable clamps, saddles, hooks, bolts etc.</b>				
a	4 x 300 Sq.mm	RM	1040		
b	4 x 240 Sq.mm	RM	176		
c	4 x 185 Sq.mm	RM	584		
d	4 x 150 Sq.mm	RM	320		
e	4 x 120 Sq.mm	RM	RO		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
f	4 x 95 Sq.mm	RM	137		
g	3 x 95 Sq.mm	RM	RO		
g	4 x 70 Sq.mm	RM	1200		
h	3 x 70 Sq.mm	RM	200		
i	4 x 50 Sq.mm	RM	920		
j	3 x 50 Sq.mm	RM	320		
k	4 x 35 Sq.mm	RM	800		
l	3 x 35 Sq.mm	RM	RO		
m	4 x 25 Sq.mm	RM	3480		
n	3 x 25 Sq.mm	RM	RO		
o	4 x 16 Sq.mm	RM	6600		
p	3 x 16 Sq.mm	RM	842		
q	4 x 10 Sq.mm	RM	5022		
r	3 x 10 Sq.mm	RM	511		
s	4 x 6 Sq.mm	RM	200		
t	3 x 6 Sq.mm	RM	434		
u	4 x 4 Sq.mm	RM	80		
v	3 x 4 Sq.mm	RM	480		
w	4 x 2.5 Sq.mm	RM	80		
x	3 x 2.5 Sq.mm	RM	RO		
y	2 x 2.5 Sq.mm	RM	352		
z	2 x 4Sq.mm	RM	RO		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>E.03.6</b>	<b>Laying, testing and commissioning of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen Type and Fire Resistant / Survival Type Control Cables on existing trays/walls/columns/ indoor/ trenches with suitable clamps, saddles, hooks, bolts etc.</b>				
a	2 C x 2.5 sqmm	RM	984		
b	3 C x 2.5 sqmm	RM	264		
c	4 C x 2.5 sqmm	RM	2028		
d	5 C x 2.5 sqmm	RM	1228		
e	7 C x 2.5 sqmm	RM	980		
f	9 C x 2.5 sqmm	RM	148		
g	12 C x 2.5 sqmm	RM	108		
h	16 C x 2.5 sqmm	RM	108		
l	19 C x 2.5 sqmm	RM	276		
<b>E.03.7</b>	<b>Supply and providing terminations conforming to relevant Section of M &amp; W Specifications for XLPE insulated, LSZH and Fire Survival (as specified in Schedule 3.02) armoured / unarmoured cables of sizes given below including the cost of supplying, fixing and crimping copper lugs, double compression Flame proof brass glands, insulation tape etc. This also includes making holes in gland plate complete as per specifications and as required.</b>				
a	4 x 300 Sq.mm	RM	98		
b	4 x 240 Sq.mm	RM	26		
c	4 x 185 Sq.mm	RM	13		
d	4 x 150 Sq.mm	RM	18		
e	4 x 120 Sq.mm	RM	1		
f	4 x 95 Sq.mm	RM	4		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
g	3 x 95 Sq.mm	RM	2		
g	4 x 70 Sq.mm	RM	8		
h	3 x 70 Sq.mm	RM	4		
i	4 x 50 Sq.mm	RM	10		
j	3 x 50 Sq.mm	RM	4		
k	4 x 35 Sq.mm	RM	4		
l	3 x 35 Sq.mm	RM	2		
m	4 x 25 Sq.mm	RM	30		
n	3 x 25 Sq.mm	RM	2		
o	4 x 16 Sq.mm	RM	98		
p	3 x 16 Sq.mm	RM	3		
q	4 x 10 Sq.mm	RM	30		
r	3 x 10 Sq.mm	RM	30		
s	4 x 6 Sq.mm	RM	3		
t	3 x 6 Sq.mm	RM	24		
u	4 x 4 Sq.mm	RM	2		
v	3 x 4 Sq.mm	RM	4		
w	4 x 2.5 Sq.mm	RM	2		
x	3 x 2.5 Sq.mm	RM	2		
y	2 x 2.5 Sq.mm	RM	20		
z	2 x 4Sq.mm	RM	2		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>E.03.8</b>	<b>Supply and Providing terminations conforming to relevant Section of M &amp; W Specifications for XLPE, LSZH, armoured / unarmoured cables of sizes given below including the cost of supplying, fixing and crimping copper lugs, double compression Flame proof brass glands, insulation tape etc. This also includes making holes in gland plate complete as per specifications and as required.</b>				
a	3 C x 2.5 Sq.mm Cu. Cable	Nos	6		
b	4 C x 2.5 Sq.mm Cu. Cable	Nos	26		
c	5 C x 2.5 Sq.mm Cu. Cable	Nos	26		
d	7 C x 2.5 Sq.mm Cu. Cable	Nos	8		
e	9 C x 2.5 Sq.mm Cu. Cable	Nos	6		
f	12 C x 2.5 Sq.mm Cu. Cable	Nos	6		
g	16 C x 2.5 Sq.mm Cu. Cable	Nos	6		
h	19 C x 2.5 Sq.mm Cu. Cable	Nos	6		
i	2 C x 2.5 sqmm Cu. Cable	Nos	38		
<b>E.03.9</b>	<b>CABLE TRAY</b>				
	Supply & installation of Prefabricated, perforated GI cable trays made of minimum 2mm thick GI sheets continuously connected including horizontal and vertical bends, reducers, tees, coupling plate and nut bolts washers, securing the support to the structure by dash fasteners, minor civil work, etc. duly suspended from the ceiling with 12mm dia vertical G.I rods supported by 40 mm X40 mm X5mm G.I angle etc. (or installed on wall supported on suitable brackets as required & approved) , conforming to M & W relevant Specifications Section .				
	With return flange				
a	600 mm wide x 50 mm deep	Meters	448		
b	450 mm widex 50 mm deep	Meters	64		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
c	300 mm wide x 50 mm deep	Meters	960		
d	150mm wide x 50mm deep	Meters	1472		
e	100mm wide x 50mm deep	Meters	64		
	Without return flange				
a	600 mm wide x 50 mm deep	Meters	192		
b	450 mm wide x 50 mm deep	Meters	32		
c	300 mm wide x 50 mm deep	Meters	2112		
d	150mm wide x 50mm deep	Meters	1344		
e	100mm wide x 50mm deep	Meters	960		
<b>E.03.10</b>	<b>CABLE LADDER</b>				
	Supply & installation of prefabricated, GI, ladder type cable tray conforming to M & W Specifications, continuously connected including horizontal & vertical bends reducers, tees, coupling plate, nut bolts washers etc. The side runners shall be 100 x 20 x 2.5 mm and centre rungs shall be of size 30 x 15 x 2.5 mm with centre to centre distance of 250 mm, as required.				
a	600 mm wide	Meters	1632		
b	450 mm wide	Meters	128		
c	300 mm wide	Meters	422		
d	150 mm wide	Meters	96		
e	100 mm wide	Meters	64		
<b>E.03.11</b>	<b>Supply, fabrication &amp; installation of fabricated GI steel work conforming to M &amp; W specification, to support GI cable trays, bus duct, light fixtures, conduit wirings, Bracket, &amp; other electrical works including Tunnel services etc, as required. This includes all the fixing accessories like fasteners and all masonry works.</b>	Kgs	20480		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	<b>TOTAL FOR CABLES, CABLE TRAYS &amp; STEELWORK</b>				
<b>E.04</b>	<b>WIRING &amp; ACCESSARIES</b>				
	Whether explicitly stated in the schedules below or not, the following must be complied with:				
	For supply and installation of conduits, cable trunking, raceway, flexible conduits and wiring, relevant clauses of M & W Specifications must be followed				
	Wires supplied must conform to relevant clauses of M & W Specifications				
	Wiring accessories must conform to relevant Section of the M & W Specifications				
	In case of any contradiction between BOQ and M & W specifications, the most stringent condition of the two will apply.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
E.04.1	Supply, Installation, Testing and Commissioning of conducting & wiring for primary point (MCB to first point) for light / fan / exhaust fan / call bell point with 2.5 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.	Points	48		
E.04.2	Supply, Installation, Testing and Commissioning of conducting & wiring for secondary point for light / fan / exhaust fan / call bell point with 2.5 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.	Points	325		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.3	Supply, Installation, Testing and Commissioning of conducting & wiring for primary point (MCB to first point) for light / fan / exhaust fan / call bell point with 2.5 sq. mm single core, copper conductor, Fire Survival Type, LSZH wires, conforming to BS 7846 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.	Points	16		
E.04.4	Supply, Installation, Testing and Commissioning of conducting & wiring for secondary point for light / fan / exhaust fan / call bell point with 2.5 sq. mm single core, copper conductor, Fire Survival Type, LSZH wires, conforming to BS 7846 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.	Points	109		
E.04.5	Supply, Installation, Testing and Commissioning of conducting & wiring for primary point (MCB to first point) for light / fan / exhaust fan / call bell point with 4 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.(For Flood lighting)	Points	6		
E.04.6	Supply, Installation, Testing and Commissioning of conducting & wiring for secondary point for light / fan / exhaust fan / call bell point with 4 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.(For Flood lighting)	Points	13		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.7	Supply, Installation, Testing and Commissioning of conducting & wiring for primary point (From DB to switchboard & switch board to first point) for light / fan / exhaust fan / call bell point with 3 x 2.5 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in hot dipped galvanized welded steel conduit / flexible conduit, recessed / surface mounted complete with accessories such as bends, junction boxes, flexible conduit, pull boxes, saddles including cutting, chasing and refilling etc. complete, as required, with modular type switch, front plate, box etc. as per M & W specifications.				
a	First point controlled by 16A switch\10A MCB	Nos.	53		
E.04.8	Supply, Installation, Testing and Commissioning of wiring for primary point (From DB to switchboard & switch board to first point) for light / fan / exhaust fan / call bell point with 3 x 2.5 sq. mm single core, copper conductor, Fire Survival Type, LSZH wires, conforming to BS 7846 and Section E02 of M & W Specifications, in hot dipped galvanized welded steel conduit / flexible conduit, recessed / surface mounted complete with accessories such as bends, junction boxes, flexible conduit, pull boxes, saddles including cutting, chasing and refilling etc. complete, as required, with modular type switch, front plate, box etc. as per M & W specifications.				
a	First point controlled by 16A switch\10A MCB	Nos.	20		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.9	Supply, Installation, Testing and Commissioning of conducting & wiring for secondary / loop point for light / fan / exhaust fan / call bell point with 3 x 2.5 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in hot dipped galvanized welded steel conduit / flexible conduit, recessed / surface mounted complete with accessories such as bends, junction boxes, flexible conduit, pull boxes, saddles including cutting, chasing and refilling etc. complete, as required, with modular type switch, front plate, box etc. as per M & W specifications.	Nos.	265		
E.04.10	Supply, Installation, Testing and Commissioning of conducting & wiring for secondary / loop point for light / fan / exhaust fan / call bell point with 3 x 2.5 sq. mm single core, copper conductor, Fire Survival Type, LSZH wires, conforming to BS 6387 and relevant Section of M & W Specifications, in hot dipped galvanized welded steel conduit / flexible conduit, recessed / surface mounted complete with accessories such as bends, junction boxes, flexible conduit, pull boxes, saddles including cutting, chasing and refilling etc. complete, as required, with modular type switch, front plate, box etc. as per M & W specifications.	Nos.	86		
E.04.11	Supply, Installation, Testing and commissioning of wiring for Tunnel light with 3 core x 4 sq.mm, armoured, XLPE insulated, Low Smoke Zero Halogen, Fire Resistant / Survival Type Cables conforming to BS 7846 and relevant Section of M & W specifications, for tunnel lights including termination, saddles, earthing etc. complete as required.		0		
a	Primary Point	Nos.	48		
b	Secondary point	Nos.	392		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.12	Supply and fixing of M.S. electro-galvanised box in recess / surface for power points including providing and fixing of moulded plate type, universal 6 pin, 6 / 16A shrouded socket outlet (shuttered) as specified in M & W Specifications, with 16A switch including connections, earthing and testing etc as required.	Nos	120		
E.04.13	Supplying and fixing of 3 Phase, 5 pin, 32A industrial switch, (as specified in M & W specifications), controlled socket outlet with straight plugs in IP - 65 enclosure including connections, earthing and testing etc. Complete as required	Nos	17		
E.04.14	Supplying and fixing of 1 Phase, 3 pin, 16A industrial switch, (as specified in M & W specifications), controlled socket outlet with straight plugs in IP - 65 enclosure for tunnel & station area including termination, earthing and testing etc. Complete as required	Nos	62		
E.04.15	Supplying & fixing of 50 mm x 200 mm(w), rectangular, G.I. Cable trunking including pull boxes as required at site, 2 mm thick, as specified in relevant section of M & W Specifications, with one side having continuous hinged cover with locking arrangement, earthing arrangement including provision of earthing strips at joints etc. complete as required.	Mtr.	400		
E.04.16	Supplying & fixing of 50 mm x 50 mm(w), rectangular, G.I. Cable trunking including pull boxes as required at site, 2 mm thick, as specified in section E03 of M & W Specifications with one side having continuous hinged cover with locking arrangement, earthing arrangement including provision of earthing strips at joints etc. complete as required.	Mtr.	640		
E.04.17	Supply and installation of following sizes of hot dipped galvanised welded steel conduit in surface / recess with GI junction boxes, pull box, saddles including cutting, chasing and refilling etc. complete as required.				
a	25mm dia conduit	Mtr.	1600		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
b	32mm dia conduit	Mtr.	240		
E.04.18	Supply and installation of following sizes of GI flexible conduit in surface / recess with coupler, saddles including cutting, chasing and refilling etc. complete as required.				
a	25mm dia conduit	Mtr.	480		
b	32mm dia conduit	Mtr.	160		
E.04.19	Supply, Laying, Installation, Testing & commissioning of wiring for Advertisement point with 3 core x 4 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable\wire as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.				
a	Primary Point	Nos.	12		
b	Secondary point	Nos.	48		
E.04.20	Supply, Laying, Installation, Testing & commissioning of wiring for single phase 3 pin 16A industrial socket outlet with 3 core x 6 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.				
a	Primary Point	Nos.	11		
b	Secondary point	Nos.	11		
4.22	Supply, Laying, Installation, Testing & commissioning of wiring for single phase 6 pin 6\16A socket outlet with 3 core x 4 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable\wire as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.				
a	Primary Point	Nos.	60		
b	Secondary point	Nos.	60		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.21	Supply, Laying, Installation, Testing & commissioning of wiring for three phase, 5 pin, 32A industrial socket outlet with 4 core x 6 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.	No.	17		
E.04.22	Supply, Laying, Installation, Testing & commissioning of wiring for single phase 3 pin 16A industrial socket outlet in Tunnel with 3 core x 6 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.(Inside tunnel)				
a	Primary Point	Nos.	20		
b	Secondary point	Nos.	20		
E.04.23	Supply, Laying, Testing & commissioning of 4 core x 4 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, for bus trunking connections including terminations, saddles, earthing etc. complete as required.	Meter	640		
E.04.24	Supply, Laying, Testing & commissioning of 2 core x 4 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, for bus trunking connections including terminations, saddles, earthing etc. complete as required.	Meter	40		
E.04.25	Supply, Laying, Testing & commissioning of 3 core x 2.5 sq.mm, LSZH, copper wire as per BS 7211 and relevant Section of M & W specifications, from Tap off boxes to Lighting Fixture including connections, earthing etc. complete as required.	Meter	800		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.26	Supply, installation & testing of 25 A, Copper, Lighting Bus Trunking System in easy detachable and convenient assembly suitable for 415 +-10% Volts, 3 Phase+ Single Phase, 8 Wire, 50 Hz A C System with Cu Bus Conductors of minimum 2.5 sq mm section and stainless steel / hot galvanised steel enclosure, with tap off provision every 0.5 mtr. The Lighting Bus Trunking shall be confirming to latest IEC Standards. It shall be with IP-55 Protection, halogen free and Fault Level Withstand Capacity of 2.5 kA min for 0.1 Sec (Icw) and 9.6 kA (Ipk). The Bus Trunking shall be complete with accessories like supporting clamps for Installation at Site, Fixing Clamps for luminaries and cable & one run of Cu earthing of 25x3 sqmm. equal to phase etc as required.				
a	Straight Feeder 25 A (3 Mtrs Length)	Nos	224		
b	End Feed Unit	Nos	13		
c	End Covers	Nos	13		
d	Flexible Joints	Nos	4		
e	10/16 A Single Phase Tap Off Boxes with fuse and indication.	Nos	224		
	<b>TOTAL FOR WIRING &amp; ACCESSORIES</b>				
<b>E.05</b>	<b>INDOOR LIGHTING AND FANS</b>				
	The Lighting System specified herein, must conform to relevant Section of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Supply, Installation, Testing and Commissioning of the following LED Luminaires complete with LED chip, housing, heat sink and electronic driver, surface/recess mounting arrangement and all fixing accessories. All luminaries and accessories shall be as per Specification E08.				
	All wiring within the luminaries must be with Low Smoke Zero Halogen Type and / or Fire Survival Type Wires, as per requirements of section E 08 of M & W Specifications.				
E.05.1	Supply, installation, testing and commissioning of surface mounted LED Batten - 38 Watt (Similar to Philips Catalogue no. BN 108C LED 40S PSU CDL WH 919515810658 or equivalent), with a system lumen output of 4000 lumens and a minimum system efficacy of 100 lumen/watt. The luminaire shall have a CRI of greater than 80 with rated system lifetime of 50,000 hours at L70. The luminaire is made of CRCA housing and shall have diffused optics. (BOH without False Ceiling Area)	Nos.	360		
E.05.2	Supply, installation, testing and commissioning of LED 2X2 recess mounted fixture - 40 Watt that delivers 3500 nominal lumens at a system efficacy of >90 lumen/watt for a design ambient temperature of 45 deg C (Similar to Philips Catalogue no. RC380 LED35 6500 PSU – OD WH or equivalent). The luminaire shall have a CRCA powder coated body and a high efficiency diffuser. The light output shall have a CRI>80 and the luminaire shall be made available with a CCT 6500K. The electronic driver shall operate a power factor>0.9 and a THD<10%. (BOH with False Ceiling Area)	Nos.	37		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.3	Supply, installation, testing and commissioning of LED trunking system - 40 Watt , with a system lumen output of 4000 lumens and a minimum system efficacy of 100 lumen/watt (Similar to Philips Catalogue no. LL199X 1XDLED40-6500 PSE OD WH or equivalent). The luminaire shall have a extrusion housing and light emitted shall have a CRI>80 with rated system lifetime of 50,000 hours at L70. The extrusion housing shall be available in 4', 8' and 12' sections. (Platform Public Area, Entry Corridor)	Nos.	245		
E.05.4	Supply, Installation, Testing & commissioning of luminaire - 70 Watt (similar to Philips Catalogue No. BY400V LED72S CW SK PSU S2 FG WH (Greenbay) or equivalent) as per approved make of list. Fitting should have a aluminium pressure die cast housing with dedicated optics with protected LED's giving a lumen output of 7200 lumens with efficacy of more than 100 lm/W giving optimal light distribution for symmetric/asymmetrical configuration and used for height levels between 5-9 metres.A system efficacy of at least 100 lm/W with a lumen output of 7000 lumens and a CCT of 5700K with a power factor of >.90.It is designed to meet IP65 specifications ensuring L70 for 50000 burning hours with a TDH<20%.The luminaire complies with requirements of CE ,CISPR 15Ed72 , IEC 61347-2-13, IEC 61547, IEC 62384. (Concourse Double Height Area)	Nos.	16		
E.05.5	Supply installation testing and commissioning of surface mounted LED Batten with 18 watt input wattage (Similar to Philips Catalogue no.TCW450 P 1XTLED or equivalent). Luminaire should be dust, jet and shock proof luminaire . Should have Polycarbonate	Nos.	93		
	housing and cover with all the accessories mounted in a CRCA Gear Plate. It has an IP rating of IP 65. (Undercroft)				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.6	Supply, installation, testing and commissioning of LED Downlighter - 12 Watt with a system lumen output of 1000 nominal lumens at a minimum system efficacy of 95 lm/W (Similar to Philips Catalogue no. DN392B LED10S-6500PSU WH or equivalent). The luminaire shall have a CRI greater than 80 with rated system lifetime of 50,000 hours at L70. The luminaire optics shall have a high efficiency diffuser with more than 85% transmittance. Height of luminaire shall not be more than 70mm. (Toilets)	Nos.	11		
E.05.7	Supply, installation, testing and commissioning of LED Linear 1x4 recessed fixture - 42 Watt, with a system lumen output of 3000 lumens at an efficacy of >65 lm/W (Similar to Philips Catalogue no. RC869 B W30 L120 LED or equivalent). The luminaire shall have powder coated CRCA housing and light output is by means of Semi High Gloss optics with 3D Lamellae and High Purity Anodized Aluminium mirrors. (Concourse Public Area)	Nos.	112		
E.05.8	Supply, installation, testing and commissioning of surface mounted LED Bulkhead - 10 Watt with a system lumen output of 600 lumens and a system efficacy of 60 lumen/watt (Similar to Philips Catalogue no. WT 202W LED 6S PSU S1 PC or equivalent). The luminaire shall be IP66 & IK09 rated and shall have a CRI of 70. The housing of luminaire is made of high pressure die cast aluminium with front cover made of polycarbonate diffuser. (Shaft Area)	Nos.	16		
E.05.9	Recess mounted luminaire suitable for TLED 18W lamps for vertical lighting with asymmetric light distribution for indoor application, Housing made up of CRCA sheet steel, powder coated white accommodating all electrical accessories prewired upto a terminal block (Similar to Philips Catalogue no. TBS207 1xTLED 18W or equivalent). Asymmetric light distribution offers high vertical light levels for rack/shelf and suitable for single TLED in single lamp version (wall washer)	Nos.	8		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.10	Supply, installation, testing and commissioning of surface mounted LED Batten - 42 watt, with a system lumen output of 3500 lumens and a minimum system efficacy of 80 lumen/watt (Similar to Philips Cat no - WT550C LED35SCWPSU). The luminaire shall have a CRI of greater than 80 with rated system lifetime of 50,000 hours at L70. The luminaire is made of CRCA housing and shall have diffused optics. (Platform Walkway)	Nos.	24		
E.05.11	Supply, installation, testing and commissioning of Luminaire - 19 Watt consist of extruded Aluminium alloy body sealed on to an extruded polycarbonate Prismatic protector having impact resistance IK 10 with a removable sliding plate equipped with control gear on one side and lamp on the other; one or two frames made out of injection moulded polycarbonate sealed on to the ends of the Luminaire with one or two polycarbonate covers closed with 2 stainless steel screws (Similar to Schreder Cat No MY1 LED or similar). System ensures a tightness of IP 67 for the whole luminaire suitable for 8 LEDs with all mounting accessories and 2 numbers of glands (suitable for loop in and loop out). (Tunnel)	Nos.	440		
E.05.12	Supply, installation, testing and commissioning of surface mounted LED flood light - 137 Watt with a system lumen output of 14400 lumens (Similar to Philips Catalogue no. BVP410 LED 144 CW HE NB FG S3 XT or equivalent). The luminaire shall have a aluminium pressure die-cast housing and a minimum system efficacy of >100 lumen/watt. The luminaire shall have a CRI greater than 70 with rated system lifetime of 50,000 hours at L70. (Outdoor DG & Cooling Tower Area)	Nos.	8		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.13	Supply, installation, testing and commissioning of surface mounted LED flood light - 140 watt with a system lumen output of 14000 lumens (Similar to Philips Catalogue no. BVP410 LED 144 CW HE NB FG S3 XT or equivalent). The luminaire shall have a aluminium pressure die-cast housing and a minimum system efficacy of >100 lumen/watt. The luminaire shall have a CRI greater than 70 with rated system lifetime of 50,000 hours at L70.	Nos.	2		
E.05.14	LED Trunking with System Efficacy > 90 Lumens / Watt , CRI > 80 , with Lumen output of 4000 Lumens with 40 Watt , SDCM < 3.5 , with Xitanium Driver , Class 1 , Optics - Frosted Diffuser, Injection moulded Plastic Cap, Option of Symmetric, LED TRUNK;LP3.1X2;5000K, PHILIPS make LED TRUNK or equivalent		10		
E.05.15	Extruded Aluminum Housing with High Efficiency Extruded Polycarbonate Diffuser with provision of End to End connection and life class of 40 K Hours @ L70 and Efficacy of 80 Lm / Watt and wattage of 8 Watts with Voltage Range - 160 – 270 Watts , Driver Efficiency > 80 % , Power Factor > .9 , THD < 33 % , and High Cut off Protection at 270 Volts , PHILIPS make BN550 - 1 ft or equivalent	No	8		
E.05.16	Down light with LEDs of Lumileds make which have non replaceble High Wattage LED. Color temperature =5700K. Constant current electronic driver. CRI>70. High efficiency white reflector. System Wattage of luminarie=15W.Voltage range of operation= 160V to 270V. Power factor> 0.9 System efficacy = 60 lumens per watt. Completely sealed from bottom with Polycarbonate Diffuser, Cut out =165mm. 40,000 hours burning life. Zero Maintenance , Zero mercury . The outer diameter of the front frame should not be more than 180mm made from high quality engineering plastic and the overall depth of the luminaire should not exceed 75mm, PHILIPS make BBS170 1XDLED 5000 PSU WH LED or equivalent	No	8		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.17	Recessed mounted led down light luminaire with pressure die cast aluminum housing which acts as a proper heat sink to ensure a long service life. The total power consumption should not exceed 10W (including driver). The Luminaire should have an integrated electronic driver delivering constant current output. The luminaire should have a matt finished high efficiency aluminum reflector with polycarbonate diffuser . Led should have life of 40K with minimum 70% lumen maintenance. The outer diameter of the front frame should not be more than 110mm made from high quality engineering plastic and the overall depth of the luminaire should not exceed 75mm Color Temperature 5000K CRI>70. LM80-08 For LED Source & LM79-08 test report must be submitted, PHILIPS make BBS150 LED or equivalent	No	10		
E.05.18	LED Batten with System Efficacy > 90 Lumens / Watt , CRI > 80 , with Lumen output of 3800 Lumens with 40 Watt , SDCM < 3.5 , with Xitanium Driver, output of 3800 Lumens with 40 Watt , SDCM < 3.5 , with Xitanium Driver, Class 1 , Optics - Frosted Diffuser, Injection moulded Plastic Cap , Option of Class 1 , Optics - Frosted Diffuser, Injection moulded Plastic Cap , Option of Symmetric / Asymmetric in. PHILIPS make BN208C LED40/CDL L1200 (Green Perform) FR or equivalent	No	10		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.19	LED 2X2 with Mid flux LED using efficient optics , System lumen efficacy > 80Lumen/Watt , System Luminous flux of 3450 lumens, System Wattage =43W . 50,000 hours burning life. . Color rendering index > 70 %. Color temperature 5000K. CRCA housing with high efficiency opal diffuser. Luminaire sealed from bottom. Inbuilt gear . Zero maintenance, Zero mercury. Offers 0.15w/sq ft /100Lux. LED efficacy>110 lumen/watt. LED binning code is 5SDCM. Lumen output >3500 from fixture level. Luminaire efficacy>80lumen/watt. Driver Surge protection available. Grey/white frame option. PHILIPS make RC365,CIRBUS;65W DRIVER or equivalent.	No	4		
E.05.20	2 x 2 Direct Indirect LED Luminaire with Life Class of 40 K Burning Hours @ L70 ,Stepped optics with Lumens of 2900 Lumens at System level , Lumen Efficacy of 76 Lumens / Watt , CRI > 70 , with built in Electronic Driver , PF > .9 , THD < 15 % , IEC Complint for Safety Performance & EMI , CRCA Housing and High Efficiency Diffuser. PHILIPS make RC140 B (Green Square ) or equivalent	NO	24		
E.05.21	Integral LED luminaire with a pressure die cast housing with dedicated opticsfor optimal light distribution. A specially designed heat management system to ensure system luminous efficacy > 90 lm/ W and ensure lumen depreciation upto 30% over 50k burning hours. The luminaire is designed to meet IP 65 classification and is compliant with relevant immunity, safety and performance and EMI standards. System wattage of 80 Watts , Lumen – 7300 lumens , CCT – 5700 K , CRI > 70 , Pf > .9 , THD < 20 % , PHILIPS make BY400V LED70S CW SK PSU S1 FG WH or equivalent	NO	24		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.22	Endura LED- Bulkhead can be installed as ceiling mounted and wall mounted. It serves as a simple energy efficient alternative to CFL/incandescent bulkhead luminaires. The luminaire is designed to meet IP 66 and IK 09 classification and is compliant with relevant immunity, safety and performance and EMI standards. System wattage of 10 Watts , Lumen – 600 lumens , CCT – cool white , CRI > 70 , Pf > .9 , THD < 20 % , PHILIPS make WT202W LED6S CW PSU S1 PC or equivalent.	NO	40		
E.05.23	Down light with LEDs of Lumileds make which have non replaceable High Wattage LED. Color temperature =5700K. Constant current electronic driver.CRI>70. High efficiency white reflector. System Wattage of luminarie=15W.Voltage range of operation= 160V to 270V. Power factor> 0.9 System efficacy = 60 lumens per watt. Completely sealed from bottom with Polycarbonate Diffuser, Cut out =165mm. 40,000 hours burning life. Zero Maintenance , Zero mercury . The outer diameter of the front frame should not be more than 180mm made from high quality engineering plastic and the overall depth of the luminaire should not exceed 75mm, PHILIPS make DN170C LED10S-6500 PSU WH or equivalent .	NO	16		
E.05.24	EnduraalLED Waterproof can be installed as surface mounted and suspended mounted. It serves as a simple energy efficient alternative to Fluorescent waterproof luminaires. The luminaire is designed to meet IP 65 classification and is compliant with relevant immunity, safety and performance and EMI standards. System wattage of 43 Watts , Lumen – 3500 lumens , CCT – 6500K , CRI > 80 , Pf > .9 , THD < 20 % , PHILIPS make WT550C LED 35 CWPSU S1PC or equivalent.	NO	10		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.25	SITC of Suspended Linear LED75 mm wide fitting with housing made of Extruded Aluminum and anodized finish. The diffuser should be Extruded Polycarbonate and the heat sink should be made of CRCA. The luminaire should have options for standalone(8ft and 4ft) unit lengths and should also have provision for continuous mounting. LED Used shall be SMD type and fixture should have minimum efficacy at System level (Not Chip Level) $\geq 110$ lumens/watt, Life of fixture 50000hrs@L70B50 Lumen maintenance, CCT choice available in 4000K and 6500K, CRI $>80$ , SDCM $<5$ , PF $>0.95$ , THD $<10\%$ , an operating Voltage Range of 140 - 270 V, 50Hz, and should have class B serviceability . Minimum Internal Surge Protection 2.5KV. The luminaire shall have a CRCA gear tray with reflectors for mounting of driver and this should ensure lower glare ratings for the fixture. The luminaire shall have movable suspension points for ease of installation. The fixture should comply with the parameters as per IS10322 and IEC60598, EMC / EMI compliance, Minimum system Lumens 4400 for a 8ft luminaire equivalent to Philips Pure line Slim SP780	NO	40		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.26	SITC of recess Mounted Linear LED 75 mm wide fitting with housing made of Extruded Aluminum and anodized finish. The diffuser should be Extruded Polycarbonate and the heat sink should be made of CRCA. The luminaire should have options for standalone(8ft and 4ft) unit lengths and should also have provision for continuous mounting. LED Used shall be SMD type and fixture should have minimum efficacy at System level (Not Chip Level) $\geq 110$ lumens/watt, Life of fixture 50000hrs@L70B50 Lumen maintenance, CCT choice available in 4000K and 6500K, CRI $>80$ , SDCM $<5$ , PF $>0.95$ , THD $<10\%$ , an operating Voltage Range of 140 - 270 V, 50Hz, and should have class B serviceability . Minimum Internal Surge Protection 2.5KV. The luminaire shall have a CRCA gear tray with reflectors for mounting of driver and this should ensure lower glare ratings for the fixture. The fixture should comply with the parameters as per IS10322 and IEC60598, EMC / EMI compliance, Minimum system Lumens 4400 for a 8ft luminaire equivalent to Philips Pure line Slim RC780	NO	10		
E.05.27	SITC of LED indirect output light to ensure soft and uniform light for visual comfort. The LED light source should not be directly visible to avoid any kind of glare to users. The luminaire shall have a UGR $<22$ when installed at a general height of 10ft from the ground. The Luminaire shall be available in CCT of 6500K with a CRI $>80$ and SDCM of 4. THD $<10\%$ PF $>0.9$ Lifetime of atleast 50000 burning hours at L70B50 at an ambient temperature of 25 degreeC for reliable performance. There should be no flicker in the operation of the light. The luminaire shall have a lumen output of atleast 3600lumens with a system efficacy of 100lm/W. Should have an option of DALI dimming. it should have a Class B serviceability. LM79 and LM80 reports of the fixture to support the technical requirement equivalent to Philips Coreview RC420B	NO	30		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.28	SITC of LED light with semi high gloss optics with 3D lamella D8 office compliant fixture . The Luminaire shall be available in CCT of 6500K with a CRI>80 and SDCM of 4. THD<10% PF>0.9 Lifetime of atleast 50000 burning hours at L70B50 at an ambient temperature of 25 degreeC for reliable performance. There should be no flicker in the operation of the light. The luminaire shall have a lumen output of atleast 2800lumens with a system efficacy of 65lm/W. Powder coated CRCA housing high pure anodized reflective mirrors. Should have an option of DALI dimming. it should have a Class B serviceability. LM79 and LM80 reports of the fixture to support the technical requirement equivalent to Philips Sereno RC869	NO	20		
E.05.29	SITC of High Pressure Die Cast Aluminium Alloy housing LED High Bay Luminaire with specially designed heat sinks dust free. for high ceiling heights having beam Angle 60 deg / 110Degree,PMMA material Penuts Lenses for effective light distribution, minimum Luminous flux (Lumen)16500 with a system 120lm/W .Correlated Color Temp 6500K,CRI>80,Maintenance of lumen L70 (Hrs) 50K@L70,Ambient temperature (Ta) 45Degree,optics narrow or widebeam optics, optical cover glass. Aluminium PDC Housing. Protection of Fixture:- IP65,IK08,Class I, power factor >0.95, Surge protection 4KV,Voltage range 120-277V AC, Lumen standard /Test certificate as per IEC 60598 and IS10322. LM 79 and LM80 reports needs to be submitted from a NABL/UL Approved Laboratory. The luminaire should be DALI Dimmable. Driver should be as per BIS approved. Spare driver should be easily replaceable at the site. Similar to Philips Maxoed BY415	NO	10		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.30	SITC of LED Flood light fixture with high power LEDs , IP66 and IK05 protection made of single LM6 high pressure die cast aluminum housing capable of delivering a nominal system lumen output in the range of 14000- 22000 lumens at a minimum system efficacy of 105lumen/watt and a CRI at least 70. The luminaire shall have options of rotationally symmetrical beam as well as a narrow and asymmetric beam with the help of secondary lenses on the LED light source. The lens plate should not be glued to the body of the luminaire but should be screwed. The fitting shall have a defined system of heat dissipation with the help of vertical fins to abstain from accumulation of dust/dirt on the luminaire. It should have a universal bracket and a graduation disk for aiming to ensure proper installation. The luminaire shall have a life class of 50,000 hours @ L70 for a design ambient of 35 Deg. C and driver efficiency of >85%. THD < 20% and minimum power factor of 0.9 at full load. The luminaire shall be Class I protection enabled. The overall height of the luminaire shall not be more than 165mm. LM-79/LM-80 report should be supplied for LED luminaire/LED chip. luminaire should comply with IS10322 and IEC60598 similar to Philips BVP410	NO	10		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.31	SITC of interior rated cove lighting fixtures with beam options of washing as well as grazing applications. The luminaire to have an asymmetric wash for better uniformity with a uniformity ratio of less than 3:1 on a 3 m (9 ft) wall with an 0.5 m (1.5 ft) setback. The fixture should be available in standard sizes of 1/4ft with system lumen output of 880lm/ft at a CCT of 4000K and CRI of 81 and a system lumen efficacy of atleast 76lm/W. Lifetime of atleast 50000 burning hours at L70 at 25degC. The luminaire shall have a powerfactor of 0.99 at 120V supply. The luminaire shall be dimmable by the available ELV type dimmers. The width of the fixture to be not more than 41mm for ease of installation. UL / cUL, FCC Class B, CE, C-Tick, CCC certified. IP20 rated fixture for indoor use. Operating temperature range of minus 40 to 50degC and humidity of 0-95%. Die cast aluminium housing with polycarbonate lens. Operating voltage range of 100-277V AC equivalent to Philips Evenbalance	NO	10		
E.05.32	SITC of LED lights with textile to create a white light ceiling surface for daylight experience that hides the source of light completely. Dimension of one panel luminaire dimension should not be greater than 2.7x1.8mt with the smallest dimension being 0.9x0.9mt with a depth of 155mm. Depth is considered with e-box. The weight of the luminaire should be greater than 42kg. The light output should be at least 3200lm/sq mt. The CCT should be 3000k or 4000k. The CRI of the luminaire should be not less than 85. The luminaire should have life of 50k hrs for L70. The luminaire should have acoustics properties of $\alpha_w$ 0.6 class C EN 11654, also the noise reduction coefficient of NRC 0.6 ASTM C423 – 99. The luminaire driver should be compatible for DALI or 0-10V. The luminaire should be compatible for ambient temp of 5 to 35 °C. Approved for fire rating of fabric by (EN 13501) B-s1, d0 and panel at (EN 13501) B-s2, d0. CE certified luminaire. Similar to Philips One Space PreFab.	NO	10		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.33	SITC of wall or ceiling mounted textile panels with high quality industrial fabric of Class B-s2,d0 (EN 13501-2 Euroclass) fire rating with multi-colored LED with the ability to display dynamic content remotely controlled and managed. Maximum size of panel possible 6.4x1.2mt. Possibility of wall(surface/recessed) or ceiling mounting ( surface,recess or suspended).Solution to have customised dimensions as per site requirement .The fixture shall have thickness of not more than 127mm, including mounting elements. It should be available in different sizes to suit the applications. Suitable for indoor use, IP20rated. Maximum weight is 19.3kg/m2.The panel shall have a power consumption of not more than 55W/ sqmt and luminance of upto 170Cd/sqmt for specific textiles. Pixel pitch of 60mm with RGB LEDs with an integrated playback controller. Should be compatible with content manager software for programming and content source to be .wmv files. It should be controllable through all of the below mentioned features- DiscoverME LTP mobile applications/Remote control/Integrated scheduler/ access through any computer connected to the luminous textile panel network. There should not be any limit to the number of panels connected in a system. It should have a sound absorption coefficient of 0.45. Main power connection with IEC connectors, RJ45 Ethernet connector for Data. Operating voltage range of 100-240VAC, operating frequency range of 50-60Hz and operating temperature range of 5-35degC. Lifetime to be atleast 60000 hours at L70 at an ambient temp of 25 degC. Class B-s2,d0 (EN 13501-2 Euroclass)rated for fire safety. EN13501-2 rated. CE/UL/CCC/ GOST-R approved. Similar to Philips Luminous Textile	NO	10		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.34	LED Step-Light BWG150, Low-power white-light LED light source, available in a choice of warm white (3000 K) or neutral white (4000 K), Long lifetime of 25,000 hours (70% lumen maintenance @ Tc = 25°C), IP67 protection PHILIPS make BWG150 LED50/WW PSU 2 or equivalent.	NO	10		
<b>E.06</b>	<b>Temporary Lighting at Station</b>				
E.06.1	Installation & Commissioning of 40Watt tube lights with cover 350 No. approx. along with the necessary wiring & power supply arrangement to provide general lighting at concourse, Platform ,Undercroft and Tunnel area during construction period.	per tube light for 240 days	160		
E.06.2	Cost (Addition/deletion) of Installation and Commissioning of 40 watt tube lights with cover 10No/day approx. along with the necessary wiring and power supply arrangement , to provide general lighting at concourse, Platform, Unddercroft& Tunnel area during construction period.	L/s	1		
<b>E.07</b>	<b>External Station Lighting</b>				
E.07.1	9.0 meter hot dipped galvanised Octagonal with single overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	No.	10		
E.07.2	9.0 meter hot dipped galvanised Octagonal with double overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	No.	10		
E.07.3	7.0 meter hot dipped galvanised Octagonal with single overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	NO	10		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.07.4	7.0 meter hot dipped galvanised Octagonal with double overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	NO	10		
E.07.5	Supply, installation, testing and commissioning of LED Street light fixture - 70 watt with IP66 protected LM6 high pressure aluminium die cast housing capable of delivering a nominal system lumen output of 7200 lumens with a minimum system efficacy of 85 lumen/watt and a CRI greater than 70. The luminaire shall have a life class of 50,000 hours @ L70 and driver efficiency of >85%. (Similar to Philips Cat. No. BRP410 LED CW 072 MR FG S1 PSU or equivalent)	NO	10		
E.07.6	Supply of 75mm dia HDPE pipe confirming to PN-4 boring of road channel area by using open trench method and laying of HDPE pipe properly continuously jointed restoring the surface where pitting is done ,to original position.	mtr	10		
E.07.7	Supply of 75mm dia HDPE pipe confirming to PN-4 boring of road channel area by using trench less method and laying of HDPE pipe properly continuously jointed restoring the surface where pitting is done ,to original position.	mtr	10		
E.07.8	Supply and laying of 6 SWG wire along with the cable	mtr	100		
E.07.9	Providing and fixing thermo plastic poly carbonate pole boxex confirming to IP-65 degree of protection, along with 16A MCB and 5 way connector and 2 No. cable gland suitable for 4x25 sq.mm cable.	no	1040		
E.07.10	wiring for luminaries in existing poles with following sizes of unarmoured cu cables from pole box to each fittings.				
a	3x2.5 sq mm	Meters	2160		
	<b>TOTAL FOR INDOOR LIGHTING AND FANS</b>				
<b>E.08</b>	<b>PROTECTIVE, CLEAN EARTH AND LIGHTING PROTECTION SYSTEM</b>				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	The Earthing and Lightning Protection System specified herein, must conform to relevant Section of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
<b>E.08.1</b>	<b>Earthmat</b>	Sets	2		
a	Supply, laying, testing and commissioning of 20 mm dia Cu rod for earth mat (at 500mm or deeper as per the final approved design as per the site condition) as per specifications including lap (of not less than 150mm) & cross braced joints and providing bitumin coat at every joint as required. Risers from earth mat to be brought out as per approved drawings and specifications. (Cost of risers not included in this item).				
b	Supply, laying, testing and commissioning of 16 mm dia Cu rod, laying of vertical earth electrodes 3 m deep from earth mat including braced joints with earth mat as per approved drawings and specifications. The weld joints to be provided with bitumin coats.				
c	Supply, laying, testing and commissioning of 240 sqmm Cu flexible conductor, for each electrode up to 1.5 mtr above the undercroft finished floor level				
d	50 mm dia HDPE pipe for mechanical protection of flexible rised				
e	Copper U clamp for fixing the rod/rised at a certain interval as specified the employer requirement.				
<b>E.08.2</b>	<b>Clean Earthmat</b>	Sets	1		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	Supply, laying, testing and commissioning of 13 mm dia Cu rod for earth mat (at 500mm or deeper as per the final approved design as per the site condition) as per specifications including lap (of not less than 150mm) & cross braced joints and providing bitumin coat at every joint as required. Risers from earth mat to be brought out as per approved drawings and specifications. (Cost of risers not included in this item).				
b	Supply, laying, testing and commissioning of 13 mm dia Cu rod, laying of vertical earth electrodes 3 m deep from earth mat including braced joints with earth mat as per approved drawings and specifications. The weld joints to be provided with bitumin coats.				
c	Supply, laying, testing and commissioning of 185 sqmm Cu flexible conductor, lfor each electrode up to 1.5 mtr above the undercroft finished floor level				
	Supply and laying,Testing and commissioning of copper/wire for interconnecting the earthing stations ,panels,DBs etc. of the following sizes in built up trenches /surface/wall/ground complete with holes & fixing,jointing / terminating accessories as per specifications & drawing as required. (Quantity shall be paid as per the actual measurement as executed, however direct measurement shall not excced the quantity indicated in drawing approved .				
d	50 mm x 6 mm Cu strip	Meters	1600		
e	50 mm x 4 mm Cu strip	Meters	960		
f	25mm x 3 mm Cu strip	Meters	2560		
	Supply of GI strips / rods / wires (minimum 97% conductivity) of the following sizes for provision in Earthing System.				
g	75 mm x 10 mm GI strip	Meters	128		
h	50 mm x 10 mm GI strip	Meters	128		
i	50 mm x 6 mm GI strip	Meters	960		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
j	32 mm x 5 mm GI strip	Meters	64		
k	25 mm x 6 mm GI strip	Meters	640		
l	8 SWG / 4 mm diameter, copper Wire	Meters	320		
	Supply, laying and testing of unarmoured, stranded copper conductor, Low Smoke Zero Halogen, green coloured cables of following sizes, conforming to BS 7211, for earthing, including termination of the same by copper lugs at both ends.				
m	1 x 6 sq. mm	Meters	64		
n	1 x 10 sq. mm	Meters	64		
o	1 x 16 sq. mm	Meters	64		
p	1 x 70 sq. mm	Meters	320		
q	1 x 150 sq. mm		100		
E.08.3	Supply and making of G.I Main earth connection / terminal of size 75 mm x 10 mm, 600 mm mounted on 2 Nos. SMC / DMC insulator for connection with Principal earth Terminal / Connection including copper nut-bolts, washers etc. complete as per M & W specifications and drawings for protective earthing.	Nos.	32		
E.08.4	Supply and making of G.I Main earth connection / terminal of size 32 mm x 5 mm, 300 mm mounted on 2 Nos. SMC / DMC insulator for connection with Principal earth Terminal / connection including G.I nuts-bolts, washers etc complete as per drawings for clean earthing.	Nos.	8		
E.08.9	Supplying & making of test joints with the following sizes of G.I Strip with bimetallic test link of length 125 mm ,4 nos. bolts, nuts and washers of brass, DMC support, as required, and as per M & W specifications and drawings etc.				
a	75 mm x 10 mm G.I strip	Nos.	10		
b	50 mm x 6 mm G.I strip	Nos.	5		

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S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.08.10	Providing and making plate earthing station with 600 x 600 x 6 mm copper plate earth electrode, 50 mm dia GI watering pipe, reducer & CI funnel with wire mesh, 150 mm coke / charcoal and salt around plate earth, all earth work, masonry enclosure with frame & cast iron hinged cover plate as per IS 3043.	Nos.	5		
	<b>TOTAL FOR PROTECTIVE, CLEAN EARTH AND LIGHTING PROTECTION SYSTEM</b>				
<b>E.09</b>	<b>UPS</b>				
	Supply, Installation, Testing and Commissioning of 2 x 80KVA, True Online Double Conversion, Parallel Redundant, 3 Phase AC Input & 3 Phase AC Output, UPS System having an Ingress protection Rating of IP 33 consisting of the following:	Sets	2		
	One Nos of 80kVA, 415V UPS.				
	Galvanic Isolation Transformer at Inverter output with Delta Connection of primary to separate input and Output neutral.				
	IGBT Rectifier Modules to achieve less than 5% Input Current Distortion and greater than 0.9 Power Factor at Input				
	Completely Microprocessor based with Diagnostics capability				
	Input phase Reversal Correction without switching to batteries				
	Maintenance by-pass module.				
	Two sets of SMF VRLA battery each having 30 minutes back up time at full load with interconnecting cables, racks and standard accessories (2V Cells with 20 Years Design life).				
	Isolation switches / MCCB for UPS as per Drawings & Specification and MCCB box with 2 pole DC MCCB of suitable rating for battery bank.				
	<b>TOTAL FOR UPS</b>				
<b>E.10</b>	<b>Diesel Generator Sets</b>				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Design, Manufacture & Supply of DG set (Radiator cooled - cooling system designed for 50°C ambient) of following aggregate capacity / rating, comprising of Diesel Engines coupled to Alternator both mounted on common base frame suitable for 3-phase, 415 volts, 50 Hz, 1500 RPM, Standby Power rated output with other standard accessories i.e. Fuel tank (990 Litres) with necessary medium class M.S. fuel piping (25mm size) with necessary fittings from DG set to Fuel Tank, automotive Batteries with leads as per manufacturer recommendations.				
	DG sets shall be suitable for auto starting & auto synchronising with auto load sharing and remote monitoring & control arrangement compatible with the existing electrical system as per particular specifications, complete as required.				
	Suitable number of silencers per DG set along with the insulation / aluminium cladding for sound attenuation as per specifications.				
	Supply of rubber mat in front and back of DG Control Panel (/ AMF panel)/ Isolation panel as per latest standards (IS:15652:2006) amended upto date.				
	Detailed, Maintenance & Operation manuals, to be supplied after 3 months of Date of vendor approval of DG sets complete as per the specifications.				
	2000 KVA (comprising of 2 DG sets of minimum 1000 kVA capacity each).	Sets	1		
<b>E.10.1</b>	<b>INSTALLATION of DG sets</b>				
	Installation/Erection, Testing & Commissioning including Integrated Testing with all systems for the DG sets along with all accessories for the following Capacity DG sets complete as per specifications as required.				
	2000 KVA (comprising of 2 DG sets of minimum 1000 kVA capacity each).	Sets	2		
<b>E.10.11</b>	<b>Exhaust System</b>				
	Supply, installation of following sizes of MS Piping for Exhaust system as per IS: 3589 and 1239 (part - I) including providing suitable bends, reducers etc.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	350mm (NB) MS ERW pipe 4.85 mm	RM	80		
	250mm (NB) MS ERW pipe 4.85 mm	RM	20		
	The rate for the MS exhaust pipe should be inclusive of supply & fixing of SS expansion joints (Bellows) according to size of horizontal / vertical exhaust pipes of DG sets as required at site. It shall not be payable separately.				
	Measurement for MS Exhaust piping will be taken excluding the length of Expansion Joints (SS bellows) and silencer.				
	Supply, installation, testing and commissioning of 75 mm thick Rockwool LRB mattress insulation (of 150 Kg/m <sup>3</sup> density) over the exhaust pipes of following diameter including cladding with aluminium sheet of 24 SWG and covering from outside complete as required suitable for DG exhaust pipe temp. upto 450°C etc.				
	350mm (NB)	RM	80		
	250mm (NB)	RM	16		
	Supply & Fixing of miscellaneous structural support for horizontal / vertical exhaust piping including fabrication, hardwares and painting as per requirement.	KG	15000		
	Portable Oil Filling pump- Electrical Type necessary to deliver the oil upto height of 10 mtrs.	No	2		
	Providing & fixing of pre- fabricated 22SWG GI sheet ducting (120 gsm galvanisation) for hot air discharge /supply air intake complete including supports, bends, flanges etc. as required.	sqm	50		
	EARTHING				
<b>E.10.12</b>	<b>Providing Earth pits with 600 X 600 X 6.3 mm GI plate electrode complete as per IS: 3043. (For Body Earthing).</b>	No	12		
	Providing Earth pits with 600 X 600 X 3 mm Copper plate electrode complete as per IS: 3043. (For Neutral Earthing).	No	12		

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Supply, laying, testing and commissioning of Copper / GI strips for interconnecting the earthing station, panels, DG set etc. of following sizes in trench/surface/wall/ground complete with holes and fixing, jointing/termination accessories with holes and fixing, jointing/termination accessories .				
	50 mm x 5 mm GI strip (For Body Earthing).	RM	80		
	50 mm x 5 mm Copper strip (For Neutral Earthing).	RM	36		
	Civil works				
<b>E.10.13</b>	<b>Civil work for cable trench / hume pipes from DG Sets to existing cable trench and making the same in good condition at station.</b>	Job	1		
	Civil foundation for 1010 KVA DG set (only PCC raft of 300 mm) for the existing site condition.	Cum	20		
	Provision of making cable trenches, cut outs, finishing works etc as per the works required for the DG sets Installation	Cum	20		
	Supplying and laying of GI pipes of 150 mm Nominal Bore 4.85 mm thick as per IS 1239 to accommodate all cables, earthing strips and fuel pipe lines as utility to DG set.	M	s		
	ACOUSTIC TREATMENT FOR DG ROOM				
<b>E.10.14</b>	<b>Providing and fixing Acoustic Treatment lining on walls and ceiling of DG room by means of Mineral rock wool slab of minimum density 64 Kgs/m<sup>3</sup>, confirming to IS 8183 and with minimum thickness of 75mm covered by fire resistant fibre tissue confirming to AWWA C – 203, specifications and with inside cover of 0.6 mm thick perforated Aluminium sheet, complete as required. The Rock wool shall be laid on a 600 X 600 mm grid, 50 mm GI channel frame work fixed to walls and ceiling.</b>	Sqmtr	750		
	Acoustically Lined Louvers as per above material specifications				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Providing and fixing Acoustic Doors for DG room comprising of ISMC 100 frame, cladded on both side of 0.5 mm thick MS sheets with cavity fill of required thickness (minimum 75 mm thickness) of resin bonded 64 kg/m <sup>3</sup> density glass wool to achieve noise levels, as specified in the specifications including Nitrile rubber / Neoprene rubber gasket between MS sheet cladding and frame, heavy Duty Hardware / Locking mechanism complete as required.				
	Note:- 1. Payment will be based on per Sqmtr size of the Door.				
	2. Sliding Door with Self lubricating sliding mechanism (Roller ball Bearing) in MS channels in floor to be proposed only after suitable consideration to noise criteria.				
	Supply, Installation, Testing and commissioning of Intake / Exhaust Fans complete, as required of suitable sizes for ventilation of Air requirements of DG Sets of following sizes (Calculations to prove adequacy of the rating of the selected Fans must be submitted). The system should be designed to provide suitable ventilation for efficient air circulation, to ensure that the temperature rise in the DG room with respect to the ambient is less than 5°C. There should be specially designed circuitry to ensure that the fan(s) starts when the Genset is in operation and when the Genset has been switched off the fan(s) automatically switch over to main supply and run for 5 – 15 minutes (programmable) before stopping to ensure that set is ready to start in case of another failure.				
	2x1000 KVA	Job	1		
	Note:-				
	Drawing for the acoustic treatment of room to be submitted for approval of Engineer - in - charge before procuring the material for Acoustic treatment.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Providing noise barrier of suitable inclination and projected length, for installation around DG set installation in the Ancillary building, fabricated out of 2 mm thick polycarbonate sheet with minimum surface density of 10 kg/Sqm. to ensure adequate transmission loss of sound to achieve noise control as per CPCB norms for public area, including saturatory of Installation, complete as per required as per specifications				
	Operation & Maintenance Training for the Staff complete as per the M&W specifications.				
	OPERATION & MAINTENANCE OF DG SET BEFORE REVENUE OPERATION DATE.				
	Providing of maintenance and operating services for different "aggregate capacities" of DG sets installed at a station as specified below. (before the Revenue Operation of the Corridor / DG set is taken over by Client/employer).				
	2000 KVA (comprising of 2 DG sets of minimum 1000 kVA capacity each).	Days	90		
	Note:-				
	1. The above items includes the cost of providing skilled DG set operator, all Consumables ( like battery water, Lubricating Oil, Coolant, etc) except Diesel. (Diesel as per requirement shall be supplied by Client/employer).				
	2. Based on the hours of operation, the firm will be responsible for complying with the requirements of timely maintenance as per the recommendations of Engine Manufacturer.				
	3. The operation of DG set will not affect the warranty conditions of the DG sets supplied in this tender. The warranty clause will be applied from the date of Taking over of DG set by Client/employer/Employer.				
	4. Permission for Operating the DG set and period of its operation will be specifically approved by Engineer- In- Charge.				

**PART – A – ELECTRICAL WORKS FOR MANDAI STATION**

S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	COMPREHENSIVE MAINTENANCE OF DG SET AFTER DEFECT LIABILITY PERIOD.				
	Providing of Comprehensive maintenance services (Inclusive of all preventive maintenance spares and consumables, site visits, attending to breakdown calls etc. but excluding cost of breakdown spares) for "3- years" After Defect Liability period for different capacities of DG sets for the capacities of DG sets as specified below.				
	2000 KVA (comprising of 2 DG sets of minimum 1000 kVA capacity each).	Sets	1		
	Note:-				
	1. In the above item, Rates quoted by the Firm should be for each DG set for 3-years maintenance.				
	2. The above item includes cost of providing skilled service personal for the maintenance, Tools and Plant etc. for preventive maintenance. (Diesel is are not to be included in the rates.)				
	3. Breakdown maintenance staff, Tools, and equipment etc. for carrying out the maintenance to the Employers satisfaction.				
	4. Contractor will be required to maintain a fully equipped" 24 - hour Complaint Centre" in Pune and after receiving the Complaint the site should be attended by the maintenance staff within one hour.				
	<b>TOTAL FOR DIESEL GENERATOR SETS</b>	Sets	1		

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>F.11</b>	<b>PUMPS FOR FIRE PROTECTION SYSTEM</b>				
	<b>Note:</b>				
i)	Whether explicitly specified or not, the Pumps for Fire Protection System specified herein, must conform to respective Sections of the M & W Specifications, in addition to the description given in respective items of BOQ. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
ii)	The motor HP to be confirmed by the supplier for the duty mentioned for each pump.				
iii)	Rates quoted shall be inclusive of all structural supports, clamps etc. as per approved design/specifications.				
(iv)	All Main Fire Pumps shall be capable of delivering 150% of the rated flow at a head not less than 65% of the rated head. Also the shut-off head shall not exceed 120% of the rated head.				
(v)	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
11.1	Providing and fixing horizontal Fire Pumping Set with CI body, Bronze Impeller, Stainless Steel Shaft and connected by a flexible coupling to a totally enclosed, fan cooled induction motor, mounted on common structural base plate with all pump accessories complete as per Specifications including mechanical seal & neoprene lined vibration eliminators. Motors shall be suitable for 415 volts, 3 phase, 50 cycles, A/C supply as per Section E12 of M & W Specifications.				
a)	MAIN FIRE PUMPS FOR COMBINED SYSTEM.				
	Horizontal Split Casing				
	Capacity - 3785 LPM				

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Head - 112 M				
	HP - To suit power requirements for flow at 150% of the duty point				
	RPM - 1450/2950	Nos	2		
c)	JOCKEY PUMP (FOR COMBINED SYSTEM)				
	Capacity - 180 LPM				
	Head - 112 M				
	HP - As required	Nos	1		
	<b>TOTAL OF PUMPS FOR FIRE PROTECTION SYSTEM</b>				
<b>F.12</b>	<b>PIPE WORK FOR FIRE SYSTEM</b>				
	The Pipe Work specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
F.12.1	Providing and fixing of heavy duty Galvanised Steel Pipe (conforming to Specifications) with all fittings viz. flanges, bends, tees, elbows, reducers, as specified, including cutting, welding / making threaded joint and fixing to floor / wall with approved structural supports such as clamps, hangers etc. This further includes (1) Cutting holes / chases in brick or RCC walls / slabs and making good the same (2) Painting with two or more coats of synthetic enamel paint of approved shade as per pipe colour code over two coats of primer (3) Painting of legends with direction arrows complete as per specifications.				
F.12.1.1	25mm	RM	80		

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.12.1.2	32mm	RM	128		
F.12.1.3	40 mm	RM			
F.12.1.4	50mm	RM	104		
F.12.1.5	65mm	RM	8		
F.12.1.6	80mm	RM	500		
F.12.1.7	100mm	RM	232		
F.12.1.8	150mm	RM	2560		
F.12.1.9	200mm	RM	36		
F.12.1.10	250 mm	RM	1		
F.12.2	Providing and fixing Heavy Duty galvanised steel pipes, embeded in earth shall be conforming to Specifications with all fittings like couplings, bends, elbows, tees, flanges, CAF gaskets etc., including welding as required. This also includes necessary excavation in all kinds of soil (including hard rock) up to the required depth and providing 150 mm thick sand layer all around the pipes, refilling, ramming, removal and disposal of surplus earth complete in all respects as per the specifications. This further includes provision of corrosion protection by wrapping two layers of 400 microne thick polythene sheet over two coats of bitumen.				
F.12.2.1	80mm	RM	28		
F.12.2.2	100mm	RM	1		
F.12.2.3	150mm	RM	8		
F.12.2.4	200mm	RM	1		
	<b>TOTAL OF PIPE WORK FOR FIRE SYSTEM</b>				
<b>F.13</b>	<b>PIPING ANCILLARIES FOR FIRE SYSTEMS</b>				

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	The piping ancillaries specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
F.13.1	Providing and fixing Butterfly Valves of the following sizes (conforming to BS: 5155 and Specifications), suitable for pressure rating of 16 Kg / Sq. cm, with gaskets, flanges, nuts, bolts and washers including painting complete as required.				
F.13.1.1	65mm dia.	Each	2		
F.13.1.2	80mm dia.	Each	24		
F.13.1.3	100mm dia	Each	3		
F.13.1.4	150mm dia	Each	16		
F.13.1.5	200mm dia	Each	5		
F.13.2	Providing and fixing Wafer type Double Plate Check Valves of the following sizes (conforming to API-594 and Specifications), suitable for pressure rating of 16 Kg / Sq. cm with cast iron body conforming to BS 1452, including gasket, flanges, nuts, bolts and washers including painting complete as per M & W Specifications.				
F.13.2.1	65mm	Each	2		
F.13.2.2	100mm	Each	2		
F.13.2.3	150mm	Each	4		

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.13.3	Providing and fixing Cast Iron Double Flanged 'Y' type Strainers of the following sizes with nuts, bolts, gaskets etc. complete in all respect as described in Specifications.				
F.13.3.1	200 mm dia	Each	3		
F.13.3.2	80 mm dia	Each	2		
F.13.4	Providing and fixing Gate Valves of the following sizes (conforming to BS: 5154 and Specifications) having Bronze body conforming to BS 1400 with screwed ends suitable for pressure rating of 16 bars.				
F.13.4.1	25mm dia	Each	4		
F.13.4.2	32mm dia	Each	6		
F.13.4.3	40 mm dia	Each	1		
F.13.5	Providing and fixing Gun metal Air Release Valve as per Specifications.	Each	1		
F.13.6	Providing and fixing 150 mm diameter, Bourden type, Brass, Dial type Pressure Gauge calibrated for 0 - 15 kg / Sq. mm range with brass isolation valve complete as per Specifications.	Each	8		
F.13.7	Providing and fixing 80 mm dia Pressure Relieving Valve and Gate Valve to be fixed on Hydrants Pump Delivery Line with by pass connection to pump suction line.	Each	2		
F.13.8	Supply and installation of stainless steel Expansion Bellow				
F.13.8.1	200 mm dia	Each	3		
F.13.8.2	150 mm dia	Each	3		
F.13.8.3	80 mm dia	Each	2		
F.13.8.4	65 mm dia	Each	2		
F.13.9	Supply and installation of Orifice Plate 80mm OD(Brass)	Each	21		
	<b>TOTAL OF PIPING ANCILLARIES FOR FIRE SYSTEMS</b>				

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>F.14</b>	<b>FIRE HYDRANT SYSTEM</b>				
	The Fire Hydrant System specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
F.14.1	Providing and fixing Vertical Air Vessel of size 450 mm diameter and 1.50 m high, fabricated out of 6 mm thick M.S. plate having dish ends of 8 mm thick MS plate, complete with pressure switches (for every individual pump to operate at drop of pre - set pressure).This includes Bronze Air Release Valve, GM Gate Valves, pressure gauge, safety valve, drain valve etc. complete in all respects. Air Vessel must be painted with two coats of synthetic enamel paint of approved shade over one coat of primer,	Nos.	2		
F.14.2	Providing and fixing following types of Fire Hydrant Valves conforming to IS : 5290 and Specifications having female instantaneous type connection with matching flange, gaskets, nuts and bolts complete in all respects.				
F.14.2.1	Single headed	Each	22		
F.14.2.2	Double headed	Each	24		
F.14.3	Providing and fixing 63 mm diameter, 15 metre long, synthetic non percolating hose (conforming to IS 636/88 type-B with UL listed and Specifications) having Stainless steel male and female Instantaneous type coupling, machine wound with copper wire complete in all respects.	Each	141		
F.14.4	Providing and fixing of standard size Stainless steel 63 mm diameter short branch pipe with nozzle, conforming to IS 903 and Specifications	Each	25		

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.14.5	Providing and fixing Fire Man Axe conforming to IS : 926 : 1985 with Clamps.	Each	3		
F.14.6	Providing and fixing Wall mounted Swinging type First - Aid Fire Hose Reel conforming to (IS 12585 : 1988 & IS : 884 : 1985 for drum) and as per Specifications having 20 mm diameter and 30 M length. The Hose Reel must be non kinking type made up of Thermo Plastic Synthetic, must be suitable for with - standing a bursting pressure of not less than 27 bars and must include Brass Jet & Spray type Nozzle having Shut - Off valve complete in all respect.	Each	19		
F.14.7	Providing and fixing Fire Hose Cabinet made up of fully welded construction of size 750 x 600 x 250 mm, fabricated from 14 SWG GI sheet, having hinged double front door with locking arrangements and partially glazed with 5 mm thick glass. Cabinet must have Stove enamelled Fire Red finish with "FIRE HOSE" written on front and must be suitable for housing 2 Nos. 15m long synthetic Hose with couplings, 1 No. Branch Pipe, Fire Man Axe complete as specified in drawing.	Each	6		

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.14.8	Providing and fixing of Fire Hose Cabinet Shutter made up of MS 50 x 50 x 2 mm tubular steel section ( shutter framing ), rebated section framing of 2 mm thick MS sheet for fixing of shutter framing and fully welded construction of Hose Cabinet Size of 1200 x 2100 mm approximately, having hinged double front door with locking arrangements and partially glazed with 5 mm thick glass. Glass shall be fixed by MS beading screwed to shutter frame. Cabinet Shutter and steel parts must be powder coated to Fire Red finish with "FIRE HOSE" painted on glazing ( for internal Hydrants). The width & height of the cabinet shall depend upon the actual size of the fire niche available. Contractor shall make shop drawings and get these approved before fabrication. Shutter and frame shall have provision for fixing of Magnetic Contact.	Each	12		
F.14.8a	Providing and fixing of Fire Hose Cabinet Shutter as per description at 14.8 (above) but of Stainless steel SS-304 construction (only for FHCs in public areas)	Each	7		
F.14.9	Providing and fixing Stainless steel, four way, Collecting Head conforming to IS 904 with 63 mm diameter Instantaneous type Inlet with built - in Check Valve for Fire Brigade connection to fire water.	Each	1		
F.14.1	Providing and fixing Four way, Stainless steel Collecting Head conforming to IS 904 : 1983 for Fire Brigade connection to Sprinkler and Hydrant Mains with hood Butterfly Valve and 100 mm diameter C.I. Double flanged Non - return Valve including nuts, bolts, gaskets etc. complete in all respect.	Each	2		
14.11	Providing and fixing standard Draw Out connection with 63 mm diameter Instantaneous type coupling conforming to relevant standards for installation at Main Fire Water Tank.	Each	1		

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
14.12	Providing and fixing Butterfly Valve of 150 mm dia conforming to BS : 5155 with limit switches for remote indication of 'OPEN' and 'CLOSE' positions suitable for pressure rating of 16 kg/sq.cm. With gasket, flanges,nuts, bolts etc.(but excluding signal wire or indication devices).	Each	1		
	<b>TOTAL OF FIRE HYDRANT SYSTEM</b>				
<b>F.15</b>	<b>FIRE SPRINKLER SYSTEM</b>				
	The Fire Sprinkler System specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
F.15.1	Providing, Fixing, Testing and Commissioning of 15 mm diameter Quartzoid Bulb type Sprinkler Set designed to operate at 68 Degree Centigrade including UL listed Sprinkler Guard. (UL / FM / FOC listed or approved).				
F.15.1.1	Pendant type Standard Response K80	Nos.	8		
F.15.1.2	Sidewall Sprinkler Standard Response K80	Nos.	6		
F15.2	Not used				
F.15.3	Providing and fixing 150 mm diameter Deluge Valve, Electrical release Trim type (UL Listed), suitable for working pressure of 12.5 bars with flange connection, complete in all respects.	Each	0		
F.15.4	Providing and fixing 150 mm diameter Motorised Butterfly valve complete as required.	Each	2		

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.15.5	Providing and fixing electrically operated Flow Indicating switches including 1.5 mm thick gasket, nuts and bolts complete as per M & W Specification.				
F.15.5.1	For 25mm dia pipes	Nos.	4		
F.15.5.2	For 50mm dia pipes	Nos.	6		
F.15.5.3	For 80mm to 150 mm dia pipes	Nos.	23		
F.15.6	Providing and fixing MS cabinet of size 600 x 300 x 150mm, fabricated from 16 SWG MS sheet, with double front glass door and locking arrangement, having suitable shelves with space for 6 spare sprinklers and 6 spare medium velocity spray nozzle including one spanner properly fixed in the shelf. Cabinet shall be painted with enamel paint of approved shade, complete as per drawing.	Each	1		
F.15.7	Providing and fixing 150 mm diameter Installation Control Valve conforming to BS: 5153 or equivalent with water turbine type automatic alarm. This includes all standard fittings & valves like drain valve, test valve assembly, non return valve, stop valve, 'Y' strainer, pressure gauges etc. complete as per M & W Specification	Each	1		
	<b>TOTAL OF FIRE SPRINKLER SYSTEM</b>				
<b>F.16</b>	<b>MISCELLANEOUS FIRE SERVICES EQUIPMENT</b>				
	The Miscellaneous Fire Services Equipment specified herein, must conform to Section E33 of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	All the items / parts mentioned in relevant clauses of the specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
F.16.1	Providing and fixing fully charged Portable Fire Extinguisher of 9 litres capacity, Water type (Gas Cartridge) complete with Standard Discharge Valve and tube including CI bracket for wall mounting etc. conforming to IS 15683 : 2006	Each	19		
F.16.2	Providing and fixing portable fire extinguisher, dry powder type (gas cartridge) with cylinder initially fully charged with dry powder (ABC type) of 6 Kg, complete with standard discharge valve with tube, CI bracket for wall mounting etc. conforming to relevant standard IS 15683 : 2006)	Each	5		
F.16.3	Providing and fixing initially fully charged Portable Fire Extinguisher of 4.5 Kg. capacity, carbon dioxide type with cylinder with CO2 gas, complete with squeeze lever Discharge Valve, Pressure Gauge, Discharge Tube Horn including CI bracket for wall mounting etc. conforming to IS 15683 : 2006	Nos.	35		
F.16.4	Fire protective clothing & breathing apparatus				
F.16.4.1	Set of protective clothing containing 2 nos.	Nos.	2		
	Each following items ;				
	a. Coat				
	b. Trouser				
	c. Gloves				
	d. Anti-Flash Hood				
	e. Helmets				
	f. Boots				
	g. FRP/stainless steel case for storage of Fire Suits				

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.16.4.2	Self- contained open circuit type compressed air Breathing apparatus set confirming to EN-137: 2006, standard complete with one spare cylinders	Nos.	2		
	a) Air cylinder with valve				
	b) Back plate with body harness				
	c) Face mask				
	d) Pressure reducer				
	e) Lung demand valve				
	f) Pressure gauge & warning whistle				
	g) Hoses				
	h) Carrying case				
	i) Spare air cylinder				
	j) Wall mount cabinet for Breathing Apparatus				
F.16.4.3	Water-jel fire blanket consisting scientifically formulated cooling gel and a carrier in size 96" * 72" n canister.	Nos.	1		
F.16.4.4	Water-jel fire blanket consisting scientifically formulated cooling gel and a carrier in size 72" * 60" n canister.	Nos.	1		
F.16.4.5	Snap light emergency evacuation system complete with two high intensity yellow klcolourcyalumelightsticsk (light proof, water proof, wind proof, non explosive, and non toxic) with temper proof pin on a all mounted unit.	Nos.	2		
	<b>TOTAL OF MISCELLANEOUS FIRE SERVICES EQUIPMENT</b>				
<b>F.17</b>	<b>CLEAN AGENT GAS BASED HIGH TEMPERATURE POLYMER TUBE SYSTEM</b>				
	Supply, fixing, testing and commissioning of Polymer Tube Detection based Clean Agent System for Electrical Panels (Polymer Tube Panel Protection System), for 2 Nos. ASS Room consisting of the following components:				

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.17.1	10 LB capacity Clean Agent system, complete with all necessary Clean Agent gas, fitting, support and accessories, connected with valve.	No.	6		
F.17.2	5 LB capacity Clean Agent system, complete with all necessary Clean Agent gas, fitting, support and accessories, connected with valve.	No.	4		
F.17.3	End of Line adapter	No.	10		
F.17.4	Pressure Switch	No.	10		
F.17.5	Polymer Detection Tube with all necessary fittings & support	M	522		
F.17.6	Master Control Unit for controlling each system, buzzers and electronic hooters, including all necessary accessories + electrical wiring to make each entire system functional	No.	10		
	<b>Note:</b> The items indicated above are notable items. The vendor to include all allied and implied items in required quantity at no extra cost.				
	<b>TOTAL OF CLEAN AGENT GAS BASED HIGH TEMPERATURE POLYMER TUBE SYSTEM</b>				
<b>F.18</b>	<b>INERGENT / CLEAN GAS FLOODING</b>				
F.18.1	Clean agent IG 541 (300 bar) system complying with NFPA 2007 gas suppression system for signaling equipment room, Telecom equipment room, UPS room based on NFPA 2007. Including pipe headers, nozzles, pressure relief vents and other accessories for the each room with facilities for manual override; predischage alarm and Abort switch for each room sizes given below.				
a)	Signaling equipment room, Telecom equipment room, S&T UPS room	M3	480		
	<b>Total of INERGENT / CLEAN GAS FLOODING System</b>				
<b>F.19</b>	<b>FIRE ALARM AND DETECTION SYSTEM</b>				

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	The Fire Alarm and Detection System specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specification and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
	All the items not specifically mentioned here but necessary to make the system complete and suitable for desired application as per M & W Specifications and Drawings will be deemed to be included in the quoted prices				
F.19.01	Supply, Installation, Testing and Commissioning of 8 Loop Addressable Main Fire Alarm Control Panel (MFACP) complete with capacity to connect Devices & Detectors (in zoned manner) as per M & W Specifications & Drawings but not limited to the following:	Set	1		
F.19.1.1	8 Loop Panel				
F.19.1.2	Repeater Driver Board				
F.19.1.3	Communication Board				
F.19.1.4	Software & Graphics				
F.19.1.5	PC with 21" TFT + 80column Printer.				
F.19.1.6	Nicl. Batteries & Battery Charger.				
F.19.1.7	Amplifier card				
F.19.1.8	Provision for interfacing with other systems such as SCADA / BMS with all required Hardware & Software.				

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F19.02	Supply, Installation, Testing and Commissioning of Repeater Annunciator Panel with Mimic panel as per M & W Specifications and Drawings.	Set	1		
F19.03	Supply, Installation, Testing & Commissioning of Signal Initiating (Intelligent Analogue Addressable) devices complete with Detector Base etc. as per M & W Specifications.				
F19.03.1	Intelligent Addressable Multi Sensor Smoke Detector.	Nos.	360		
F19.03.2	Addressable Fault Isolator Base	Nos.	1		
F19.03.3	Addressable Fault Isolator	Nos.	25		
F19.03.4	Addressable Mannual Glass Break Unit	Nos.	17		
F19.03.5	Sounder with strobe light	Nos.	17		
F19.03.6	Addressable Loop Sounder 6.8 W.	Nos.			
F19.03.7	Response Indicator	Nos.	111		
F19.03.8	Intelligent Addressable Duct Detector.	Nos.	3		
F19.03.9	Intelligent Addressable Control Module.	Nos.	17		
F19.03.10	Intelligent Addressable Monitoring Modules	Nos.	1		
F19.03.11	Intelligent Addressable water Flow Monitoring Modules	Nos.	21		
F19.03.12	Magnetic Lock Assembly for minimum 400 Kg. Load	Nos.	1		
F19.03.13	Magnetic Contact	Nos.	1		
F19.03.14	Emergency Door Release Switch	Nos.	1		
F19.03.15	Power supply unit for Powering Magnetic Door Lock	Nos.	1		
F19.03.16	High Temperature (min. 80 C degree trip) Heat detector	Nos.	6		

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F19.04	Supplying, Laying, Termination, Testing & Commissioning of Fire Survival Cables (confirming to BS: 7846 and specifications for performance requirements of Fire Survival Cables) armoured, 1 pair 2.5 sq.mm, screened / shielded, Copper conductor (one pair shielded and one pair unshielded) cable or Mineral Insulated cable complying the CWZ category.	Metre	872		
F19.05	Supplying, Laying, Termination, Testing & Commissioning of Fire Survival Cables (confirming to BS: 7846 and specifications for performance requirements of Fire Survival Cables) armoured, 1 twisted pair 1.5 sq.mm, screened / shielded copper conductor cable or Mineral Insulated cable complying the CWZ category for looping of detection units etc.	Metre	2980		
	<b>TOTAL OF FIRE ALARM AND DETECTION SYSTEM</b>				
<b>F.20</b>	<b>Continuous Fibre Optic Distributed Linear Heat Sensing System</b> to be installed in the entire length of the tunnels and trackway with redundancy complete with temperature monitoring capabilities.				
F.20.1	Linear Heat Detection controller with Measurement Range 4 km integrated Relay Board having TCP/IP Interface including: 2 Sensor Channel with HD I/O Connection Set with	Set	1		
F.20.2	Linear Heat Detection System Software-for Commissioning and Configuration Software	Set	1		
F.20.3	Power Converter for Linear Heat Detection controller - AC Input 85-264 VAC, 45-65 Hz - DC Input 90-350 VDC - Output 24 VDC 2.5 A	Set	1		
F.20.4	Outdoor Housing: - IP66 Std. Display - Multicolor LCD (Alarm, Status, Operation)	Set	1		

PART-B – FIRE PROTECTION SYSTEM FOR MANDAI STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	- Coated Steel, RAL 7035, Wall Mount				
	- IP66 Rated (NEMA4)				
	LINEAR HEAT SENSOR CABLE – FIBER OPTICAL & ACCESSORIES				
F.20.5	Sensor Cable - Thermoplastic	Metre	2560		
	- Tight Buffered Design				
	- Flame Retardant Non Corrosive Jacket				
	- 4 x Multimode Graded Index 50/125 µmFibers				
F.20.6	E2000 8° Pigtail for Multimode Graded Index 50/125µm,	Set	2		
F.20.7	Heavy Duty Splice Box	Set	2		
	- IP67 aluminum				
	- Indoor / Outdoor Use				
	<b>TOTAL OF LINEAR HEAT DETECTION SYSTEM</b>				
F.21	Supply, installation, testing and commissioning of UL/FM approved VESDA System for Signaling equipment room, Telecom equipment room, S&T UPS room, E&M UPS room and ASS rooms including VLP panels associated aspirating devices and piping, integrating devices with the main fire alarm system.	set	7		
F.21.1	Supply , installtion, testing and commissioning of SCADA/ control system network etc for VESDA system including of PCN network cabling etc	lot	1		
	<b>TOTAL OF VESDA SYSTEM</b>				

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
<b>1</b>	<b>PIPE WORKS FOR HYDRAULIC SERVICES</b>				
	The Pipe Work specified herein, must conform to Plumbing, Drainage and Water Supply Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between Plumbing, Drainage and Water Supply specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the Plumbing, Drainage and Water Supply specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
1.1	Providing and fixing Heavy Duty GI pipes of the following sizes conforming to IS:1239 and Plumbing, Drainage and Water Supply Specifications complete with all fittings and specials such as bends, tees, unions, reducers, flanges & plugs etc. conforming to IS:1879 and Plumbing, Drainage and Water Supply Specifications including fixing at wall / ceiling level supported by structural supports, clamps, hangers etc. This also includes threading, jointing, making connections, cutting holes in wall / floor / slab and making good the same with cement concrete 1:2:4, complete in all respect as per specifications.				
a	15 mm dia	R.M.	24		
b	20 mm dia	R.M.	192		
c	25 mm dia	R.M.	80		
d	32 mm dia	R.M.	24		
e	40 mm dia	R.M.	48		

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
f	50 mm dia	R.M.	80		
g	65 mm dia	R.M.	16		
1.2	Painting of GI pipe and fittings of the following sizes with two or more coats of synthetic enamel paint, of approved quality and shade, as per pipe colour code over a coat of primer. This includes painting of legends with direction arrows complete as per specifications.				
a)	15 mm dia	R.M.	24		
b)	20 mm dia	R.M.	192		
c)	25 mm dia	R.M.	80		
d)	32 mm dia	R.M.	24		
e)	40 mm dia	R.M.	48		
f)	50 mm dia	R.M.	80		
g)	65 mm dia	R.M.	16		
1.3	Providing protection to embedded G.I. Pipes and fittings of the following sizes, in wall chases, by wrapping two layers of 400 micron thick polythene sheet over two coats of bitumen. This includes proper overlaps on joints complete as per specifications.				
a)	15 mm dia	R.M.	24		
b)	20 mm dia	R.M.	80		
c)	25 mm dia	R.M.	24		
d)	32 mm dia	R.M.	16		

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
1.4	Providing and fixing insulation to hot water pipes of the following sizes (exposed) with 13 mm thick, flexible, closed cell, EPDM and low density elastomeric thermal insulation tube of expanded synthetic rubber, jointed with self-adhesive rubber insulation tape including making good the walls as required.				
a)	15 mm dia	R.M.	24		
b)	20 mm dia	R.M.	36		
1.5	Providing and fixing centrifugally cast iron (spun) soil, waste & vent pipe of the following sizes conforming to IS 3989 and Plumbing, Drainage and Water Supply Specifications with all fittings such as access door, tees, bends, cowls etc. This includes jointing of 25 mm deep lead joint with refined pig lead, provision of structural supports as required, cutting chases or holes in wall and floors and making good the same with 1:3 cement mortar or 1:2:4 cement concrete wherever required.				
a)	75mm dia	R.M.	216		
b)	100mm dia	R.M.	320		
c)	150mm dia	R.M.	60		
1.6	DI pipes and fittings				

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Supply and Installation of DI Pipes (K9) Including supply, storage, transportation and handling of all pipes, fittings and accessories (including all types of bends, adaptors, short piece sockets and spigots, collars, tees, flexible couplings, reducers, blind flanges, puddle flanges, dismantling joints...etc.), jointing materials, PE protective sleeving throughout, and all other materials required; excavation at any depth in any kind of soil and rock, any type of surface, natural, asphalt, concrete ...etc., laying of pipes including all jointing, any ancillary necessary for proper laying and jointing of pipes; supply from any distance placing and compaction of bedding, embedment (sand fill), backfilling and surface reinstatement, including warning tape and electronic identifiers or warning tape with ferrous strip ; testing; flushing and disinfection; all to the approval of the Engineer.				
	Class K7				
a)	100mm dia	R.M.	248		
b)	200mm dia	R.M.	208		
	Class K9				
a)	100mm dia	R.M.	80		
b)	150mm dia	R.M.	24		
c)	200mm dia	R.M.	272		
1.6	Providing and laying Cement Concrete 1:2:4 (1 cement: 2 coarse sand : 4 graded stone aggregate 40mm nominal size), of 75mm thick (average), around Cast Iron soil and waste pipes of the following sizes, below floor, including necessary shuttering and timbering etc. complete as required.				
a)	100mm dia pipe	R.M.	40		

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
b)	150mm dia pipe	R.M.	80		
1.7	Constructing brick masonry channel with F.P.S. bricks of class designation 75 in cement mortar 1:4 (1 cement : 4 sand) including necessary excavation, 10 cm thick cement concrete 1:5:10 (1 cement : 5 sand : 10 graded stone aggregate 40 mm nominal size) for foundation and 25 mm thick cement concrete 1:2:4 (1 cement : 2 sand : 4 graded stone aggregate 12.5 nominal size) for filling haunches, including 12 mm cement plaster 1:4 (1 cement : 4 sand) with a floating coat of neat cement inside the drain, its top and exposed side including providing cast iron grating and fixing to the drain complete as required.				
a)	150mm wide channel 200 mm average depth (For Pump Room)	R.M.	21		
1.8	Providing and fixing UV stabilized UPVC rain water pipe (SWR) with one end plain and other end socketed with injection moulded/fabricated fittings such as tees, bends, doors etc. and provided with square grooved along with V shaped rubber ring including making good wall and flooring wherever necessary. The wall thickness of the pipe and other technical characteristics shall be conforming to IS: 13592/92 Type A. The jointing is to be completed with rubber lubricant.				
a)	100 mm (OD)	R.M.	32		
b)	150 mm (OD)	R.M.	60		
<b>TOTAL</b>					

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
<b>2</b>	<b>PIPING ANCILLARIES FOR HYDRAULIC SERVICES</b>				
	The Pipe Ancillaries specified herein, must conform to Plumbing, Drainage and Water Supply Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between Plumbing, Drainage and Water Supply specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the Plumbing, Drainage and Water Supply specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
2.1	Providing and fixing Brass Ball Valves of the following sizes conforming to BS 5351 and Plumbing, Drainage and Water Supply Specifications, suitable for pressure rating of 10 kg / Sq.cm, with lever and fittings viz. flanges / union, nuts, bolts, washer etc. complete as per Plumbing, Drainage and Water Supply specification.				
a)	20 mm dia	Each	10		
b)	25 mm dia	Each	8		
c)	32 mm dia	Each	4		
d)	40 mm dia	Each	6		
e)	50 mm dia	Each	4		
f)	65 mm dia	Each	2		

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
2.2	Providing and fixing Butterfly Valves of the following sizes conforming to BS: 5155 and Plumbing, Drainage and Water Supply Specifications, suitable for pressure rating of 10 kg / Sq.cm, with hand lever operation, rubber gaskets, flanges, nuts, bolts and washers including painting complete as per Plumbing, Drainage and Water Supply specification.				
a)	65 mm dia	Each	5		
b)	100 mm dia	Each	6		
c)	150 mm dia	Each	10		
2.3	Providing and fixing Wafer type Double Plate Check Valves of the following sizes conforming to API-594 and Plumbing, Drainage and Water Supply Specifications, suitable for pressure rating of 10 kg / Sq.cm with cast iron body conforming to BS 1452, rubber gasket, flanges, union, nuts, bolts and washers including painting complete as per M & W Specifications.				
a)	50 mm dia	Each	2		
c)	100 mm dia	Each	2		
d)	150 mm dia	Each	10		
2.4	Providing and fixing Double Flanged Flexible Rubber Expansion Joint of standard length with Unit Control as described on Section 5.3.14 of the Plumbing, Drainage and Water Supply Specification, of the following sizes, complete with all accessories including rubber gaskets, flanges nuts, bolts and washers tested to a pressure of 10 kg / Sq.cm.				
a)	50 mm dia	Each	2		

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
2.5	Providing and fixing Cast Iron Double Flanged 'Y' type Strainers of the following sizes with nuts, bolts, gaskets etc. complete in all respect as described in the Plumbing, Drainage and Water Supply Specification.				
a)	65 mm dia	Each	2		
b)	100 mm dia	Each	2		
2.6	Providing and fixing C.I. Sluice valves of the following sizes conforming to BS : 5150 and Plumbing, Drainage and Water Supply specifications complete with bolts, nuts, rubber insertions etc.				
	100 mm dia	Each	2		
2.7	Providing and fixing in position Float Valve with Copper Ball Float and Brass Rod of required length conforming to BS 1212 and Plumbing, Drainage and Water Supply Specifications suitable for pressure of 10 kg / Sq.cm.				
	100 mm dia	Each	6		
2.8	Providing and fixing 100 mm diameter, Brass Dial Type Pressure Gauge as described in Plumbing, Drainage and Water Supply Specifications suitable for 0 - 15 kg / Sq.cm pressure range with isolation cock and complete in all respects.	Each	8		
2.9	Providing and fixing air vent for Domestic water supply risers with Ball Valve as described in Plumbing, Drainage and Water Supply Specifications suitable for pressure of 10 kg / Sq.cm complete, as per specifications.				
a)	20 mm dia	Each	3		

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	<b>TOTAL</b>				
<b>3</b>	<b>MISCELLANEOUS PLUMBING AND DRAINAGE EQUIPMENT</b>				
	Whether explicitly specified or not, the Miscellaneous Plumbing and Drainage Equipment specified herein, in addition to the description given in respective items of BOQ.				
	All the items / parts mentioned in relevant clauses of the Plumbing, Drainage and Water Supply specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
3.1	Providing and fixing CI “P” or “S” trap (conforming to IS: 3989) of self-cleaning design, with or without vent arm, complete including cost of cutting and making good the walls and floors.				
a)	100 mm inlet and 100 mm outlet.	Each	8		
b)	100 mm inlet and 75 mm outlet.	Each	6		
3.2	Providing and fixing WC connector (straight or bend type) of 100 mm diameter and required length including proper connection to C.I. pipe complete as required.	Each	8		
3.3	Providing and fixing floor drain with 4mm thick stainless steel gratings (100 mm diameter) with frame including fixing to the floor with cement mortar.	Each	12		

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
3.4	Providing and fixing Stainless Steel 'Cockroach' Trap with 150 mm x 150 mm stainless steel grating fixed on top of floor trap. The cost includes the cost of all ancillary works as required to complete the work.	Each	16		
3.5	Providing and fixing Stainless Steel grating, Grade 304 on top of floor trap. The rate includes the cost of all ancillary works and material as required to complete the work.				
a)	125 x 125 x 1mm or 125mm dia x 1 mm	Each	16		
3.6	Providing and fixing floor clean out plug for Cast Iron Soil or waste pipes of the following sizes comprising of C.I. Plug, nipples, bends including lead jointing etc. complete.				
a)	150mm diameter	Each	10		
b)	100mm diameter	Each	3		
3.7	Providing and fixing of 200 mm X 200 mm C.I. Square grating at terrace RWP complete in all respect.	Each	16		
3.8	Providing and fixing 100 mm dia G.I. Vent pipe at the roof level of water tanks with anti-mosquito brass grating, bends as required complete in all respects as per drawing.	Each	6		
	<b>TOTAL</b>				

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
<b>4</b>	<b>EXTERNAL SEWAGE &amp; STORM WATER DRAINAGE:</b>				
4.1	Providing and laying non-pressure NP4 class RCC pipes with collars jointed with stiff mixture of Cement mortar in the proportion of 1:2 (1 cement: 2 fine sand) including testing of joints etc. complete. This also includes excavation in all kinds of soil (including hard rock), dewatering, refilling, watering, ramming, removing and disposal of the surplus excavated material and making good the same, complete as required.				
a)	250 mm dia RCC pipe	R.M.	72		
b)	200 mm dia RCC pipe	R.M.	32		
c)	150 mm dia RCC pipe	R.M.	40		
4.2	Providing and laying Cement Concrete in the proportion 1:4:8 (1 cement : 4 course sand : 8 graded stone aggregate of 40 mm nominal size) for NP 4 class RCC pipes with concrete bedding and haunches up to the center of pipe including shuttering & timbering complete as required.				
a)	For 250 mm dia pipe – 150mm thick PCC bedding	R.M.	72		
b)	For 200 mm dia pipe – 150mm thick PCC bedding	R.M.	32		
c)	For 150 mm dia pipe – 100mm thick PCC bedding	R.M.	40		

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
4.3	Providing, fixing, jointing and testing in position, the following C.I. Class (LA) Pipes, conforming to IS:1536 and cut to required lengths for drainage. This also includes making proper connections with refined pig lead of required depths. The pipe must be laid below ground level in trenches up to the required depth including excavation in all kind of soils (including hard rock), dewatering, refilling, watering, ramming, removing and disposal of the surplus excavated material as per instructions by site in charge and making good the same, complete as required.				
a)	150 mm dia	R.M.	120		
4.4	Constructing rectangular manhole of the following types in brick masonry with Class 75 designation bricks of approved quality in Cement Mortar in the proportion 1:4 (1 cement : 4 coarse sand) having RCC top slab with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), foundation with cement concrete 1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size), inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) and finished with a floating coat of neat cement, outer plaster 15 mm thick with cement concrete 1:4 (1 cement : 4 coarse sand) including making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) and finished with a floating coat of neat cement, fixing of foot rests made up of 20 mm M.S. square bar in 1:2:4 cement concrete (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm nominal size) block of size 200 mm x 200 mm x 100 mm. This also includes excavation in all kinds of soil (including hard rock), dewatering, refilling, watering,				

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	ramming, removing and disposing surplus excavated material, complete as required.				
a)	Inside size 900 mm x 800 mm and 600 mm depth with 560 mm diameter SFRC, heavy duty perforated cover with frame conforming to IS:12592 fixed in top slab.	Each	10		
b)	Inside size 1200 mm x 900 mm and 900 mm depth with 560 mm diameter SFRC, heavy duty perforated cover with frame conforming to IS:12592 fixed in top slab.	Each	12		
4.5	Making connection of storm water drain / sewer line with Municipal external storm water / sewer line including necessary excavation in all kinds of soil up to required depth, breaking the wall / floor of municipal manhole / nallah and making good the same with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20mm nominal size), plastering on both sides with cement mortar 1:4 (1 cement : 4 coarse sand) finished with a floating coat of neat cement and making necessary channels for drain etc. complete. This also includes the liasoning work such as filling necessary applications, submission of forms for approval to the municipal authorities, depositing the necessary fees and other amounts as required for getting the premises / installations inspected and approved and all other formalities required till the connection is obtained. All the expenses incurred in this regard shall be borne by the contractor except for the payments to be made for any security deposits which will be reimbursed on actual.				

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
a)	For Sewer connection	Job	1		
b)	For Storm water connection	Job	2		
<b>20</b>	<b>PUMPS FOR WATER SUPPLY / SEWAGE/ SEEPAGE WATER</b>				
	Whether explicitly specified or not, the Pumps for Water Supply / Water Treatment specified herein, must conform to Specifications and Motors must conform to Specifications, in addition to the description given in respective items of BOQ. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
	The motor HP to be confirmed by the supplier for the duty mentioned for each pump.				
	Rates quoted shall be inclusive of all structural supports, clamps etc. as per approved design / specifications.				
20.1	Supply, Installation, Testing and Commissioning of following Hydropneumatically operated pumping set (pressure switch operated fully automatic) with C.I. Body, bronze Impeller, stainless steel shaft and induction motor, vibration eliminating pads and accessories including pressure tank, pressure switches, automatic control panel etc.mounted on a common skid complete in all respect.				
a)	Not Used				
b)	For domestic water supply to station				

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Type of pump : Centrifugal				
	Capacity :6 Cum/Hr				
	Head : 15 m				
	Motor RPM : 2900				
	Each set consists of 2 pumps and 1 pressure tank. At any given time, only one pump need operate. Both the pumps must operate alternatively in service.	Set	1		
20.2	Supply, Installation, Testing and Commissioning of the following horizontal single / multistage centrifugal pump pit with CI body, baring impeller, SS shaft and induction motor mounted on a comon base frame, vibration eliminating pads accessories complete				
a)	Filter Feed Pump				
	Capacity :15 Cum/Hr				
	Head : 30 m				
	Motor-RPM- 2900				
	Each set consists of 2 pumps (1 Working + 1 Standby). At any given time, only one pump need operate. Both the pumps must operate alternatively in service.	Set	1		
20.3	Supply, Installation, Testing and Commisioning the following Submersible Sump Pumps conforming to M & W Specifiactions with motors conforming M & W Specifiactions for waste water drainage, free standing type, complete with				
a)	For Main Sewage Sumps at concourse level / Undercroft level				
	Solid handling Capacity 40 mm				
	Flow Rate - 120 LPM				

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Head - 30 M				
	RPM - 2900				
	Each set consists of 2 pumps (1 Working + 1 Standby). At any given time, only one pump must operate. Both the pumps must operate alternatively in service.	Set	2		
b)	For Sump at basement of Ancillary building				
	Solid handling Capacity 40 mm				
	Flow Rate - 300 LPM				
	Head -20 M				
	RPM - 2900				
	Each set consists of 2 pumps (1 Working + 1 Standby). At any given time, only one pump must operate. Both the pumps must operate alternatively in service.	Set	1		
c)	For Main Seepage Sumps at Undercroft level				
	Solid handling Capacity 40 mm				
	Flow Rate - 600 LPM				
	Head - 30M				
	RPM - 2900				
	Each set consists of 3 pumps (1 Working + 1 Standby + 1 Assisting Pump). However in case of operation of fire pumps all the three pumps may operate simultaneously.	Set	2		
d)	For Main Seepage Sumps at middle of tunnel				
	Solid handling Capacity 40 mm				
	Flow Rate - 600 LPM				
	Head - 30M				

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	RPM - 2900				
	Each set consists of 2 pumps (1 Working + 1 Standby). However in case of operation of fire pumps all the two pumps may operate simultaneously.	Set	1		
e)	For Seepage Sumps at Entry / Exit at Undercroft Level				
	Solid handling Capacity 40 mm				
	Flow Rate - 300 LPM				
	Head - 20 M				
	RPM - 2900				
	Each set consists of 2 pumps (1 Working + 1 Standby). However in case of operation of fire pumps all the two pumps may operate simultaneously.	Set	4		
20.4	Supply, Installation, Testing and commissioning of level controller switches for automatic operation of seepage/sewage pumps with S.S. probes 2X1.5 sq.mm conductor cables from motors control center to probes.	Set	11		
	<b>TOTAL OF PUMPS FOR WATER SUPPLY / SEWAGE/ SEEPAGE WATER</b>				
<b>21</b>	<b>WATER TREATMENT PLANT</b>				
	Whether explicitly specified or not, the Water Treatment Plant and Pumps specified herein, must conform to Section E26 & E27 of the M & W Specifications and Motors must conform to Section E12 of the M & W Specifications, in addition to the description given in respective items of BOQ. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	The motor HP to be confirmed by the manufacturer for the duty mentioned for each pump along with performance characteristic curve.				
	Rates quoted shall be inclusive of all structural supports, clamps etc. as per approved design / specifications.				
21.1	DUAL MEDIA FILTER				
	Providing and fixing of mild steel (rubber Lined) pressure vessel confirming to IS:2825 dual media filter complete in all respects as	NO.	1		
	1) Capacity = 15Cum / hr				
	2) Rate of flow = Not more than 12.5 Cum / hr / sqm of surface area				
	3) Wall thickness of shell and of dished ends as per IS:2825				
	4) Initial charge of media.				
	5) Sample valves				
	6) Sockets and valve for dosing chemicals.				
	7) Pressure gauge at inlet and outlet with isolating cocks and supports.				
21.2	SOFTENER UNITS				
	Providing and fixing of mild steel (rubber Lined) pressure vessel confirming to IS:2825 dual media filter complete in all respects as per M & W specifications, having following	NO.	1		
	1) Capacity = 15Cum / hr				
	2) Rate of flow = Not more than 15 Cum / hr / sqm of surface area				
	3) Wall thickness of shell and of dished ends as per IS:2825				
	4) Initial charge of media.				
	5) Sample valves				
	6) OBR (13 Hrs) 200 cum				
	7) Pressure gauge at inlet and outlet with isolating cocks and supports.				

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	8) All Face piping and diaphragm valve etc..				
	9) Thickness of rubber lining not less then 3mm				
	10) All pipes to be as per IS : 1239 class "c"				
	11) Ejector for regeneration				
	12) For resin quantity and design purpose consider hardness of water as 350 ppm,quality of outgoing water - commercial Zero hardness.				
21.3	IRON REMOVAL FILTER				
	Providing and fixing of mild steel (rubber Lined) pressure vessel confirming to IS:2825 dual media filter complete in all respects as per M & W specifications,having following	NO.	1		
	1) Capacity = 15Cum / hr				
	2) Rate of flow = Not more than 10 Cum / hr / sqm of surface area				
	3) Wall thickness of shell and of dished ends as per IS:2825				
	4) Initial charge of media.				
	5) Sample valves				
	6) OBR (13 Hrs) 200 cum				
	7) Pressure gauge at inlet and outlet with isolating cocks and supports.				
	8) All Face piping and diaphragm valve etc..				
	9) Thickness of rubber lining not less then 3mm				
	10) All pipes to be as per IS : 1239 class "c"				
	11) Ejector for regeneration				
	12) For resin quantity and design purpose consider hardness of water as 350 ppm,quality of outgoing water - commercial Zero hardness.				
21.4	REGENERATION TANK / SALT DILUTION TANK				

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Providing and fixing HDPE tank of Capacity 2000 litres to store and measure brine for regeneration of softening plant.Tank shall be complete with all interconnecting MS / HDPE pipes and other assemblies / accessories required for commissioning.				
a)	Brine Measuring Tank - 2000 litres capacity	NO.	1		
21.5	CHEMICAL DOSING PUMP				
	Providing , fixing ,Instalation and comissioning of chemical dosing pump capacity 6 lph with 250 ltrs capacity chemical tank.	NO.	1		
21.6	LEVEL CONTROLLERS / LEVEL INDICATORS				
	Supply, Installation, Testing and Commisioning of Magnetic Float type Level Controllers / Indicators having adequete number of switches (Minimum 5 Nos.) for the services mentioned below. Contoller Equipment shall be mounted inside the electrical panels				
a)	For Domestic Water tanks for the following levels.				
i)	High High level to trigger alarm.				
ii)	High Level to switch OFF the Tube well.				
iii)	Raw Water Tank 1/2 full				
v)	Low Low level to trigger alarm	Set	1		
b)	For Fire Water Tanks, one set for each of the tanks for the following levels.				
i)	High Level to trigger alarm				
ii)	Full Fire Water Tank indication				
iii)	Low low level in fire water tank to trigger alarm	Set	2		
c)	For Treated Water Tank for the following levels				
i)	High High level to trigger alarm				
ii)	High Level to switch OFF the Filter Feed Pumps.				

**PART –C – PLUMBING AND DRAINAGE SYSTEM FOR MANDAI STATION**

S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
iii)	Treat Water Tank 1/2 full				
iv)	Low Level to switch ON the Filter Feed Pumps				
v)	Low Low level to trigger alarm	Set	1		
	<u>Note:</u>				
	All above level Controllers / Indicators to be complete with sensors, switches, relays, all wiring from the sensors to the Control Unit, Control Units to Motor Control Centers of the various Pumps and to the various alarm and indicating devices.				
	Sensors Terminal Units would be in weather proof enclosures (IP-56).				
	<b>TOTAL OF WATER TREATMENT PLANT</b>				

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**Price Centre M : Electrical and Mechanical works for Swargate station**

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SL No.	Description of items	TOTAL AMOUNT(IN RUPEES)	
		In Figures	In Words
PART-A	Electrical Works		
PART-B	Fire protection System		
PART-C	Plumbing Works		
	TOTAL		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	SUB-MAIN SWITCHBOARDS AND LOCAL ELECTRICAL PANELS				
E.01	Switch Boards/panels				
a	Supply, installation, testing and commissioning of front operated, front / back access, cubicle type, indoor duty, floor / wall / recess / surface mounted (as specified below), totally enclosed dust and vermin proof switchboards / panels with minimum Ingress protection classification of IP 54, fabricated from 2 mm thick CRCA sheets with dip coat priming and epoxy powder coated finish. The panels must be suitable for 415 volts 3 phase, 4 wire, 50 Hz, system, must be able to withstand symmetrical fault level of (as specified for various panels) for 1 sec at 415 V and must include all interconnections, earthing and bonding requirements etc. The panels must conform to Drawings& Standards specified in relevant specifications, as required and as given below.				
b	Main LV Switchboards must conform the relevant Section of the M & W specifications				
c	All the items mentioned in relevant Sections / Clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates				
d	In case of any contradiction between BOQ / M & W Specifications and Drawings, the most stringent conditions of the above will apply.				
e	The Switchboards shall be provided with detachable gland plates for entry of cables from the top / bottom as required.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
f	All live accessible parts shall be shrouded and all equipment shall be finger touch proof. SMC / DMC shrouds and busbar supports suitably spaced shall be used. Hinged doors with padlocking facility shall be provided on all outgoing feeders with switch handles lockable in OFF position.				
g	All accessories & supporting structures such as channels, ISMC-100 base frame, mounting brackets, lifting lugs, panel heaters, ventilation arrangement etc shall be provided as required.				
h	Each incomer and outgoing feeder shall be provided with LED type status indication lamps suitable for 240 V, AC, as approved.				
i	Space provision as specified in M & W Specifications for future expansion.				
j	Components and accessories shall be same for switchboards and panels for uniformity, standardisation and replaceability and shall be applicable to all panels/ boards under the scope of work				
k	All interconnections, labelling, earthing, associated foundation / masonry work, sealing of gaps around the panels by chequered plates & erection etc. complete shall be executed as required.				
l	MCCB's shall be as per relevant Section of M & W Specifications and shall be current limiting type with front adjustable electronic releases for required protections against fault, suitable for isolation as per Annexure 7.1.2 of IEC 60947 – 2, with Ics and Icu values as specified in relevant clauses of M & W Specifications and conforming to latest IEC 60947. The operating voltage (Ue) shall be 415 V and insulation voltage (Ui) 690V with trip free mechanism, handle indicating ON / OFF / tripped positions. The breaking capacity as mentioned in items of BOQ below, shall be Ics values and shall not be less than 35 kA. Breakers must have Ics = 100% Icu. Electronic trip units shall comply with the requirements as specified in Appendix F (EMC /EMI Compatibility) of IEC 60947-2 or EN 60947-2.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
m	MCCBs for Network / Feeder Protection shall have adjustable protection against Overload and adjustable protection against Short Circuit as specified in M & W Specifications, whether specifically asked in BOQ or not. MCCB's for Network / Feeder Protection shall have releases with Earth Fault protection feature, wherever and as indicated in Bill of Quantities or Drawings. However, on completion of Cable Sizing Calculations and Fault calculations by the Contractor, if Earth Fault releases are required for additional feeders, where this requirement is not indicated in the BOQ, same shall be provided at no extra cost to the Employer. For Motor Protection MCCB's, requirements of M & W Specifications shall be followed.				
n	ACBs/MCCBs shall be compact, suitably designed to provide protection of motors, cables, busbars to suit rated current, unbalanced power distribution, as required.				
o	Panel / Switchboard board design shall be compact and components / accessories of compact sizes shall be used to economise the room space available. Employer reserve the right to seek compact items in place of larger ones.				
p	Incomer ACB'S / MCCBs / MCBs of switchboards / panels shall be provided with NO / NC contacts as specified in specifications for interface with SCADA System and for manual / auto and local / remote operation.				
q	ACB's shall have Microprocessor based releases as specified in the M & W Specifications.				
r	In case higher frame sizes (than those specified in the BOQ) are required to be provided to achieve the requirement of Total Discrimination mentioned in relevant Section of M & W Specifications, due to selection of a particular make, the same shall be provided at no extra cost if other makes are able to achieve the same with the specified frame size.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
s	Contractor must carry out Cable Sizing based on actual lengths of cables and Discrimination study for selection of trip units and settings for the releases during production of Working Drawings.				
t	All Motor feeders, having separate Thermal Over - load relay, shall be provided with Reset push button.				
u	Even though, ratings of MPCB / Contactors for Motor Feeders are mentioned in BOQ items below, after Selection of a particular make of Switchgear, MPCB / Contactors with ratings as per tested Type II Coordination from the selected manufacturer, only shall be provided.				
v	Description of Various panels/boards covered under this BOQ is as given below:				
w	All the panel shall be form form 4b type and shall be Suitable for Built- in CLEAN AGENT fire trace tube gas flooding system.				
E.01.1	Local Motor Control Panels for Sewage Pumps, for both the side (North & south end) as per M & W Specifications & Drawing complete and as per the following details:	No's	2		
	Incomer				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	Automatic Transfer Switch (ATS) with 2 Nos. 160/40A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
b	LED phase indication lamp for R-Y-B.				
B.	BUS BAR				
	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in relevant section of M & W Specifications) rated 100 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
C.	OUTGOING				
1	2 Sets of Star Delta starter unit for Sewage Pumps (3.7 KW each) with one Pump as Working and One as Standby. Each Starter Unit shall be equipped with the following.				
a	1 No. 3 pole, 10 A, MPCB (with inbuilt Single Phasing Preventer) having 6 - 10 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
b	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
c	1 No. Digital Ammeter, CT operated.				
d	1 No. CT, 10/5A, 10VA, class - I for metering.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
e	Auto / Local / Remote Selector Switch key operated.				
f	Door mounted push buttons for Start and Stop functions.				
g	Emergency Stop push button lockable type.				
h	LED indication lamp for ON, OFF, Trip.				
i	3 No. 18A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
J	One No. Star Delta Timer.				
k	One No. timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
l	Running hour meter.				
m	Auxiliary Contactors for Auto/Local/Remote Operation.				
n	Power & Control terminals for cable connections.				
	Equipment common for all feeders is indicated below:				
a)	1 No Working / Standby Selector Switch.				
b)	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
E.01.2	Local Motor Control Panel for Seepage Pumps, for both the ends (north & south) as per M & W Specifications & Drawing complete and as per the following details.	No's	2		
	Incomer				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Automatic Transfer Switch (ATS) with 2 Nos. 250/160A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
a	LED indication lamp for the following-				
b	ON, OFF, TRIP (each for both the supplies)				
c	LED phase indication lamp for R-Y-B.				
d	BUS BAR				
e	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 200 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
	OUTGOING				
f	3 Sets of Star Delta starter unit for Seepage Pumps (11 KW each) with Three Pumps as Working . Each Starter Unit shall be equipped with the following:				
g	SS				
h	1 No. 4 Pole RCCB 40A rating and 100mA sensitivity.				
i	1 No. Digital Ammeter, CT operated.				
j	1 No. CT 30/5A, 10VA, class - I for metering.				
k	Auto / Local / Remote Selector Switch key operated.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
l	Door mounted push buttons for Start and Stop functions.				
m	Emergency stop push button lockable type.				
n	LED indication lamp for ON, OFF, Trip.				
o	3 No. 25A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 230 VAC.				
p	One No. Star Delta Timer.				
q	One No. timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
r	Running hour meter.				
s	Auxiliary Contactors for Auto/Local/Remote Operation.				
t	Power & Control terminals for cable connections.				
	Equipment common for all feeders is indicated below:				
u	1 No. 3 Position Selector Switch with all other accessories and auxiliary contactors (for level indication multiplication) to change the sequence of operation of three motors automatically.				
v	1 Nos. Feeders with 100/40 A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit .Feeder shall be equipped with the following:				
w	LED indication lamp for ON, OFF & TRIP.				
x	Phase Indication for R, Y and B				
	Metering				
y	1 No Digital Voltmeter with Inbuilt Selector Switch.				
z	1 No Digital Ammeter with Inbuilt Selector Switch.				
aa	3 Nos. CTs, 40/5A, 10VA, CL-1 for metering.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.01.3	Local Motor Control Panel for Mid tunnel Pumps, as per M & W Specifications & Drawing complete and as per the following details.				
	INCOMER				
a	100/40 A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit .				
b	LED phase indication lamp for R-Y-B.				
	BUS BAR				
c	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 100 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
	OUTGOING				
d	2 Sets of Star Delta starter unit for Sump Pumps (3.70 KW each) with one Pump as Working and One as Standby. Each Starter Unit shall be equipped with the following.				
e	1 No. 3 pole, 10 A, MPCB (with inbuilt Single Phasing Preventer) having 6 - 10 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
f	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
g	1 No. Digital Ammeter, CT operated.				
h	1 No. CT, 10/5A, 10VA, class - I for metering.				
i	Auto / Local / Remote Selector Switch key operated.				
j	Door mounted push buttons for Start and Stop functions.				
k	Emergency Stop push button lockable type.				
l	LED indication lamp for ON, OFF, Trip.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
m	3 No. 18A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
n	One No. Star Delta Timer.				
o	One No. timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
p	Running hour meter.				
q	Auxiliary Contactors for Auto/Local/Remote Operation.				
r	Power & Control terminals for cable connections.				
s	1 No Working / Standby Selector Switch.				
t	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
E.01.4	SMDB for Lighting distribution panels as per Technical Specifications and as per the following details.	No's	2		
	INCOMING				
a	1 No. 400 A/400 A, 415V, 65kA, 3P motorised MCCB having (1) Electronic Trip Unit with adjustable Overload, adjustable Short Circuit and adjustable Earth Fault (All with adjustable time delays) protection; (2) Provision for remote tripping of MCCB; (3) NO/NC contacts for operation and (4) Neutral sensor for earth fault protection.				
b	TNC switch				
c	LED indication lamp for ON, OFF & TRIP.				
d	Phase Indication for R, Y and B				
	Metering				
e	1 No Digital Voltmeter with Inbuilt Selector Switch.				
f	1 No Digital Ammeter with Inbuilt Selector Switch.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
g	3 Nos. CTs, 400/5A, 10VA, CL-1 for metering.				
	BUS-BARS				
h	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars rated 400 Amps, suitable to withstand symmetrical fault level of 50kA 65KA for 1 second at 415 volts.				
	OUTGOINGS				
i	14 Nos. Feeders with 100A/100 A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit.				
j	Scada/BMS Connectivity at the separate Marshelling box in the panel with provision of all necessary I/O points & Transducers mounting prewired upto marshelling box terminal boards from the factory itself and audited in factory from the BMS provider				
E.01.5	SMDB for Small power distribution panels as per Technical Specifications and as per the following details.	No's	2		
	INCOMING				
a	1 No. 630 A / 630 A, 415V, 65kA, 3P motorised MCCB having (1) Electronic Trip Unit with adjustable Overload, adjustable Short Circuit and adjustable Earth Fault (All with adjustable time delays) protection; (2) Provision for remote tripping of MCCB; (3) NO/NC contacts for operation and (4) Neutral sensor for earth fault protection.				
b	TNC switch				
c	LED indication lamp for ON, OFF & TRIP.				
d	Phase Indication for R, Y and B				
	Metering				
e	1 No Digital Voltmeter with Inbuilt Selector Switch.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
f	1 No Digital Ammeter with Inbuilt Selector Switch.				
g	3 Nos. CTs, 630/5A, 10VA, CL-1 for metering.				
	BUS-BARS				
h	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars rated 630 Amps, suitable to withstand symmetrical fault level of 50 KA for 1 second at 415 volts.				
	OUTGOING				
i	25 Nos. Feeders with 100A/100A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				
j	4 Nos. Feeder with 250A/160A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				
k	Scada/BMS Connectivity at the separate Marshelling box in the panel with provision of all necessary I/O points & Transducers mounting prewired upto marshelling box terminal boards from the factory itself and audited in factory from the BMS provider				
E.01.6	Retail Panel-1	No's	1		
	Incoming				
a	100 amp TPN 50KA MCCB with built in microprocessor based release unit for short circuit, over current and earth fault protection with adjustable setting and with the following accessories :				
b	0-500 volts, digital voltmeter with 2 amps MCB's.				
c	0 – 100 amps digital ammeter and 100/5 amps 15 VA burden,CL 1 CTs				
d	Phase indicating lights protected by 2 amps MCB's.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
e	Each 1 no. NO/NC Auxiliary Contacts (ON/OFF Status) and Trip alarm contact (Trip status) for BMS Monitor (Potential free contacts)				
	Bus Bars				
f	100 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Goings				
g	4 Nos. 63 amp 50kA TPN MCCB each with microprocessor based releases control unit for protection with site settable over current, short circuit, instantaneous short circuit , earth fault fault protection and indicating lamps, Each 1 no. NO/NC Auxillary Contacts (ON/OFF Status) and Trip alarm contact (Trip status) for BMS Monitor (Potential free contacts)				
h	1 no's 63 amp 690 volts TPN 50 kA MCCBs as spare				
	Metering				
i	1 No., 230V, AC operated integral type Digital meter with RS-485 port for measuring Amps ,Voltage, Energy, frequency & power factor conforming to specifications, latest IEC/ EMC and EMI standards/criterion, with necessary Circuit MCBs and suitable size summing CTs for above two incomer metering supporting SCADA/BMS connectivity				
	Special Features:				
j	BMS compatibility for all incomers, Bus couplers and outgoing breakers including meters, BMS Control / Monitor Parameters (Potential free contacts)				
k	Suitability for Built- in CLEAN AGENT gas flooding system.				
E.01.7	Fire Pump Panel, as per M & W Specifications & Drawing complete and as per the following details.	No's	1		
	INCOMER				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	Automatic Transfer Switch (ATS) with 2 Nos. 400/400A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
b	LED indication lamp for the following-				
c	ON, OFF, TRIP (each for both the supplies)				
d	LED phase indication lamp for R-Y-B.				
	METERING				
e	1 No Digital Voltmeter with Inbuilt Selector Switch.				
f	1 No Digital Ammeter with Inbuilt Selector Switch.				
g	3 Nos. CTs, 400/5A, 10VA, CL-1 for metering.				
	BUS BAR				
h	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in of M & W Specifications) rated 400 Amps, suitable to withstand symmetrical fault level of 50kA for 1 second at 415 volts.				
	OUTGOING				
i	2 Sets of Star Delta starter unit for Fire Hydrant Pumps (116 KW each) with One Pump as Working and One as Standby. Each Starter Unit shall be equipped with the following.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
j	1 No. 3 Pole, 415V, 250 A, 50kA, 3P Motor Duty MCCB with Magnetic Trip Unit Only (having short circuit protection only) and auxiliary Contacts.				
k	1 No. Digital Ammeter, CT operated.				
l	1 No. CT, 160 /5A, 10VA, class - I for metering.				
m	Auto / Local / Remote Selector Switch key operated.				
n	Door mounted push buttons for Start and Stop functions.				
o	Emergency stop push button lockable type.				
p	LED indication lamp for ON, OFF, Trip.				
q	3 No. 150A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
r	One No. Star Delta Timer.				
s	Auxiliary Contactors for Auto/Local/Remote Operation.				
t	Triple pole, Suitable C.T. operated, bimetal Over Load relays (with in built single phasing protection) suitable for above mentioned motor feeder having arrangement for by - passing the Over Load relay in case the pump is running during an emergency scenario with all accessories including 3 Nos. Suitable C.T.s, Auxiliary Contactors etc.				
u	Power & Control terminals for cable connections.				
	Equipment common for all feeders is indicated below:				
v	1 No. Working / Standby Selector Switch.				
w	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
x	2 Sets of Star Delta starter unit for Fire Sprinkler Pumps (45 KW each) with One Pump as Working and One as Standby & 1 no spare. Each Starter Unit shall be equipped with the following.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
y	1 No. 3 Pole, 415V, 250A, 50kA, 3P Motor Duty MCCB with Magnetic Trip Unit Only (having short circuit protection only) and auxiliary Contacts.				
z	1 No. Digital Ammeter, CT operated.				
aa	1 No. CT, 160 /5A, 10VA, class - I for metering.				
ab	Auto / Local / Remote Selector Switch key operated.				
ac	Door mounted push buttons for Start and Stop functions.				
ad	Emergency stop push button lockable type.				
ae	LED indication lamp for ON, OFF, Trip.				
af	3 No. 150A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
ag	One No. Star Delta Timer.				
ah	Auxiliary Contactors for Auto/Local/Remote Operation.				
ai	Triple pole, Suitable C.T. operated, bimetal Over Load relays (with in built single phasing protection) suitable for above mentioned motor feeder having arrangement for by - passing the Over Load relay in case the pump is running during an emergency scenario with all accessories including 3 Nos. Suitable C.T.s, Auxiliary Contactors etc.				
aj	Power & Control terminals for cable connections.				
ak	Equipment common for all feeders is indicated below:				
al	1 No. Working / Standby Selector Switch.				
am	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
an	3 Sets of Star Delta Starter Unit (One Set for Hydrant Jockey Pump, One Set for Sprinkler Jockey Pump& One Set as spare) of 11 KW. Each Starter Unit shall be equipped with the followings:				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
ao	1 No. 3 Pole, 415V, 100 A, 50kA, 3P Motor Duty MCCB with Magnetic Trip Unit Only (having short circuit protection only) and auxiliary Contacts.				
ap	1 No. Digital Ammeter, CT operated.				
aq	1 No. CT, 30/5A, 10VA, class - I for metering.				
ar	Auto / Local / Remote Selector Switch key operated.				
as	Door mounted push buttons for Start and Stop functions.				
at	Emergency stop push button lockable type.				
au	LED indication lamp for ON, OFF, Trip.				
av	3 No. 40A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
aw	One No. Star Delta Timer.				
ax	Auxiliary Contactors for Auto/Local/Remote Operation.				
ay	Triple pole, Suitable C.T. operated, bimetal Over Load relays (with in built single phasing protection) suitable for above mentioned motor feeder having arrangement for by - passing the Over Load relay in case the pump is running during an emergency scenario with all accessories including 3 Nos. Suitable C.T.s, Auxiliary Contactors etc.				
az	Power & Control terminals for cable connections.				
E.01.8	Local Motor Control Panel for Water Treatment System, Pump Room as per M & W Specifications & Drawing complete and as per the following details.	No's	1		
	Incomer				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	2 Nos. 250/160 A, 415V, 35kA, 4P MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and having NO/NC contacts for operation. The MCCB's must be mechanically and electrically interlocked such that it is possible to manually close one of them at a time.				
b	LED phase indication lamp for R-Y-B.				
c	LED indication lamp for the following-				
d	ON, OFF, TRIP				
e	BUS BAR				
f	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 200 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
	Outgoing				
g	2 Sets of Star - Delta Starter Unit of 7.5 KW (one for Borewell Pump and one as spare). Each Starter Unit shall be equipped with the following:				
h	1 No. 3 pole, 18 A, MPCB (with inbuilt Single Phasing Preventer) having 13 - 18 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
i	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
j	1 No. Digital Ammeter, CT operated.				
k	1 No. CT, 25/5A, 10VA, class - I for metering.				
l	Auto / Local / Remote Selector Switch key operated.				
m	Door mounted push buttons for Start and Stop functions.				
n	Emergency stop push button lockable type.				
o	LED indication lamp for ON, OFF, Trip.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
p	3 No. 25A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
q	One No. Star Delta Timer.				
r	Running Hour meter.				
s	Auxiliary Contactors for Auto/Local/Remote Operation.				
t	Power & Control terminals for cable connections.				
u	9 Sets of Star - Delta Starter Unit of 3.75kW each for Filter Feed Pump (1 Working + 1 Standby), Raw Water Pump (1 Working + 1 Standby), Soft Water Pump (1 Working + 1 Standby), Domestic Water Pump (1 Working + 1 Standby), and 1 nos Spare feeder. Each Starter Unit shall be equipped with the following:				
v	1 No. 3 pole, 10 A, MPCB (with inbuilt Single Phasing Preventer) having 6 - 10 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
w	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
x	1 No. Digital Ammeter, CT operated.				
y	1 No. CT, 10/5A, 10VA, class - I for metering.				
z	Auto / Local / Remote Selector Switch key operated.				
aa	Door mounted push buttons for Start and Stop functions.				
ab	LED indication lamp for ON, OFF, Trip.				
ac	Emergency stop push button lockable type.				
ad	3 No. 18A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
ae	One No. Star Delta Timer.				
af	Running Hour meter.				
ag	Auxiliary Contactors for Auto/Local/Remote Operation.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
ah	Power & Control terminals for cable connections.				
	Equipment common for both feeders in each set of pumps (1 Working & 1 Standby) are indicated below Total Five Sets of such equipment shall be provided:				
ai	1 No Working / Standby Selector Switch.				
aj	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
ak	4Sets of DOL starter unit for Sump Pumps (2.2 KW each) with Two Pump as Working and Two as Standby. Each Starter Unit shall be equipped with the following.				
al	1 No. 3 pole, 6.3 A, MPCB (with inbuilt Single Phasing Preventer) having 4 - 6.3 A Over - load release and having Auxiliary contacts for indications for On, Off and Trip.				
am	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
an	1 No. Digital Ammeter, CT operated.				
ao	1 No. CT, 10/5A, 10VA, class - I for metering.				
ap	Auto / Local / Remote Selector Switch key operated.				
aq	Door mounted push buttons for Start and Stop functions.				
ar	Emergency Stop push button lockable type.				
as	LED indication lamp for ON, OFF, Trip.				
at	1 No. 18A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
au	One No. timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
av	Running hour meter.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
aw	Auxiliary Contactors for Auto/Local/Remote Operation.				
ax	Power & Control terminals for cable connections.				
ay	2 Nos. Feeders with 160/100 A, 3 pole, 35kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				
az	3 Nos. Feeders with 100/100 A, 3 pole, 35kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				
E.01.9	Local Control Panels, for UPS as per M & W Specifications & Drawing complete and as per the following details.	No's	2		
a	2 Nos. 250/160 A, 415V, 35kA, 4P MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and having NO/NC contacts for operation.				
b	LED indication lamp for the following-				
c	ON, OFF, TRIP (each for both the supplies)				
d	LED phase indication lamp for R-Y-B.				
	Metering				
e	1 No Digital Voltmeter with Inbuilt Selector Switch.				
f	1 No Digital Ammeter with Inbuilt Selector Switch.				
g	3 Nos. CTs, 250/5A, 10VA, CL-1 for metering.				
	BUS-BARS				
h	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in M & W Specifications rated 250 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
	OUTGOINGS				
i	12 Nos. 40A, 4P, MCB (C curve) .				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
j	4Nos. Feeders with 100 / 40 A, 3 pole, 35kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit.				
E.01.10	Auto Transfer Switch for UPS as per M & W Specifications & Drawing complete and as per the following details.	Sets	2		
a	Automatic Transfer Switch (ATS) with 2 Nos. 400/250A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
b	LED indication lamp for the following-				
c	ON, OFF, TRIP (each for both the supplies)				
d	LED phase indication lamp for R-Y-B.				
e	Out going terminals for cable collection to be provided.				
E.01.11	Sub Main Distribution Boards for escalator power as per M & W Specifications & Drawing complete and as per the following details.	Nos	2		
	INCOMER				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Automatic Transfer Switch (ATS) with 2 Nos. 400/250A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
	LED indication lamp for the following-				
	ON, OFF, TRIP (each for both the supplies)				
	LED phase indication lamp for R-Y-B.				
	Metering				
	1 No Digital Voltmeter with Inbuilt Selector Switch.				
	1 No Digital Ammeter with Inbuilt Selector Switch.				
	3 Nos. CTs, 250/5A, 10VA, CL-1 for metering.				
	BUS BAR				
	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 250 Amps, suitable to withstand symmetrical fault level of 50kA for 1 second at 415 volts.				
	OUTGOING				
	10 Nos. Feeder with 160/100 A, 3 pole, 50kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.01.12	Lift Power panel/DB as per M & W Specifications & Drawing complete and as per the following details.	No's	19		
a	Automatic Transfer Switch (ATS) with 2 Nos. 160/100A, 4 pole, motorised MCCBs, electrically and mechanically interlocked with base frame and controller having selector switch for automatic & forced operation on normal and emergency sources. ATS must have monitoring of normal source, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller or separately provided. The controller should have communication capability with BMS/SCADA. The MCCB's must have Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications.				
b	LED indication lamp for the following-				
c	ON, OFF, TRIP (each for both the supplies)				
d	LED phase indication lamp for R-Y-B.				
e	1 No 6A, DP, MCB ( B curve) for Lift control supply (UPS supply) local isolation.				
f	Out going terminals for cable collection to be provided as per the lift load & protection requirement.				
E.01.13	DG Set Power, Control & Synchronizing panel DB as per M&W specifications & Drawing complete and as per the following details.	No's	1		
A	From DG Panel to Main Distribution Board				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	1 No. 3200A, 415V, 65kA, 4 Pole, Electrically operated Draw Out type, ACB complete with safety shutters, 240V AC shunt trip coil & closing coil and having microprocessor based releases with (1) Communication capability (2) Provision for measurement of three phase and neutral current (3) Protection against long time + short time + earth fault (all with adjustable time delays) + instantaneous (4) Zone Selective Interlocking Unit for Total Discrimination (5) Communication options to remotely read and set parameters for the protection functions, transmission of ammeter measurements (6) Signalling of the cause of tripping and alarms, maximeter reset etc (7) NO / NC contacts for interlocks and indications. (8) Status Indication ON, OFF, TRIP.				
b	TNC switch				
c	Auto / Local / Remote Selector Switch key operated.				
d	LED indication lamp for ON, OFF & TRIP.				
e	ON, OFF, TRIP, spring charged & phase indication R-Y-B.				
f	Digital Ammeter with Inbuilt Selector Switch				
g	3 Nos. CTs, 3200/5A, 15VA, CL-1 for metering.				
B	D.G. INCOMER				
	2 Nos DG incomer with each consisting of the following-				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	1 No. 1600/ 1600A, 415V, 65kA, 3 Pole, Electrically operated Draw Out type ACB, complete with safety shutters, 240V AC shunt trip coil & closing coil and having microprocessor based releases with (1) Communication capability (2) Provision for measurement of V, A, W, VAR, VA, Wh, VARh, Hz, power factor etc (3) Protection against long time + short time + instantaneous + earth fault (all with adjustable time delays), over and under voltage, minimum and maximum frequency, voltage and current imbalance, phase sequence, load shedding and reconnection & reverse power protection (4) Measurement of interrupted currents, differentiated fault indications, maintenance indicators (5) Last few trippings and event histories and time stamping with facility for consulting the history file, maintenance indicator register etc (6) Communication options to remotely read and set parameters for the protection functions, transmission of all the calculated indicators and measurements (7) Signalling of the cause of tripping and alarms (8) NO / NC contacts for interlocks and indications.				
b	TNC switch				
c	Selector switch for following operation-				
d	Auto / Local / Remote operation of Breaker, Manual / Auto Synchronization, On line set selection.				
e	LED indication lamp for the following-				
f	ON, OFF, TRIP, spring charged & phase indication R-Y-B.				
g	Push Buttons for the following functions-				
h	Fault Accept, Annunciator Reset, Lamp test.				
	Metering				
i	Multifunction energy meter for measurement of voltage, line current, power factor, power & energy				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
j	4 Nos. CTs, 2000/5A, 15VA, CL-1 for metering.				
k	Protection-				
l	Microprocessor base restricted earth fault relay.				
m	Microprocessor base differential protection relay.				
n	Master Trip Lockout Relay.				
o	4 Nos. CTs, 1600/5A, 15VA, CL-PS.(3 Nos in Panel and One No in DG neutral) for REF protection.				
p	6 Nos. CTs, 1600/5A, 15VA, CL-PS. (3 Nos in Panel and 3 Nos in Alternator Winding) for Differential protection.				
q	8 Window Annunciator with Hooter.				
r					
s	1 No 250A, AC-3 duty, Power Contactor with Auxiliary Contacts for neutral.				
t	Synchronizing equipment-				
u	Provision & Installation of Auto Synchronising Module for each DG Set with AMF, Active & Reactive Auto load sharing & Auto Load Management, with 16 Nos. Digital Inputs & Digital Outputs, with provision for BMS / SCADA connectivity.				
v	1 No Double Voltmeter, 1 No Double frequency Meter, 1 No Synchronoscope, 1 No Synchro Check Relay, Set of dark lamps with auxiliary transformer, 1 No Selector Switch for set to be synchronised (One set for Total No of DG sets)				
w	Voltage Raise / Lower & Frequency Raise / Lower Switch.				
x	Solid state / Motorised Potentiometer for AVR and Speed control ( as per manufacturer's requirement).				
y	1 No 24V DC source unit, 24V DC battery (for 8 hours back up) with battery charging circuit. (Common for all DG synchronization system).				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
z	BUS BAR				
z	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in of M & W Specifications) rated 4000 Amps, suitable to withstand symmetrical fault level of 65kA for 1 second at 415 volts.				
aa	OUTGOING FEEDERS				
ab	2 nos. 400A/400A, 415V, 65kA, 3P, MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and Earth Fault (With Adjustable time delay); having NO/NC contacts for operation and neutral sensor for earth fault protection.				
ac	LED phase indication lamp for R-Y-B.				
ad	Digital Ammeter with Inbuilt Selector Switch				
ae	3 Nos. CTs, 400/5A, 10VA, CL-1 for metering.				
af	2 no. 160A/100A, 415V, 65kA, 3P, MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and Earth Fault (With Adjustable time delay); having NO/NC contacts for operation and neutral sensor for earth fault protection.				
ag	Digital Ammeter with Inbuilt Selector Switch				
ah	3 Nos. CTs, 100/5A, 10VA, CL-1 for metering.				
E.01.14	D.G. Auxiliary panel as per M & W Specifications & Drawing complete and as per the following details.	Nos	1		
a	Incoming				
b	1No. 160 / 100 A, 415V, 35kA, 3P MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and Earth fault and having NO/NC contacts for operation and neutral sensor for earth fault protection.				
c	LED phase indication lamp for R-Y-B.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
d	Metering				
e	1 No Digital Ammeter with Inbuilt Selector Switch.				
	3 Nos. CTs, 100/5A, 10VA, CL-1 for metering.				
f	Bus bars				
	Electrolytic high conductivity T P & N (full size) copper conductor bus-bars (as specified in Section E01 of M & W Specifications) rated 100 Amps, suitable to withstand symmetrical fault level of 35kA for 1 second at 415 volts.				
g	Outgoings				
h	3 Sets of DOL Starter units of 0.75 kW each for Engine Lub-oil Priming Pump (2 Working + 1 Spare) & each shall be equipped as detailed below.				
i	1 No. 3 pole 2.5 Amps MPCB (with inbuilt single Phasing Preventer) having 1.6 - 2.4A Over - load release and having contacts for indications - On, Off, Trip.				
j	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
k	Auto / Local / Remote Selector Switch key operated.				
l	Door mounted push buttons for Start and Stop functions.				
m	Emergency stop push button lockable type.				
n	LED indication lamp for ON, OFF, Trip.				
o	1 No. 9A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 V AC.				
p	Auxiliary Contactors for Auto/Local/Remote Operation.				
q	Power & Control terminals for cable connections.				
r	2 Sets of DOL Starter units for Fuel Transfer Pumps (2.2 KW each) 1 Working + 1 Standby & each shall be equipped as detailed below.				
s	1 No. 3 pole 6.3 Amps MPCB (with inbuilt single Phasing Preventer) having 4 - 6.3A Over - load release and having contacts for indications - On, Off, Trip.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
t	1 No. 4 pole, RCCB with 40A rating and 100 mA sensitivity.				
u	1 No. Digital Ammeter, CT operated.				
v	1 No. CT, 10/5A, 10VA, class - I for metering.				
w	Auto / Local / Remote Selector Switch key operated.				
x	Door mounted push buttons for Start and Stop functions.				
y	Emergency stop push button lockable type.				
z	LED indication lamp for ON, OFF, Trip.				
aa	1 No. 9A, AC-3 Duty, 3 - pole Contactor with Auxiliary Contacts and Operating Coil of 240 VAC.				
ab	One No timer with Instantaneous and Time Delay Contact (for programming in case selected pump is not operative then next shall be switched on automatically)				
ac	Running hour meter.				
ad	Auxiliary Contactors for Auto/Local/Remote Operation.				
ae	Power & Control terminals for cable connections.				
af	Equipment common for all feeders as below:				
ag	1 No Working / Standby Selector Switch.				
ah	Auxiliary Contactors with 240 VAC operating coil (for Working / Standby selection).				
ai	3No. 100 / 40 A, 415V, 50kA, 3P MCCB having Electronic Trip Unit with adjustable protection against Overload, adjustable protection against Short Circuit and Earth fault and having NO/NC contacts for operation and neutral sensor for earth fault protection. Breaker shall be equipped as detailed below.				
aj	LED phase indication lamp for R-Y-B.				
ak	LED indication lamp for the following-				
	ON, OFF, TRIP				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	<b>TOTAL FOR SUB-MAIN SWITCHBOARDS AND LOCAL ELECTRICAL PANELS</b>				
<b>E.02</b>	<b>DISTRIBUTION BOARDS</b>				
	The Distribution Boards specified herein, must conform to relevant section of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the specified conditions will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
	Supply, Installation, Testing & Commissioning of front operated, indoor, front access cubicle type, dead rear, wall / recess / surface mounted Distribution Boards, (confirming to specifications given in Section E06 of M & W Specifications). The Distribution Boards must have Ingress Protection Classification of IP 54, current rating of 100 Amps, and must be suitable to withstand symmetrical fault current level of 10 KA for 1 sec at 415 volts, with the configurations detailed below. Distribution boards must be provided with electrolytic, high conductivity, TPN copper bus-bars as specified in M & W specifications (with full sized Neutral busbar), gland plates at both ends, blanking plates etc. as required. All internal wiring within the Distribution boards must be with Copper Conductor, LSZH wires (conforming to BS 7211 and Section E02 of M & W Specifications) for Normal Lighting and Socket Distribution Boards and with Fire Resistant / Survival wires (conforming to BS 7846 and Section E02 of M & W Specifications) for Emergency Lighting Distribution Boards.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>E.02.1</b>	<b>SMALL POWER (SOCKET) TPN DISTRIBUTION BOARDS FOR UC., PL. BOH</b>	NOS	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	24 Nos. 25A, SP MCB				
f	6 Nos. 32A, 4P MCB + RCCB (30 mA Sensitivity)				
g	Terminals blocks for power & control cables.				
<b>E.02.2</b>	<b>SMALL POWER TPN DISTRIBUTION BOARDS FOR PL. PUBLIC AREA (SPDB - 2, 4 as per Drawing ).</b>	NOS	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	12 Nos. 25A, SP MCB				
f	2 Nos. 32A, 4P MCB + RCCB (30 mA Sensitivity)				
h	Terminals blocks for power & control cables.				
<b>E.02.3</b>	<b>SMALL POWER TPN DISTRIBUTION BOARDS FOR CONC., &amp; GROUND AREA</b>	NOS	4		
a	INCOMER				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	24 Nos. 25A, SP MCB				
f	4 Nos. 32A, 4P MCB + RCCB (30 mA Sensitivity)				
h	Terminals blocks for power & control cables.				
<b>E.02.4</b>	<b>SMALL POWER TPN DISTRIBUTION BOARDS FOR TUNNEL NORTH</b>	NOS	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	36 Nos. 25A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.5</b>	<b>SMALL POWER TPN DISTRIBUTION BOARDS FOR TUNNEL SOUTH</b>	NOS	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	36 Nos. 25A, SP MCB				
h	Terminals blocks for power & control cables.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
<b>E.02.6</b>	<b>ADVIRTISEMENT DISTRIBUTION TPN DISTRIBUTION BOARDS</b>	NOS	4		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 50A, TPN MCB				
d	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
e	OUTGOING				
f	24 Nos. 25A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.7</b>	<b>NORMAL LIGHTING TPN DISTRIBUTION BOARDS FOR PUBLIC AREAS</b>	Nos	4		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 32A, TPN MCB				
d	3 Nos. 25A, 4 Pole MCB + RCCB (30 mA Sensitivity)				
e	3 Nos. 25A, 3 pole AC-3 duty Contactor.				
	Auxiliary Contactors, 4 nos push buttons, indication lamp for 50%, 75% and 100% selection, Local / Remote selector switch for Auto/Local Operation and lighting control from control desk located at Station control room or through SCADA.				
f	OUTGOING				
g	18 Nos. 10A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.8</b>	<b>NORMAL LIGHTING TPN DISTRIBUTION BOARDS FOR PL BOH</b>	Nos	2		
a	INCOMER				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 25A, TPN MCB				
	3 Nos. 25A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	18 Nos. 10A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.9</b>	<b>NORMAL LIGHTING TPN DISTRIBUTION BOARDS FOR CONC. BOH</b>	Nos	2		
a	INCOMER				
b	1 No. 63A, 4P, On - Load Manual Change - over Switch with 2 No. auxiliary contacts for position signalling.				
c	1 No. 25A, TPN MCB				
	3 Nos. 25A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	36 Nos. 10A, SP MCB				
h	Terminals blocks for power & control cables.				
<b>E.02.10</b>	<b>EMERGENCY LIGHTING TPN DISTRIBUTION BOARDS</b>	Nos	6		
a	INCOMER				
b	1 No. 32A, TPN MCB				
c	OUTGOING				
d	9 Nos. Of 10A DP MCB + DP RCCB (30mA Sensitivity)				
e	Terminals blocks for power & control cables.				
<b>E.02.11</b>	<b>EMERGENCY LIGHTING TPN DISTRIBUTION BOARDS</b>	Nos	6		
a	INCOMER				
b	1 No. 32A, TPN MCB				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
c	OUTGOING				
d	12 Nos. Of 10A DP MCB + DP RCCB (30mA Sensitivity)				
e	Terminals blocks for power & control cables.				
<b>E.02.12</b>	<b>TPN EMERGENCY LIGHTING DISTRIBUTION BOARD UDB - (for tunnels)</b>	Nos	2		
	INCOMER				
a	One no 100 / 40 A, 3 pole, 35kA, MCCB having Electronic Trip Unit with adjustable protection against Overload and adjustable protection against Short Circuit. The MCCB should be suitable for remote ON and OFF and auxiliary ON and OFF contacts should be provided for remote monitoring.				
b	OUTGOING				
c	30 Nos. Of 10A DP MCB + DP RCCB (30mA Sensitivity)				
d	Terminals blocks for power & control cables.				
<b>E.02.13</b>	<b>SPN EMERGENCY DISTRIBUTION BOARD FOR SCADA (5 Nos)</b>	Nos	5		
a	INCOMER				
b	1 No. 32A, DP MCB				
c	OUTGOING				
d	8 Nos. Of 10A DP MCB + DP RCCB (30mA Sensitivity)				
e	Terminals blocks for power & control cables.				
<b>E.02.14</b>	<b>SPN EMERGENCY DISTRIBUTION BOARD FOR UTILITY BUILDING UPS</b>	Nos	1		
a	INCOMER				
b	1 No. 20A, DP MCB				
c	OUTGOING				
d	9 Nos. Of 6A DP MCB + DP RCCB (30mA Sensitivity)				
e	Terminals blocks for power & control cables.				
<b>E.02.15</b>	<b>SMALL POWER (SOCKET) TPN DISTRIBUTION BOARDS</b>	NOS	1		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	INCOMER				
b	1 No. 50A, TPN MCB				
c	3 Nos. 40A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	24 Nos. 25A, SP MCB				
f	6 Nos. 32A, 4P MCB + RCCB (30 mA Sensitivity)				
g	Terminals blocks for power & control cables.				
<b>E.02.16</b>	<b>NORMAL LIGHTING TPN DISTRIBUTION BOARDS</b>	NOS	1		
a	INCOMER				
b	1 No. 25A, TPN MCB				
c	3 Nos. 25A, DP RCCB (30 mA Sensitivity)				
d	OUTGOING				
e	15 Nos. 10A, SP MCB				
f	Terminals blocks for power & control cables.				
	<b>TOTAL FOR DISTRIBUTION BOARDS</b>				
<b>E.03</b>	<b>CABLES, CABLE TRAYS &amp; STEELWORK</b>				
	The Cable and Cable Containment System specified herein, must conform to relevant Section of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	It may be noted that Contractor will be required to carry out cable sizing based on actual cable lengths, as per Working Drawings developed by him and after incorporating any changes in load requirements from the tendering stage. Optimisation must be carried out during cable sizing to reduce the cable requirement and size. Further, Contractor must obtain Engineer's approval on the Cable Sizing Calculation.				
E.03.1	Supply at the site of work of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen Type Cables conforming to BS 6724 and relevant Section of the M&W specifications of the following sizes:				
	(Note: In case of any contradiction between BS 6724 and Specification , the stringent conditions of the two will apply)				
a	4 x 300 Sq.mm	RM	1300		
b	4 x 240 Sq.mm	RM	200		
c	4 x 185 Sq.mm	RM	700		
d	4 x 150 Sq.mm	RM	400		
e	4 x 120 Sq.mm	RM	RO		
f	4 x 95 Sq.mm	RM	121		
g	3 x 95 Sq.mm	RM	RO		
g	4 x 70 Sq.mm	RM	1500		
h	3 x 70 Sq.mm	RM	150		
i	4 x 50 Sq.mm	RM	1100		
j	3 x 50 Sq.mm	RM	100		
k	4 x 35 Sq.mm	RM	1000		
l	3 x 35 Sq.mm	RM	RO		
m	4 x 25 Sq.mm	RM	4200		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
n	3 x 25 Sq.mm	RM	RO		
o	4 x 16 Sq.mm	RM	8250		
p	3 x 16 Sq.mm	RM	1000		
q	4 x 10 Sq.mm	RM	5000		
r	3 x 10 Sq.mm	RM	539		
s	4 x 6 Sq.mm	RM	100		
t	3 x 6 Sq.mm	RM	542		
u	4 x 4 Sq.mm	RM	100		
v	3 x 4 Sq.mm	RM	600		
w	4 x 2.5 Sq.mm	RM	100		
x	3 x 2.5 Sq.mm	RM	RO		
y	2 x 2.5 Sq.mm	RM	RO		
z	2 x 4Sq.mm	RM	RO		
E.03.2	Supply at the site of work of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen, Fire Resistant / Survival Type Cables conforming to BS 7846 and revevant Section of M&W Specifications , of the following sizes:				
	(Note: In case of any contradiction between BS 7846 and Specification, the stringent conditions of the two will apply)				
a	4 x240Sq.mm	RM	20		
b	4 x185Sq.mm	RM	30		
c	4 x 95 Sq.mm	RM	50		
d	3 x 95 Sq.mm	RM	RO		
e	3 x 70 Sq.mm	RM	100		
f	4 x 50 Sq.mm	RM	50		
g	3 x 50 Sq.mm	RM	300		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
h	4 x 25 Sq.mm	RM	150		
i	3 x 16 Sq.mm	RM	53		
j	4 x 10 Sq.mm	RM	1277		
k	3 x 10 Sq.mm	RM	100		
l	4 x 6 Sq.mm	RM	150		
m	4 x 2.5 Sq.mm	RM	RO		
n	3 x 2.5 Sq.mm	RM	RO		
o	2 x 2.5 Sq.mm	RM	440		
p	2 x 4 Sq.mm	RM	RO		
E.03.3	Supply at the site of work of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen Type Control Cables conforming to BS 6724 & relevant section of M&W Specifications, of the following sizes:				
	(Note: In case of any contradiction between BS 6724 and Specification , the stringent conditions of the two will apply)				
a	2 C x 2.5 Sq. mm Copper cable	RM	33		
b	3 C x 2.5 Sq. mm Copper cable	RM	33		
c	4 C x 2.5 Sq. mm Copper cable	RM	39		
d	5 C x 2.5 Sq. mm Copper cable	RM	39		
e	7 C x 2.5 Sq. mm Copper cable	RM	28		
f	9 C x 2.5 Sq. mm Copper cable	RM	39		
g	12 C x 2.5 Sq. mm Copper cable	RM	39		
h	16 C x 2.5 Sq. mm Copper cable	RM	39		
l	19 C x 2.5 Sq. mm Copper cable	RM	50		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.03.4	Supply at the site of work of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen, Fire Resistant / Survival Type Auxiliary / Control Cables conforming to BS 7846 and relevant Section of M&W Specifications , of the following sizes:				
	(Note: In case of any contradiction between BS 7846 and Specification , the stringent conditions of the two will apply)				
a	2 C x 2.5 Sq. mm Copper cable	RM	1320		
a	3 C x 2.5 Sq. mm Copper cable	RM	330		
b	4 C x 2.5 Sq. mm Copper cable	RM	2750		
c	5 C x 2.5 Sq. mm Copper cable	RM	1650		
d	7 C x 2.5 Sq. mm Copper cable	RM	1320		
e	9 C x 2.5 Sq. mm Copper cable	RM	165		
f	12 C x 2.5 Sq. mm Copper cable	RM	110		
g	16 C x 2.5 Sq. mm Copper cable	RM	110		
h	19 C x 2.5 Sq. mm Copper cable	RM	330		
E.03.5	Laying, testing and commissioning of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen Type and Fire Resistant / Survival Type Cables (as specified in Schedule 3.01 & 3.02) on existing trays/ walls/ columns/ indoor/ trenches with suitable clamps, saddles, hooks, bolts etc.				
a	4 x 300 Sq.mm	RM	1300		
b	4 x 240 Sq.mm	RM	220		
c	4 x 185 Sq.mm	RM	730		
d	4 x 150 Sq.mm	RM	400		
e	4 x 120 Sq.mm	RM	RO		
f	4 x 95 Sq.mm	RM	171		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
g	3 x 95 Sq.mm	RM	RO		
g	4 x 70 Sq.mm	RM	1500		
h	3 x 70 Sq.mm	RM	250		
i	4 x 50 Sq.mm	RM	1150		
j	3 x 50 Sq.mm	RM	400		
k	4 x 35 Sq.mm	RM	1000		
l	3 x 35 Sq.mm	RM	RO		
m	4 x 25 Sq.mm	RM	4350		
n	3 x 25 Sq.mm	RM	RO		
o	4 x 16 Sq.mm	RM	8250		
p	3 x 16 Sq.mm	RM	1053		
q	4 x 10 Sq.mm	RM	6277		
r	3 x 10 Sq.mm	RM	639		
s	4 x 6 Sq.mm	RM	250		
t	3 x 6 Sq.mm	RM	542		
u	4 x 4 Sq.mm	RM	100		
v	3 x 4 Sq.mm	RM	600		
w	4 x 2.5 Sq.mm	RM	100		
x	3 x 2.5 Sq.mm	RM	RO		
y	2 x 2.5 Sq.mm	RM	440		
z	2 x 4Sq.mm	RM	RO		
E.03.6	Laying, testing and commissioning of 600/1000 V grade, Copper Conductor, XLPE Insulated, armoured, Low Smoke Zero Halogen Type and Fire Resistant / Survival Type Control Cables on existing trays/walls/columns/ indoor/ trenches with suitable clamps, saddles, hooks, bolts etc.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	2 C x 2.5 sqmm	RM	1353		
b	3 C x 2.5 sqmm	RM	363		
c	4 C x 2.5 sqmm	RM	2789		
d	5 C x 2.5 sqmm	RM	1689		
e	7 C x 2.5 sqmm	RM	1348		
f	9 C x 2.5 sqmm	RM	204		
g	12 C x 2.5 sqmm	RM	149		
h	16 C x 2.5 sqmm	RM	149		
l	19 C x 2.5 sqmm	RM	380		
E.03.7	Supply and providing terminations conforming to relevant Section of M & W Specifications for XLPE insulated, LSZH and Fire Survival (as specified in Schedule 3.02) armoured / unarmoured cables of sizes given below including the cost of supplying, fixing and crimping copper lugs, double compression Flame proof brass glands, insulation tape etc. This also includes making holes in gland plate complete as per specifications and as required.				
a	4 x 300 Sq.mm	RM	134		
b	4 x 240 Sq.mm	RM	35		
c	4 x 185 Sq.mm	RM	18		
d	4 x 150 Sq.mm	RM	24		
e	4 x 120 Sq.mm	RM	1		
f	4 x 95 Sq.mm	RM	4		
g	3 x 95 Sq.mm	RM	2		
g	4 x 70 Sq.mm	RM	12		
h	3 x 70 Sq.mm	RM	4		
i	4 x 50 Sq.mm	RM	13		
j	3 x 50 Sq.mm	RM	4		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
k	4 x 35 Sq.mm	RM	4		
l	3 x 35 Sq.mm	RM	2		
m	4 x 25 Sq.mm	RM	40		
n	3 x 25 Sq.mm	RM	2		
o	4 x 16 Sq.mm	RM	134		
p	3 x 16 Sq.mm	RM	4		
q	4 x 10 Sq.mm	RM	42		
r	3 x 10 Sq.mm	RM	40		
s	4 x 6 Sq.mm	RM	4		
t	3 x 6 Sq.mm	RM	34		
u	4 x 4 Sq.mm	RM	2		
v	3 x 4 Sq.mm	RM	4		
w	4 x 2.5 Sq.mm	RM	2		
x	3 x 2.5 Sq.mm	RM	2		
y	2 x 2.5 Sq.mm	RM	26		
z	2 x 4Sq.mm	RM	2		
E.03.8	Supply and Providing terminations conforming to relevant Section of M & W Specifications for XLPE, LSZH, armoured / unarmoured cables of sizes given below including the cost of supplying, fixing and crimping copper lugs, double compression Flame proof brass glands, insulation tape etc. This also includes making holes in gland plate complete as per specifications and as required.				
a	3 C x 2.5 Sq.mm Cu. Cable	Nos	8		
b	4 C x 2.5 Sq.mm Cu. Cable	Nos	44		
c	5 C x 2.5 Sq.mm Cu. Cable	Nos	44		
d	7 C x 2.5 Sq.mm Cu. Cable	Nos	14		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate (In INR)	Total (In INR)
e	9 C x 2.5 Sq.mm Cu. Cable	Nos	8		
f	12 C x 2.5 Sq.mm Cu. Cable	Nos	8		
g	16 C x 2.5 Sq.mm Cu. Cable	Nos	8		
h	19 C x 2.5 Sq.mm Cu. Cable	Nos	12		
l	2 C x 2.5 sqmm Cu. Cable	Nos	66		
E.03.9	CABLE TRAY				
	Supply & installation of Prefabricated, perforated GI cable trays made of minimum 2mm thick GI sheets continuously connected including horizontal and vertical bends, reducers, tees, coupling plate and nut bolts washers, securing the support to the structure by dash fasteners, minor civil work, etc. duly suspended from the ceiling with 12mm dia vertical G.I rods supported by 40 mm X40 mm X5mm G.I angle etc. (or installed on wall supported on suitable brackets as required & approved) , conforming to M & W relevant Specifications Section .				
	With return flange				
a	600 mm wide x 50 mm deep	Meters	770		
b	450 mm wide x 50 mm deep	Meters	100		
c	300 mm wide x 50 mm deep	Meters	1650		
d	150mm wide x 50mm deep	Meters	2530		
e	100mm wide x 50mm deep	Meters	100		
	Without return flange				
a	600 mm wide x 50 mm deep	Meters	300		
b	450 mm wide x 50 mm deep	Meters	50		
c	300 mm wide x 50 mm deep	Meters	3630		
d	150mm wide x 50mm deep	Meters	2310		
e	100mm wide x 50mm deep	Meters	1650		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.03.10	CABLE LADDER				
	Supply & installation of prefabricated, GI, ladder type cable tray conforming to M & W Specifications , continuously connected including horizontal & vertical bends reducers, tees, coupling plate, nut bolts washers etc. The side runners shall be 100 x 20 x 2.5 mm and centre rungs shall be of size 30 x 15 x 2.5 mm with centre to centre distance of 250 mm, as required.				
a	600 mm wide	Meters	2800		
b	450 mm wide	Meters	200		
c	300 mm wide	Meters	750		
d	150 mm wide	Meters	150		
e	100 mm wide	Meters	100		
E.03.11	Supply, fabrication & installation of fabricated GI steel work conforming to M & W specification, to support GI cable trays, bus duct, light fixtures, conduit wirings , Bracket ,& other electrical works including Tunnel servicesetc, as required. This includes all the fixing accessories like fasteners and all masonry works.	Kgs	41000		
	<b>TOTAL FOR CABLES, CABLE TRAYS &amp; STEELWORK</b>				
<b>E.04</b>	<b>WIRING &amp; ACCESSARIES</b>				
	Whether explicitly stated in the schedules below or not, the following must be complied with:				
	For supply and installation of conduits, cable trunking, raceway, flexible conduits and wiring, relevant clauses of M & W Specifications must be followed				
	Wires supplied must conform to relevant clauses of M & W Specifications				
	Wiring accessories must conform to relevant Section of the M & W Specifications				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	In case of any contradiction between BOQ and M & W specifications, the most stringent condition of the two will apply.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
E.04.1	Supply, Installation, Testing and Commissioning of conducting & wiring for primary point (MCB to first point) for light / fan / exhaust fan / call bell point with 2.5 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.	Points	65		
E.04.2	Supply, Installation, Testing and Commissioning of conducting & wiring for secondary point for light / fan / exhaust fan / call bell point with 2.5 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.	Points	449		
E.04.3	Supply, Installation, Testing and Commissioning of conducting & wiring for primary point (MCB to first point) for light / fan / exhaust fan / call bell point with 2.5 sq. mm single core, copper conductor, Fire Survival Type, LSZH wires, conforming to BS 7846 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.	Points	21		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.4	Supply, Installation, Testing and Commissioning of conducting & wiring for secondary point for light / fan / exhaust fan / call bell point with 2.5 sq. mm single core, copper conductor, Fire Survival Type, LSZH wires, conforming to BS 7846 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.	Points	150		
E.04.5	Supply, Installation, Testing and Commissioning of conducting & wiring for primary point (MCB to first point) for light / fan / exhaust fan / call bell point with 4 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.(For Flood lighting)	Points	7		
E.04.6	Supply, Installation, Testing and Commissioning of conducting & wiring for secondary point for light / fan / exhaust fan / call bell point with 4 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in cable trunking /conduits/flexible conduits/raceway complete, as required, as per M & W specifications.(For Flood lighting)	Points	17		
E.04.7	Supply, Installation, Testing and Commissioning of conducting & wiring for primary point (From DB to switchboard & switch board to first point) for light / fan / exhaust fan / call bell point with 3 x 2.5 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in hot dipped galvanized welded steel conduit / flexible conduit, recessed / surface mounted complete with accessories such as bends, junction boxes, flexible conduit, pull boxes, saddles including cutting, chasing and refilling etc. complete, as required, with modular type switch, front plate, box etc. as per M & W specifications.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
a	First point controlled by 16A switch\10A MCB	Nos.	72		
E.04.8	Supply, Installation, Testing and Commissioning of wiring for primary point (From DB to switchboard & switch board to first point) for light / fan / exhaust fan / call bell point with 3 x 2.5 sq. mm single core, copper conductor, Fire Survival Type, LSZH wires, conforming to BS 7846 and Section E02 of M & W Specifications, in hot dipped galvanized welded steel conduit / flexible conduit, recessed / surface mounted complete with accessories such as bends, junction boxes, flexible conduit, pull boxes, saddles including cutting, chasing and refilling etc. complete, as required, with modular type switch, front plate, box etc. as per M & W specifications.				
a	First point controlled by 16A switch\10A MCB	Nos.	25		
E.04.9	Supply, Installation, Testing and Commissioning of conducting& wiring for secondary / loop point for light / fan / exhaust fan / call bell point with 3 x 2.5 sq. mm single core, copper conductor, LSZH wires, conforming to BS 7211 and relevant Section of M & W Specifications, in hot dipped galvanized welded steel conduit / flexible conduit, recessed / surface mounted complete with accessories such as bends, junction boxes, flexible conduit, pull boxes, saddles including cutting, chasing and refilling etc. complete, as required, with modular type switch, front plate, box etc. as per M & W specifications.	Nos.	365		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.10	Supply, Installation, Testing and Commissioning of conduiting & wiring for secondary / loop point for light / fan / exhaust fan / call bell point with 3 x 2.5 sq. mm single core, copper conductor, Fire Survival Type, LSZH wires, conforming to BS 6387 and relevant Section of M & W Specifications, in hot dipped galvanized welded steel conduit / flexible conduit, recessed / surface mounted complete with accessories such as bends, junction boxes, flexible conduit, pull boxes, saddles including cutting, chasing and refilling etc. complete, as required, with modular type switch, front plate, box etc. as per M & W specifications.	Nos.	121		
E.04.11	Supply, Installation, Testing and commissioning of wiring for Tunnel light with 3 core x 4 sq.mm, armoured, XLPE insulated, Low Smoke Zero Halogen, Fire Resistant / Survival Type Cables conforming to BS 7846 and relevant Section of M & W specifications, for tunnel lights including termination, saddles, earthing etc. complete as required.				
a	Primary Point	Nos.	60		
b	Secondary point	Nos.	470		
E.04.12	Supply and fixing of M.S. electro-galvanised box in recess / surface for power points including providing and fixing of moulded plate type, universal 6 pin, 6 / 16A shrouded socket outlet (shuttered) as specified in M & W Specifications, with 16A switch including connections, earthing and testing etc as required.	Nos	150		
E.04.13	Supplying and fixing of 3 Phase, 5 pin, 32A industrial switch, (as specified in M & W specifications), controlled socket outlet with straight plugs in IP - 65 enclosure including connections, earthing and testing etc. Complete as required	Nos	21		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.14	Supplying and fixing of 1 Phase, 3 pin, 16A industrial switch, (as specified in M & W specifications), controlled socket outlet with straight plugs in IP - 65 enclosure for tunnel & station area including termination, earthing and testing etc. Complete as required	Nos	78		
E.04.15	Supplying & fixing of 50 mm x 200 mm(w), rectangular, G.I. Cable trunking including pull boxes as required at site, 2 mm thick, as specified in relevant section of M & W Specifications, with one side having continuous hinged cover with locking arrangement, earthing arrangement including provision of earthing strips at joints etc. complete as required.	Mtr.	500		
E.04.16	Supplying & fixing of 50 mm x 50 mm(w), rectangular, G.I. Cable trunking including pull boxes as required at site, 2 mm thick, as specified in section E03 of M & W Specifications with one side having continuous hinged cover with locking arrangement, earthing arrangement including provision of earthing strips at joints etc. complete as required.	Mtr.	1000		
E.04.17	Supply and installation of following sizes of hot dipped galvanised welded steel conduit in surface / recess with GI junction boxes, pull box, saddles including cutting, chasing and refilling etc. complete as required.				
a	25mm dia conduit	Mtr.	2000		
b	32mm dia conduit	Mtr.	300		
E.04.18	Supply and installation of following sizes of GI flexible conduit in surface / recess with coupler, saddles including cutting, chasing and refilling etc. complete as required.				
a	25mm dia conduit	Mtr.	600		
b	32mm dia conduit	Mtr.	200		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.19	Supply, Laying, Installation, Testing & commissioning of wiring for Advertisement point with 3 core x 4 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable\wire as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.				
a	Primary Point	Nos.	15		
b	Secondary point	Nos.	60		
E.04.20	Supply, Laying, Installation, Testing & commissioning of wiring for single phase 3 pin 16A industrial socket outlet with 3 core x 6 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.				
a	Primary Point	Nos.	14		
b	Secondary point	Nos.	14		
4.22	Supply, Laying, Installation, Testing & commissioning of wiring for single phase 6 pin 6\16A socket outlet with 3 core x 4 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable\wire as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.				
a	Primary Point	Nos.	75		
b	Secondary point	Nos.	75		
E.04.21	Supply, Laying, Installation, Testing & commissioning of wiring for three phase, 5 pin, 32A industrial socket outlet with 4 core x 6 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.	No.	21		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.22	Supply, Laying, Installation, Testing & commissioning of wiring for single phase 3 pin 16A industrial socket outlet in Tunnel with 3 core x 6 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, including saddles, earthing etc. complete as required.(Inside tunnel)				
a	Primary Point	Nos.	25		
b	Secondary point	Nos.	25		
E.04.23	Supply, Laying, Testing & commissioning of 4 core x 4 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, for bus trunking connections including terminations, saddles, earthing etc. complete as required.	Meter	800		
E.04.24	Supply, Laying, Testing & commissioning of 2 core x 4 sq.mm, armoured, XLPE insulated, LSZH, copper conductor cable as per BS 6724 and relevant Section of M & W specifications, for bus trunking connections including terminations, saddles, earthing etc. complete as required.	Meter	50		
E.04.25	Supply, Laying, Testing & commissioning of 3 core x 2.5 sq.mm, LSZH, copper wire as per BS 7211 and relevant Section of M & W specifications, from Tap off boxes to Lighting Fixture including connections, earthing etc. complete as required.	Meter	1000		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.04.26	Supply, installation & testing of 25 A, Copper, Lighting Bus Trunking System in easy detachable and convenient assembly suitable for 415 +-10% Volts, 3 Phase+ Single Phase, 8 Wire, 50 Hz A C System with Cu Bus Conductors of minimum 2.5 sq mm section and stainless steel / hot galvanised steel enclosure, with tap off provision every 0.5 mtr. The Lighting Bus Trunking shall be confirming to latest IEC Standards. It shall be with IP-55 Protection, halogen free and Fault Level Withstand Capacity of 2.5 kA min for 0.1 Sec (Icw) and 9.6 kA (Ipk). The Bus Trunking shall be complete with accessories like supporting clamps for Installation at Site, Fixing Clamps for luminaries and cable & one run of Cu earthing of 25x3 sqmm. equal to phase etc as required.				
a	Straight Feeder 25 A (3 Mtrs Length)	Nos	280		
b	End Feed Unit	Nos	16		
c	End Covers	Nos	16		
d	Flexible Joints	Nos	5		
e	10/16 A Single Phase Tap Off Boxes with fuse and indication.	Nos	280		
	<b>TOTAL FOR WIRING &amp; ACCESSARIES</b>				
<b>E.05</b>	<b>INDOOR LIGHTING AND FANS</b>				
	The Lighting System specified herein, must conform to relevant Section of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Supply, Installation, Testing and Commissioning of the following LED Luminaires complete with LED chip, housing, heat sink and electronic driver, surface/recess mounting arrangement and all fixing accessories. All luminaries and accessories shall be as per Specification E08.				
	All wiring within the luminaries must be with Low Smoke Zero Halogen Type and / or Fire Survival Type Wires, as per requirements of section E 08 of M & W Specifications.				
E.05.1	Supply, installation, testing and commissioning of surface mounted LED Batten - 38 Watt (Similar to Philips Catalogue no. BN 108C LED 40S PSU CDL WH 919515810658 or equivalent), with a system lumen output of 4000 lumens and a minimum system efficacy of 100 lumen/watt. The luminaire shall have a CRI of greater than 80 with rated system lifetime of 50,000 hours at L70. The luminaire is made of CRCA housing and shall have diffused optics. (BOH without False Ceiling Area)	Nos.	495		
E.05.2	Supply, installation, testing and commissioning of LED 2X2 recess mounted fixture - 40 Watt that delivers 3500 nominal lumens at a system efficacy of >90 lumen/watt for a design ambient temperature of 45 deg C (Similar to Philips Catalogue no. RC380 LED35 6500 PSU – OD WH or equivalent). The luminaire shall have a CRCA powder coated body and a high efficiency diffuser. The light output shall have a CRI>80 and the luminaire shall be made available with a CCT 6500K. The electronic driver shall operate a power factor>0.9 and a THD<10%. (BOH with False Ceiling Area)	Nos.	51		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.3	Supply, installation, testing and commissioning of LED trunking system - 40 Watt , with a system lumen output of 4000 lumens and a minimum system efficacy of 100 lumen/watt (Similar to Philips Catalogue no. LL199X 1XDLED40-6500 PSE OD WH or equivalent). The luminaire shall have a extrusion housing and light emitted shall have a CRI>80 with rated system lifetime of 50,000 hours at L70. The extrusion housing shall be available in 4', 8' and 12' sections. (Platform Public Area, Entry Corridor)	Nos.	337		
E.05.4	Supply, Installation, Testing & commissioning of luminaire - 70 Watt (similar to Philips Catalogue No. BY400V LED72S CW SK PSU S2 FG WH (Greenbay) or equivalent) as per approved make of list. Fitting should have a aluminium pressure die cast housing with dedicated optics with protected LED's giving a lumen output of 7200 lumens with efficacy of more than 100 lm/W giving optimal light distribution for symmetric/asymmetrical configuration and used for height levels between 5-9 metres.A system efficacy of at least 100 lm/W with a lumen output of 7000 lumens and a CCT of 5700K with a power factor of >.90.It is designed to meet IP65 specifications ensuring L70 for 50000 burning hours with a TDH<20%.The luminaire complies with requirements of CE ,CISPR 15Ed72 , IEC 61347-2-13, IEC 61547, IEC 62384. (Concourse Double Height Area)	Nos.	22		
E.05.5	Supply installation testing and commissioning of surface mounted LED Batten with 18 watt input wattage (Similar to Philips Catalogue no.TCW450 P 1XTLED or equivalent). Luminaire should be dust, jet and shock proof luminaire . Should have Polycarbonate	Nos.	128		
	housing and cover with all the accessories mounted in a CRCA Gear Plate. It has an IP rating of IP 65. (Undercroft)				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.6	Supply, installation, testing and commissioning of LED Downlighter - 12 Watt with a system lumen output of 1000 nominal lumens at a minimum system efficacy of 95 lm/W (Similar to Philips Catalogue no. DN392B LED10S-6500PSU WH or equivalent). The luminaire shall have a CRI greater than 80 with rated system lifetime of 50,000 hours at L70. The luminaire optics shall have a high efficiency diffuser with more than 85% transmittance. Height of luminaire shall not be more than 70mm. (Toilets)	Nos.	25		
E.05.7	Supply, installation, testing and commissioning of LED Linear 1x4 recessed fixture - 42 Watt, with a system lumen output of 3000 lumens at an efficacy of >65 lm/W (Similar to Philips Catalogue no. RC869 B W30 L120 LED or equivalent). The luminaire shall have powder coated CRCA housing and light output is by means of Semi High Gloss optics with 3D Lamellae and High Purity Anodized Aluminium mirrors. (Concourse Public Area)	Nos.	154		
E.05.8	Supply, installation, testing and commissioning of surface mounted LED Bulkhead - 10 Watt with a system lumen output of 600 lumens and a system efficacy of 60 lumen/watt (Similar to Philips Catalogue no. WT 202W LED 6S PSU S1 PC or equivalent). The luminaire shall be IP66 & IK09 rated and shall have a CRI of 70. The housing of luminaire is made of high pressure die cast aluminium with front cover made of polycarbonate diffuser. (Shaft Area)	Nos.	22		
E.05.9	Recess mounted luminaire suitable for TLED 18W lamps for vertical lighting with asymmetric light distribution for indoor application, Housing made up of CRCA sheet steel, powder coated white accommodating all electrical accessories prewired upto a terminal block (Similar to Philips Catalogue no. TBS207 1xTLED 18W or equivalent). Asymmetric light distribution offers high vertical light levels for rack/shelf and suitable for single TLED in single lamp version (wall washer)	Nos.	11		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.10	Supply, installation, testing and commissioning of surface mounted LED Batten - 42 watt, with a system lumen output of 3500 lumens and a minimum system efficacy of 80 lumen/watt (Similar to Philips Cat no - WT550C LED35SCWPSU). The luminaire shall have a CRI of greater than 80 with rated system lifetime of 50,000 hours at L70. The luminaire is made of CRCA housing and shall have diffused optics. (Platform Walkway)	Nos.	33		
E.05.11	Supply, installation, testing and commissioning of Luminaire - 19 Watt consist of extruded Aluminium alloy body sealed on to an extruded polycarbonate Prismatic protector having impact resistance IK 10 with a removable sliding plate equipped with control gear on one side and lamp on the other; one or two frames made out of injection moulded polycarbonate sealed on to the ends of the Luminaire with one or two polycarbonate covers closed with 2 stainless steel screws (Similar to Schreder Cat No MY1 LED or similar). System ensures a tightness of IP 67 for the whole luminaire suitable for 8 LEDs with all mounting accessories and 2 numbers of glands (suitable for loop in and loop out). (Tunnel)	Nos.	530		
E.05.12	Supply, installation, testing and commissioning of surface mounted LED flood light - 137 Watt with a system lumen output of 14400 lumens (Similar to Philips Catalogue no. BVP410 LED 144 CW HE NB FG S3 XT or equivalent). The luminaire shall have a aluminium pressure die-cast housing and a minimum system efficacy of >100 lumen/watt. The luminaire shall have a CRI greater than 70 with rated system lifetime of 50,000 hours at L70. (Outdoor DG & Cooling Tower Area)	Nos.	10		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.13	Supply, installation, testing and commissioning of surface mounted LED flood light - 140 watt with a system lumen output of 14000 lumens (Similar to Philips Catalogue no. BVP410 LED 144 CW HE NB FG S3 XT or equivalent). The luminaire shall have a aluminium pressure die-cast housing and a minimum system efficacy of >100 lumen/watt. The luminaire shall have a CRI greater than 70 with rated system lifetime of 50,000 hours at L70.	Nos.	3		
E.05.14	LED Trunking with System Efficacy > 90 Lumens / Watt , CRI > 80 , with Lumen output of 4000 Lumens with 40 Watt , SDCM < 3.5 , with Xitanium Driver , Class 1 , Optics - Frosted Diffuser, Injection moulded Plastic Cap, Option of Symmetric, LED TRUNK;LP3.1X2;5000K, PHILIPS make LED TRUNK or equivalent		10		
E.05.15	Extruded Aluminum Housing with High Efficiency Extruded Polycarbonate Diffuser with provision of End to End connection and life class of 40 K Hours @ L70 and Efficacy of 80 Lm / Watt and wattage of 8 Watts with Voltage Range - 160 – 270 Watts , Driver Efficiency > 80 % , Power Factor > .9 , THD < 33 % , and High Cut off Protection at 270 Volts , PHILIPS make BN550 - 1 ft or equivalent	No	10		
E.05.16	Down light with LEDs of Lumileds make which have non replaceble High Wattage LED. Color temperature =5700K. Constant current electronic driver. CRI>70. High efficiency white reflector. System Wattage of luminaire=15W.Voltage range of operation= 160V to 270V. Power factor> 0.9 System efficacy = 60 lumens per watt. Completely sealed from bottom with Polycarbonate Diffuser, Cut out =165mm. 40,000 hours burning life. Zero Maintenance , Zero mercury . The outer diameter of the front frame should not be more than 180mm made from high quality engineering plastic and the overall depth of the luminaire should not exceed 75mm, PHILIPS make BBS170 1XDLED 5000 PSU WH LED or equivalent	No	10		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.17	Recessed mounted led down light luminaire with pressure die cast aluminum housing which acts as a proper heat sink to ensure a long service life. The total power consumption should not exceed 10W (including driver). The Luminaire should have an integrated electronic driver delivering constant current output. The luminaire should have a matt finished high efficiency aluminum reflector with polycarbonate diffuser . Led should have life of 40K with minimum 70% lumen maintenance. The outer diameter of the front frame should not be more than 110mm made from high quality engineering plastic and the overall depth of the luminaire should not exceed 75mm Color Temperature 5000K CRI>70. LM80-08 For LED Source & LM79-08 test report must be submitted, PHILIPS make BBS150 LED or equivalent	No	10		
E.05.18	LED Batten with System Efficacy > 90 Lumens / Watt , CRI > 80 , with Lumen output of 3800 Lumens with 40 Watt , SDCM < 3.5 , with Xitanium Driver, output of 3800 Lumens with 40 Watt , SDCM < 3.5 , with Xitanium Driver, Class 1 , Optics - Frosted Diffuser, Injection moulded Plastic Cap , Option of Class 1 , Optics - Frosted Diffuser, Injection moulded Plastic Cap , Option of Symmetric / Asymmetric in. PHILIPS make BN208C LED40/CDL L1200 (Green Perform) FR or equivalent	No	10		
E.05.19	LED 2X2 with Mid flux LED using efficient optics , System lumen efficacy > 80Lumen/Watt , System Luminous flux of 3450 lumens, System Wattage =43W . 50,000 hours burning life. . Color rendering index > 70 %. Color temperature 5000K. CRCA housing with high efficiency opal diffuser. Luminaire sealed from bottom. Inbuilt gear . Zero maintenance, Zero mercury. Offers 0.15w/sq ft /100Lux. LED efficacy>110 lumen/watt. LED binning code is 5SDCM. Lumen output >3500 from fixture level. Luminaire efficacy>80lumen/watt. Driver Surge protection available. Grey/white frame option. PHILIPS make RC365,CIRRUS;65W DRIVER or equivalent.	No	5		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.20	2 x 2 Direct Indirect LED Luminaire with Life Class of 40 K Burning Hours @ L70 ,Stepped optics with Lumens of 2900 Lumens at System level , Lumen Efficacy of 76 Lumens / Watt , CRI > 70 , with built in Electronic Driver , PF > .9 , THD < 15 % , IEC Complint for Safety Performance & EMI , CRCA Housing and High Efficiency Diffuser. PHILIPS make RC140 B (Green Square ) or equivalent	NO	30		
E.05.21	Integral LED luminaire with a pressure die cast housing with dedicated opticsfor optimal light distribution. A specially designed heat management system to ensure system luminous efficacy > 90 lm/ W and ensure lumen depreciation upto 30% over 50k burning hours. The luminaire is designed to meet IP 65 classification and is compliant with relevant immunity, safety and performance and EMI standards. System wattage of 80 Watts , Lumen – 7300 lumens , CCT – 5700 K , CRI > 70 , Pf > .9 , THD < 20 % , PHILIPS make BY400V LED70S CW SK PSU S1 FG WH or equivalent	NO	30		
E.05.22	Endura LED- Bulkhead can be installed as ceiling mounted and wall mounted. It serves as a simple energy efficient alternative to CFL/incandescent bulkhead luminaires. The luminaire is designed to meet IP 66 and IK 09 classification and is compliant with relevant immunity, safety and performance and EMI standards. System wattage of 10 Watts , Lumen – 600 lumens , CCT – cool white , CRI > 70 , Pf > .9 , THD < 20 % , PHILIPS make WT202W LED6S CW PSU S1 PC or equivalent.	NO	50		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.23	Down light with LEDs of Lumileds make which have non replaceable High Wattage LED. Color temperature =5700K. Constant current electronic driver.CRI>70. High efficiency white reflector. System Wattage of luminarie=15W.Voltage range of operation= 160V to 270V. Power factor> 0.9 System efficacy = 60 lumens per watt. Completely sealed from bottom with Polycarbonate Diffuser, Cut out =165mm. 40,000 hours burning life. Zero Maintenance , Zero mercury . The outer diameter of the front frame should not be more than 180mm made from high quality engineering plastic and the overall depth of the luminaire should not exceed 75mm, PHILIPS make DN170C LED10S-6500 PSU WH or equivalent .	NO	20		
E.05.24	EnduraalLED Waterproof can be installed as surface mounted and suspended mounted. It serves as a simple energy efficient alternative to Fluorscent waterproof luminaires. The luminaire is designed to meet IP 65 classification and is compliant with relevant immunity, safety and performance and EMI standards. System wattage of 43 Watts , Lumen – 3500 lumens , CCT – 6500K , CRI > 80 , Pf > .9 , THD < 20 % , PHILIPS make WT550C LED 35 CWPSU S1PC or equivalent.	NO	10		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.25	SITC of Suspended Linear LED75 mm wide fitting with housing made of Extruded Aluminum and anodized finish. The diffuser should be Extruded Polycarbonate and the heat sink should be made of CRCA. The luminaire should have options for standalone(8ft and 4ft) unit lengths and should also have provision for continuous mounting. LED Used shall be SMD type and fixture should have minimum efficacy at System level (Not Chip Level) $\geq 110$ lumens/watt, Life of fixture 50000hrs@L70B50 Lumen maintenance, CCT choice available in 4000K and 6500K, CRI $>80$ , SDCM $<5$ , PF $>0.95$ , THD $<10\%$ , an operating Voltage Range of 140 - 270 V, 50Hz, and should have class B serviceability . Minimum Internal Surge Protection 2.5KV. The luminaire shall have a CRCA gear tray with reflectors for mounting of driver and this should ensure lower glare ratings for the fixture. The luminaire shall have movable suspension points for ease of installation. The fixture should comply with the parameters as per IS10322 and IEC60598, EMC / EMI compliance, Minimum system Lumens 4400 for a 8ft luminaire equivalent to Philips Pure line Slim SP780	NO	100		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.26	SITC of recess Mounted Linear LED 75 mm wide fitting with housing made of Extruded Aluminum and anodized finish. The diffuser should be Extruded Polycarbonate and the heat sink should be made of CRCA. The luminaire should have options for standalone(8ft and 4ft) unit lengths and should also have provision for continuous mounting. LED Used shall be SMD type and fixture should have minimum efficacy at System level (Not Chip Level) $\geq 110$ lumens/watt, Life of fixture 50000hrs@L70B50 Lumen maintenance, CCT choice available in 4000K and 6500K, CRI $>80$ , SDCM $<5$ , PF $>0.95$ , THD $<10\%$ , an operating Voltage Range of 140 - 270 V, 50Hz, and should have class B serviceability . Minimum Internal Surge Protection 2.5KV. The luminaire shall have a CRCA gear tray with reflectors for mounting of driver and this should ensure lower glare ratings for the fixture. The fixture should comply with the parameters as per IS10322 and IEC60598, EMC / EMI compliance, Minimum system Lumens 4400 for a 8ft luminaire equivalent to Philips Pure line Slim RC780	NO	10		
E.05.27	SITC of LED indirect output light to ensure soft and uniform light for visual comfort. The LED light source should not be directly visible to avoid any kind of glare to users. The luminaire shall have a UGR $<22$ when installed at a general height of 10ft from the ground. The Luminaire shall be available in CCT of 6500K with a CRI $>80$ and SDCM of 4. THD $<10\%$ PF $>0.9$ Lifetime of atleast 50000 burning hours at L70B50 at an ambient temperature of 25 degreeC for reliable performance. There should be no flicker in the operation of the light. The luminare shall have a lumen output of atleast 3600lumens with a system efficacy of 100lm/W. Should have an option of DALI dimming. it should have a Class B serviceability. LM79 and LM80 reports of the fixture to support the technical requirement equivalent to Philips Coreview RC420B	NO	50		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.28	SITC of LED light with semi high gloss optics with 3D lamella D8 office compliant fixture . The Luminaire shall be available in CCT of 6500K with a CRI>80 and SDCM of 4. THD<10% PF>0.9 Lifetime of atleast 50000 burning hours at L70B50 at an ambient temperature of 25 degreeC for reliable performance. There should be no flicker in the operation of the light. The luminaire shall have a lumen output of atleast 2800lumens with a system efficacy of 65lm/W. Powder coated CRCA housing high pure anodized reflective mirrors. Should have an option of DALI dimming. it should have a Class B servability. LM79 and LM80 reports of the fixture to support the technical requirement equivalent to Philips Sereno RC869	NO	50		
E.05.29	SITC of High Pressure Die Cast Aluminium Alloy housing LED High Bay Luminaire with specially designed heat sinks dust free. for high ceiling heights having beam Angle 60 deg / 110Degree,PMMA material Lens Lenses for effective light distribution, minimum Luminous flux (Lumen)16500 with a system 120lm/W .Correlated Color Temp 6500K,CRI>80,Maintenance of lumen L70 (Hrs) 50K@L70,Ambient temperature (Ta) 45Degree,optics narrow or widebeam optics, optical cover glass. Aluminium PDC Housing. Protection of Fixture:- IP65,IK08,Class I, power factor >0.95, Surge protection 4KV,Voltage range 120-277V AC, Lumen standard /Test certificate as per IEC 60598 and IS10322. LM 79 and LM80 reports needs to be submitted from a NABL/UL Approved Laboratory. The luminaire should be DALI Dimmable. Driver should be as per BIS approved. Spare driver should be easily replaceable at the site. Similar to Philips Maxored BY415	NO	10		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.30	SITC of LED Flood light fixture with high power LEDs , IP66 and IK05 protection made of single LM6 high pressure die cast aluminum housing capable of delivering a nominal system lumen output in the range of 14000- 22000 lumens at a minimum system efficacy of 105lumen/watt and a CRI at least 70. The luminaire shall have options of rotationally symmetrical beam as well as a narrow and asymmetric beam with the help of secondary lenses on the LED light source. The lens plate should not be glued to the body of the luminaire but should be screwed. The fitting shall have a defined system of heat dissipation with the help of vertical fins to abstain from accumulation of dust/dirt on the luminaire. It should have a universal bracket and a graduation disk for aiming to ensure proper installation. The luminaire shall have a life class of 50,000 hours @ L70 for a design ambient of 35 Deg. C and driver efficiency of >85%. THD < 20% and minimum power factor of 0.9 at full load. The luminaire shall be Class I protection enabled. The overall height of the luminaire shall not be more than 165mm. LM-79/LM-80 report should be supplied for LED luminaire/LED chip. luminaire should comply with IS10322 and IEC60598 similar to Philips BVP410	NO	10		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.31	SITC of interior rated cove lighting fixtures with beam options of washing as well as grazing applications. The luminaire to have an asymmetric wash for better uniformity with a uniformity ratio of less than 3:1 on a 3 m (9 ft) wall with an 0.5 m (1.5 ft) setback. The fixture should be available in standard sizes of 1/4ft with system lumen output of 880lm/ft at a CCT of 4000K and CRI of 81 and a system lumen efficacy of atleast 76lm/W. Lifetime of atleast 50000 burning hours at L70 at 25degC. The luminaire shall have a powerfactor of 0.99 at 120V supply. The luminaire shall be dimmable by the available ELV type dimmers. The width of the fixture to be not more than 41mm for ease of installation. UL / cUL, FCC Class B, CE, C-Tick, CCC certified. IP20 rated fixture for indoor use. Operating temperature range of minus 40 to 50degC and humidity of 0-95%. Die cast aluminium housing with polycarbonate lens. Operating voltage range of 100-277V AC equivalent to Philips Evenbalance	NO	10		
E.05.32	SITC of LED lights with textile to create a white light ceiling surface for daylight experience that hides the source of light completely. Dimension of one panel luminaire dimension should not be greater than 2.7x1.8mt with the smallest dimension being 0.9x0.9mt with a depth of 155mm. Depth is considered with e-box. The weight of the luminaire should be greater than 42kg. The light output should be at least 3200lm/sq mt. The CCT should be 3000k or 4000k. The CRI of the luminaire should be not less than 85. The luminaire should have life of 50k hrs for L70. The luminaire should have acoustics properties of $\alpha_w$ 0.6 class C EN 11654, also the noise reduction coefficient of NRC 0.6 ASTM C423 – 99. The luminaire driver should be compatible for DALI or 0-10V. The luminaire should be compatible for ambient temp of 5 to 35 °C. Approbated for fire rating of fabric by (EN 13501) B-s1, d0 and panel at (EN 13501) B-s2, d0. CE certified luminaire. Similar to Philips One Space PreFab.	NO	10		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.33	SITC of wall or ceiling mounted textile panels with high quality industrial fabric of Class B-s2,d0 (EN 13501-2 Euroclass) fire rating with multi-colored LED with the ability to display dynamic content remotely controlled and managed. Maximum size of panel possible 6.4x1.2mt. Possibility of wall(surface/recessed) or ceiling mounting ( surface,recess or suspended).Solution to have customised dimensions as per site requirement .The fixture shall have thickness of not more than 127mm, including mounting elements. It should be available in different sizes to suit the applications. Suitable for indoor use, IP20rated. Maximum weight is 19.3kg/m2.The panel shall have a power consumption of not more than 55W/sqmt and luminance of upto 170Cd/sqmt for specific textiles. Pixel pitch of 60mm with RGB LEDs with an integrated playback controller. Should be compatible with content manager software for programming and content source to be .wmv files. It should be controllable through all of the below mentioned features- DiscoverME LTP mobile applications/Remote control/Integrated scheduler/ access through any computer connected to the luminous textile panel network. There should not be any limit to the number of panels connected in a system. It should have a sound absorption coefficient of 0.45. Main power connection with IEC connectors, RJ45 Ethernet connector for Data. Operating voltage range of 100-240VAC, operating frequency range of 50-60Hz and operating temperature range of 5-35degC. Lifetime to be atleast 60000 hours at L70 at an ambient temp of 25 degC. Class B-s2,d0 (EN 13501-2 Euroclass)rated for fire safety. EN13501-2 rated. CE/UL/CCC/ GOST-R approved. Similar to Philips Luminous Textile	NO	10		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.05.34	LED Step-Light BWG150, Low-power white-light LED light source, available in a choice of warm white (3000 K) or neutral white (4000 K), Long lifetime of 25,000 hours (70% lumen maintenance @ Tc = 25°C), IP67 protection PHILIPS make BWG150 LED50/WW PSU 2 or equivalent.	NO	10		
<b>E.06</b>	<b>Temporary Lighting at Station</b>				
E.06.1	Installation & Commissioning of 40Watt tube lights with cover 350 No. approx. along with the necessary wiring & power supply arrangement to provide general lighting at concourse, Platform ,Undercroft and Tunnel area during construction period.	per tube light for 240 days	200		
E.06.2	Cost (Addition/deletion) of Installation and Commissioning of 40 watt tube lights with cover 10No/day approx. along with the necessary wiring and power supply arrangement , to provide general lighting at concourse, Platform, Undercroft& Tunnel area during construction period.	L/s	1		
<b>E.07</b>	<b>External Station Lighting</b>				
E.07.1	9.0 meter hot dipped galvanised Octagonal with single overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	No.	10		
E.07.2	9.0 meter hot dipped galvanised Octagonal with double overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	No.	10		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.07.3	7.0 meter hot dipped galvanised Octagonal with single overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	NO	10		
E.07.4	7.0 meter hot dipped galvanised Octagonal with double overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	NO	10		
E.07.5	Supply, installation, testing and commissioning of LED Street light fixture - 70 watt with IP66 protected LM6 high pressure aluminium die cast housing capable of delivering a nominal system lumen output of 7200 lumens with a minimum system efficacy of 85 lumen/watt and a CRI greater than 70. The luminaire shall have a life class of 50,000 hours @ L70 and driver efficiency of >85%.(Similar to Philips Cat. No. BRP410 LED CW 072 MR FG S1 PSU or equivalent)	NO	20		
E.07.6	Supply of 75mm dia HDPE pipe confirming to PN-4 boring of road channel area by using open trench method and laying of HDPE pipe properly continuously jointed restoring the surface where pitting is done ,to original position.	mtr	100		
E.07.7	Supply of 75mm dia HDPE pipe confirming to PN-4 boring of road channel area by using trench less method and laying of HDPE pipe properly continuously jointed restoring the surface where pitting is done ,to original position.	mtr	100		
E.07.8	Supply and laying of 6 SWG wire along with the cable	mtr	300		
E.07.9	Providing and fixing thermo plastic poly carbonate pole boxex confirming to IP-65 degree of protection, along with 16A MCB and 5 way connector and 2 No. cable gland suitable for 4x25 sq.mm cable.	no	50		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.07.10	wiring for luminaries in existing poles with following sizes of unarmoured cu cables from pole box to each fittings.				
a	3x2.5 sq mm	Meters	1000		
	<b>TOTAL FOR INDOOR LIGHTING AND FANS</b>				
<b>E.08</b>	<b>PROTECTIVE, CLEAN EARTH AND LIGHTING PROTECTION SYSTEM</b>				
	The Earthing and Lightning Protection System specified herein, must conform to relevant Section of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
E.08.1	Earthmat	Sets	2		
a	Supply, laying, testing and commissioning of 20 mm dia Cu rod for earth mat (at 500mm or deeper as per the final approved design as per the site condition) as per specifications including lap (of not less than 150mm) & cross braced joints and providing bitumin coat at every joint as required. Risers from earth mat to be brought out as per approved drawings and specifications. (Cost of risers not included in this item).				
b	Supply, laying, testing and commissioning of 16 mm dia Cu rod, laying of vertical earth electrodes 3 m deep from earth mat including braced joints with earth mat as per approved drawings and specifications. The weld joints to be provided with bitumin coats.				
c	Supply, laying, testing and commissioning of 240 sqmm Cu flexible conductor, for each electrode up to 1.5 mtr above the undercroft finished floor level				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
d	50 mm dia HDPE pipe for mechanical protection of flexible riser				
e	Copper U clamp for fixing the rod/riser at a certain interval as specified the employer requirement.				
E.08.2	Clean Earthmat	Sets	1		
a	Supply, laying, testing and commissioning of 13 mm dia Cu rod for earth mat (at 500mm or deeper as per the final approved design as per the site condition) as per specifications including lap (of not less than 150mm) & cross braced joints and providing bitumin coat at every joint as required. Risers from earth mat to be brought out as per approved drawings and specifications. (Cost of risers not included in this item).				
b	Supply, laying, testing and commissioning of 13 mm dia Cu rod, laying of vertical earth electrodes 3 m deep from earth mat including braced joints with earth mat as per approved drawings and specifications. The weld joints to be provided with bitumin coats.				
c	Supply, laying, testing and commissioning of 185 sqmm Cu flexible conductor, for each electrode up to 1.5 mtr above the undercroft finished floor level				
	Supply and laying, Testing and commissioning of copper/wire for interconnecting the earthing stations, panels, DBs etc. of the following sizes in built up trenches /surface/wall/ground complete with holes & fixing, jointing / terminating accessories as per specifications & drawing as required. (Quantity shall be paid as per the actual measurement as executed, however direct measurement shall not exceed the quantity indicated in drawing approved .				
d	50 mm x 6 mm Cu strip	Meters	2500		
e	50 mm x 4 mm Cu strip	Meters	1500		
f	25mm x 3 mm Cu strip	Meters	4000		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Supply of GI strips / rods / wires (minimum 97% conductivity) of the following sizes for provision in Earthing System.				
g	75 mm x 10 mm GI strip	Meters	200		
h	50 mm x 10 mm GI strip	Meters	200		
i	50 mm x 6 mm GI strip	Meters	1500		
j	32 mm x 5 mm GI strip	Meters	100		
k	25 mm x 6 mm GI strip	Meters	1000		
l	8 SWG / 4 mm diameter, copper Wire	Meters	500		
	Supply, laying and testing of unarmoured, stranded copper conductor, Low Smoke Zero Halogen, green coloured cables of following sizes, conforming to BS 7211, for earthing, including termination of the same by copper lugs at both ends.				
m	1 x 6 sq. mm	Meters	100		
n	1 x 10 sq. mm	Meters	100		
o	1 x 16 sq. mm	Meters	100		
p	1 x 70 sq. mm	Meters	500		
q	1 x 150 sq. mm		100		
E.08.3	Supply and making of G.I Main earth connection / terminal of size 75 mm x 10 mm, 600 mm mounted on 2 Nos. SMC / DMC insulator for connection with Principal earth Terminal / Connection including copper nut-bolts, washers etc. complete as per M & W specifications and drawings for protective earthing.	Nos.	40		
E.08.4	Supply and making of G.I Main earth connection / terminal of size 32 mm x 5 mm, 300 mm mounted on 2 Nos. SMC / DMC insulator for connection with Principal earth Terminal / connection including G.I nuts-bolts, washers etc complete as per drawings for clean earthing.	Nos.	10		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.08.9	Supplying & making of test joints with the following sizes of G.I Strip with bimetallic test link of length 125 mm ,4 nos. bolts, nuts and washers of brass, DMC support, as required, and as per M & W specifications and drawings etc.				
a	75 mm x 10 mm G.I strip	Nos.	12		
b	50 mm x 6 mm G.I strip	Nos.	6		
E.08.10	Providing and making plate earthing station with 600 x 600 x 6 mm copper plate earth electrode, 50 mm dia GI watering pipe, reducer & CI funnel with wire mesh, 150 mm coke / charcoal and salt around plate earth, all earth work, masonry enclosure with frame & cast iron hinged cover plate as per IS 3043.	Nos.	6		
	<b>TOTAL FOR PROTECTIVE, CLEAN EARTH AND LIGHTING PROTECTION SYSTEM</b>				
<b>E.09</b>	<b>UPS</b>				
	Supply, Installation, Testing and Commissioning of 2 x 80KVA, True Online Double Conversion, Parallel Redundant, 3 Phase AC Input & 3 Phase AC Output, UPS System having an Ingress protection Rating of IP 33 consisting of the following:	Sets	2		
	One Nos of 80kVA, 415V UPS.				
	Galvanic Isolation Transformer at Inverter output with Delta Connection of primary to separate input and Output neutral.				
	IGBT Rectifier Modules to achieve less than 5% Input Current Distortion and greater than 0.9 Power Factor at Input				
	Completely Microprocessor based with Diagnostics capability				
	Input phase Reversal Correction without switching to batteries				
	Maintenance by-pass module.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Two sets of SMF VRLA battery each having 30 minutes back up time at full load with interconnecting cables, racks and standard accessories (2V Cells with 20 Years Design life).				
	Isolation switches / MCCB for UPS as per Drawings & Specification and MCCB box with 2 pole DC MCCB of suitable rating for battery bank.				
	<b>TOTAL FOR UPS</b>				
<b>E.10</b>	<b>Diesel Generator Sets</b>				
	Design, Manufacture & Supply of DG set (Radiator cooled - cooling system designed for 50°C ambient) of following aggregate capacity / rating, comprising of Diesel Engines coupled to Alternator both mounted on common base frame suitable for 3-phase, 415 volts, 50 Hz, 1500 RPM, Standby Power rated output with other standard accessories i.e. Fuel tank (990 Litres) with necessary medium class M.S. fuel piping (25mm size) with necessary fittings from DG set to Fuel Tank, automotive Batteries with leads as per manufacturer recommendations.				
	DG sets shall be suitable for auto starting & auto synchronising with auto load sharing and remote monitoring & control arrangement compatible with the existing electrical system as per particular specifications, complete as required.				
	Suitable number of silencers per DG set along with the insulation / aluminium cladding for sound attenuation as per specifications.				
	Supply of rubber mat in front and back of DG Control Panel (/ AMF panel)/ Isolation panel as per latest standards (IS:15652:2006) amended upto date.				
	Detailed, Maintenance & Operation manuals, to be supplied after 3 months of Date of vendor approval of DG sets complete as per the specifications.				
	2000 KVA (comprising of 2 DG sets of minimum 1000 kVA capacity each).	Sets	1		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
E.10.1	INSTALLATION of DG sets				
	Installation/Erection, Testing & Commissioning including Integrated Testing with all systems for the DG sets along with all accessories for the following Capacity DG sets complete as per specifications as required.				
	2000 KVA (comprising of 2 DG sets of minimum 1000 kVA capacity each).	Sets	1		
E.10.11	Exhaust System				
	Supply, installation of following sizes of MS Piping for Exhaust system as per IS: 3589 and 1239 (part - I) including providing suitable bends, reducers etc.				
	350mm (NB) MS ERW pipe 4.85 mm	RM	80		
	250mm (NB) MS ERW pipe 4.85 mm	RM	20		
	The rate for the MS exhaust pipe should be inclusive of supply & fixing of SS expansion joints (Bellows) according to size of horizontal / vertical exhaust pipes of DG sets as required at site. It shall not be payable separately.				
	Measurement for MS Exhaust piping will be taken excluding the length of Expansion Joints (SS bellows) and silencer.				
	Supply, installation, testing and commissioning of 75 mm thick Rockwool LRB mattress insulation (of 150 Kg/m <sup>3</sup> density) over the exhaust pipes of following diameter including cladding with aluminium sheet of 24 SWG and covering from outside complete as required suitable for DG exhaust pipe temp. upto 450°C etc.				
	350mm (NB)	RM	80		
	250mm (NB)	RM	16		
	Supply & Fixing of miscellaneous structural support for horizontal / vertical exhaust piping including fabrication, hardwares and painting as per requirement.	KG	15000		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Portable Oil Filling pump- Electrical Type necessary to deliver the oil upto height of 10 mtrs.	No	2		
	Providing & fixing of pre- fabricated 22SWG GI sheet ducting (120 gsm galvanisation) for hot air discharge /supply air intake complete including supports, bends, flanges etc. as required.	sqm	50		
	<b>EARTHING</b>				
E.10.12	Providing Earth pits with 600 X 600 X 6.3 mm GI plate electrode complete as per IS: 3043. (For Body Earthing).	No	12		
	Providing Earth pits with 600 X 600 X 3 mm Copper plate electrode complete as per IS: 3043. (For Neutral Earthing).	No	12		
	Supply, laying, testing and commissioning of Copper / GI strips for interconnecting the earthing station, panels, DG set etc. of following sizes in trench/surface/wall/ground complete with holes and fixing, jointing/termination accessories with holes and fixing, jointing/termination accessories .				
	50 mm x 5 mm GI strip (For Body Earthing).	RM	80		
	50 mm x 5 mm Copper strip (For Neutral Earthing).	RM	36		
	<b>Civil works</b>				
E.10.13	Civil work for cable trench / hume pipes from DG Sets to existing cable trench and making the same in good condition at station.	Job	1		
	Civil foundation for 1010 KVA DG set (only PCC raft of 300 mm) for the existing site condition.	Cum	20		
	Provision of making cable trenches, cut outs, finishing works etc as per the works required for the DG sets Installation	Cum	20		

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Supplying and laying of GI pipes of 150 mm Nominal Bore 4.85 mm thick as per IS 1239 to accommodate all cables, earthing strips and fuel pipe lines as utility to DG set.	M	10		
	<b>ACOUSTIC TREATMENT FOR DG ROOM</b>				
E.10.14	Providing and fixing Acoustic Treatment lining on walls and ceiling of DG room by means of Mineral rock wool slab of minimum density 64 Kgs/m <sup>3</sup> , confirming to IS 8183 and with minimum thickness of 75mm covered by fire resistant fibre tissue confirming to AWWA C – 203, specifications and with inside cover of 0.6 mm thick perforated Aluminium sheet, complete as required. The Rock wool shall be laid on a 600 X 600 mm grid, 50 mm GI channel frame work fixed to walls and ceiling.	Sqmtr	750		
	Acoustically Lined Louvers as per above material specifications				
	Providing and fixing Acoustic Doors for DG room comprising of ISMC 100 frame, cladded on both side of 0.5 mm thick MS sheets with cavity fill of required thickness (minimum 75 mm thickness) of resin bonded 64 kg/m <sup>3</sup> density glass wool to achieve noise levels, as specified in the specifications including Nitrile rubber / Neoprene rubber gasket between MS sheet cladding and frame, heavy Duty Hardware / Locking mechanism complete as required.				
	Note:- 1. Payment will be based on per Sqmtr size of the Door.				
	2. Sliding Door with Self lubricating sliding mechanism (Roller ball Bearing) in MS channels in floor to be proposed only after suitable consideration to noise criteria.				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Supply, Installation, Testing and commissioning of Intake / Exhaust Fans complete, as required of suitable sizes for ventilation of Air requirements of DG Sets of following sizes (Calculations to prove adequacy of the rating of the selected Fans must be submitted). The system should be designed to provide suitable ventilation for efficient air circulation, to ensure that the temperature rise in the DG room with respect to the ambient is less than 5°C. There should be specially designed circuitry to ensure that the fan(s) starts when the Genset is in operation and when the Genset has been switched off the fan(s) automatically switch over to main supply and run for 5 – 15 minutes (programmable) before stopping to ensure that set is ready to start in case of another failure.				
	2x1000 KVA	Job	1		
	Note:-				
	Drawing for the acoustic treatment of room to be submitted for approval of Engineer - in - charge before procuring the material for Acoustic treatment.				
	Providing noise barrier of suitable inclination and projected length, for installation around DG set installation in the Ancillary building, fabricated out of 2 mm thick polycarbonate sheet with minimum surface density of 10 kg/Sqm. to ensure adequate transmission loss of sound to achieve noise control as per CPCB norms for public area, including saturation of Installation, complete as per required as per specifications				
	Operation & Maintenance Training for the Staff complete as per the M&W specifications.				
	<b>OPERATION &amp; MAINTENANCE OF DG SET BEFORE REVENUE OPERATION DATE.</b>				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Providing of maintenance and operating services for different "aggregate capacities" of DG sets installed at a station as specified below. (before the Revenue Operation of the Corridor / DG set is taken over by Client/employer).				
	2000 KVA (comprising of 2 DG sets of minimum 1000 kVA capacity each).	Days	90		
	Note:-				
	1. The above items includes the cost of providing skilled DG set operator, all Consumables ( like battery water, Lubricating Oil, Coolant, etc) except Diesel. (Diesel as per requirement shall be supplied by Client/employer).				
	2. Based on the hours of operation, the firm will be responsible for complying with the requirements of timely maintenance as per the recommendations of Engine Manufacturer.				
	3. The operation of DG set will not affect the warranty conditions of the DG sets supplied in this tender. The warranty clause will be applied from the date of Taking over of DG set by Client/employer/Employer.				
	4. Permission for Operating the DG set and period of its operation will be specifically approved by Engineer- In- Charge.				
	<b>COMPREHENSIVE MAINTENANCE OF DG SET AFTER DEFECT LIABILITY PERIOD.</b>				
	Providing of Comprehensive maintenance services (Inclusive of all preventive maintenance spares and consumables, site visits, attending to breakdown calls etc. but excluding cost of breakdown spares) for "3- years" After Defect Liability period for different capacities of DG sets for the capacities of DG sets as specified below.				
	2000 KVA (comprising of 2 DG sets of minimum 1000 kVA capacity each).	Sets	1		
	Note:-				

PART – A – ELECTRICAL WORKS FOR SWARGATE STATION					
S.N.	Description	Units	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	1. In the above item, Rates quoted by the Firm should be for each DG set for 3-years maintenance.				
	2. The above item includes cost of providing skilled service personal for the maintenance, Tools and Plant etc. for preventive maintenance. (Diesel is are not to be included in the rates.)				
	3. Breakdown maintenance staff, Tools, and equipment etc. for carrying out the maintenance to the Employers satisfaction.				
	4. Contractor will be required to maintain a fully equipped" 24 - hour Complaint Centre" in Pune and after receiving the Complaint the site should be attended by the maintenance staff within one hour.				
	<b>TOTAL FOR DIESEL GENERATOR SETS</b>	Sets	1		

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>F.11</b>	<b>PUMPS FOR FIRE PROTECTION SYSTEM</b>				
	<b>Note:</b>				
i)	Whether explicitly specified or not, the Pumps for Fire Protection System specified herein, must conform to respective Sections of the M & W Specifications, in addition to the description given in respective items of BOQ. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
ii)	The motor HP to be confirmed by the supplier for the duty mentioned for each pump.				
iii)	Rates quoted shall be inclusive of all structural supports, clamps etc. as per approved design/specifications.				
(iv)	All Main Fire Pumps shall be capable of delivering 150% of the rated flow at a head not less than 65% of the rated head. Also the shut-off head shall not exceed 120% of the rated head.				
(v)	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
11.1	Providing and fixing horizontal Fire Pumping Set with CI body, Bronze Impeller, Stainless Steel Shaft and connected by a flexible coupling to a totally enclosed, fan cooled induction motor, mounted on common structural base plate with all pump accessories complete as per Specifications including mechanical seal & neoprene lined vibration eliminators. Motors shall be suitable for 415 volts, 3 phase, 50 cycles, A/C supply as per Section E12 of M & W Specifications.				
a)	MAIN FIRE PUMPS FOR COMBINED SYSTEM.				
	Horizontal Split Casing				
	Capacity - 3785 LPM				

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	Head - 112 M				
	HP - To suit power requirements for flow at 150% of the duty point				
	RPM - 1450/2950	Nos	2		
c)	JOCKEY PUMP (FOR COMBINED SYSTEM)				
	Capacity - 180 LPM				
	Head - 112 M				
	HP - As required	Nos	1		
	<b>TOTAL OF PUMPS FOR FIRE PROTECTION SYSTEM</b>				
<b>F.12</b>	<b>PIPE WORK FOR FIRE SYSTEM</b>				
	The Pipe Work specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
F.12.1	Providing and fixing of heavy duty Galvanised Steel Pipe (conforming to Specifications) with all fittings viz. flanges, bends, tees, elbows, reducers, as specified, including cutting, welding / making threaded joint and fixing to floor / wall with approved structural supports such as clamps, hangers etc. This further includes (1) Cutting holes / chases in brick or RCC walls / slabs and making good the same (2) Painting with two or more coats of synthetic enamel paint of approved shade as per pipe colour code over two coats of primer (3) Painting of legends with direction arrows complete as per specifications.				
F.12.1.1	25mm	RM	100		

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.12.1.2	32mm	RM	160		
F.12.1.3	40 mm	RM			
F.12.1.4	50mm	RM	130		
F.12.1.5	65mm	RM	10		
F.12.1.6	80mm	RM	625		
F.12.1.7	100mm	RM	290		
F.12.1.8	150mm	RM	3200		
F.12.1.9	200mm	RM	45		
F.12.1.10	250 mm	RM	1		
F.12.2	Providing and fixing Heavy Duty galvanised steel pipes, embeded in earth shall be conforming to Specifications with all fittings like couplings, bends, elbows, tees, flanges, CAF gaskets etc., including welding as required. This also includes necessary excavation in all kinds of soil (including hard rock) up to the required depth and providing 150 mm thick sand layer all around the pipes, refilling, ramming, removal and disposal of surplus earth complete in all respects as per the specifications. This further includes provision of corrosion protection by wrapping two layers of 400 microne thick polythene sheet over two coats of bitumen.				
F.12.2.1	80mm	RM	35		
F.12.2.2	100mm	RM	1		
F.12.2.3	150mm	RM	10		
F.12.2.4	200mm	RM	1		
	<b>TOTAL OF PIPE WORK FOR FIRE SYSTEM</b>				
<b>F.13</b>	<b>PIPING ANCILLARIES FOR FIRE SYSTEMS</b>				

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	The piping ancillaries specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
F.13.1	Providing and fixing Butterfly Valves of the following sizes (conforming to BS: 5155 and Specifications), suitable for pressure rating of 16 Kg / Sq. cm, with gaskets, flanges, nuts, bolts and washers including painting complete as required.				
F.13.1.1	65mm dia.	Each	2		
F.13.1.2	80mm dia.	Each	30		
F.13.1.3	100mm dia	Each	4		
F.13.1.4	150mm dia	Each	20		
F.13.1.5	200mm dia	Each	6		
F.13.2	Providing and fixing Wafer type Double Plate Check Valves of the following sizes (conforming to API-594 and Specifications), suitable for pressure rating of 16 Kg / Sq. cm with cast iron body conforming to BS 1452, including gasket, flanges, nuts, bolts and washers including painting complete as per M & W Specifications.				
F.13.2.1	65mm	Each	2		
F.13.2.2	100mm	Each	2		
F.13.2.3	150mm	Each	5		

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.13.3	Providing and fixing Cast Iron Double Flanged 'Y' type Strainers of the following sizes with nuts, bolts, gaskets etc. complete in all respect as described in Specifications.				
F.13.3.1	200 mm dia	Each	4		
F.13.3.2	80 mm dia	Each	2		
F.13.4	Providing and fixing Gate Valves of the following sizes (conforming to BS: 5154 and Specifications) having Bronze body conforming to BS 1400 with screwed ends suitable for pressure rating of 16 bars.				
F.13.4.1	25mm dia	Each	5		
F.13.4.2	32mm dia	Each	7		
F.13.4.3	40 mm dia	Each	1		
F.13.5	Providing and fixing Gun metal Air Release Valve as per Specifications.	Each	1		
F.13.6	Providing and fixing 150 mm diameter, Bourden type, Brass, Dial type Pressure Gauge calibrated for 0 - 15 kg / Sq. mm range with brass isolation valve complete as per Specifications.	Each	10		
F.13.7	Providing and fixing 80 mm dia Pressure Relieving Valve and Gate Valve to be fixed on Hydrants Pump Delivery Line with by pass connection to pump suction line.	Each	2		
F.13.8	Supply and installation of stainless steel Expansion Bellow				
F.13.8.1	200 mm dia	Each	4		
F.13.8.2	150 mm dia	Each	4		
F.13.8.3	80 mm dia	Each	2		
F.13.8.4	65 mm dia	Each	2		
F.13.9	Supply and installation of Orifice Plate 80mm OD(Brass)	Each	26		
	<b>TOTAL OF PIPING ANCILLARIES FOR FIRE SYSTEMS</b>				

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
<b>F.14</b>	<b>FIRE HYDRANT SYSTEM</b>				
	The Fire Hydrant System specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
F.14.1	Providing and fixing Vertical Air Vessel of size 450 mm diameter and 1.50 m high, fabricated out of 6 mm thick M.S. plate having dish ends of 8 mm thick MS plate, complete with pressure switches (for every individual pump to operate at drop of pre - set pressure).This includes Bronze Air Release Valve, GM Gate Valves, pressure gauge, safety valve, drain valve etc. complete in all respects. Air Vessel must be painted with two coats of synthetic enamel paint of approved shade over one coat of primer,	Nos.	2		
F.14.2	Providing and fixing following types of Fire Hydrant Valves conforming to IS : 5290 and Specifications having female instantaneous type connection with matching flange, gaskets, nuts and bolts complete in all respects.				
F.14.2.1	Single headed	Each	28		
F.14.2.2	Double headed	Each	30		
F.14.3	Providing and fixing 63 mm diameter, 15 metre long, synthetic non percolating hose (conforming to IS 636/88 type-B with UL listed and Specifications) having Stainless steel male and female Instantaneous type coupling, machine wound with copper wire complete in all respects.	Each	176		
F.14.4	Providing and fixing of standard size Stainless steel 63 mm diameter short branch pipe with nozzle, conforming to IS 903 and Specifications	Each	31		

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.14.5	Providing and fixing Fire Man Axe conforming to IS : 926 : 1985 with Clamps.	Each	4		
F.14.6	Providing and fixing Wall mounted Swinging type First - Aid Fire Hose Reel conforming to (IS 12585 : 1988 & IS : 884 : 1985 for drum) and as per Specifications having 20 mm diameter and 30 M length. The Hose Reel must be non kinking type made up of Thermo Plastic Synthetic, must be suitable for with - standing a bursting pressure of not less than 27 bars and must include Brass Jet & Spray type Nozzle having Shut - Off valve complete in all respect.	Each	24		
F.14.7	Providing and fixing Fire Hose Cabinet made up of fully welded construction of size 750 x 600 x 250 mm, fabricated from 14 SWG GI sheet, having hinged double front door with locking arrangements and partially glazed with 5 mm thick glass. Cabinet must have Stove enamelled Fire Red finish with "FIRE HOSE" written on front and must be suitable for housing 2 Nos. 15m long synthetic Hose with couplings, 1 No. Branch Pipe, Fire Man Axe complete as specified in drawing.	Each	7		

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.14.8	Providing and fixing of Fire Hose Cabinet Shutter made up of MS 50 x 50 x 2 mm tubular steel section ( shutter framing ), rebated section framing of 2 mm thick MS sheet for fixing of shutter framing and fully welded construction of Hose Cabinet Size of 1200 x 2100 mm approximately, having hinged double front door with locking arrangements and partially glazed with 5 mm thick glass. Glass shall be fixed by MS beading screwed to shutter frame. Cabinet Shutter and steel parts must be powder coated to Fire Red finish with "FIRE HOSE" painted on glazing ( for internal Hydrants). The width & height of the cabinet shall depend upon the actual size of the fire niche available. Contractor shall make shop drawings and get these approved before fabrication. Shutter and frame shall have provision for fixing of Magnetic Contact.	Each	15		
F.14.8a	Providing and fixing of Fire Hose Cabinet Shutter as per description at 14.8 (above) but of Stainless steel SS-304 construction (only for FHCs in public areas)	Each	9		
F.14.9	Providing and fixing Stainless steel, four way, Collecting Head conforming to IS 904 with 63 mm diameter Instantaneous type Inlet with built - in Check Valve for Fire Brigade connection to fire water.	Each	1		
F.14.1	Providing and fixing Four way, Stainless steel Collecting Head conforming to IS 904 : 1983 for Fire Brigade connection to Sprinkler and Hydrant Mains with hood Butterfly Valve and 100 mm diameter C.I. Double flanged Non - return Valve including nuts, bolts, gaskets etc. complete in all respect.	Each	2		
14.11	Providing and fixing standard Draw Out connection with 63 mm diameter Instantaneous type coupling conforming to relevant standards for installation at Main Fire Water Tank.	Each	1		

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
14.12	Providing and fixing Butterfly Valve of 150 mm dia conforming to BS : 5155 with limit switches for remote indication of 'OPEN' and 'CLOSE' positions suitable for pressure rating of 16 kg/sq.cm. With gasket, flanges,nuts, bolts etc.(but excluding signal wire or indication devices).	Each	1		
	<b>TOTAL OF FIRE HYDRANT SYSTEM</b>				
<b>F.15</b>	<b>FIRE SPRINKLER SYSTEM</b>				
	The Fire Sprinkler System specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
F.15.1	Providing, Fixing, Testing and Commissioning of 15 mm diameter Quartzoid Bulb type Sprinkler Set designed to operate at 68 Degree Centigrade including UL listed Sprinkler Guard. (UL / FM / FOC listed or approved).				
F.15.1.1	Pendant type Standard Response K80	Nos.	10		
F.15.1.2	Sidewall Sprinkler Standard Response K80	Nos.	7		
F15.2	Not used				
F.15.3	Providing and fixing 150 mm diameter Deluge Valve, Electrical release Trim type (UL Listed), suitable for working pressure of 12.5 bars with flange connection, complete in all respects.	Each	0		
F.15.4	Providing and fixing 150 mm diameter Motorised Butterfly valve complete as required.	Each	2		

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.15.5	Providing and fixing electrically operated Flow Indicating switches including 1.5 mm thick gasket, nuts and bolts complete as per M & W Specification.				
F.15.5.1	For 25mm dia pipes	Nos.	5		
F.15.5.2	For 50mm dia pipes	Nos.	7		
F.15.5.3	For 80mm to 150 mm dia pipes	Nos.	29		
F.15.6	Providing and fixing MS cabinet of size 600 x 300 x 150mm, fabricated from 16 SWG MS sheet, with double front glass door and locking arrangement, having suitable shelves with space for 6 spare sprinklers and 6 spare medium velocity spray nozzle including one spanner properly fixed in the shelf. Cabinet shall be painted with enamel paint of approved shade, complete as per drawing.	Each	1		
F.15.7	Providing and fixing 150 mm diameter Installation Control Valve conforming to BS: 5153 or equivalent with water turbine type automatic alarm. This includes all standard fittings & valves like drain valve, test valve assembly, non return valve, stop valve, 'Y' strainer, pressure gauges etc. complete as per M & W Specification	Each	1		
	<b>TOTAL OF FIRE SPRINKLER SYSTEM</b>				
<b>F.16</b>	<b>MISCELLANEOUS FIRE SERVICES EQUIPMENT</b>				
	The Miscellaneous Fire Services Equipment specified herein, must conform to Section E33 of the M & W Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	All the items / parts mentioned in relevant clauses of the specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
F.16.1	Providing and fixing fully charged Portable Fire Extinguisher of 9 litres capacity, Water type (Gas Cartridge) complete with Standard Discharge Valve and tube including CI bracket for wall mounting etc. conforming to IS 15683 : 2006	Each	24		
F.16.2	Providing and fixing portable fire extinguisher, dry powder type (gas cartridge) with cylinder initially fully charged with dry powder (ABC type) of 6 Kg, complete with standard discharge valve with tube, CI bracket for wall mounting etc. conforming to relevant standard IS 15683 : 2006)	Each	6		
F.16.3	Providing and fixing initially fully charged Portable Fire Extinguisher of 4.5 Kg. capacity, carbon dioxide type with cylinder with CO2 gas, complete with squeeze lever Discharge Valve, Pressure Gauge, Discharge Tube Horn including CI bracket for wall mounting etc. conforming to IS 15683 : 2006	Nos.	44		
F.16.4	Fire protective clothing & breathing apparatus				
F.16.4.1	Set of protective clothing containing 2 nos.	Nos.	2		
	Each following items ;				
	a. Coat				
	b. Trouser				
	c. Gloves				
	d. Anti-Flash Hood				
	e. Helmets				
	f. Boots				
	g. FRP/stainless steel case for storage of Fire Suits				

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.16.4.2	Self- contained open circuit type compressed air Breathing apparatus set confirming to EN-137: 2006, standard complete with one spare cylinders	Nos.	2		
	a) Air cylinder with valve				
	b) Back plate with body harness				
	c) Face mask				
	d) Pressure reducer				
	e) Lung demand valve				
	f) Pressure gauge & warning whistle				
	g) Hoses				
	h) Carrying case				
	i) Spare air cylinder				
	j) Wall mount cabinet for Breathing Apparatus				
F.16.4.3	Water-jel fire blanket consisting scientifically formulated cooling gel and a carrier in size 96" * 72" n canister.	Nos.	1		
F.16.4.4	Water-jel fire blanket consisting scientifically formulated cooling gel and a carrier in size 72" * 60" n canister.	Nos.	1		
F.16.4.5	Snap light emergency evacuation system complete with two high intensity yellow klcolourcyalumelightscticsk (light proof, water proof, wind proof, non explosive, and non toxic) with temper proof pin on a all mounted unit.	Nos.	2		
	<b>TOTAL OF MISCELLANEOUS FIRE SERVICES EQUIPMENT</b>				
<b>F.17</b>	<b>CLEAN AGENT GAS BASED HIGH TEMPERATURE POLYMER TUBE SYSTEM</b>				
	Supply, fixing, testing and commissioning of Polymer Tube Detection based Clean Agent System for Electrical Panels (Polymer Tube Panel Protection System), for 2 Nos. ASS Room consisting of the following components:				

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F.17.1	10 LB capacity Clean Agent system, complete with all necessary Clean Agent gas, fitting, support and accessories, connected with valve.	No.	8		
F.17.2	5 LB capacity Clean Agent system, complete with all necessary Clean Agent gas, fitting, support and accessories, connected with valve.	No.	5		
F.17.3	End of Line adapter	No.	13		
F.17.4	Pressure Switch	No.	13		
F.17.5	Polymer Detection Tube with all necessary fittings & support	M	652		
F.17.6	Master Control Unit for controlling each system, buzzers and electronic hooters, including all necessary accessories + electrical wiring to make each entire system functional	No.	13		
	<b>Note:</b> The items indicated above are notable items. The vendor to include all allied and implied items in required quantity at no extra cost.				
	<b>TOTAL OF CLEAN AGENT GAS BASED HIGH TEMPERATURE POLYMER TUBE SYSTEM</b>				
<b>F.18</b>	<b>INERGENT / CLEAN GAS FLOODING</b>				
F.18.1	Clean agent IG 541 (300 bar) system complying with NFPA 2007 gas suppression system for signaling equipment room, Telecom equipment room, UPS room based on NFPA 2007. Including pipe headers, nozzles, pressure relief vents and other accessories for the each room with facilities for manual override; predischage alarm and Abort switch for each room sizes given below.				
a)	Signaling equipment room, Telecom equipment room, S&T UPS room	M3	600		
	<b>Total of INERGENT / CLEAN GAS FLOODING System</b>				
<b>F.19</b>	<b>FIRE ALARM AND DETECTION SYSTEM</b>				

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	The Fire Alarm and Detection System specified herein, must conform to Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between M & W specification and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
	All the items not specifically mentioned here but necessary to make the system complete and suitable for desired application as per M & W Specifications and Drawings will be deemed to be included in the quoted prices				
F.19.01	Supply, Installation, Testing and Commissioning of 8 Loop Addressable Main Fire Alarm Control Panel (MFACP) complete with capacity to connect Devices & Detectors (in zoned manner) as per M & W Specifications & Drawings but not limited to the following:	Set	1		
F.19.1.1	8 Loop Panel				
F.19.1.2	Repeater Driver Board				
F.19.1.3	Communication Board				
F.19.1.4	Software & Graphics				
F.19.1.5	PC with 21" TFT + 80column Printer.				
F.19.1.6	Nicl. Batteries & Battery Charger.				
F.19.1.7	Amplifier card				
F.19.1.8	Provision for interfacing with other systems such as SCADA / BMS with all required Hardware & Software.				

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F19.02	Supply, Installation, Testing and Commissioning of Repeater Annunciator Panel with Mimic panel as per M & W Specifications and Drawings.	Set	1		
F19.03	Supply, Installation, Testing & Commissioning of Signal Initiating (Intelligent Analogue Addressable) devices complete with Detector Base etc. as per M & W Specifications.				
F19.03.1	Intelligent Addressable Multi Sensor Smoke Detector.	Nos.	450		
F19.03.2	Addressable Fault Isolator Base	Nos.	1		
F19.03.3	Addressable Fault Isolator	Nos.	31		
F19.03.4	Addressable Mannual Glass Break Unit	Nos.	21		
F19.03.5	Sounder with strobe light	Nos.	21		
F19.03.6	Addressable Loop Sounder 6.8 W.	Nos.			
F19.03.7	Response Indicator	Nos.	139		
F19.03.8	Intelligent Addressable Duct Detector.	Nos.	4		
F19.03.9	Intelligent Addressable Control Module.	Nos.	21		
F19.03.10	Intelligent Addressable Monitoring Modules	Nos.	1		
F19.03.11	Intelligent Addressable water Flow Monitoring Modules	Nos.	26		
F19.03.12	Magnetic Lock Assembly for mimimum 400 Kg. Load	Nos.	1		
F19.03.13	Magnetic Contact	Nos.	1		
F19.03.14	Emergency Door Release Switch	Nos.	1		
F19.03.15	Power supply unit for Powering Magnetic Door Lock	Nos.	1		
F19.03.16	High Temperature (min. 80 C degree trip) Heat detector	Nos.	8		

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
F19.04	Supplying, Laying, Termination, Testing & Commissioning of Fire Survival Cables (confirming to BS: 7846 and specifications for performance requirements of Fire Survival Cables) armoured, 1 pair 2.5 sq.mm, screened / shielded, Copper conductor (one pair shielded and one pair unshielded) cable or Mineral Insulated cable complying the CWZ category.	Metre	1090		
F19.05	Supplying, Laying, Termination, Testing & Commissioning of Fire Survival Cables (confirming to BS: 7846 and specifications for performance requirements of Fire Survival Cables) armoured, 1 twisted pair 1.5 sq.mm, screened / shielded copper conductor cable or Mineral Insulated cable complying the CWZ category for looping of detection units etc.	Metre	3725		
	<b>TOTAL OF FIRE ALARM AND DETECTION SYSTEM</b>				
<b>F.20</b>	<b>Continuous Fibre Optic Distributed Linear Heat Sensing System</b> to be installed in the entire length of the tunnels and trackway with redundancy complete with temperature monitoring capabilities.				
F.20.1	Linear Heat Detection controller with Measurement Range 4 km integrated Relay Board having TCP/IP Interface including: 2 Sensor Channel with HD I/O Connection Set with	Set	1		
F.20.2	Linear Heat Detection System Software-for Commissioning and Configuration Software	Set	1		
F.20.3	Power Converter for Linear Heat Detection controller - AC Input 85-264 VAC, 45-65 Hz - DC Input 90-350 VDC - Output 24 VDC 2.5 A	Set	1		
F.20.4	Outdoor Housing: - IP66 Std. Display - Multicolor LCD (Alarm, Status, Operation)	Set	1		

PART - B – FIRE PROTECTION SYSTEM FOR SWARGATE STATION					
S. N.	Description	Unit	Quantity	Unit Rate	Total
				(In INR)	(In INR)
	- Coated Steel, RAL 7035, Wall Mount				
	- IP66 Rated (NEMA4)				
	LINEAR HEAT SENSOR CABLE – FIBER OPTICAL & ACCESSORIES				
F.20.5	Sensor Cable - Thermoplastic	Metre	3200		
	- Tight Buffered Design				
	- Flame Retardant Non Corrosive Jacket				
	- 4 x Multimode Graded Index 50/125 µmFibers				
F.20.6	E2000 8° Pigtail for Multimode Graded Index 50/125µm,	Set	2		
F.20.7	Heavy Duty Splice Box	Set	2		
	- IP67 aluminum				
	- Indoor / Outdoor Use				
	<b>TOTAL OF LINEAR HEAT DETECTION SYSTEM</b>				
F.21	Supply, installation, testing and commissioning of UL/FM approved VESDA System for Signaling equipment room, Telecom equipment room, S&T UPS room, E&M UPS room and ASS rooms including VLP panels associated aspirating devices and piping, integrating devices with the main fire alarm system.	set	7		
F.21.1	Supply , installtion, testing and commissioning of SCADA/ control system network etc for VESDA system including of PCN network cabling etc	lot	1		
	<b>TOTAL OF VESDA SYSTEM</b>				

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
<b>1</b>	<b>PIPE WORKS FOR HYDRAULIC SERVICES</b>				
	The Pipe Work specified herein, must conform to Plumbing, Drainage and Water Supply Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between Plumbing, Drainage and Water Supply specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the Plumbing, Drainage and Water Supply specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
1.1	Providing and fixing Heavy Duty GI pipes of the following sizes conforming to IS:1239 and Plumbing, Drainage and Water Supply Specifications complete with all fittings and specials such as bends, tees, unions, reducers, flanges & plugs etc. conforming to IS:1879 and Plumbing, Drainage and Water Supply Specifications including fixing at wall / ceiling level supported by structural supports, clamps, hangers etc. This also includes threading, jointing, making connections, cutting holes in wall / floor / slab and making good the same with cement concrete 1:2:4, complete in all respect as per specifications.				
a	15 mm dia	R.M.	30		
b	20 mm dia	R.M.	240		
c	25 mm dia	R.M.	100		
d	32 mm dia	R.M.	30		

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
e	40 mm dia	R.M.	60		
f	50 mm dia	R.M.	100		
g	65 mm dia	R.M.	20		
1.2	Painting of GI pipe and fittings of the following sizes with two or more coats of synthetic enamel paint, of approved quality and shade, as per pipe colour code over a coat of primer. This includes painting of legends with direction arrows complete as per specifications.				
a)	15 mm dia	R.M.	30		
b)	20 mm dia	R.M.	240		
c)	25 mm dia	R.M.	100		
d)	32 mm dia	R.M.	30		
e)	40 mm dia	R.M.	60		
f)	50 mm dia	R.M.	100		
g)	65 mm dia	R.M.	20		
1.3	Providing protection to embedded G.I. Pipes and fittings of the following sizes, in wall chases, by wrapping two layers of 400 micron thick polythene sheet over two coats of bitumen. This includes proper overlaps on joints complete as per specifications.				
a)	15 mm dia	R.M.	30		
b)	20 mm dia	R.M.	100		
c)	25 mm dia	R.M.	30		
d)	32 mm dia	R.M.	20		

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
1.4	Providing and fixing insulation to hot water pipes of the following sizes (exposed) with 13 mm thick, flexible, closed cell, EPDM and low density elastomeric thermal insulation tube of expanded synthetic rubber, jointed with self-adhesive rubber insulation tape including making good the walls as required.				
a)	15 mm dia	R.M.	30		
b)	20 mm dia	R.M.	45		
1.5	Providing and fixing centrifugally cast iron (spun) soil, waste & vent pipe of the following sizes conforming to IS 3989 and Plumbing, Drainage and Water Supply Specifications with all fittings such as access door, tees, bends, cowls etc. This includes jointing of 25 mm deep lead joint with refined pig lead, provision of structural supports as required, cutting chases or holes in wall and floors and making good the same with 1:3 cement mortar or 1:2:4 cement concrete wherever required.				
a)	75mm dia	R.M.	270		
b)	100mm dia	R.M.	400		
c)	150mm dia	R.M.	75		
1.6	DI pipes and fittings				

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Supply and Installation of DI Pipes (K9) Including supply, storage, transportation and handling of all pipes, fittings and accessories (including all types of bends, adaptors, short piece sockets and spigots, collars, tees, flexible couplings, reducers, blind flanges, puddle flanges, dismantling joints...etc.), jointing materials, PE protective sleeving throughout, and all other materials required; excavation at any depth in any kind of soil and rock, any type of surface, natural, asphalt, concrete ...etc., laying of pipes including all jointing, any ancillary necessary for proper laying and jointing of pipes; supply from any distance placing and compaction of bedding, embedment (sand fill), backfilling and surface reinstatement, including warning tape and electronic identifiers or warning tape with ferrous strip ; testing; flushing and disinfection; all to the approval of the Engineer.				
	Class K7				
a)	100mm dia	R.M.	310		
b)	200mm dia	R.M.	260		
	Class K9				
a)	100mm dia	R.M.	100		
b)	150mm dia	R.M.	30		
c)	200mm dia	R.M.	340		
1.6	Providing and laying Cement Concrete 1:2:4 (1 cement: 2 coarse sand : 4 graded stone aggregate 40mm nominal size), of 75mm thick (average), around Cast Iron soil and waste pipes of the following sizes, below floor, including necessary shuttering and timbering etc. complete as required.				
a)	100mm dia pipe	R.M.	50		

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
b)	150mm dia pipe	R.M.	100		
1.7	Constructing brick masonry channel with F.P.S. bricks of class designation 75 in cement mortar 1:4 (1 cement : 4 sand) including necessary excavation, 10 cm thick cement concrete 1:5:10 (1 cement : 5 sand : 10 graded stone aggregate 40 mm nominal size) for foundation and 25 mm thick cement concrete 1:2:4 (1 cement : 2 sand : 4 graded stone aggregate 12.5 nominal size) for filling haunches, including 12 mm cement plaster 1:4 (1 cement : 4 sand) with a floating coat of neat cement inside the drain, its top and exposed side including providing cast iron grating and fixing to the drain complete as required.				
a)	150mm wide channel 200 mm average depth (For Pump Room)	R.M.	26		
1.8	Providing and fixing UV stabilized UPVC rain water pipe (SWR) with one end plain and other end socketed with injection moulded/fabricated fittings such as tees, bends, doors etc. and provided with square grooved along with V shaped rubber ring including making good wall and flooring wherever necessary. The wall thickness of the pipe and other technical characteristics shall be conforming to IS: 13592/92 Type A. The jointing is to be completed with rubber lubricant.				
a)	100 mm (OD)	R.M.	40		
b)	150 mm (OD)	R.M.	75		
<b>TOTAL</b>					

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
<b>2</b>	<b>PIPING ANCILLARIES FOR HYDRAULIC SERVICES</b>				
	The Pipe Ancillaries specified herein, must conform to Plumbing, Drainage and Water Supply Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between Plumbing, Drainage and Water Supply specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the Plumbing, Drainage and Water Supply specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
2.1	Providing and fixing Brass Ball Valves of the following sizes conforming to BS 5351 and Plumbing, Drainage and Water Supply Specifications, suitable for pressure rating of 10 kg / Sq.cm, with lever and fittings viz. flanges / union, nuts, bolts, washer etc. complete as per Plumbing, Drainage and Water Supply specification.				
a)	20 mm dia	Each	12		
b)	25 mm dia	Each	10		
c)	32 mm dia	Each	5		
d)	40 mm dia	Each	8		
e)	50 mm dia	Each	5		
f)	65 mm dia	Each	2		

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
2.2	Providing and fixing Butterfly Valves of the following sizes conforming to BS: 5155 and Plumbing, Drainage and Water Supply Specifications, suitable for pressure rating of 10 kg / Sq.cm, with hand lever operation, rubber gaskets, flanges, nuts, bolts and washers including painting complete as per Plumbing, Drainage and Water Supply specification.				
a)	65 mm dia	Each	6		
b)	100 mm dia	Each	8		
c)	150 mm dia	Each	12		
2.3	Providing and fixing Wafer type Double Plate Check Valves of the following sizes conforming to API-594 and Plumbing, Drainage and Water Supply Specifications, suitable for pressure rating of 10 kg / Sq.cm with cast iron body conforming to BS 1452, rubber gasket, flanges, union, nuts, bolts and washers including painting complete as per M & W Specifications.				
a)	50 mm dia	Each	3		
c)	100 mm dia	Each	3		
d)	150 mm dia	Each	12		
2.4	Providing and fixing Double Flanged Flexible Rubber Expansion Joint of standard length with Unit Control as described on Section 5.3.14 of the Plumbing, Drainage and Water Supply Specification, of the following sizes, complete with all accessories including rubber gaskets, flanges nuts, bolts and washers tested to a pressure of 10 kg / Sq.cm.				
a)	50 mm dia	Each	2		

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
2.5	Providing and fixing Cast Iron Double Flanged 'Y' type Strainers of the following sizes with nuts, bolts, gaskets etc. complete in all respect as described in the Plumbing, Drainage and Water Supply Specification.				
a)	65 mm dia	Each	2		
b)	100 mm dia	Each	3		
2.6	Providing and fixing C.I. Sluice valves of the following sizes conforming to BS : 5150 and Plumbing, Drainage and Water Supply specifications complete with bolts, nuts, rubber insertions etc.				
	100 mm dia	Each	3		
2.7	Providing and fixing in position Float Valve with Copper Ball Float and Brass Rod of required length conforming to BS 1212 and Plumbing, Drainage and Water Supply Specifications suitable for pressure of 10 kg / Sq.cm.				
	100 mm dia	Each	8		
2.8	Providing and fixing 100 mm diameter, Brass Dial Type Pressure Gauge as described in Plumbing, Drainage and Water Supply Specifications suitable for 0 - 15 kg / Sq.cm pressure range with isolation cock and complete in all respects.	Each	10		
2.9	Providing and fixing air vent for Domestic water supply risers with Ball Valve as described in Plumbing, Drainage and Water Supply Specifications suitable for pressure of 10 kg / Sq.cm complete, as per specifications.				
a)	20 mm dia	Each	4		

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	<b>TOTAL</b>				
<b>3</b>	<b>MISCELLANEOUS PLUMBING AND DRAINAGE EQUIPMENT</b>				
	Whether explicitly specified or not, the Miscellaneous Plumbing and Drainage Equipment specified herein, in addition to the description given in respective items of BOQ.				
	All the items / parts mentioned in relevant clauses of the Plumbing, Drainage and Water Supply specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
3.1	Providing and fixing CI “P” or “S” trap (conforming to IS: 3989) of self-cleaning design, with or without vent arm, complete including cost of cutting and making good the walls and floors.				
a)	100 mm inlet and 100 mm outlet.	Each	10		
b)	100 mm inlet and 75 mm outlet.	Each	8		
3.2	Providing and fixing WC connector (straight or bend type) of 100 mm diameter and required length including proper connection to C.I. pipe complete as required.	Each	10		
3.3	Providing and fixing floor drain with 4mm thick stainless steel gratings (100 mm diameter) with frame including fixing to the floor with cement mortar.	Each	15		

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
3.4	Providing and fixing Stainless Steel 'Cockroach' Trap with 150 mm x 150 mm stainless steel grating fixed on top of floor trap. The cost includes the cost of all ancillary works as required to complete the work.	Each	20		
3.5	Providing and fixing Stainless Steel grating, Grade 304 on top of floor trap. The rate includes the cost of all ancillary works and material as required to complete the work.				
a)	125 x 125 x 1mm or 125mm dia x 1 mm	Each	20		
3.6	Providing and fixing floor clean out plug for Cast Iron Soil or waste pipes of the following sizes comprising of C.I. Plug, nipples, bends including lead jointing etc. complete.				
a)	150mm diameter	Each	12		
b)	100mm diameter	Each	4		
3.7	Providing and fixing of 200 mm X 200 mm C.I. Square grating at terrace RWP complete in all respect.	Each	20		
3.8	Providing and fixing 100 mm dia G.I. Vent pipe at the roof level of water tanks with anti-mosquito brass grating, bends as required complete in all respects as per drawing.	Each	8		

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	<b>TOTAL</b>				
<b>4</b>	<b>EXTERNAL SEWAGE &amp; STORM WATER DRAINAGE:</b>				
4.1	Providing and laying non-pressure NP4 class RCC pipes with collars jointed with stiff mixture of Cement mortar in the proportion of 1:2 (1 cement: 2 fine sand) including testing of joints etc. complete. This also includes excavation in all kinds of soil (including hard rock), dewatering, refilling, watering, ramming, removing and disposal of the surplus excavated material and making good the same, complete as required.				
a)	250 mm dia RCC pipe	R.M.	90		
b)	200 mm dia RCC pipe	R.M.	40		
c)	150 mm dia RCC pipe	R.M.	50		
4.2	Providing and laying Cement Concrete in the proportion 1:4:8 (1 cement : 4 course sand : 8 graded stone aggregate of 40 mm nominal size) for NP 4 class RCC pipes with concrete bedding and haunches up to the center of pipe including shuttering & timbering complete as required.				
a)	For 250 mm dia pipe – 150mm thick PCC bedding	R.M.	90		
b)	For 200 mm dia pipe – 150mm thick PCC bedding	R.M.	40		
c)	For 150 mm dia pipe – 100mm thick PCC bedding	R.M.	50		

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
4.3	Providing, fixing, jointing and testing in position, the following C.I. Class (LA) Pipes, conforming to IS:1536 and cut to required lengths for drainage. This also includes making proper connections with refined pig lead of required depths. The pipe must be laid below ground level in trenches up to the required depth including excavation in all kind of soils (including hard rock), dewatering, refilling, watering, ramming, removing and disposal of the surplus excavated material as per instructions by site in charge and making good the same, complete as required.				
a)	150 mm dia	R.M.	150		
4.4	Constructing rectangular manhole of the following types in brick masonry with Class 75 designation bricks of approved quality in Cement Mortar in the proportion 1:4 (1 cement : 4 coarse sand) having RCC top slab with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), foundation with cement concrete 1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size), inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) and finished with a floating coat of neat cement, outer plaster 15 mm thick with cement concrete 1:4 (1 cement : 4 coarse sand) including making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) and finished with a floating coat of neat cement, fixing of foot rests made up of 20 mm M.S. square bar in 1:2:4 cement concrete (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm nominal size) block of size 200 mm x 200 mm x 100 mm. This also includes excavation in all kinds of soil (including hard rock), dewatering, refilling, watering,				

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	ramming, removing and disposing surplus excavated material, complete as required.				
a)	Inside size 900 mm x 800 mm and 600 mm depth with 560 mm diameter SFRC, heavy duty perforated cover with frame conforming to IS:12592 fixed in top slab.	Each	12		
b)	Inside size 1200 mm x 900 mm and 900 mm depth with 560 mm diameter SFRC, heavy duty perforated cover with frame conforming to IS:12592 fixed in top slab.	Each	15		
4.5	Making connection of storm water drain / sewer line with Municipal external storm water / sewer line including necessary excavation in all kinds of soil up to required depth, breaking the wall / floor of municipal manhole / nallah and making good the same with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20mm nominal size), plastering on both sides with cement mortar 1:4 (1 cement : 4 coarse sand) finished with a floating coat of neat cement and making necessary channels for drain etc. complete. This also includes the liasoning work such as filling necessary applications, submission of forms for approval to the municipal authorities, depositing the necessary fees and other amounts as required for getting the premises / installations inspected and approved and all other formalities required till the connection is obtained. All the expenses incurred in this regard shall be borne by the contractor except for the payments to be made for any security deposits which will be reimbursed on actual.				
a)	For Sewer connection	Job	1		

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
b)	For Storm water connection	Job	2		
<b>20</b>	<b>PUMPS FOR WATER SUPPLY / SEWAGE/ SEEPAGE WATER</b>				
	Whether explicitly specified or not, the Pumps for Water Supply / Water Treatment specified herein, must conform to Specifications and Motors must conform to Specifications, in addition to the description given in respective items of BOQ. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
	The motor HP to be confirmed by the supplier for the duty mentioned for each pump.				
	Rates quoted shall be inclusive of all structural supports, clamps etc. as per approved design / specifications.				
20.1	Supply, Installation, Testing and Commissioning of following Hydropneumatically operated pumping set (pressure switch operated fully automatic) with C.I. Body, bronze Impeller, stainless steel shaft and induction motor, vibration eliminating pads and accessories including pressure tank, pressure switches, automatic control panel etc.mounted on a common skid complete in all respect.				
a)	Not Used				
b)	For domestic water supply to station				
	Type of pump : Centrifugal				
	Capacity :6 Cum/Hr				

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Head : 15 m				
	Motor RPM : 2900				
	Each set consists of 2 pumps and 1 pressure tank. At any given time, only one pump need operate. Both the pumps must operate alternatively in service.	Set	1		
20.2	Supply, Installation, Testing and Commissioning of the following horizontal single / multistage centrifugal pump pit with CI body, baring impeller, SS shaft and induction motor mounted on a comon base frame, vibration eliminating pads accessories complete				
a)	Filter Feed Pump				
	Capacity :15 Cum/Hr				
	Head : 30 m				
	Motor-RPM- 2900				
	Each set consists of 2 pumps (1 Working + 1 Standby). At any given time, only one pump need operate. Both the pumps must operate alternatively in service.	Set	1		
20.3	Supply, Installation, Testing and Commisioning the following Submersible Sump Pumps conforming to M & W Specifiactions with motors conforming M & W Specifiactions for waste water drainage, free standing type, complete with				
a)	For Main Sewage Sumps at concourse level / Undercroft level				
	Solid handling Capacity 40 mm				
	Flow Rate - 120 LPM				
	Head - 30 M				
	RPM - 2900				

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Each set consists of 2 pumps (1 Working + 1 Standby). At any given time, only one pump must operate. Both the pumps must operate alternatively in service.	Set	2		
b)	For Sump at basement of Ancillary building				
	Solid handling Capacity 40 mm				
	Flow Rate - 300 LPM				
	Head -20 M				
	RPM - 2900				
	Each set consists of 2 pumps (1 Working + 1 Standby). At any given time, only one pump must operate. Both the pumps must operate alternatively in service.	Set	1		
c)	For Main Seepage Sumps at Undercroft level				
	Solid handling Capacity 40 mm				
	Flow Rate - 600 LPM				
	Head - 30M				
	RPM - 2900				
	Each set consists of 3 pumps (1 Working + 1 Standby + 1 Assisting Pump). However in case of operation of fire pumps all the three pumps may operate simultaneously.	Set	2		
d)	For Main Seepage Sumps at middle of tunnel				
	Solid handling Capacity 40 mm				
	Flow Rate - 600 LPM				
	Head - 30M				
	RPM - 2900				

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Each set consists of 2 pumps (1 Working + 1 Standby). However in case of operation of fire pumps all the two pumps may operate simultaneously.	Set			
e)	For Seepage Sumps at Entry / Exit at Undercroft Level				
	Solid handling Capacity 40 mm				
	Flow Rate - 300 LPM				
	Head - 20 M				
	RPM - 2900				
	Each set consists of 2 pumps (1 Working + 1 Standby). However in case of operation of fire pumps all the two pumps may operate simultaneously.	Set	5		
20.4	Supply, Installation, Testing and commissioning of level controller switches for automatic operation of seepage/sewage pumps with S.S. probes 2X1.5 sq.mm conductor cables from motors control center to probes.	Set	12		
	<b>TOTAL OF PUMPS FOR WATER SUPPLY / SEWAGE/ SEEPAGE WATER</b>				
<b>21</b>	<b>WATER TREATMENT PLANT</b>				
	Whether explicitly specified or not, the Water Treatment Plant and Pumps specified herein, must conform to Section E26 & E27 of the M & W Specifications and Motors must conform to Section E12 of the M & W Specifications, in addition to the description given in respective items of BOQ. In case of contradiction between M & W specifications and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the M & W specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
	The motor HP to be confirmed by the manufacturer for the duty mentioned for each pump along with performance characteristic curve.				

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Rates quoted shall be inclusive of all structural supports, clamps etc. as per approved design / specifications.				
21.1	DUAL MEDIA FILTER				
	Providing and fixing of mild steel (rubber Lined) pressure vessel confirming to IS:2825 dual media filter complete in all respects as	NO.	1		
	1) Capacity = 15Cum / hr				
	2) Rate of flow = Not more than 12.5 Cum / hr / sqm of surface area				
	3) Wall thickness of shell and of dished ends as per IS:2825				
	4) Initial charge of media.				
	5) Sample valves				
	6) Sockets and valve for dosing chemicals.				
	7) Pressure gauge at inlet and outlet with isolating cocks and supports.				
21.2	SOFTENER UNITS				
	Providing and fixing of mild steel (rubber Lined) pressure vessel confirming to IS:2825 dual media filter complete in all respects as per M & W specifications, having following	NO.	1		
	1) Capacity = 15Cum / hr				
	2) Rate of flow = Not more than 15 Cum / hr / sqm of surface area				
	3) Wall thickness of shell and of dished ends as per IS:2825				
	4) Initial charge of media.				
	5) Sample valves				
	6) OBR (13 Hrs) 200 cum				
	7) Pressure gauge at inlet and outlet with isolating cocks and supports.				
	8) All Face piping and diaphragm valve etc..				
	9) Thickness of rubber lining not less than 3mm				

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	10) All pipes to be as per IS : 1239 class "c"				
	11) Ejector for regeneration				
	12) For resin quantity and design purpose consider hardness of water as 350 ppm,quality of outgoing water - commercial Zero hardness.				
21.3	IRON REMOVAL FILTER				
	Providing and fixing of mild steel (rubber Lined) pressure vessel confirming to IS:2825 dual media filter complete in all respects as per M & W specifications,having following	NO.	1		
	1) Capacity = 15Cum / hr				
	2) Rate of flow = Not more than 10 Cum / hr / sqm of surface area				
	3) Wall thickness of shell and of dished ends as per IS:2825				
	4) Initial charge of media.				
	5) Sample valves				
	6) OBR (13 Hrs) 200 cum				
	7) Pressure gauge at inlet and outlet with isolating cocks and supports.				
	8) All Face piping and diaphragm valve etc..				
	9) Thickness of rubber lining not less then 3mm				
	10) All pipes to be as per IS : 1239 class "c"				
	11) Ejector for regeneration				
	12) For resin quantity and design purpose consider hardness of water as 350 ppm,quality of outgoing water - commercial Zero hardness.				
21.4	REGENERATION TANK / SALT DILUTION TANK				

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
	Providing and fixing HDPE tank of Capacity 2000 litres to store and measure brine for regeneration of softening plant. Tank shall be complete with all interconnecting MS / HDPE pipes and other assemblies / accessories required for commissioning.				
a)	Brine Measuring Tank - 2000 litres capacity	NO.	1		
21.5	CHEMICAL DOSING PUMP				
	Providing , fixing , Instalation and comissioning of chemical dosing pump capacity 6 lph with 250 ltrs capacity chemical tank.	NO.	1		
21.6	LEVEL CONTROLLERS / LEVEL INDICATORS				
	Supply, Installation, Testing and Commisioning of Magnetic Float type Level Controllers / Indicators having adequete number of switches (Minimum 5 Nos.) for the services mentioned below. Contoller Equipment shall be mounted inside the electrical panels				
a)	For Domestic Water tanks for the following levels.				
i)	High High level to trigger alarm.				
ii)	High Level to switch OFF the Tube well.				
iii)	Raw Water Tank 1/2 full				
v)	Low Low level to trigger alarm	Set	1		
b)	For Fire Water Tanks, one set for each of the tanks for the following levels.				
i)	High Level to trigger alarm				
ii)	Full Fire Water Tank indication				
iii)	Low low level in fire water tank to trigger alarm	Set	2		
c)	For Treated Water Tank for the following levels				
i)	High High level to trigger alarm				
ii)	High Level to switch OFF the Filter Feed Pumps.				

PART – C – PLUMBING AND DRAINAGE WORKS FOR SWARGATE STATION					
S.N.	Description	Unit	Quantity	Unit Rate	Total
				(INR)	(INR)
iii)	Treat Water Tank 1/2 full				
iv)	Low Level to switch ON the Filter Feed Pumps				
v)	Low Low level to trigger alarm	Set	1		
	<u>Note:</u>				
	All above level Controllers / Indicators to be complete with sensors, switches, relays, all wiring from the sensors to the Control Unit, Control Units to Motor Control Centers of the various Pumps and to the various alarm and indicating devices.				
	Sensors Terminal Units would be in weather proof enclosures (IP-56).				
	<b>TOTAL OF WATER TREATMENT PLANT</b>				

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**Price Centre N: Lump Sum Provision For Incidental and unforeseen items.**

Price Centre	Description	
N 1.0	Lump sum provision to be operated for incidental and unforeseen items and Miscellaneous Works likely to be required as per PWD Pune Circle, Maharashtra PWD and CPWD schedules	50,00,00,000.00

# *Maha Metro*



## **Tender Documents**

**UGC-02: DESIGN AND CONSTRUCTION OF UNDERGROUND STATIONS AT  
BUDHWAR PETH, MANDAI AND SWARGATE AND ASSOCIATED TUNNELS**

### **PART I – BIDDING PROCEDURES**

**Section V – Eligible Source Countries of External Funding  
Agency**

June 2018

## **Section V. Eligible Source Countries of External Funding Agencies**

### **1. Eligible Source Countries for External Funding Agency**

All countries and areas are eligible to quote for this bid.