MAHARASHTRA STATE ELECTRICITY TRANSMISSION CO.LTD
(CIN No.U40109MH2005SGCI53646)

Office of the Executive Engineer
EHV O & M Division-I, Pune
Block No.406, Administrative Building, 3rd Floor, Rasta Peth, Pune–411011
Phone No : 7447440351 E-mail- ee6140@mahatransco.in

EE/EHV O&M Dn.-I/Pune/Tech./1823 **Date :10.10.2023**

Sub:- SRM Enquiry for work of health Analysis of existing Earthing System & Soil Resistivity Measurement at 132kV Mundhwa S/S, under EHV O&M Division-I, Pune.
RFX No: 7000028766

Dear Sir,

Online bids are invited in two bid system for the work of health Analysis of existing Earthing System & Soil Resistivity Measurement at 132kV Mundhwa S/S, under EHV O&M Division-I, Pune, on or before 17.10.2023 upto 11:00 Hrs. on following terms and conditions:-

TERMS AND CONDITIONS:-

Submission of bid
Two bid system should be followed for submitting the offer. Uploading of required documents shall be done on MSETCL's SRM E-tender website **https://srmetender.mahatransco.in.**

A. Techno –Commercial bid:-
This should contain following documents certificates (all self-attested copies) as a proof of qualifying pre-requisites, broachers, attested certificates etc.

a) Valid copy of Electrical License.
b) Valid Copy of shop act & establishment registration/NOC of Grampanchayat / Udyog Adhar.
c) Valid Copy of Pan Card.
d) Valid registration under GST.
e) Work experience certificate of similar type of work executed at 220/132/100 kV EHV substations under MSETCL or any other power sector utility (not below the rank of Executive Engineer).
f) List of key technical personnel with Qualification and List of equipment, T & P and material.

If validity of any license/certificate expires during order period, you will have to renew the same & submit the copy to this office. Payment will be affected for valid period only.

B. Commercial bid:- Bidder should upload the digitally signed price bid under commercial bid online.

a) Techno-commercial bid will be opened online for all received bids. After verifying the all documents /certificates submitted in techno commercial bid for prequalification as mentioned above, if it is found that, the tenderer fulfills the desired prerequisites; the price bid will be opened online. If the same is not found to be meeting the prerequisite, the commercial bid shall

not be opened. Bids with incomplete details or not submitted in prescribed form etc. are liable to reject.

b) This office reserves all the rights to reject any or all Bids without assigning any reasons thereof.

c) The technical documents should be uploaded in the technical bid & commercial documents /offer/price bid should be uploaded separately, in case both technical & commercial bid are uploaded in one file wrongly, the offer will be rejected.

d) The estimate rates given by this office are inclusive of taxes. However, the bidder should quote rates exclusive of all taxes. The taxes should be quoted separately.

1. **VALUE OF THE WORK: -** Value of the work will be **Rs. 4,95,600/-** (Rs. Four Lakh Ninety Five Thousand Rupees Only).

2. **SIGNING OF CONTRACT/ AGREEMENT: The contractor shall enter into an agreement of Rs. 500/- (As per estimated Amount) with the MSETCL within 07 days from the date of receipt of the work order.** The MSETCL will not be liable to pay nor shall the contractor be entitled to claim amount due or payable under the contract until the agreement is executed. The necessary stamp duty for the agreement shall be borne by the contractor.

3. **WORK COMPLETION PERIOD:-** The work of health Analysis of existing Earthing System & Soil Resistivity Measurement at 132kV Mundhwa S/S, under EHV O&M Division-I, Pune, should be completed within 1 month from the date of LOI/Work Order.

4. **SECURITY DEPOSIT / PERFORMANCE BANK GUARANTEE IN LIEU OF SECURITY DEPOSIT:** The contractor has to submit, Security Deposit @ of 10% of the Quoted / Contract (Work order) amount whichever is higher, by Online / NEFT / RTGS / D.D./ B.G./ fixed deposit in nationalized or scheduled bank within 07 days after acceptance of the LOI and before starting the execution of the work as per work order.

   The validity of the DD / B.G. / F.D. shall be up to 90 days after due date of completion towards security for proper fulfillment of order and performance of the material / works.

   The Security Deposit will be refunded within 1 month after submission of report / analysis & if applied within 01 month from date of submission of report/analysis as per work order. The Owner is not liable to pay any interest or compensation to the Contractor for retaining the performance Guarantee after the end of the work completion period.

   Failure to furnish the Security Deposit within specified period shall entail to forfeiture of the EMD and cancellation of the Contract / Work Order.

   The termination of the Contract on account of 'Contractor's default' shall not entitle the Contractor to reduce the value of the Security Deposit / Performance Guarantee nor the time thereof. The Security Deposit / Performance Guarantee shall be valid for the full value and for the full period till submission of report/ analysis.

   Please note that, the % of SD/PBG Clause of the work order may be vary as per rules & guidelines issued by MSETCL / Govt from lime lo time. Some will be binding on you.

5. **TIME THE ESSENCE OF CONTRACT:** The time stipulated in the work order for the completion of works shall be deemed to be the essence of the contract The Contractor shall so organize his resources and perform his work as to complete it not later than the date agreed to.

6. **WORKMANSHIP AND MATERIAL:** Quality of work to be carried out should be strictly confirmed to our specification, otherwise same will be rejected and contractor has to do the same at his cost and risk only. All work shall be performed and completed in accordance with the best

shop practice.

A. Minutes of meeting shall be recorded; for observations, works to be carried out & before execution of the work; and duly signed by the contractor & the owner or his representative/operating officer of MSETCL.
B. JMC of works shall be carried out jointly and signed by operating officer & the contractor.
C. All above documents shall be submitted along with the bill. The prescribed formats will be issued with the final work order.

7. Technical Skilled Persons:- The contractor shall deploy and provide onsite only such employees who are skilled and experienced for execution and supervision of works. He shall also be responsible for any injury / accident to his employees, payment of compensations etc. as may require to be paid eventually, shall be borne by the contractor himself.

8. SUPERVISION OF WORK: The work should be carried out under the supervision of the substation in charge of respective substation. **The work carried out without supervision will not be recorded and payment will not be released for such works which may please be noted.**

9. SUBMISSION OF DOCUMENTS:- You have to submit the renewed documents (if expired) during order period otherwise payment will be held till the submission of documents.

10. PENALTY :

A) **Delay in execution of work:** If the contractor fails to complete the work in all respect instipulated time as mentioned above, he will be liable to pay penalty at rate of ½ % per week subject to maximum limit of 10% of the total value of the order.

B) **Performance of work:** During the contract period, if it is found that performance of work is unsatisfactory, the contract is liable for termination by giving 3 days prior notice and at contractor's entire risk and the security deposit paid by contractor shall be forfeited.

C) **Delay in starting the work**: If it is found that the contractor fails to execute the agreement / Pay the Security Deposit / start the work within stipulated time period, the contract is liable for termination by giving 3 days prior notice and at contractor's entire riskand the EMD paid shall be forfeited.

11. SUBMISSION OF TAX INVOICE: The original tax invoice shall be submitted to the Executive Engineer, EHV O&M Division-I, Pune as per Schedule 'A'. The bills must be submitted along with joint measurement certificate signed by both parties. Bill shall be submitted in triplicate.

SES for the executed work as per the actual quantity will be done by operating officer of respective substation. The payment will be effected by Division office accordingly, subject to availability of funds after receipt of the bills.

12. PAYMENT TERMS: 100% payment will be done after the work completion per occasion and on the submission of Tax Invoice as mentioned in Cl No. 11 above.

13. MODE OF PAYEMNT: The payment will be disbursed vide RTGS / NEFT by Division

office.

14. DEDUCTION OF TAXES: Income Tax TDS @ 2 %, GST TDS @ 2% & labour cess @ 1% will be deducted from the contractor's bill.

15. The T&P/labour/machinery/equipment/material if required for the work shall be on contractor's account.

16. TERMINATION OF CONTRACT WITH RISK & COST : If the agency fails to complete the work fully as given in Schedule against the order, within the stipulated period, the Company shall be at liberty, **with prior notice of 3 days,** to get the work on account of and at the risk of the contractor. MSETCL will prefer a claim for the difference in price and for all expenses whatsoever incurred in getting the same work. The said claim shall be recovered from any payment due to the Contractor from MSETCL, i.e. from bills or deposit or on any account; such expenses will also include 15% Supervision charges. The owner reserves the right to Terminate / cancel the contract, in the event of the breach of contract in any respect or undue delay in execution of work / starting of the work.

17. Ideal labour hours:- In case of suspension of work or delay in work due to any reason or stay order of the Court of Law etc., **no compensation will be paid by the MSETCL against idling of labours / idling of machinery etc., during the period.**

18. The contractor shall have to make his own arrangement for Transport of man power, tools and Tackles in adequate quantity whenever required.

19. RECOVERY: Whenever any recovery towards losses/damages/shortages etc. is applicable; the same shall be recovered from contractor's bill, as assessed by the Operating officer / Engineer-In-Charge. Recovery other than mentioned in work order placed to successful bidder will be done after consent of both parties.

20. FORCE MAJEURE: Only the following conditions shall be considered for the purpose of this clause.

a. Natural Phenomenon such as floods, Draughts, Earthquakes, Epidemics etc.
b. Acts of any Government, Domestic or Foreign such as war (declared or undeclared) quarantines, embargoes.

The party affected by 'Force Measure' shall within 15 days of the occurrence of such a cause notify the MSETCL in writing with sufficient documentary proof. The Contractor or the Owner shall not be liable for delays in performing their respective obligations resulting from any force majeure causes as defined above. The date of completion will be extended by a reasonable time by mutual agreement.

21. SUBLETTING THE CONTRACT: The contract or any part thereof shall not be assigned, transferred, or sublet without the prior written permission of the undersigned. Even if such permission is granted, it shall be responsibility of the principal contractor to whom the work order originally issued to execute the works as per the terms of the contract.

22. DETAILS CONFIDENTIAL: The Contractor shall treat the Contract and everything contained therein as private and confidential. In particular the Contractor shall not publish or share any information, drawing or photograph concerning the works and shall not use the site for the purpose of advertising except with the written consent of the Engineer and subject to such conditions as he may prescribe.

23. JURISDICTION: All disputes, differences related to the tender contract shall be subject to the exclusive jurisdiction of Pune District Court.

24. COMPENSATION: If any accident occurs to any of your worker / your Supervisor / or outsiders while carrying out the work, same will be on your account. The MSETCL will not be responsible for such accident/ compensation payment etc.

25. LOSS OF MATERIAL: You will have to keep your material in safe custody at your end. The MSETCL will not be responsible for the loss of the material kept at MSETCL's site. The accommodation for your staff will not be provided by the MSETCL.

26. In case of any dispute whatsoever, regarding interpretation of the terms and conditions, or quality, the decision of the Executive Engineer, EHV O&M Division- I Pune will be final and binding on the contractor.

27. All other Standard Terms and conditions prescribed by MSETCL, regarding works, which are not specifically stated here, are also applicable to this contract and shall also form a part of the contract and shall be binding on the successful bidder.

28. The undersigned reserves right to Accept/Reject/Cancel the above enquiry.

Encl: Schedule A & B.

Yours faithfully,

-sd-
(V.V.borkar)
Executive Engineer
EHV O&M Division- I, Pune.

MAHARASHTRA STATE ELECTRICITY TRANSMISSION COMPANY LTD							
EHV O&M Division-I,Pune							
SCHEDULE 'A'							
Sr. No.	**Particulars of work**	**Material/ Service No.**	**Unit**	**Qty.**	**Ex-Works Unit Rate**	**Unit Rate with GST**	**Amount**
1	Work of Health Assessment of grounding system & soil resistivity measurement (Earthing Audit)Covering following Tests, along with deatils in schedule B a) Soil Resistivity Test b) Earth Electrode Resistance Test c) Riser Integrity Test d) Grid Integrity Test e) Touch & Step Potential Test f) Effect of corrosion Test g) Software simulation & design adequacy h) Submission of Evaluation Report at 132kV Mundhwa Substation	50007408	EA	1	420000	495600	495600
						Total	**495600/-**

Amount Rs.: Four Lakh Ninety Five Thousand & Six hundred Rupees only.

Note: The detailed scope of work is enclosed in Schedule B.

-sd-

(V.V.Borkar)
Executive Engineer
EHV O&M Div-1, Pune

MAHARASHTRA STATE ELECTRICITY TRANSMISSION COMPANY LTD

EHV O&M Division-I,Pune

SCHEDULE 'B'

Scope of work for the of health Analysis of existing Earthing System & Soil Resistivity Measurement at 132kV Mundhwa S/S, under EHV O&M Division-I, Pune

1.1 Soil Resistivity test :

Scope of Works: Reading shall be taken up to 25 meters spacing between the spikes subject to physicalsite condition & space availability, in as required directions from location canter.

Methodology to be followed: Wenner four-point method

Meters to be used: Variable voltage and variable frequency meters (Megger DET4TC2/Kyoritsu) or its equivalent.

Deliverables: Audit Report should consist of

i) Soil resistivity table.
ii) Trend graph for average soil resistivity versus probe spacing.
iii) Interference on nature & type of soil
iv) Executive summary

1.2 Earth Electrode Resistance Test:

Scope of Works: Individual earth electrode resistance measurement should be done after ensuringsuitable earth bypass arrangement, by using Stake-less method where it is not possible to disconnect the electrode from the earth grid. Fall of Potential method can also be used where it is possible to disconnectthe electrode from the earth grid.

Methodology to be followed: Fall of potential or Stake-less method. Measured resistance value has to becompared with calculated value to assess the condition and health of individual earth electrode.

Standards to be followed: IEEE 81 / IS 3043

Meters to be used: Variable voltage and variable frequency meters (MeggerDET4TC2/Kyoritsu) alongwith I and V clamps or it's equivalents.

Deliverables: Audit Report should consist of

i) Earth electrode resistance table.
ii) Comparison of measured resistance with calculated resistance.
iii) Earth grid resistance.

Observation on health and condition earth electrode

1.3 Riser Integrity Test:

Scope of Works: Integrity of riser earth connection between electrical equipment and earth grid/earthelectrode has to be determined in report.

Methodology to be followed: Low magnitude current injection at off grid frequency using currentdivision method.

Standards to be followed: IEEE 81

Meters to be used: Current injection kit with variable frequency option and Fluke flexible clamp meter376 / Equivalent.

Deliverables: Audit Report should consist of

i) Measured current division between conductor towards electrical equipment and conductortowards earth grid/electrode.
ii) Pin point open/defective risers.
iii) Observation on health and condition of riser.
iv) Recommendation.
v) Executive Summery.

1.4 Grid Integrity Test:

Scope of Works: Integrity of earth grid conductor in substations and plant area has to be determined.

Methodology to be followed: Grid conductor impedance should be measured between two selected points within the earth grid. Measured impedance values are to be compared with calculated impedance. This Test has to be repeated to cover the entire earth grid area subject to feasibility and actual site conditions.

Standards to be followed: IEEE 81

Meters to be used: Earth grid impedance measurement kit - DLRO / Equivalent.

Deliverables: Audit Report should consist of

i) Table of measured earth grid impedance between two selected points in earth grid conductorand calculated earth grid impedance.
ii) Measured current division between conductor towards electrical equipment and conductortowards earth grid / electrode.
iii) Pin point open / defective section of the earth grid.
iv) Observation on health and condition of the earth grid.

1.5 Touch & Step potential Test:

Scope of Works: Measure Touch and Step Potentials at 10 locations within the substation area by extrapolation technique.
Methodology to be followed: Low magnitude off grid frequency current at low voltage has to be injected from a remote location. Touch and step potentials should be measured at 10 locations using a tuned voltmeter. Measured potentials has to be linearly extrapolated for the actual fault current at the substation. This value has to be compared with threshold potentials obtained in software simulation for safety.

Standards to be followed: IEEE 81

Meters to be used: Off grid frequency current injection kit and tuned voltmeter - Mitton / equivalent.

Deliverables: Audit Report should consist of

i) Table of measured touch and step potentials in milli Volts.
ii) Table of extrapolated touch and step potentials for the actual fault current.
iii) Comparison of extrapolated touch and step potentials with threshold potentialsobtained in software simulation.
iv) Observation.
v) Recommendation.
vi) Executive summary.

1.6 Effect of Corrosion Test:

Scope of Works: Determining the metal loss due to corrosion in main mat and risers and earth pits based on which the adequacy of size of conductor installed for the prevailing fault current/the residual life of the earth system is determined. It is done at random location of the substations.earthing systm corrosion assessment activity at severe locations selected based on IEEE and NACE guidelines and assessment shall be carried out under the guidance of NACE certified CP-Level III Engineer.

Standards to be followed: IEEE 81/ CBIP manual339

Meters to be used: Standard Vernier Calipers.

Deliverables: Audit Report should consist of

i) Measured dimension of earth strip/ grid conductor.

ii) Comparison of measured dimension with original earth strip/ grid conductor dimension.

iii) Observation on health & condition of earth strip/ grid conductor.

iv) Recommendation

v) Executive summary

1.7 Software simulation & design Adequacy:

Scope of Works: Computer software modeling and simulation of earth grid for safety using CDEGS Software/or its equivalent IEEE software's.

Methodology to be followed: Uniform/Two/Multilayer soil modeling should be chosen basedon least RMS error. Earth electrodes and earth grid in the substation has to be model with present condition. Injection of fault current in the modeled grid has to be done to determined safe touch and step potentials for safety of the earth grid.

Standards to be followed: IEEE 80/ IEEE 81

Meters to be used:Equivalent/suitable.
Deliverables: Software Simulation Report should consist of

i) Input data provided by customer
ii) Soil modeling software screen shot.
iii) Touch & step potential software screen shot with threshold & actual attained values.
iv) Adequacy of existing Earthing Grid for present Fault Current Level & alsofor future expansions.
v) Stitching treatment with implementable solution comprising Earthing designs &BOQ if the sub-station is unsafe.

1.8 Submission of Evaluation Report:

The Executing agency shall after carrying out the detailed study of the existing earthing systems shall submit the comprehensive report with the help of requisite software's regarding adequacy of the existing earthing system & called up to which it is adequate/safe. Also, submit the prepared modification/additions to the existing earthing system **to meet thefault level of 50 kA** along with requisite estimate & bills of materials supported by all self-explanatory drawings for each substation separately.
The agency shall also submit their suggestions/recommendation for improvement or strengthening of the earthing systems.

1.9 Other Details:

a. Bidder should possess sufficient experience and expertise in providing the software to be used for work.
b.Field audit should start with a kick off meeting at the site office with concerned MSETCL engineers.
c. Audit methodology and schedule should be discussed and finalized with concerned MSETCL engineers.
d. Audit team should conduct various tests and measurements as defined in scope of work.
e. Audit team should wear appropriate PPE to ensure utmost safety while working in the field.
f. Vendor/Service Provider should use meters and test equipment of reputed make such as Megger/ Fluke with Current injection capability at variable voltage and variable frequency as recommended in IEEE 81-2012.
g. Copies of valid calibration reports for all the meters and test equipment should be carried to the Site by the audit team and the same should be shown to concerned MSETCL engineers.
h. All data and drawings required for the successful completion of the audit should becollected by the audit team from concerned MSETCL engineers.

i. Preliminary/Draft report should be submitted within 15 days of completion of field audit.

j. Audit Report should consist of:

i. Executive Summary
ii. Test & measurement results, collected data and drawings in appropriatechapters.
iii. Health Condition and status of existing earthing and systems.
iv. Observations of all anomalies and defects at site.
v. Implementable Mitigation measures and recommendation for all theanomalies and defects in the existing system.
vi. Conclusion.

k. Vendor/Service Provider should arrange a report discussion cum presentation meeting within 10 days of submission of draft report to clarify all the queries of MSETCL through virtual meeting platforms.

l. Final report in one soft copy and two hard copies should be submitted by the vendor within 15 days of report discussion.

m. Audit and report engineer should be certified by third party agencies like National Safety Council.

n. The all above activities are part of the stipulated time period of the contract.

o. The bidder shall visit the site of work to see himself the conditions of workplace,labour rates and all other materials required to carry out the work in order to complete in all scope.

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Executive Engineer

EHV O&M Div-I, Pune