



GOVERNMENT OF SINDH
PROJECT MANAGEMENT UNIT (PMU)
MUNICIPAL SERVICES DELIVERY PROGRAM
(MSDP);
PLANNING & DEVELOPMENT DEPARTMENT

REQUEST FOR PROPOSAL

Project

Energy Audit Study of
KW&SB Dhabeji Pumping Complex (DPC)

(Tender Reference No. PMU-MSDP-EAS(DPC)-01)

QUALITY & COST BASED SELECTION (QCBS) METHOD

[RULE 72 (3) OF SINDH PUBLIC PROCUREMENT RULES, 2010 (Amended 2019).]

SEPTEMBER 2020

Foreword

This Standard Request for Proposals is applicable to consultant assignments by the procuring agencies of Sindh province whose legal agreement makes reference to the Sindh Public Procurement Rules, 2010.

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Section 1. Letter of Invitation

NOTICE INVITING TENDER

ENERGY AUDIT STUDY OF KW&SB DHABEJI PUMPING COMPLEX (DPC)

(Tender Reference No. PMU-MSDP-EAS(DPC)-01)

1. The Program Management Unit (PMU), Sindh MSDP; P&D Department, Government of Sindh has received a grant from the USAID towards the cost of Energy Audit Study of KW&SB Dhabeji Pumping Complex (DPC), to support KWSSIP Program.
2. This Energy Audit Study of KW&SB, Dhabeji Pumping Complex (DPC) (Tender Reference No. PMU-MSDP-EAS (DPC)-01) shall be executed through Municipal Services Delivery Program (MSDP) and Financial Assistance of USAID to support KWSSIP Program.
3. The PMU, USAID- Sindh MSDP invites all interested consultant firms/ consultants / joint ventures/ consortium, having a demonstrable experience especially in public sector preferably in providing the consulting services for Energy Sector. The consultant should have valid license of PEC of relevant category and having similar work experience along with registration of relevant tax authorities including Sindh Revenue Board for the above activities. The schedule of sale of tender documents/ RFP and dropping/ opening will be as follows:

Schedule	Date & Time	Venue
Issuance of Tender	From (During Working Hours) 10th September , 2020 (Thursday) TO 9th October, 2020 (Friday) (Till 12PM)	Office of the Program Director, PMU, MSDP D-18, Block -2, Clifton, Karachi
Dropping of Tender	9th October, 2020 (Friday) 03:30PM	Ph: 021-35810016-18
Opening of Tender	9th October, 2020 (Friday) 04:00PM	
Pre Bid Meeting	22nd September, 2020 (Tuesday)	

4. Consulting firms may obtain further information including Qualification Criteria and acquire the complete set of Request of Proposal (RFP) documents from the office of Program Director PMU MSDP situated at D-18, Block -2, Clifton, Karachi, on submission of a written application personally or through authorized representative from the above office on payment of a fees of Pak Rs. 2000/- (non-refundable) in shape of Call Deposit/Pay Order/Demand Draft in favor of **“The Program Director, Sindh MSDP”** as per given schedule above. In other case the bidding documents can be downloaded from SPPRA /PPMS website www.pprasindh.gov.pk & as well as <http://msdp.gos.pk/> and can be dropped on the given date & time place in this NIT along with a pay order of tender cost as mentioned above otherwise tender will be rejected. All Pay orders should have validity of at least 04 Months from the day of submission to MSDP. Please note that the bidding documents will not be sent through post/ courier.
5. The Tender Notice, prepared in accordance with the instructions in the RFP Documents Technical & Financial Offer separately, accompanied by a bid security of **1% of Bid Price** in Pak Rupees as mentioned below, either in the shape of Call Deposit, Demand Draft/Pay Order or Bank Guarantee in favor of **“The Program Director, Sindh MSDP”**:-

- A. **Pak Rs. 200,000/- (of the 1%)** to be deposited with **Technical Offer**
- B. **1% of quoted bid in Pak Rupees with Financial Offer (After deducting Pak Rs.200,000/- already attached with the Technical Offer)**
6. The Technical Offer of the Bids will be opened on **9th October, 2020 (Friday) 04:00PM**, in presence of the bidders or their authorized representatives who choose to attend at the same address. In case of emergency or holiday, then bids will be received and opened on next working day at the same time.
 7. The bids in sealed covers mentioning name of work and marked as **“Technical”** and **“Financial”** Offer should be dropped at the place and time mentioned above. Initially, the technical proposals will be opened by the Consultant Selection Committee on the date and time mentioned above, whereas the financial proposal will be retained with PMU-MSDP till evaluation of the technical proposals.
 8. The technical proposals submitted by the bidders will be evaluated by Consultant Selection Committee and thereafter financial proposals of technically qualified bids will be opened by the same Committee on the date and time to be communicated to the bidders.
 9. The financial proposals of the bids found technically non-responsive shall be returned bidder.
 10. National Competitive Bidding Method (NCB) with Quality and Cost Based (QCBS) Method will be adopted.
 11. In case, due to any reason, no tenders are received on the above dates then the next date of sale, submission and opening will be as follows:-

Schedule	Date & Time	Venue
Issuance of Tender	From (During Working Hours) 16th October , 2020 (Friday) TO 17th November, 2020 (Tuesday) (Till 12PM)	Office of the Program Director, PMU, MSDP D-18, Block -2, Clifton, Karachi
Dropping of Tender	17th November, 2020 (Tuesday) 03:30PM	Ph: 021-35810016-18
Opening of Tender	17th November, 2020 (Tuesday) 04:00PM	

12. Procuring agency reserves right to annul the bidding process and reject all bids or proposals, as per SPP Rules 2010 (Amended 2019).

Sd/-
Program Director
MSDP Sindh-USAID
House No. D-18, Block-2,
Kehkashan, Clifton, Karachi

Letter of Invitation

Invitation/File No.....;
Karachi and Date]

Dear Mr. /Ms.:

1. The ----- (hereinafter called “Procuring Agency”) now invite proposals to provide the following consulting services:

"-----".

The details on the services are provided in the Terms of Reference.

2. This Request for Proposal (RFP) has been addressed to the interested consultant firms/ consultants / joint ventures/ consortium,
3. A consultant firms/ consultants / joint ventures/ consortium, will be selected under Quality & Cost Based Selection (QCBS) Method and procedures described in this RFP, in accordance with the SPP Rules 2010.
4. The RFP comprised of Technical & Financial Proposal/ Offer as follows:-
 - i. **Technical Part** (This part includes the following documents)
 - Introduction
 - Section 1 - Letter of Invitation
 - Section 2 - Instructions to Consultants (including Data Sheet)
 - Section 3 - Technical Proposal - Standard Forms
 - Section 5 - Terms of Reference
 - Section 6 - Standard Forms of Contract
 - ii. **Financial Part** (This part includes the following documents)
 - Section 4 - Financial Proposal - Standard Forms

Yours sincerely,

Section 2. Instructions to Consultants

Instructions to Consultants

1. Definitions

- (a) “Procuring Agency (PA)” means Program Director PMU- MSDP, P&D Department, Government of Sindh with which the selected Consultant signs the Contract for the Services.
- (b) “Consultant” means an Engineering Professional who can study, design, organize, evaluate and any other professional capability to discharge their expertise as per scope of work.
- (c) “Contract” means an agreement enforceable by law and includes General and Special Conditions of the contract.
- (d) “Data Sheet” means such part of the Instructions to Consultants that is used to reflect specific assignment conditions.
- (e) “Day” means calendar day including holiday.
- (f) “Government” means the Government of Sindh.
- (g) “Instructions to Consultants” (Section 2 of the RFP) means the document which provides to eligible the consultant to qualify as shortlisted Consultants with all information needed to prepare their Proposals.
- (h) “LOI” (Section 1 of the RFP) means the Letter of Invitation sent by the procuring agency to the Consultant.
- (i) “Proposal” means the Technical Proposal and the Financial Proposal.
- (j) “RFP” means the Request For Proposal prepared by the procuring Agency for the selection of Consultants.
- (k) “Sub-Consultant” means any person or entity to whom the Consultant subcontracts any part of the Services. (Not applicable in this case)
- (l) “Terms of Reference” (TOR) means the document included in the RFP as Section 5 which explains the objectives, scope of work, activities, tasks to be performed, respective responsibilities of the procuring agency and the Consultant, and expected results and deliverables of the assignment.

2. Introduction

- 2.1 The Procuring Agency named in the **Data Sheet** will select a consulting firm/organization (the Consultant) in accordance with the method of selection, **Quality and Cost Based Selection (QCBS)** as per SPP Rules 2010 (amended 2019).
- 2.2 The Consultants are invited to submit a Technical Proposal and a Financial Proposal, as specified in the Data Sheet. The Proposal will be the basis for contract negotiations and ultimately for a signed Contract with the selected Consultant.
- 2.3 Consultants should familiarize themselves with rules / conditions and take them into account while preparing their Proposals. Consultants are encouraged to attend a pre- bid meeting as specified in the EOI and Data Sheet. Attending the pre-bid meeting is, however optional. Consultants may liaise with procuring agency's representative named in the Data Sheet for gaining better insight into the assignment.
- 2.4 Consultants shall bear all costs associated with the preparation and submission of their proposals and contract negotiation. The Procuring Agency reserves the right to annul the selection process at any time prior to Contract award, without thereby incurring any liability to the Consultants.
- 2.5 Procuring Agency may provide facilities and inputs as specified in Data Sheet.

3. Conflict of Interest

- 3.1.1 Consultants are required to provide professional, objective, and impartial advice and holding the Procuring Agency interest paramount. They shall strictly avoid conflict with other assignments or their own corporate interest. Consultants have an obligation to disclose any situation of actual or potential conflict that impacts their capacity to serve the best interest of the Procuring Agency, or that may reasonably be perceived as having such effect. Failure to disclose said situations may lead to the disqualification of the Consultant or the termination of its Contract.

- 3.1.2 Without limitation on the generality of the foregoing, Consultants, and any of their affiliates, shall be considered to have a conflict of interest and shall not be recruited, under any of the circumstances set forth below:
- (i) A Consultant that has been engaged by the procuring agency to provide goods, works or services other than consulting services for a project, any of its affiliates, shall be disqualified from providing consulting services related to those goods, works or services. Conversely, a firm hired to provide consulting services for the preparation or implementation of a project, any of its affiliates, shall be disqualified from subsequently providing goods or works or services other than consulting services resulting from or directly related to the firm's consulting services for such preparation or implementation.
 - (ii) A Consultant (including its Personnel and Sub-Consultants) or any of its affiliates shall not be hired for any assignment that, by its nature, may be in conflict with another assignment of the Consultant to be executed for the same or for another Procuring Agency.
 - (iii) A Consultant (including its Personnel and Sub-Consultants) that has a business or family relationship with a member of the Procuring Agency's staff who is directly or indirectly involved in any part of (i) the preparation of the Terms of Reference of the assignment, (ii) the selection process for such assignment, or (iii) supervision of the Contract, may not be awarded a Contract, unless the conflict stemming from this relationship has been resolved.

Conflicting Relationships

- 3.2 Government officials and civil servants may be hired as consultants only if:
- (i) They are on leave of absence without pay;
 - (ii) They are not being hired by the agency they were working for, six months prior to going on leave; and
 - (iv) Their employment would not give rise to any conflict of interest.

4. Fraud and Corruption

It is Government's policy that Consultants under the contract(s), observe the highest standard of ethics during the procurement and execution of such contracts. In pursuit of this policy, the Procuring Agency follows the instructions contained in Sindh Public procurement Rules 2010 which defines:

“ corrupt and fraudulent practices” includes the offering, giving, receiving, or soliciting, directly or indirectly of anything of value to influence the act of another party for wrongful gain or any act or omission ,including misrepresentation, that knowingly or recklessly misleads or attempt mislead a party to obtain a financial or other benefit or to avoid an obligation;

Under Rule 35 of SPPR2010, “The PA can interalia blacklist Bidders found to be indulging in corrupt or fraudulent practices. Such barring action shall be duly publicized and communicated to the SPPRA. Provided that any supplier or contractor who is to be blacklisted shall be accorded adequate opportunity of being heard”.

- 5. Integrity Pact** Pursuant to Rule 89 of SPPR 2010 Consultant undertakes to sign an Integrity pact in accordance with prescribed format attached hereto for all the procurements estimated to exceed Rs. 10 million.
- 6. Eligible Consultants**
- 6.1 If a pre-qualification process has been undertaken, as outlined under Rule 27 and 28 of SPPR2010 for the Contract(s) for which these RFP documents are being issued, those firms - in case of Joint Ventures with the same partner(s) and Joint Venture structure - that had been pre-qualified are eligible.
- 6.2 Short listed consultants emerging from request of expression of interest are eligible.
- 6.3 National consultant in case of NCB (National Competitive bidding) and international consultant in case of ICB International competitive Bidding) shall comply with applicable laws concerning Federal, Provincial & Local taxes and specific eligible parameters defined in the Data sheet, terms of reference ToRs; and consultant from eligible source countries (for ICB) as defined under the rules, laws statues or relevant instructions of Federal/Provincial Government are eligible.
- 7. Eligibility of Sub-Consultants** A prequalified/shortlisted Consultant would not be allowed to associate with Consultants who have failed to qualify the pre- qualification/short listing process. (Sub Consultancy is **NOT** allowed)
- 8. Only one Proposal** The Consultants may only submit one proposal. If a Consultant submits or participates in more than one proposal, such proposals shall be disqualified. Participation of the same Sub- Consultant, including individual experts, to more than one proposal is not allowed.
- 9 Proposal Validity**
- 9.1 The Data Sheet indicates Proposals validity that shall not be more than 90 days in case of National Competitive Bidding (NCB) .

The validity can be extended for further 90 days with mutual consent as per clause 38(4) of SPP Rules 2010 (Amended 2019) During this period, Consultants shall maintain the availability of Professional staff nominated in the Proposal. The Procuring Agency will make its best effort to complete negotiations within this period. Should the need arise; however, the Procuring Agency may request Consultants to extend the validity period of their proposals. Consultants who agree to

such extension shall confirm that they maintain the availability of the Professional staff nominated in the Proposal, or in their confirmation of extension of validity of the Proposal, Consultants may submit new staff in replacement, who would be considered in the final evaluation for contract award. Consultants who do not agree have the right to refuse to extend the validity of their Proposals.

9.2 Consultants shall submit required bid security as defined in the data sheet.

10. Clarification and Amendment in RFP Documents

10.1 Consultants may request for a clarification of contents of the bidding document in writing, and procuring agency shall respond to such queries in writing within three calendar days, provided they are received at least five calendar days prior to the date of opening of proposal. The procuring agency shall communicate such response to all parties who have obtained RFP document without identifying the source of inquiry. Should the PA deem it necessary to amend the RFP as a result of a clarification, it shall do so.

10.2 At any time before the submission of Proposals, the Procuring Agency may amend the RFP by issuing an addendum/ corrigendum in writing. The addendum shall be sent to all Consultants and will be binding on them. Consultants shall acknowledge receipt of all amendments. To give Consultants reasonable time in which to take an amendment into account in their Proposals the Procuring Agency may, if the amendment is substantial, extend the deadline for the submission of Proposals.

11. Preparation of Proposals

11.1 In preparing their Proposal, Consultants are expected to examine in detail the documents comprising the RFP. Material deficiencies (deviation from scope, experience and qualification of personnel) in providing the information requested may result in rejection of a Proposal.

11.2 The estimate number of professional staff months or the budget required for executing the assignment should be shown in the data sheet, but not both. However, proposal shall be based on the professional staff month or budget estimated by the consultant.

12. Language

The Proposal as well as all related correspondence exchanged by the Consultants and the Procuring Agency shall be written in English. However, it is desirable that the firm's Personnel have a working knowledge of the national and regional languages of Islamic Republic of Pakistan.

13. Technical Proposal Format and Content

13.1 While preparing the Technical Proposal, consultants must give particular attention to the following:

- (i) If a consultant considers that it does not have all the expertise for the assignment, it may obtain a full range of expertise by associating with individual consultant(s) and/or other firms or entities in a joint venture or sub-consultancy, as appropriate. The international consultants are encouraged to seek the participation of local consultants by entering into a joint venture with, or subcontracting part of the assignment to, national consultants.
- (ii) For assignments on a staff-time basis, the estimated number of professional staff-months is given in the Data Sheet. The proposal shall, however, be based on the number of professional staff-months estimated by the firm. For fixed-budget-based assignments, the available budget is given in the Data Sheet, and the Financial Proposal shall not exceed this budget.
- (iii) It is desirable that the majority of the key professional staff proposed be permanent employees of the firm or have an extended and stable working relationship with it. However, given the multi-disciplinary technical nature of works involved, respective expertise can be acquired with undertaking of the availability for the duration of the project timeline.
- (iv) Proposed professional staff must, at a minimum, have the experience indicated in the Data Sheet, preferably working under similar geographical condition.
- (v) Alternative professional staff shall not be proposed, and only one curriculum vitae (CV) shall be submitted for each position.

13.2 The Technical Proposal shall provide the following information using the attached Standard Forms (Section 3):

- (i) A brief description of the consultant organization and an outline of recent experience on assignments (Section 3B) of a similar nature. For each assignment, the outline should indicate, *inter alia*, details of contract assignment.

- (ii) Any comments or suggestions on the Terms of Reference and on the data, a list of services, and facilities to be provided by the PA (Section 3C).
- (iii) The list of the proposed staff team by specialty, the tasks that would be assigned to each staff team member, and their timing (Section 3E).
- (iv) CVs recently signed by the proposed professional staff and the authorized representative submitting the proposal (Section 3F). Key information should include number of years working for the consultant and degree of responsibility held in various assignments during the last years as required in the Eligibility and Qualification Criteria.
- (v) Estimates of the total staff input (professional and support staff; staff time) needed to carry out the assignment, supported by bar chart diagrams showing the time proposed for each professional staff team member (Sections 3E and 3G).
- (vi) A detailed description of the proposed methodology, work plan for performing the assignment, staffing, and monitoring of training, as specified in the Scope of Work and Data Sheet, training as a major component of the assignment (Section 3D).
- (vii) Any additional information requested in the Data Sheet.

13.3 The Technical Proposal shall not include any financial information.

14. Financial Proposals

14.1 The Financial Proposal shall be prepared using the attached Standard Forms (Section 4). It shall list all costs associated with the assignment, including (a) remuneration for staff (in the field and at the Consultants' office), and (b) reimbursable expenses indicated in the Data Sheet (if applicable). Alternatively Consultant may provide their own list of cost. If appropriate, these costs should be broken down by activity. All activities and items described in the Technical Proposal must be priced separately; activities and items described in the Technical Proposal but not priced, shall be assumed to be included in the prices of other activities or items.

15. Taxes

15.1 The Consultant will be subject to all admissible taxes including stamp duty and service charges at a rate prevailing on the date of contract agreement unless exempted by relevant tax authority.

16. Submission,

16.1 Proposal shall contain no interlineations or overwriting.

**Receipt, and
Opening of
Proposals**

Submission letters for both Technical and Financial Proposals should respectively be in the format of TECH-1 of Section 3, and FIN-1 of Section 4. All pages of the original Technical and Financial Proposals will be initialed by an authorized representative of the Consultants. The authorization shall be in the form of a written power of attorney accompanying the Proposal

16.2 All required copies of the Technical Proposal are to be made from the original. If there are discrepancies between the original and the copies of the Technical Proposal, the original governs.

16.3 The original and all copies of the Technical Proposal shall be placed in a sealed envelope clearly marked "TECHNICAL PROPOSAL" Similarly, the original Financial Proposal shall be placed in a sealed envelope clearly marked "FINANCIAL PROPOSAL" followed by name of the assignment, and with a warning "**DO NOT OPEN WITH THE TECHNICAL PROPOSAL.**" If the Financial Proposal is not submitted in a separate sealed envelope duly marked as indicated above, this will constitute grounds for declaring the Proposal non-responsive.

16.4 The Proposals must be sent to the address indicated in the Data Sheet and received by the PA no later than the time and the date indicated in the Data Sheet, or any extension to this date. Any proposal received by the PA after the deadline for submission shall be returned unopened. In order to avoid any delay arising from the postal or PA's internal dispatch workings, Consultants should ensure that proposals to be sent through couriers should reach a day before the deadline for submission.

17.1 From the time the Proposals are opened to the time the Contract is awarded, the Consultants should not contact the PA on any matter related to its Technical and/or Financial Proposal. Any effort by Consultants to influence the PA in the examination, evaluation, ranking of Proposals, and recommendation for award of Contract may result in the rejection of the Consultants' Proposal.

**17. Proposal
Evaluation**

Evaluators of Technical Proposals shall have no access to the Financial Proposals until the technical evaluation is concluded.

18.1 Notwithstanding any method used pursuant to Rule 36 (a-d) of PPR 2010, the evaluation committee shall evaluate the Technical Proposals on the basis of their responsiveness to the Terms of Reference, applying the evaluation criteria, sub-

**18. Evaluation of
Technical Proposals**

criteria, and point system specified in the Data Sheet. Each responsive Proposal will be given a technical score (St). A Proposal shall be rejected at this stage if it fails to achieve the minimum technical score indicated in the Data Sheet.

As this case is of Quality and Cost -Based Selection (QCBS), method, therefore the highest ranked consultant or firm/ Joint Venture/ consortium is invited to negotiate its proposal and the contract on the basis of the Technical Proposal and the Financial Proposal submitted.

**Public Opening and
Evaluation of Financial
Proposals: (QCBS,
Fixed-Budget, and
Least-Cost Selection
Methods Only)**

- 18.2 After the technical evaluation is completed, the PA shall notify in writing Consultants that have secured the minimum qualifying marks, the date, time and location, allowing a reasonable time, for opening the Financial Proposals. Consultants' attendance at the opening of Financial Proposals is optional.

Financial proposals of those consultants who failed to secure minimum qualifying marks shall be returned unopened after issuance of acceptance letter to the successful bidder.

**19. Evaluation of
Financial Proposals**

- 19.1 In QCBS, Financial Proposals shall be opened publicly in the presence of the Consultants' representatives who choose to attend. The name of the Consultants, and the technical scores of the Consultants shall be read aloud. The Financial Proposal of the Consultants who met the minimum qualifying mark will then be inspected to confirm that they have remained sealed and unopened. These Financial Proposals shall be then opened, and the total prices read aloud and recorded.
- 19.2 The Evaluation Committee will correct any computational errors. When correcting computational errors, in case of discrepancy between a partial amount and the total amount, or between word and figures the formers will prevail. In addition to the above corrections, activities and items described in the Technical Proposal but not priced, shall be assumed to be included in the prices of other activities or items.
- 19.3 The Lowest Evaluated Financial Proposal (Fm) will be given the maximum financial score (Sf) of 100 points. The financial scores (Sf) of the other Financial Proposals will be computed as indicated in the Data Sheet. Proposals will be ranked according

to their combined technical (St) and financial (Sf) scores using the weights (T = the weight given to the Technical Proposal; P = the weight given to the Financial Proposal; T + P = 1) indicated in the Data Sheet: $S = St \times T\% + Sf \times P\%$. The firm achieving the highest combined technical and financial score will be invited for negotiations.

19.4 In the case of Fixed-Budget and Quality Based Selection, the Procuring Agency will select the firm that submitted the highest ranked Technical Proposal. (NOT APPLICABLE IN THIS CASE)

20. Negotiations

20.1 Negotiations will be held at the date and address indicated in the Data Sheet. The invited Consultant will, as a pre-requisite for attendance at the negotiations, confirm availability of all Professional staff. Failure in satisfying such requirements may result in the PA proceeding to negotiate with the next-ranked Consultant. Representatives conducting negotiations on behalf of the Consultant must have written authority to negotiate and conclude a Contract.

21. Technical negotiations

21.1 Technical Negotiations will include a discussion of the Technical Proposal, the proposed technical approach and methodology, work plan, organization and staffing, and any suggestions made by the Consultant to improve the Terms of Reference. The PA and the Consultants will finalize the Terms of Reference, staffing schedule, work schedule, logistics, and reporting. These documents will then be incorporated in the Contract as "Description of Services". Minutes of negotiations, which will be signed by the PA and the Consultant, will become part of Contract Agreement.

22. Financial negotiations

22.1 If applicable, it is the responsibility of the Consultant, before starting financial negotiations, to contact the local tax authorities to determine the tax amount to be paid by the Consultant under the Contract. The financial negotiations will include a clarification (if any) of the firm's tax liability, and the manner in which it will be reflected in the Contract; and will reflect the agreed technical modifications in the cost of the services. Consultants will provide the PA with the information on remuneration rates described in the Appendix attached to Section 4 i.e. Financial Proposal - Standard Forms of this RFP.

23. Availability of Professional

23.1 Having selected the Consultant on the basis of, among other things, an evaluation of proposed Professional staff, the PA

staff/experts

expects to negotiate a Contract on the basis of the Professional staff named in the Proposal. Before contract negotiations, the PA will require assurances that the Professional staff will be actually available. The PA will not consider substitutions during contract negotiations unless both parties agree that undue delay in the selection process makes such substitution unavoidable or for reasons such as death or medical incapacity. If this is not the case and if it is established that Professional staff were offered in the proposal without confirming their availability, the Consultant may be disqualified. Any proposed substitute shall have equivalent or better qualifications and experience than the original candidate and be submitted by the Consultant within the period of time specified in the letter of invitation to negotiate.

24. Award of Contract

- 24.1 After completing negotiations, the Procuring Agency shall award the Contract to the selected Consultant and within fifteen calendar days of the award of contract, Procuring Agency shall publish on the website of the Authority and on its own website, if such a website exists, the result of the bidding process, identifying the bid through procuring identifying number, if any and the following information, evaluation report, form of contract and letter of award, bill of quantity or schedule of requirement, as the case may be.
- 24.2 After issuance of Acceptance Letter the Consultant required to submit a performance security at the rate indicated in data sheet.
- 24.3 The Consultant is expected to commence the assignment on the date and at the location specified in the Data Sheet.

25. Confidentiality

Information relating to evaluation of Proposals and recommendations concerning awards shall not be disclosed to the Consultants who submitted the Proposals or to other persons not officially concerned with the process, until the publication of the Award of Contract. The undue use by any Consultant of confidential information related to the process may result in the rejection of its Proposal.

26. Contract Period

As mentioned in the Data Sheet.

Revised Data Sheet

Clause Reference	
1.1	<p>Name of the Assignment is: " Energy Audit Study of KW&SB Dhabeji Pumping Complex (DPC)".</p> <p>The Name of the PA's official (s):</p> <p>The Office of Program Director PMU- MSDP; P& D Department, Government of Sindh.</p> <p>Address: <u>PMU-MSDP Sindh-USAID</u> <u>House No. D-18, Block-2,</u> <u>Kehkashan, Clifton, Karachi</u> Telephone: <u>021-35810017</u></p> <p>Facsimile: _____</p> <p>E-mail: _____</p>
1.2	<p>The method of selection is: <u>Quality and Cost Based Selection (QCBS)</u></p> <p>The Edition of the Guidelines is: <u>The Sindh Public Procurement Rules, 2010 (Amended 2019).</u></p>
1.3	<p>Financial Proposal to be submitted together with Technical Proposal:</p> <p><u>Yes</u></p> <p>(but Financial & Technical Proposals are to submitted in separate envelopes) Type of contract is lump Sum (inclusive of all costs)</p> <p>Note: The Consultant firm is required to submit Cost Breakdown / Rate Analysis of the Financial Proposal on the basis of the final deliverables of the project including the software and the trainings.</p>
1.4	<p>The PA will provide the following inputs and facilities: <u>Dedicated staff for liaison & coordination.</u></p>
1.5	<p>The Proposal submission address is: <u>The Office of Program Director</u> <u>PMU-MSDP Sindh-USAID</u> <u>House No. D-18, Block-2,</u> <u>Kehkashan, Clifton, Karachi</u></p> <p>Proposals must be submitted no later than the date and time as mentioned in the EOI</p>
1.6	<p>Expected date for commencement of consulting services: <u>September 2020.</u></p>

9.1	Proposals validity is 90 days as this is National Competitive Bidding (NCB) as per SPP Rules 2010 (Amended 2019), which can be extended for further 90 days with mutual consent as permissible by SPPRA.
9.2	The consultants shall submit bid security of 1% of the bid price along with Technical and Financial proposal as mentioned in the EOI, in form of pay order / bank draft, and in favor <u>The Program Director, PMU- MSDP.</u>
10.1	Clarifications may be requested before the Pre- Bid meeting scheduled as per the EOI. The address for requesting clarifications is: <u>The Office of Program Director</u> <u>MSDP Sindh-USAID</u> <u>House No. D-18, Block-2,</u> <u>Kehkashan, Clifton, Karachi</u> Facsimile: _____ E-mail: _____
12	The Proposal as well as all related correspondence exchanged by the Consultants and the Procuring Agency shall be written in English. However it is desirable that the firm's Personnel have a working knowledge of the national and regional languages of Islamic Republic of Pakistan.
6.1	Not Applicable.
11.2	The estimated number of professional staff-months required for the assignment is: _____
13.1	The format of the Technical Proposal to be submitted is: <u>Technical Proposal</u>
13.2 (vii)	Training is specific component of this assignment <u>Yes.</u>
14.1	<i>List the applicable Reimbursable expenses in local currency.</i>
15.1	Amounts payable by the PA to the Consultant under the contract to be subject to local taxation, stamp duty and service charges, if applicable <u>Yes</u>
16.2	Consultant must submit the original and <u>02</u> copies of the Technical Proposal and the original of the Financial Proposal.
13.1	Criteria, sub-criteria, and point system for the evaluation of Technical Proposals are:

S.No	Evaluation Criteria	Marks	
1	Company Profile	05	
2	Approach & Methodology	15	
	a) Working Methodology specially elaborating the plan to complete the task within given time period		6 Points
	b) List of technology/ software & hardware /equipment's / tools to meet your execution plan		3 Points
	c) Understanding of main working area		3 Points
	d) Approach to overcome the expected site problems during execution	3 Points	
3	<p>Man Power Local with Relevant Project Experience (Following each Man Power has 3 points)</p> <ul style="list-style-type: none"> a) Team Leader(Electric or Mechanical Engineer)/Chief Project Manager b) Water Distribution Network / Civil Engineer c) Electrical Engineer / Water Transmission & Pumps Analyst d) Mechanical Engineer / Water Transmission Lines / Mechanical Systems Analyst e) Water Distribution Software Analyst f) Electrical Software Analyst g) Senior Mechanical Technician h) Senior Electrical Technician i) Water / Transmission Line Network Technician j) Field Surveyors <p>(The local Experts should demonstrate proven record of relevant projects experience required along with use of required software project experience in past for Energy and Water Simulation and Calibration Software as recommended in the TOR).</p>	30	
4	<p>Man Power International (Hydraulics Expert)</p> <p>(The International Experts should demonstrate proven record of relevant projects experience required along with use of required software project experience in past for Energy and Water Simulation and Calibration Software as recommended in the TOR).</p>	30	
5	<p>Firm Relevant Experience (Marks as against each following category)</p> <p>(The Lead Firm should have established proven record of undertaking civil , mechanical and electrical / transmission / energy projects for qualifying to undertake comprehensive Energy Audit of KW&SB Dhabeji Pumping Complex (DPC))</p> <ul style="list-style-type: none"> a) Mechanical / Industrial Projects (8 Marks) b) Hydraulics / Water Transmission Projects (8 Marks) c) Technical Trainings (4 Marks) 	20	
	TOTAL	100	
	Note: Minimum Qualifying Scores should be 75 or above for financial bid consideration		

	<p>In addition, the firms will be required to qualify against each following Eligibility Criteria prior to evaluate on Qualification Criteria, as mentioned above, on the basis of their technical offer.</p> <p style="text-align: center;"><u>Eligibility Criteria</u></p> <ul style="list-style-type: none"> i. Project Manager/ Team Leader should be an electrical/mechanical engineer and local/ Pakistani National. ii. Firm’s Litigation History on Rs. 500 Stamp Paper. (In case of JV/ Consortium, all members will submit separately) iii. Affidavit on Rs. 500 stamp paper that firm has never been black listed. (In case of JV/ Consortium, all members will submit separately) iv. Integrity Pact on Rs. 500 Stamp Paper, duly signed and stamped. (In case of JV/ Consortium, all members will submit separately) v. Firm’s NTN, SRB, GST, PEC and registration with relevant professional body. (In case of JV/ Consortium, all partners will comply) vi. Proper Page Numbering with Initial and stamp on each paper by Authorized personnel.
Q	Expected date and address for contract negotiations: To be announced later after Bid Evaluation.
24.2	Successful consultant is required to submit performance security in form of pay order, demand draft or bank guarantee in favor of Program Director PMU- MSDP. The amount of performance security will be equivalent to 5% of the contract amount.
5.1	Consultant undertakes to sign Integrity Pact for the procurement estimated to exceed Pak Rs.10 million.

Section 3. Technical Proposal - Standard Forms

[Comments in brackets] provide guidance to the shortlisted Consultants for the preparation of their Technical Proposals; they should be deleted from the Technical Proposals to be submitted.]

Refer to Reference Paragraph 13.1 of the Data Sheet for format of Technical Proposal to be submitted, and paragraph 13.2 of Section 2 of the RFP for Standard Forms required and number of pages recommended.

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	A - Consultant's Organization	26
	B - Consultant's Experience	27
Form TECH-3.	Comments and Suggestions on the Terms of Reference and on Counterpart Staff and Facilities to be Provided by the PA	28
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Form TECH-4.	Description of Approach, Methodology and Work Plan for Performing the Assignment	30
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Form TECH-7.	Staffing Schedule.....	34
Form TECH-8.	Work Schedule.....	35

FORM TECH-1. TECHNICAL PROPOSAL SUBMISSION FORM

[Location, Date]

To: [Name and address of PA]

Dear Sirs:

We, the undersigned, offer to provide the consulting services for [Insert title of assignment] in accordance with your Request for Proposal dated [Insert Date] and our Proposal. We are hereby submitting our Proposal, which includes this Technical Proposal, and a Financial Proposal sealed under a separate envelope.

We are submitting our Proposal in association with: [Insert a list with full name and address of each associated Consultant]

We hereby declare that all the information and statements made in this Proposal are true and accept that any misinterpretation contained in it may lead to our disqualification.

If negotiations are held during the period of validity of the Proposal, i.e., before the date indicated in the Data Sheet, we undertake to negotiate on the basis of the proposed staff. Our Proposal is binding upon us and subject to the modifications resulting from Contract negotiations.

We undertake, if our Proposal is accepted, to initiate the consulting services related to the assignment not later than the date indicated in the Data Sheet.

We understand you are not bound to accept any Proposal you receive. We remain,

Yours sincerely,

Authorized Signature [In full and initials]: _____ Name
and Title of Signatory: _____ Name of
Firm: _____ Address: _____

-
- 1 [In case Paragraph Reference 1.2 of the Data Sheet requires to submit a Technical Proposal only, replace this sentence with: "We are hereby submitting our Proposal, which includes this Technical Proposal only."]
 - 2 [Delete in case no association is foreseen.]

For FTP Only

FORM TECH-2. CONSULTANT'S ORGANIZATION AND EXPERIENCE

A - Consultant's Organization

[Provide here a brief (two pages) description of the background and organization of your firm/entity and each associate for this assignment.]

B - Consultant's Experience

[Using the format below, provide information on each assignment for which your firm, and each associate for this assignment, was legally contracted either individually or as a corporate entity or as one of the major companies within an association, for carrying out consulting services similar to the ones requested under this assignment. Use 20 pages.]

Assignment name:	Approx. value of the contract (in current US\$ or Euro):
Country: Location within country:	Duration of assignment (months):
Name of PA:	Total No of staff-months of the assignment:
Address:	Approx. value of the services provided by your firm under the contract (in current US\$ or Euro):
Start date (month/year): Completion date (month/year):	No of professional staff-months provided by associated Consultants:
Name of associated Consultants, if any:	Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):
Narrative description of Project:	
Description of actual services provided by your staff within the assignment:	

Firm's Name: _____

For FTP Only

FORM TECH-3. COMMENTS AND SUGGESTIONS ON THE TERMS OF REFERENCE AND ON COUNTERPART STAFF AND FACILITIES TO BE PROVIDED BY THE PA

A - On the Terms of Reference

[Present and justify here any modifications or improvement to the Terms of Reference you are proposing to improve performance in carrying out the assignment (such as deleting some activity you consider unnecessary, or adding another, or proposing a different phasing of the activities). Such suggestions should be concise and to the point, and incorporated in your Proposal.]

B - On Counterpart Staff and Facilities

[Comment here on counterpart staff and facilities to be provided by the PA according to Paragraph Reference 1.4 of the Data Sheet including: administrative support, office space, local transportation, equipment, data, etc.]

FORM TECH-4. DESCRIPTION OF APPROACH, METHODOLOGY AND WORK PLAN FOR PERFORMING THE ASSIGNMENT

[Technical approach, methodology and work plan are key components of the Technical Proposal. You are suggested to present your Technical Proposal (maximum of 50 pages, inclusive of charts and diagrams) divided into the following three chapters:

a) Technical Approach and Methodology, b)

Work Plan, and

c) Organization and Staffing,

a) Technical Approach and Methodology. In this chapter you should explain your understanding of the objectives of the assignment, approach to the services, methodology for carrying out the activities and obtaining the expected output, and the degree of detail of such output. You should highlight the problems being addressed and their importance, and explain the technical approach you would adopt to address them. You should also explain the methodologies you propose to adopt and highlight the compatibility of those methodologies with the proposed approach.

b) Work Plan. In this chapter you should propose the main activities of the assignment, their content and duration, phasing and interrelations, milestones (including interim approvals by the PA), and delivery dates of the reports. The proposed work plan should be consistent with the technical approach and methodology, showing understanding of the TOR and ability to translate them into a feasible working plan. A list of the final documents, including reports, drawings, and tables to be delivered as final output, should be included here. The work plan should be consistent with the Work Schedule of Form TECH-8.

c) Organization and Staffing. In this chapter you should propose the structure and composition of your team. You should list the main disciplines of the assignment, the key expert responsible, and proposed technical and support staff.]

FORM TECH-5. TEAM COMPOSITION AND TASK ASSIGNMENTS

Professional Staff				
Name of Staff	Firm	Area of Expertise	Position Assigned	Task Assigned

FORM TECH-6. CURRICULUM VITAE (CV) FOR PROPOSED
PROFESSIONAL STAFF

1. **Proposed Position** [*only one candidate shall be nominated for each position*]: _____

2. **Name of Firm** [*Insert name of firm proposing the staff*]: _____

3. **Name of Staff** [*Insert full name*]: _____

4. **Date of Birth:** _____ **Nationality:** _____

5. **Education** [*Indicate college/university and other specialized education of staff member, giving names of institutions, degrees obtained, and dates of obtainment*]: _____

6. **Membership of Professional Associations:** _____

7. **Other Training** [*Indicate significant training since degrees under 5 - Education were obtained*]: _____

8. **Countries of Work Experience:** [*List countries where staff has worked in the last ten years*]: _____

9. **Languages** [*For each language indicate proficiency: good, fair, or poor in speaking, reading, and writing*]: _____

10. **Employment Record** [*Starting with present position, list in reverse order every employment held by staff member since graduation, giving for each employment (see format here below): dates of employment, name of employing organization, positions held.*]:

From [Year]: _____ To [Year]: _____

Employer: _____

Positions held: _____

<p>11. Detailed Tasks Assigned</p> <p><i>[List all tasks to be performed under this assignment]</i></p>	<p>12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned</p> <p><i>[Among the assignments in which the staff has been involved, indicate the following information for those assignments that best illustrate staff capability to handle the tasks listed under point 11.]</i></p> <p>Name of assignment or project: _____</p> <p>Year: _____</p> <p>Location: _____ PA: _____</p> <p>Main project features: _____</p> <p>Positions held: _____</p> <p>Activities performed: _____</p>
--	---

13. Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

_____ Date: _____
[Signature of staff member or authorized representative of the staff] Day/Month/Year

Full name of authorized representative: _____

FORM TECH-7. STAFFING SCHEDULE¹

N°	Name of Staff	Staff input (in the form of a bar chart) ²													Total staff-month input			
		1	2	3	4	5	6	7	8	9	10	11	12	n	Home	Field ³	Total	
Foreign																		
1		<i>[Home]</i>															[Cross-hatch]	
		<i>[Field]</i>															[Cross-hatch]	
2																	[Cross-hatch]	[Cross-hatch]
																	[Cross-hatch]	[Cross-hatch]
3																	[Cross-hatch]	[Cross-hatch]
																	[Cross-hatch]	[Cross-hatch]
n																	[Cross-hatch]	[Cross-hatch]
																	[Cross-hatch]	[Cross-hatch]
Subtotal													[Cross-hatch]					
Local																		
1		<i>[Home]</i>															[Cross-hatch]	[Cross-hatch]
		<i>[Field]</i>															[Cross-hatch]	[Cross-hatch]
2																	[Cross-hatch]	[Cross-hatch]
																	[Cross-hatch]	[Cross-hatch]
n																	[Cross-hatch]	[Cross-hatch]
																	[Cross-hatch]	[Cross-hatch]
Subtotal													[Cross-hatch]					
Total													[Cross-hatch]	[Cross-hatch]				

- 1 For Professional Staff the input should be indicated individually; for Support Staff it should be indicated by category (e.g.: draftsmen, clerical staff, etc.).
- 2 Months are counted from the start of the assignment. For each staff indicate separately staff input for home and field work.
- 3 Field work means work carried out at a place other than the Consultant's home office.

Full time input
 Part time input

FORM TECH-8. WORK SCHEDULE

N°	Activity ¹	Months ²												
		1	2	3	4	5	6	7	8	9	10	11	12	n
1														
2														
3														
4														
5														
n														

1 Indicate all main activities of the assignment, including delivery of reports (e.g.: inception, interim, and final reports), and other benchmarks such as PA approvals. For phased assignments indicate activities, delivery of reports, and benchmarks separately for each phase.

2 Duration of activities shall be indicated in the form of a bar chart.

Section 4. Financial Proposal - Standard Forms

[Comments in brackets [] provide guidance to the shortlisted Consultants for the preparation of their Financial Proposals; they should be deleted from the Financial Proposals to be submitted.]

Financial Proposal Standard Forms shall be used for the preparation of the Financial Proposal according to the instructions provided under para. 14 of Section 2. Such Forms are to be used whichever is the selection method indicated in para. 4 of the Letter of Invitation.

[The Appendix “Financial Negotiations - Breakdown of Remuneration Rates” is to be only used for financial negotiations when Quality-Based Selection, Selection Based on Qualifications, or Single-Source Selection method is adopted, according to the indications provided under para. 6.3 of Section 2.]

Form FIN-1.	Financial Proposal Submission Form	37
Form FIN-2.	Summary of Costs.....	38
Form FIN-3.	Breakdown of Costs by Activity	39
Form FIN-4.	Breakdown of Remuneration.....	40
Form FIN-5.	Breakdown of Reimbursable Expenses	41

FORM FIN-1. FINANCIAL PROPOSAL SUBMISSION FORM

[Location, Date]

To:[Name and address of PA]

Dear Sirs:

We, the undersigned, offer to provide the consulting services for [Insert title of assignment] in accordance with your Request for Proposal dated [Insert Date] and our Technical Proposal. Our attached Financial Proposal is for the sum of [Insert amount(s) in words and figures¹].

Our Financial Proposal shall be binding upon us subject to the modifications resulting from Contract negotiations, up to expiration of the validity period of the Proposal, i.e. before the date indicated in Paragraph Reference 1.12 of the Data Sheet.

Commissions and gratuities paid or to be paid by us to agents relating to this Proposal and Contract execution, if we are awarded the Contract, are listed below²:

Name and Address of Agents	Amount and Currency	Purpose of Commission or Gratuity
_____	_____	_____
_____	_____	_____
_____	_____	_____

We understand you are not bound to accept any Proposal you receive.

We remain,

Yours sincerely,

Authorized Signature [In full and initials]: _____

Name and Title of Signatory: _____

Name of Firm: _____

Address: _____

1 Amounts must coincide with the ones indicated under Total Cost of Financial proposal in Form FIN-2.

2 If applicable, replace this paragraph with: "No commissions or gratuities have been or are to be paid by us to agents relating to this Proposal and Contract execution."

FORM FIN-2. SUMMARY OF COSTS

Item	Costs	
	<i>Indicate Foreign Currency</i>	<i>Indicate Local Currency</i>
Total Costs of Financial Proposal ²		

- 1 All payments will be made in Pak Rupees.
- 2 Indicate the total costs excluding local taxes to be paid by the PA in Pak Rupees. Such total costs must coincide with the sum of the relevant Subtotals indicated in all Forms FIN-3 provided with the Proposal.
- 3 Direct Cost should include Cost of Software and Training

FORM FIN-3. BREAKDOWN OF COSTS BY ACTIVITY¹

Group of Activities (Phase): ² _____	Description: ³ _____			
	Costs			
Cost component	<i>[Indicate Foreign Currency # 1]</i> ⁴	<i>[Indicate Foreign Currency # 2]</i> ⁴	<i>[Indicate Foreign Currency # 3]</i> ⁴	<i>[Indicate Local Currency]</i>
Remuneration ⁵				
Reimbursable Expenses ⁵				
Subtotals				

- 1 Form FIN-3 shall be filled at least for the whole assignment. In case some of the activities require different modes of billing and payment (e.g.: the assignment is phased, and each phase has a different payment schedule), the Consultant shall fill a separate Form FIN-3 for each group of activities. For each activity, the sum of the relevant Subtotals of all Forms FIN-3 provided must coincide with the Total Costs of Financial Proposal indicated in Form FIN-2.
- 2 Names of activities (phase) should be the same as, or correspond to the ones indicated in the second column of Form TECH-8.
- 3 Short description of the activities whose cost breakdown is provided in this Form.
- 4 All payments will be reflected in Pak Rupees in FIN-2.
- 5 Remuneration and Reimbursable Expenses must respectively coincide with relevant Total Costs indicated in Forms FIN-4, and FIN-5.

FORM FIN-4. BREAKDOWN OF REMUNERATION¹

Name ²	Position ³	Staff-month Rate ⁴
Foreign Staff		
		[Home]
		[Field]
Local Staff		
		[Home]
		[Field]

- 1 Form FIN-4 shall be filled in for the same Professional and Support Staff listed in Form TECH-7.
- 2 Professional Staff should be indicated individually; Support Staff should be indicated per category (e.g.: draftsmen, clerical staff).
- 3 Positions of the Professional Staff shall coincide with the ones indicated in Form TECH-5.
- 4 Indicate separately staff-month rate and rate of payment for home and field work.

FORM FIN-5. BREAKDOWN OF REIMBURSABLE EXPENSES

N°	Description ¹	Unit	Unit Cost ²
	Per diem allowances	Day	
	International flights ³	Trip	
	Miscellaneous travel expenses	Trip	
	Communication costs between [Insert place] and [Insert place]		
	Drafting, reproduction of reports		
	Equipment, instruments, materials, supplies, etc.		
	Shipment of personal effects	Trip	
	Use of computers, software		
	Laboratory tests.		
	Subcontracts		
	Local transportation costs		
	Office rent, clerical assistance		
	Training of the PA's personnel		

- 1 Delete items that are not applicable or add other items according to Paragraph Reference 14.1 of the Data Sheet.
- 2 Indicate unit cost in Pak Rupees.
- 3 Indicate route of each flight, and if the trip is one- or two-ways.
- 4 Only if the training is a major component of the assignment, defined as such in the TOR.

Section 5. Terms of Reference

Dhabeji Pumping Complex (DPC) **Scope of Works for E&A Services**

5.0 Introduction and Objectives of the Study

Karachi Water and Sewerage Services Improvement Project (KWSSIP) has been conceived by the World Bank (WB) and the Asian Infrastructure Investment Bank (AIIB) as a multi-phased Program with three overlapping phases over a 12 years period. First phase, with a planned outlay of \$400 million, aims to (a) raise the Karachi Water and Sewage Board (KW&SB) operational capacity to delivery reliable municipal services in water and sanitation on a sustainable and predictable basis; and (b) establish an enabling environment for future private sector investments in water supply and waste water services delivery. All the three phases of KWSSIP would be underpinned by strong institutional reforms and strengthening of regulatory framework in order to expand the coverage of water and sanitation services to the city's residents. Achievements toward key performance indicators and lessons learnt during the first phase will inform the design of the subsequent phases.

Promoting energy efficiency is a key aspect of the project as energy is a central expense, constituting 48% of the utility's operational costs in fiscal year 2017, thus contributing to its financial losses, unsteady services, and weakening institutional autonomy due to dependency on the provincial government for energy subsidies. The performance and technical audits are integral activities in preparing the WB/AIIB lending program which will contribute to improving the quality and sustainability of water services of Karachi. The timely preparation of a detailed diagnostic study auditing energy use at Dhabeji Pumping Station, ranked as the largest electro-mechanical installation of KW&SB, would greatly contribute in the preparation of KWSSIP by recommending the measures, investments and capacity building in energy-intensive installations of KW&SB.

The improvements that will be made as a result of the proposed performance audit will contribute directly to improving the quality and sustainability of water and sanitation services in the megacity of Karachi, and also reduce unnecessary greenhouse gas emissions by KW&SB. It is expected that the study will provide a platform to catalyze additional investments, of the orders of magnitude, either from the multilateral development banks and/or from private sector, to turn around the operation and maintenance of Dhabeji Pumping Station for optimum, energy-efficient and sustainable operations.

6.0 Scope

Energy Efficiency and Technical Audit (EETA) for the Dhabeji Pumping Station (DPC)

The EETA for DPC will be carried out at four distinct levels. Each level will have distinct deliverables and the next level will commence upon successful completion of the existing level and approval of the deliverables by the concerned USAID official(s). The four levels are (1) Site Survey and data generation, (2) Energy Survey and Engineering Assessment/Analyses, (3) technical recommendations for improvement/modifications that form basis for procurement of capital works, and (4) capacity building. The scope does not include the analysis of the city's distribution system, The consultant will recommend suitable control points such that the required assessments for the DPC can be satisfactorily done within these boundaries including the study of corresponding pumping infrastructure up to the discharge point with a holistic approach.

Level 1: Site survey and data generation

The survey audit of proposed site will include analysis of previous energy bills (typically up to five years), a visit to the facility and interview with the key decision makers, and basic energy measurements. This level will also include two aspects, i.e. review and analysis of secondary data / information and to generate basic pump house primary data/ information. The list of illustrative activities is given below:

- a) Conduct a thorough inspection of the facility and document the current physical and operational state;
- b) Inspect the sub-station and monitor system current, voltage, and analyze KW and frequency;
- c) Calculate and measure actual connected load actual energy consumption throughout at given intervals of time. Analyze the collected data find any gaps and the need for improvement.
- d) Inspect the existing earthing system, measure the earthing resistance to find adequacy and sufficiency of the system.
- e) Collect data regarding failure of transformer, motors, motor control centers, cable faults, relay operation and tripping. Also gather data regarding the maintenance of all major components.
- f) Prepare single line diagram of the electrical network: Existing single line diagrams will be collected and reproduced to provide following essential information:
- g) Transformer: Transformer capacity, High voltage, Low voltage, percentage impedance, vector group.
- h) Motor: Rated Voltage, Rated current, frequency, IP protection
- i) Cables: type of cable, size, make, length, method of installation
- j) High voltage circuit breakers, low voltage circuit breakers.
- k) Determine Pump Capacity, Pump age, pump flow rate, mechanical and fluid power efficiency
 - i. Conduct condition assessment of installed pumps and vibrations of pump shafts
 - ii. Prediction of Net Positive Suction Head (NPSH) of the pump and cavitation
 - iii. Collection of Specification and / or Operating Parameters of mechanical equipment
- l) Water supply data: Historical data will be collected through records and reports available with KW&SB and other sources. This data will include pressure and discharge at each node of the pipe distribution system at the Pump House. Temporal pattern of population and water supply: Time series data of population and water supply for the next 25 years will be collected to evaluate if bulk supply meets with the demand of the inhabitants of Karachi city.
- m) Layout plan: Basic data regarding source of water for Dhabeji pumping station will be collected. Similarly, outflow data will also be collected and layout plan will be generated. It will help in understanding the behavior of the distribution system.
- n) Physical condition of pipes: Physical inspection of Pipes and Fittings will be carried out. Data related to pipe physical characteristics (length, diameter, material) will be

also collected for simulation purposes. Data related to head losses will be collected (if available) for estimation of system losses.

- o) Analysis of process flow diagram of the system: The flow diagram will be examined in detail. The flow rates and pressures in different pipes will be estimated to determine system efficiency. Modeling software will be used to test the suitability of the pipe network.

Deliverable-(level-1):

The end product is a report outlining the energy use on site, an energy benchmark, and recommendations for low-cost or no cost energy efficiency improvements. The report will also list possible future energy saving capital projects.

Level 2: Energy Survey and Engineering Assessment/Analyses

This will build on a Level 1 and includes a detailed breakdown on energy use by process, more in-depth measurements, an electrical peak demand analysis, analysis of the savings generated by possible energy efficiency measures; develops possible changes to control strategies; and lay out a plan for a Level 3 analysis which would require more intensive data collection. This level include:

1. Power system modeling and design of protection system.
2. Mechanical assessment of pumps.
3. Water Resource Assessment.

The details of activities are listed below;

1. Power System Modeling and Design of Protection System

- a) The system will be modeled in Electrical Transient Analyzer Program (ETAP) or equivalent software. The model will be used for analysis as per actual pumps operating scenarios/routines for the “power flow analysis” to find any operational problems of overloading, system congestion, low power factor, proper selection of fuses, circuit breakers, cables, and improper protection etc.
- b) Fault study will be carried on the same model to find any discrepancy in selection of the breaking capacities of the circuit breakers. Protection devices will be added to the model to check the protection coordination of the fuses, circuit breakers and overcurrent relays for safety purposes.
- c) Reliability Analysis of major electrical equipment: Reliability analysis of major equipment e.g. pump motors, transformer, cable failure etc. will be done to find the “Availability Time” of the equipment.
- d) Review of existing SOPs for operation and maintenance: Existing operation and maintenance SOPs will be analyzed for any improvement. Information will be gathered regarding switching on/off sequence. Schedule of periodic and preventive maintenance will be analyzed. New and improved SOPs will be developed and submitted, if needed.

2- Mechanical Assessment of Pumps

- a) **Priming of the pump, air leaks and pockets into suction line:** Majority of the pumps cannot be operated without filling the pump housing with liquid. If the liquid is not filled in the suction line and housing, the moving element of the pump (e.g. impeller) is unable to provide the motion to the fluid. The pumps can be placed below the liquid level source, if possible or some mechanism can be provided to ensure priming such as using additional pumps to fill the suction pipe.
- b) **Foot valve clogging:** Various types of pumps need foot valve to prevent the fluid flowing back into the well when pump is not in operation. If foot valve is leaking or its strainer is clogged, the net pressure created by pump is decreased. The foot valve and its strainer will be checked if it contains larger particles.
- c) **Direction of rotation of pump shaft, viscosity of the fluid:** Direction of pump/motor shaft will be confirmed. The total suspended solids in liquid will also be tested to find whether the pump in use is suitable for the fluid.
- d) **Foundations of the pump, installation of the packing and lubrication:** The foundations and alignment will be checked to prevent vibration and noise. Wear, corrosion, coating due to any deposits, discoloration of pump components and placement of seals will be tested. Oil level and lubrication for long-term trouble free operation will also be ensured.

3- Water Resource Assessment (Hydraulic Assessment)

- a) **Hydraulic modeling of the system:** The system will be modeled with the EPANET or equivalent software. The scope of work includes Hydraulic Transient Analysis and surge protection recommendations for pipelines and pumps operational scenario analysis to be made part of the technical investigations. Head losses in pipe segments: Head losses along pipes will be computed using 01 of the three formulas as per standard practices providing optimized water distribution scenarios:
 - i. **Hazen-Williams formula:** used to model full flow conditions under simplified conditions
 - ii. **Darcy-Weisbach formula:** used to model pressurized flow under a broader range of hydraulic conditions
 - iii. **Chezy-Manning formula:** used to model pressurized flow by using Chezy's roughness coefficients for Manning's equation
 - iv. An international Hydraulic Expert is going to be an essential part of the Consultants deputed for the job under these ToRs.
- b) **Hydraulic Simulation:** The flow of water in each pipe and pressure at each node will be estimated by running the simulation. The Hydraulic simulation will include the Forebay structure and its downward flows to Karachi. The energy audit of DPC cannot be a success story unless the entire hydraulic audit is carried out. The simulated model will be calibrated through actual flow/pressure measurements. Suitable means will have to be proposed to take the field measurements if the existing system does not have installed measurement devices.

Deliverable-(level-2):

The report for a Level 2 audit will be similar to that of a Level 1 audit, but will include more energy and cost analysis. At this stage, the report shall provide a detailed wire-to-water efficiency analysis for each pump/motor system and for the overall pumping system. The Report will also include efficiency improvement options with required capital investment. This level of deliverables will also propose a plan to develop an energy audit lab at DPC with required equipment's like a mobile energy audit unit, computers and necessary software.

Level 3: Detailed Analysis of Capital-Intensive Modifications

This level will focus on further developing the capital projects identified as part of the Level 2 audit. This level requires more data collection as well as energy and process modeling to evaluate the benefits of a particular energy saving capital project. This audit will also include more detailed payback calculations. This level will also include a Detailed Analysis of Capital-Intensive Modifications, and Design of power system operation, maintenance, monitoring and personnel safety SOPs. The details of activities in each step are listed as follows.

1- Detailed Analysis of Capital-Intensive Modifications

- a) Following capital intensive modifications will be explored and analyzed based on life cycle assessment for improvement of the DPC.
 - i. Transformer capacity enhancement study and suggest expansion, if needed.
 - ii. Proper selection of the circuit breaker sizes, cabling and power factor improvement.
 - iii. Suggesting the standby generation, if system expansion is needed.
 - iv. Alternate power supply option may be worked out for the DPC and a comparative analysis of different options may be made a part of the Report.
 - v. Design of proper system and equipment earthing.
 - vi. Preparation of guidance for proper system operation and maintenance in shape of SOPs, including tagging.
 - vii. Design of proper one line diagram and control scheme.
 - viii. Modeling and power flow study of proposed power system.
 - ix. Fault Study of the new system, and protection coordination.
 - x. Selection of better pumps: Suitable pumps can be proposed if the existing ones are unable to fulfill the requirements of flow rates/pressures.
 - xi. Designing of the system with suitable pipe material and dimensions: Pipes and pipe components (such as bends, elbows, tees) can be replaced if these are found leaking and eroded or the dimensions (diameters / lengths) dimensions can be optimized. Valves with low hydraulic losses which need less actuator power can be used. Pressure and flow measuring devices can be installed at important locations in the piping unit.
 - xii. Simulation of the piping system, providing sufficient NPSH to avoid cavitation:

- xiii. The proposed piping system will be simulated using a pipe flow software to calculate flow rates, pressure drops in different branches of the pipe network. Head losses in suction piping will also be computed to determine the value of NPSH and predict cavitation.
- xiv. Maintenance schedule of the pumping unit: The maintenance of pumping unit is needed at regular intervals (daily basis or after some hours of operation). Various activities involve checking the oil quality and amount, replacement of filters and seals, checking condition of belts and pulleys and valves placed at the discharge line. A schedule can be proposed for such maintenance.
- xv. Adjustment of pipe layout plan: Changes in the pipe layout, size and material of the rising mains and pressure break points should be suggested which may lead to better water distribution with lower pressure drops.
- xvi. GIS map of the pipe distribution system: Database system will be developed in the form of GIS map and the records related to distribution system will be incorporated.
- xvii. Velocity of flowing water: Non-silting and non-scouring velocity will be recommended for each pipe segment of the water distribution system. No-silting velocity will prevent deposition of materials on the inner periphery of the pipe diameter. Likewise, non-scouring velocity will eliminate the effect of erosion in the pipe. It will increase the hydraulic efficiency of the distribution system.
- xviii. The existing arrangement of inlets, outlets, suction channels, manifolds, delivery pipes, rising mains and surge absorption arrangement at DPC shall be studied in detail with respect to its original design and necessary modification or rectification measures may be proposed in the system if required.
- xix. Viability of installing a MEICA (mechanical, electrical, instrumentation & control) based SCADA (supervisory control and data acquisition) shall also be analyzed and recommendations shall be made for proposed installation of SCADA system.
- xx. Flow measurement regime shall be proposed for the inlets and the outlets of the DPC to quantify the available water flows at the facility.

2- Design of power system operation, maintenance monitoring and personnel safety Standard Operating Procedures (SOPs)

- a) Design of proper system operation SOP along with the operation sequence and durations.
- b) Design of proper system monitoring and logging SOP, which will help for the maintenance needs and the reliability analysis.
- c) Design of proper personnel and equipment safety SOPs.
- d) Design drawings and specifications for a capital project to install high-efficiency pump sets and correct any physical plant deficiencies identified.
- e) Operations and maintenance procedures that will maximize return on investments in physical plant improvements.
- f) Design of operation log-book for flow rates and pressures at various locations.

Deliverable-(level3):

The end product of level 3 will be a detailed technical reports that summarizes the findings of all assessments, and explains proposed design of electro-mechanical

system, operations, and maintenance and safety aspects of the operations. The technical report will be accompanied with adequately detailed Design Drawings (DD); Bills of Quantities, capital cost estimates; benefits, co-benefits, implementation considerations, energy savings and general technical specifications for the required capital investments based on engineering recommendations. The report will also recommend a best-value based procurement strategy to procure engineering service(s) and construction contract(s) for the recommended physical works.

The software used for the energy audit will be handed over to KW&SB and is included in the cost of the consultancy services under reimbursable cost in the bidding documents. As a result, an Energy Audit Lab will be established at DPC in a space provide by KW&SB to make this study and its outcomes sustainable and a continuous follow up of the said study recommendations are made possible in the future.

Level 4: Capacity Building

This level will consist of two components, i.e. training needs assessment, and (2) conducting (1) training for the concerned DPC staff

1. **Training needs Assessment:** will focus on identifying the gaps between the available and desired technical and managerial skills possessed by the DPC staff in the field of Operation and Maintenance. Preference will be given to needs assessment in technical areas aiming to improve performance efficiency.
2. **Training sessions:** Overall 05 training sessions of requisite durations each shall be held with the objective to develop core technical skills of the DPC staff for proper operations and maintenance of the plant and the equipment in an efficient and sustainable manner. The Training Program will also include development of Master trainers trained in specific operational and maintenance areas of DPC with detailed trainings sessions and plans will also be developed to train staff on regular basis in future.

7.0 REPORTS AND OTHER DELIVERABLES

Engineering Assessment: Reports and other deliverables under this Task Order include, but are not necessarily limited to, the following:

S#	Deliverables	Time Schedule
1.	<p>Level 1: Site Survey and Data Generation</p> <p>Deliverable-(level-1): The end product is a report outlining the energy use on site, an energy benchmark, and recommendations for low-cost or no cost energy efficiency improvements. The</p>	1.0 month after mobilization

	report will also list possible future energy saving capital projects.	
2.	<p>Level 2: Energy Survey and Engineering Assessment/Analyses</p> <p>Deliverable-(level-2): The report for a Level 2 audit will be similar to that of a Level 1 audit, but will include more energy and cost analysis. At this stage, the report shall provide a detailed wire-to-water efficiency analysis for each pump/motor system and for the overall pumping system. The Report will also include efficiency improvement options with required capital investment. This level of deliverables will also propose a plan to develop an energy audit lab at DPC with required equipment's like a mobile energy audit unit, computers and necessary software.</p>	3.0 month after mobilization
3	<p>Level 3: Detailed Analysis of Capital-Intensive Modifications</p> <p>Deliverable-(level3): The end product of level 3 will be a detailed technical reports that summarizes the findings of all assessments, and explains proposed design of electro-mechanical system, operations, and maintenance and safety aspects of the operations. The technical report will be accompanied with adequately detailed Design Drawings (DD); Bills of Quantities, capital cost estimates; benefits, co-benefits, implementation considerations, energy savings and general technical specifications for the required capital investments based on engineering recommendations. The report will also recommend a best-value based procurement strategy to procure</p>	4.0 month after mobilization

	<p>engineering service(s) and construction contract(s) for the recommended physical works.</p> <p>The software used for the energy audit will be handed over to KW&SB and is included in the cost of the consultancy services under reimbursable cost in the bidding documents. As a result, an Energy Audit Lab will be established at DPC in a space provide by KW&SB to make this study and its outcomes sustainable and a continuous follow up of the said study recommendations are made possible in the future.</p>	
4.	<p>Level 4: Capacity Building</p> <p>Deliverable-(level4): Training sessions: Overall 05 training sessions of requisite durations each shall be held with the objective to develop core technical skills of the DPC staff for proper operations and maintenance of the plant and the equipment in an efficient and sustainable manner. The Training Program will also include development of Master trainers trained in specific operational and maintenance areas of DPC with detailed trainings sessions and plans will also be developed to train staff on regular basis in future.</p>	<p>To be completed within 6.0 month period after mobilization / Intermittent Schedule</p>

6.1 Payment Schedule on Performance:

Stage 1:

Fifteen (15) percent of the Contract Amount shall be paid upon submission of System Evaluation & Assessment **Review Report** (satisfactory level) within 15 days of commencement of assignment.

Stage 2:

Twenty Five (25) percent of the Contract Amount shall be paid upon submission of **Initial Assessment Report including Training Need Assessment** within TWO (2) months of commencement of Assignment or at least 30 days after stage 1.

Stage 3:

Thirty (30) percent of the Contract Amount shall be paid upon submission of **Midterm Assessment Report including completion of 02 training sessions** within FOUR (4) Months of Commencement of Assignment or at least 45 days after stage 2.

Stage 4:

Thirty (30) percent of the Contract Amount shall be paid upon approval of the “**Final Engineering Assessment Report**” along with completion of additional 03 Training Sessions for the DPC Staff 15 days prior to close of contract period or at least 40 days after stage 3.