NATIONAL HIGHWAY AUTHORITY

Procurement & Contract Administration Section
28 Mauve Area, G-9/I, Islamabad ☎ 051-9032727, 🖷 051-9260419

No. 6(468)/DIR-III (P&CA)/NHA/18/412 19 October, 2018

Director General
Public Procurement Regulatory Authority
1st Floor FBC Building near State Bank,
Sector G-5/2,**Islamabad**

Subject: **ANNOUNCEMENT OF EVALUATION REPORT (PPRA Rule-35): Consultancy Services for Feasibility Study And Preliminary Design For Gilgit – Shandoor Road (216 Km)**

Reference: PPRA Rule-35

Kindly find attached the duly filled and signed Evaluation Report along with Bid Evaluation Criteria (Annex-I) pertaining to the procurement of subject services in view of above referred PPRA Rule-35 for uploading on PPRA website at the earliest, please.

(Muhammad Azam)
Director(P&CA)

Encl: Evaluation Report along with **Annex-I**

Copy for kind information to:

- Member (Engineering-Coord), NHA;
- Member (Planning), NHA;
- General Manager (P&CA), NHA;
- S.O. (Tech.) to Chairman, NHA.

EVALUATION REPORT
(As Per Rule 35 of PP Rules, 2004)

1.	Name of Procuring Agency:	National Highway Authority
2.	Method of Procurement:	Single Stage Two Envelope Procedure
3.	Title of Procurement:	Feasibility Study And Preliminary Design For Gilgit – Shandoor Road (216 Km)
4.	Tender Inquiry No.:	6(468)
5.	PPRA Ref. No. (TSE):	TS346350E
6.	Date & Time of Bid Closing:	27th March, 2018 at 1130 hours local time
7.	Date & Time of Bid Opening:	27th March, 2018 at 1200 hours local time
8.	No of Bids Received:	Five (05) Proposals were received
9.	Criteria for Bid Evaluation:	Criteria of Bid Evaluation is attached at Annex-I
10.	Details of Bid(s) Evaluation:	As below

Name of Bidder	Marks			Evaluated Cost* (PKR)	Rule/Regulation/SBD**/ Policy/ Basis for Rejection / Acceptance as per Rule 35ofPPRules,2004.
	Technical (if applicable)	Financial (if applicable)	Total (out of 1000)		
1) M/s Zeeruk International (Pvt.) Ltd. in JV with M/s Engineering General Consultants (Pvt.) Ltd. and M/s Kasib Associates	580	200	780	30,253,000	Top scoring JV in combined evaluation [PPRA Rule 36(b) (ix)]
2) M/s National Engineering Services Pakistan (Pvt.) Ltd. in JV with M/s Karakoram Engineering Consultants (Pvt.) Ltd.	632	97	729	62,666,300	2nd
3) M/s Prime Engineering and Testing Consultants (Pvt.) Ltd. in JV with M/s Associated Consulting Engineers - ACE (Pvt.) Ltd., M/s Associated Consultancy Centre (Pvt.) Ltd. and M/s Babar's Associates	622	105	727	57,884,128	3rd

EVALUATION REPORT
(As Per Rule 35 of PP Rules, 2004)

Name of Bidder	Marks			Evaluated Cost* (PKR)	Rule/Regulation/SBD**/ Policy/ Basis for Rejection / Acceptance as per Rule 35ofPPRules,2004.
	Technical (if applicable)	Financial (if applicable)	Total (out of 1000)		
4) M/s Asif Ali & Associates (Pvt.) Ltd. in JV with M/s A.A. Associates and M/s Engineering Consultancy Services Punjab (Pvt.) Ltd.	592	96	688	63,132,092	4th
5) M/s Finite Engineering (Pvt.) Ltd. in JV with M/s HA Consulting	559	-	-	-	PPRA Rule 36(b) (v)

**EC is the Evaluated Cost used for evaluation purpose and includes only the cost of competitive component (i.e. Remuneration and Direct Non- Salary Cost) and is exclusive of Provisional Sum, Contingency and Indirect Taxes.*

Top Ranked Bidder: **M/s Zeeruk International (Pvt.) Ltd. in JV with M/s Engineering General Consultants (Pvt.) Ltd. and M/s Kasib Associates**

11. **Any other additional/supporting information, the procuring agency may like to share:** The Procurement was carried out in line with PPRA Rules & Regulations. The bidding was done on QCBS method with 80:20 Technical to Financial Proposals ratio.

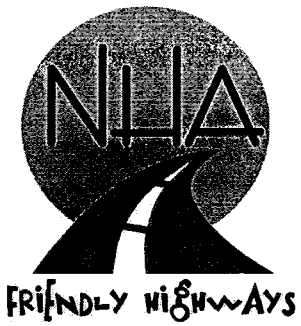
Signature:.....

Official Stamp:.....

National Highway Authority Govt. of Pakistan

****Standard Bidding Documents (SBD).***

National Highway Authority



Annex-I

Criteria

FOR

Bid Evaluation

Consultancy Services for
Feasibility Study and Preliminary Design
for Gilgit – Shandoor Road (216 Km)

October, 2018

6(468)

National Highway Authority

REQUEST FOR PROPOSAL

for

Feasibility Study and Preliminary Design for Gilgit – Shandoor Road (216 Km)

Pages (1 to 134)

Tender No. 6(468)

February, 2018

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GOVERNMENT OF PAKISTAN
NATIONAL HIGHWAY AUTHORITY
27-Mauve Area, G-9/1,
Post Box No. 1205,
ISLAMABAD
Dated the _____
Ref No._____

LETTER OF INVITATION (LOI)

To,

All prospective consultants

Gentlemen!

We extend warm welcome to you and invite you for participating in this project. We hope that you will live up to your reputation and provide us accurate information so that the evaluation is carried out "just and transparent". Please understand that the contents of this RFP, where applicable, shall be deemed part of the contract agreement. An example to this affect can be the contents of your work plan and methodology which you shall be submitting in your technical proposal. Since that is the basis of the selection, therefore, it shall become part of the contract agreement subject to approval/revisions of the same by NHA during the negotiations. Similarly, all other services and the content contributing to services shall be deemed part of the contract agreement unless it is specified for any particular item up-front in your technical proposal which obviously will make your proposal a conditional proposal whereby, authorizing NHA to may or may not consider to evaluate your proposal. Please understand that if no such mention appears up-front (i.e. on front page of technical proposal) then it shall be deemed that the consultant is in 100% agreement to the above. You are also advised to kindly read the RFP thoroughly as it can drastically affect the price structure for various services which may not be appearing directly in the terms of reference. In the end, we appreciate your participation and hope that you will feed a good proposal to merit consideration by NHA.

General Manager (P&CA)
Telephone: +92-51-9032727,
Fax: +92-51-9260419
E-mail:gmpca.nha@gmail.com,
Website: www.nha.gov.pk

ATTACHMENTS

1. Instructions to Consultants (Annex A)
2. Data Sheet (Annex B)
3. Checklist for Completeness of Proposal
4. Summary Evaluation Sheet
5. Personnel Evaluation Sheet
6. Technical Proposal Forms
7. Financial Proposal Forms
8. Appendix A (Terms of Reference)
9. Appendix B (Person-Months and Activity Schedule)
10. Appendix C (Client's Requirements from the Consultants)
11. Appendix D (Personnel, Equipment, Facilities and other services to be provided by the Client).
12. Appendix E (Copy of Model Agreement)

Annex A

INSTRUCTIONS TO CONSULTANTS

1. INTRODUCTION

1.1 You are hereby invited to submit a technical and a financial proposal for consulting services required for the assignment named in the attached Data Sheet (referred to as "Data Sheet" hereafter) annexed with this letter. Your proposal could form the basis for future negotiations and ultimately a Contract between your firm and the Client named in the Data Sheet.

1.2 A brief description of the assignment and its objectives are given in the Data Sheet. Details are provided in the attached RFP for design services provided in the Documents, and will become part of agreement subsequently.

1.3 The assignment shall be implemented in accordance with the phasing specified in the Data Sheet.

1.4 The Client has been entrusted the duty to implement the Project as Executing Agency by Government of Pakistan (GoP) and funds for the project shall be arranged by the Client.

1.5 To obtain first-hand information on the assignment and on the local conditions, you are encouraged to pay a visit to the Client before submitting a proposal and attend a pre-proposal conference if specified in the Data Sheet. Your representative shall meet the named officials on the date and time specified in the Data Sheet. Please ensure that these officials are advised of the visit in advance to allow adequate time for them to make appropriate arrangements. You must fully inform yourself of local conditions and take them into account in preparing your proposal.

1.6 The Client shall provide the inputs specified in the Data Sheet, assist the Consultants in obtaining licenses and permits needed to carry out the services, and make available relevant project data and reports.

1.7 Please note that:

i. The cost of preparing the proposal and of negotiating the Contract, including a visit to the Client, are not reimbursable as a direct cost of the Assignment, and

ii. The Client is not bound to accept any of the proposals submitted.

1.8 The names of the invited consultants are given in the Data Sheet.

1.9 We wish to remind you that in order to avoid conflicts of interest:

a) Any firm providing goods, works, or services with which you are affiliated or associated is not eligible to participate in bidding for any goods, works, or services (other than the services and any continuation thereof) resulting from or associated with the project of which this assignment forms a part; and

b) Any previous or ongoing participation in relation with the project by your firm, its professional staff, its affiliates or associates under a Contract may result in rejection of your proposal. You should clarify your situation in that respect with the Client before preparing the proposal.

1.10 A firm may submit its proposal for the Assignment either as an independent Consultant or as a Member of a JV Consultants but participation of a firm occurring in more than one proposal for the Assignment is not allowed. In case a firm participates in more than one proposal, all such proposals shall be **disqualified and rejected**. However this condition does not apply for individual Specialist Sub-consultant(s).

2. DOCUMENTS

2.1 To prepare a proposal, please use the Documents specified in the Data Sheet.

2.2 Consultants requiring a clarification of the Documents must notify the Client, in writing, not later than twenty one(21) days before the proposal submission date. Any request for clarification in writing, or by cable, telex or tele-fax shall be sent to the Client's address specified in the Data Sheet. The Client shall respond by cable, telex or tele-fax to such requests and copies of the response shall be sent to all invited Consultants.

2.3 At any time before the submission of proposals, the Client may, for any reason, whether at its own initiative or in response to a clarification requested by an invited consulting firm, modify the Documents by amendment. The amendment shall be sent in writing or by cable, telex or tele-fax to all invited consulting firms and will be binding on them. The Client may at its discretion extend the deadlines for the submission of proposals.

3. PREPARATION OF PROPOSAL

It will consist of two parts – Technical and Financial

3.1 Technical Proposal

3.1.1 The Technical Proposal should be submitted using the format specified and shall include duly signed and stamped forms appended with the RFP. This is a mandatory requirement for evaluation of proposals and needs to be filled up carefully.

3.1.2 For Technical Proposal, the general approach and methodology which you propose for carrying out the services covered in the TOR, including such detailed information as you deem relevant, together with your appreciation of the Project from provided details and

(a) A detailed overall work program to be provided with timing of the assignment of each expert or other staff member assigned to the project. This will also provide the Client an opportunity to effectively monitor work progress.

(b) Total number of man-months and project duration as per TOR.

(c) Clear description of the responsibilities of each expert staff member within the overall work program.

(d) The Curriculum Vitae (CV) of all Key Staff members and an affidavit that proposed staff shall be available for the assignment during the project duration and their present place of duty may also be specified. The Consultants are advised to suggest such names that shall be available for the Assignment.

(e) The technical proposal shall include duly filled in forms provided with this RFP. The name, background, and professional experience of each expert staff member to be assigned to the project, with particular reference to his experience of work of a nature similar to that of the proposed assignment.

(f) Current commitments and past performance are the basic criteria of technical proposal. You are required to provide the details of present commitments/on- going jobs as referred in the Form A-10 of technical proposal. Further, the basis for the past performance is the report from Design Section and Construction Wing of the Client.

3.1.3 In preparing the technical proposal, you are expected to examine all terms and instructions included in the Documents. Failure to provide all requested information shall be at your own risk and may result adversely in the scoring of your proposal. The proposal should be prepared as per RFP and any suggestion or review of staff etc. should be clearly spelt out in form A-4. This will be discussed at the time of negotiation meeting as and when called.

3.1.4 During preparation of the technical proposal, you must give particular attention to the following:

a. The Firm needs to be registered with Pakistan Engineering Council (PEC).

b. If you consider that your firm does not have all the expertise for the assignment you may obtain a full range of experience by associating with other firms or entities. You may also utilize the services of expatriate experts but only to the extent for which the requisite expertise is not available in any Pakistani firm. In case of Joint Venture, the proposal should state clearly partners will be "Jointly and Severally" responsible for performance under the Contract and one (Representative) partner will be responsible for all dealings with the Client on behalf of the Joint Venture. Its "Power of Attorney" on this account is to be enclosed. The representative partner shall retain the responsibility for the performance of obligations and satisfactory completion of the consultancy services. PEC registers a foreign consulting firm for issuing license to provide consultancy services in Pakistan, which is based on formation of JV with the condition that the foreign consulting firm shall provide only that share of consultancy services by

the JV for which expertise is not available with Pakistani consulting firms. A copy of JV agreement to be provided at the time of finalizing the contract documents with specific responsibilities and assignments to be looked after by each partner.

c. Subcontracting part of the assignment to the other Consultants is not discouraged and Specialist Sub-Consultants may be included.

d. The key professional staff proposed shall be permanent employees of the firm unless otherwise specified in the Data Sheet. The minimum stay with the firm for such persons is Six months. No alternative to key professional staff may be proposed and only one CV may be submitted for each position. The minimum required experience of proposed Key Staff is specified in the Data Sheet.

e. The training shall be imparted during the currency of the contract if specified in the Data Sheet.

3.1.5 The technical proposal shall not include any financial information. The Consultant's comments, if any, on the data, services and facilities to be provided by the Client and specified in the TOR shall be included in the technical proposal.

3.2 Financial Proposal

3.2.1 The financial proposal should be submitted using the format specified and enclosed with this RFP. This is a mandatory requirement for evaluation of proposals and needs to be filled up carefully. The total cost is to be specified in the Form A-17 and accordingly also in Form A-11.

3.2.2 The financial proposal should list the costs associated with the Assignment. These normally cover remuneration for staff in the field and at headquarters, per diem, housing, transportation for mobilization and demobilization, services and equipment (vehicles, office equipment furniture and supplies), printing of documents, surveys and investigations. These costs should be broken into foreign (if applicable) and local costs. Your financial proposal should be prepared using the formats attached as forms A-11 to A-17.

3.2.3 The financial proposal shall also take into account the professional liability as provided under the relevant PEC Bye-Laws and cost of insurances specified in the Data Sheet.

3.2.4 Costs may be expressed in currency (s) listed in the Data Sheet.

3.2.5 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 Proposals but not priced, in the Financial Proposals shall be assumed to be included in the prices of other activities or items. In case an activity or item is quantified in the Financial Proposal differently from the Technical

Proposal, the evaluation committee shall correct the quantification specified in the Financial Proposal so as to make it consistent with that specified in the Technical Proposal.

4. SUBMISSION OF PROPOSALS

4.1 You shall submit one original technical proposal and one original financial proposal and the number of copies of each specified in the Data Sheet. Each proposal shall be in a separate envelope indicating original or copy, as appropriate. All technical proposals shall be placed in an envelope clearly marked "Technical Proposal" and the financial proposals in the one marked "Financial Proposal". These two envelops, in turn, shall be sealed in an outer envelope bearing the address and information specified in the Data Sheet. The envelope shall be clearly marked, "DO NOT OPEN, EXCEPT IN PRESENCE OF THE EVALUATION COMMITTEE."

4.2 In the event of any discrepancy between the copies of the proposal, the original shall govern. The original and each copy of the technical and financial proposals shall be prepared in indelible ink and shall be signed by the authorized Consultant's representative. The representative's authorization shall be confirmed by a written power of attorney accompanying the proposals. All pages of the technical and financial proposals shall be initialed by the person or persons signing the proposal.

4.3 The proposal shall contain no interlineations or overwriting except as necessary to correct errors made by the Consultants themselves. Any such corrections shall be initialed by the person or persons signing the proposal.

4.4 The completed technical and financial proposals shall be delivered on or before the time, date, and the location specified in the Data Sheet.

4.5 The proposals shall be valid for the number of days stated in the Data Sheet from the date of its submission. During this period, you shall keep available the professional staff proposed for the assignment. The Client shall make its best effort to complete negotiations at the location stated in the Data Sheet within this period.

5. PROPOSAL EVALUATION

5.1 A Single-Stage-Two-Envelope procedures shall be adopted in ranking of the proposals. The technical evaluation shall be carried out first, followed by the financial evaluation. The Consultants shall be ranked using a combined technical/financial score.

5.2 Technical Proposal

5.2.1 The evaluation committee appointed by the Client shall carry out its evaluation for all the projects as listed in Para 1.1, applying the evaluation criteria and point system specified in the Data Sheet. Each responsive proposal shall be given a technical score:St. The Consultants scoring less than seventy (70) percent points shall be rejected and their financial proposals returned un-opened.

5.3 Financial Proposal

5.3.1 The financial proposals of the three top-ranking qualifying Consultants on the basis of evaluation of technical proposals shall be opened in the presence of the representatives of these Consultants, who shall be invited for the occasion and who care to attend. The Client shall inform the date, time and address for opening of financial proposals as specified in the Data Sheet. The total cost and major components of each proposal shall be publicly announced to the attending representatives of the firms.

5.3.2 The evaluation committee shall determine whether the financial proposals are complete and without computational errors. The lowest financial proposal (Fm) among all shall be given a financial score: Sf of 1000 points. The financial scores of the proposals shall be computed as follows:

$$S_f = (1000 \times Fm)/F$$

(F = amount of specific financial proposal)

5.3.3 Proposals, in the Quality Cum Cost Based Selection (QCBS) shall finally be ranked according to their combined technical (St) and financial (S_f) scores using the weights (T- the weight given to the technical proposal, P = the weight given to the financial proposal, and T+P=1) stated in the Data Sheet:

$$S = St \times T\% + S_f \times P\%$$

6. NEGOTIATION

6.1 Prior to the expiration of proposal validity, the Client shall notify the successful Consultant who submitted the highest ranking proposal in writing, by registered letter, cable telex or facsimile and invite it to negotiate the Contract.

6.2 Negotiations normally take from two to five days. The aim is to reach agreement on all points and initial a draft contract by the conclusion of negotiations.

6.3 Negotiations shall commence with a discussion of your technical proposal. The proposed methodology, work plan, staffing and any suggestions you may have made to improve the TOR. Agreement shall then be reached on the final TOR, the staffing, and the bar charts, which shall indicate activities, staff, and periods in the field and in the home office, staff months, logistics and reporting.

6.4 Changes agreed upon shall then be reflected in the financial proposal, using proposed unit rates (no negotiation of the staff month rates).

6.5 Having selected Consultants on the basis of, among other things, an evaluation of proposed key professional staff, the Client expects to negotiate a contract on the basis of the staff

named in the proposal. Prior to contract negotiations, the Client shall require assurances that the staff members will be actually available. The Client shall not consider substitutions of key staff except in cases of un-expected delays in the starting date or incapacity of key professional staff for reasons of health.

6.6 The negotiations shall be concluded with a review of the draft form of the contract. The Client and the Consultants shall finalize the contract to conclude negotiations. If negotiations fail, the Client shall invite the Consultants that received the second highest score in ranking to Contract negotiations. The procedure will continue with the third in case the negotiation process is not successful with the second ranked consultants.

7. AWARD OF CONTRACT

7.1 The contract shall be awarded after successful negotiations with the selected Consultants and approved by the competent authority. Upon successful completion of negotiations/initialing of the draft contract, the Client shall promptly inform the other Consultants that their proposals have not been selected.

7.2 The selected Consultant is expected to commence the assignment on the date and at the location specified in the Data Sheet.

8. CONFIRMATION OF RECEIPT

8.1 Please inform the Client by telex/facsimile courier or any other means:

(i) That you received the letter of invitation;
(ii) Whether you will submit a proposal; and
(iii) If you plan to submit a proposal, when and how you will transmit it.

Annex-B

DATA SHEET

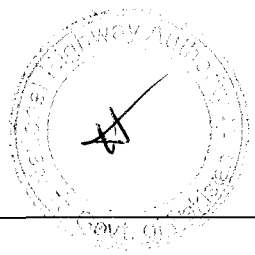
LOI Clause No.	DESCRIPTION OF CLAUSE
1.1	The name of Assignment is:-Consultancy Services for **"Feasibility Study and Preliminary Design for Gilgit – Shandoor Road (216 Km)"** The Client's Name is:- **National Highway Authority**
1.2	The description and the objectives of the assignment are: **As per TOR**
1.3	Phasing of the Assignment (if any): **Nil** The Consultant shall commence the assignment upon signing of Contract Agreement between NHA and the successful Consultant.
1.5	Pre-Proposal Conference: **Yes** ____√_____ **No** _____ The name(s) and address(es) of the Official(s) is (are): **General Manager (P&CA)** National Highway Authority 28, Mauve Area, G-9/1 Islamabad Date, Time and Venue for Pre-proposal Conference: **Date: 2nd March, 2018** **Time: 1100 hours** **Venue: NHA Auditorium (HQ)** National Highway Authority 28, Mauve Area, G-9/1 Islamabad.
1.6	The Client shall provide the following inputs: **As per TOR and Appendix D.**
1.7	Following sub-clauses are added: iii. The Consultant may please note not to suggest names of key staff already proposed in other proposals with the Client or awarded recently. This will affect adversely marking of these professionals in evaluation of the technical proposal. Their secured points are liable to be reduced by 50% if their name appears in more than 1 previous proposal in which they are ranked No.1. Also the existing load of work with a firm shall be considered as one of the factors for the consideration in the award of the work. iv. Form A-4 is meant for comments on provision contained in RFP and Terms of Reference (TOR) and unless the observations are noted in this particular form, anything written elsewhere on this account including financial

	implications, if any, shall be considered of no consequence in the evaluation process. v. Consultants may form a Joint Venture (JV) to qualify for the Assignment in which case the contract will be signed between the Client and all members of the JV on the prescribed Form included in Appendix E (copy of Model Agreement) subject to the ranking and successful negotiations. A JV may include at the most four members. To promote the consultancy industry in the country, 50 marks (out of 1000 for Evaluation) are allocated for Transfer of Knowledge in the form of JV with a new / less experienced firm by sharing at least 20% of Assignment with them.
1.8	The Invited Consultants / Eligible Consultants are: Any firm meeting the following requirements: (a) Valid Registration Certificate of Pakistan Engineering Council with relevant Project Profile Codes. Foreign consulting firms shall make JV in accordance with Bye-Law 6(2) and Bye-Law 9 of the Pakistan Engineering Council (Conduct and Practice of Consulting Engineers) Bye-Laws 1986. Failure to provide valid Registration Certificate (license) of the firm (each member in case of JV) by the PEC will entitle the Client to reject the proposal. (b) Affidavit in original bearing the subject with project name on stamp paper duly attested by the Oath Commissioner to the effect that the firm has neither been blacklisted nor any contract rescinded in the past for non-fulfillment of contractual obligations (By all member firms in case of JV and/or sub-consultant). (c) Facilities available with the Consultant to perform their functions effectively (proper office premises, software, hardware, record keeping etc.) (d) Client's satisfaction certificates (Performance Reports) for the last three relevant assignments from the respective Clients. Moreover any adverse report regarding performance of Consultant on NHA projects received from NHA's any relevant quarter may become basis for its disqualification from the services above named in clause 1.1. (e) Signing and certification of the Checklist for Completeness of the Proposal as per attachment at the end of Data Sheet. (f) Man-months of staff and Project Duration as per TOR.
2.1	The Documents are: (a) Letter of Invitation (LOI). (b) Instructions to Consultants (ITC). (c) Data Sheet. (d) Technical Proposal Forms. (e) Financial Proposal Forms

	(f) Appendix – A: TOR and Background Information. (g) Appendix – B: Man-Months and Activity Schedule (h) Appendix – C: Client's Requirements from the Consultant. (i) Appendix – D: Personnel Equipment, Facilities and Other Services to be Provided by the Client. (j) Appendix – E: Copy of Model Agreement/ Draft Form of Contract & Appendices etc. (k) Form of Contract *(For Consultants to perform services as a Joint Venture)*
2.2	The words "Twenty one (21)" is deleted in its entirety and replaced with "Five (05)" The address for seeking clarification is: **General Manager (P&CA)** National Highway Authority 28, Mauve Area, G-9/1, Islamabad E-mail: gmpca.nha@gmail.com
3.1.1	Add following: The proposals should be bound in the hard book binding form to deny the possibility of removal or addition of page(s). All the pages of proposal must be signed and stamped in original by authorized representative of the firm/JV. All the pages must be numbered starting from first page to last. Any proposal found not adhering to these requirements will be **rejected** at the time opening.
3.1.4	d. Proposed key staff shall preferably be permanent employees who are employed with the consultants at least six months prior to submission of Proposal. **Yes** ___√___ **No** _____ The minimum required experience of proposed Key Personnel are given below:

FOR KEY PERSONNEL	
Team Leader / **Sr. Highway Engineer**	Minimum B.Sc. (Civil Engineering) with minimum twenty (20) years' relevant experience [proven fifteen (15) years' design experience as Highway/ Geometric Design Engineer on National Highways Projects]; -OR- M.Sc. (Transportation Engineering) with minimum eighteen (18) years relevant experience [proven thirteen (13) years' design experience as Highway/ Geometric Design Engineer on National Highways Projects]; He/she must also have performed as Team Leader for at least three (03) major Highway Design Projects

	Highway Design Engineer	Minimum B.Sc. (Civil Engg./Transportation Engg.) with minimum twenty (20) years' relevant experience [proven fifteen (15) years' design experience as Highway Design Engineer on major Highways Projects]; -OR- M.Sc. (Transportation Engg.) with minimum eighteen (18) years' relevant experience [proven thirteen (13) years' design experience as Highway Design Engineer on major Highways Projects];
	Bridge Design Engineer	Minimum B.Sc. (Civil Engineering) with minimum twenty (20) years' relevant experience [proven fifteen (15) years' design experience as Structural Design Engineer of which five (05) years experience of designing major bridges]; -OR- M.Sc. (Structural Engineering) with minimum eighteen (18) years relevant experience [proven thirteen (13) years' design experience as Structural Design Engineer of which three (03) years experience of designing major bridges];
	Structural Design Engineer	Minimum B.Sc. (Civil Engineering) with minimum twenty (20) years' relevant experience [proven fifteen (15) years' design experience as Structural Engineer on National Highways Projects]; -OR- M.Sc. (Structural Engineering) with minimum eighteen (18) years relevant experience [proven thirteen (13) years' design experience as Structural Engineer on National Highways Projects];
	Tunnel Design Engineer	M.Sc. (Structural Engineering) with minimum eighteen (18) years relevant experience [proven thirteen (13) years' design experience as Structural Design Engineer on National Highways Projects of which the candidates must have designed at least one tunnel of 2 Km length];
	Hydraulic/ Hydrology Expert	Minimum B.Sc. (Civil Engineering) with minimum twenty (20) years relevant experience [proven eighteen (18) years' design experience as Hydraulic/ Hydrology Expert on major Highway and Bridge Projects]; -OR- M.Sc. (Hydrology/ Drainage/ Hydraulic Engineering) with minimum eighteen (18) years relevant experience [proven sixteen (16) years' design experience as



		Hydraulic/ Hydrology Expert on major Highway and Bridge Projects];
	Soil Stabilization/ Protection Expert	Minimum B.Sc. (Civil Engg./Geo-Tech Engg.) with minimum twenty (20) years' relevant experience [proven fifteen (15) years' design experience as Soil Stabilization Expert on major Highway and Bridge Projects]; -OR- M.Sc. (Soil Mechanics/Geo-Tech Engg.) with minimum eighteen (18) years' relevant experience [proven thirteen (13) years' design experience as Soil Stabilization Expert on major Highway and Bridge Projects];
	Drainage Engineer	Minimum B.Sc. (Civil Engineering) with minimum twenty (20) years relevant experience [proven eighteen (18) years' design experience as Drainage Engineer on major Highway and Bridge Projects]; -OR- M.Sc. (Hydrology/ Drainage/ Hydraulic Engineering) with minimum eighteen (18) years relevant experience [proven sixteen (16) years' design experience as Drainage Engineer on major Highway and Bridge Projects];
	Contract Specialist	Minimum B.Sc. (Civil Engineering) with minimum fifteen (15) years relevant experience (proven ten (10) years' experience of Bidding/ Contract Documents. He/she must have adequate knowledge of FIDIC contractual scheme; -OR- M.Sc. (Contracts/ Procurement or Contracts Management) with minimum thirteen (13) years relevant experience (proven eight (08) years' experience of Bidding/ Contract Documents. He/she must have adequate knowledge of FIDIC contractual scheme
	Highway Safety Engineer	Minimum B.Sc. (Civil Engineering/Transportation Engineering) with minimum twenty (20) years' relevant experience [proven fifteen (15) years' design experience as Highway Safety Engineer on National Highways Projects]; -OR- M.Sc. (Transportation/ Traffic Engineering) with minimum eighteen (18) years relevant experience [proven thirteen (13) years' design experience as

		Highway Safety Engineer on National Highways Projects], He/ she must also have experience of independently leading Highway Safety Audit Team for at least one major Highway Project;
	Traffic Engineer	Minimum B.Sc. (Civil Engineering/ Transportation Engineering) with minimum twenty (20) years relevant experience [proven eighteen (18) years' design experience as Traffic Engineer on major Highway Projects]; -OR- M.Sc. (Transportation Engineering/ Traffic Engineering) with minimum eighteen (18) years relevant experience [proven sixteen (16) years' design experience as Traffic Engineer on major Highway Projects];
	Transport Economist	Minimum B.Sc. (Civil / Transportation/ Traffic Engineering) with minimum twenty (20) years' relevant experience [proven fifteen (15) years' design experience as Transport Economist on major Highways/ Transportation Projects]; -OR- M.Sc. (Transportation/Traffic Engineering)/ Transport Economist with minimum fifteen (15) years' relevant experience [proven ten (10) years' design experience as Transport Economist on major Highways Projects];
	Geologist	Minimum B.Sc. (Engineering Geology)/ M.Sc. (Geology) with minimum eighteen (18) years' relevant experience [proven fifteen (15) years' experience as Geologist on road Projects]; -OR- M.Sc. (Soil Mechanics/Geo-Tech Engg./Engineering Geology) with minimum fifteen (15) years' relevant experience [proven thirteen (13) years' experience as Geologist on road Projects];
	GIS Expert	Minimum M.Sc. GIS with minimum fifteen (15) years relevant experience [proven thirteen (13) years' experience as GIS Expert in Design of Highway and Bridges projects];
	Quantity Surveyor	DAE (Civil); preferably having Bachelor's in Civil Engineering; In case of DAE having minimum eighteen (18) years post-qualification experience in Highway Sector which includes proven ten (10) years' experience as

		Quantity Surveyor on Highway Projects; -OR- In case of Bachelor's Degree having minimum fifteen (15) years post-qualification experience in Highway Sector including seven (7) years' experience as Quantity Surveyor on Highway Projects.
	Chief Surveyor	DAE (Civil); preferably having Bachelor's in Civil Engineering. In case of DAE having minimum eighteen (18) years post-qualification experience in Highway Sector which includes proven ten (10) years' experience as Chief Surveyor on Highway Projects. -OR- In case of Bachelor's Degree having minimum fifteen (15) years post-qualification experience in Highway Sector including seven (7) years' experience as Chief Surveyor on Highway Projects.
	Surveyor	DAE (Civil); preferably having Bachelor's in Civil Engineering. In case of DAE having minimum eighteen (18) years post-qualification experience in Highway Sector which includes proven ten (10) years' experience as Surveyor on Highway Projects. -OR- In case of Bachelor's Degree having minimum ten (10) years post-qualification experience in Highway Sector including seven (7) years' experience as Surveyor on Highway Projects.
	Note: The Consultants are advised to submit updated CV's strictly in compliance with the format of CVs given in Technical Proposal Form A-5. CVs submitted without regard to the said format may score low.	
	e. Training is an important feature of this Assignment: **Yes** ___√___ **No** _____ If Yes, details of training are given in TOR	
3.2.3	Professional liability, insurances (description or reference to appropriate documentation): i. The Consultants shall be responsible for Professional Indemnity Bond of the required amount at their own cost. This bond shall be in the joint name of Consultant and the Client.	

	ii. The Consultants are required to insure their Employees and Professionals for Hospitalization/ Medical, Travel and Accident Cover for the duration of the Contract. The details provided in Para 3.5 of Special Conditions of Contract in Model Contract.
4.1	The number of copies of the Proposal required is: **Technical Proposal:** **One Original and Three copies with CD** (soft form of complete Technical Proposal in PDF Form) in sealed envelope. **Financial Proposal:** **One Original with CD** (soft form of complete Financial Proposal in PDF as well as MS Word/Excel Forms) in sealed envelope. The address for writing on the proposal is: **General Manager (P&CA)** National Highway Authority 28, Mauve Area G-9/1 Islamabad Telephone: +92-51-9032727 Facsimile: +92-51-9260419
4.4	The date and time of proposal submission is: Date: **20th March, 2018** Time: **1100 hours** Location of Submission : **NHA Main Auditorium** National Highway Authority 27, Mauve Area G-9/1 Islamabad.
4.5	Validity period of the proposal is: **180 days** The bid shall remain valid up to: **16th September, 2018** The location for negotiation of proposal is: **General Manager (P&CA)** National Highway Authority 28, Mauve Area G-9/1 Islamabad Telephone: +92-51-9032727 Facsimile: +92-51-9260419
5.2	The evaluation of technical proposal shall be based on following criteria: **Description / Items** — **Points** **1. Experience of the Firm** — **100** 1-a) General Experience in road Transport Sector — (25) 1-b) Specific Experience related to particular Assignment — (75) **2. Approach & Methodology** — **250** 2-a Appreciation of the Project — (70) *(i). Evidence of Site Visit with Photographs* — *(30)* *(ii). Clarity of appreciation* — *(20)* *(iii). Comprehensiveness of appreciation* — *(20)*

	2-b Problem Statement/ Understanding of Objectives	(50)
	(i). Identification of Problems/ Objectives	*(30)*
	(ii). Components of Proposed Services	*(20)*
	2-c Methodology	(80)
	(i). Proposed Solutions for this Project	*(30)*
	(ii). Quality of Methodology	*(20)*
	(iii). Conciseness, clarity and completeness of proposal	*(30)*
	2-d Suggested changes for improvement in TOR	(10)
	2-e Work Program	(20)
	2-f Staffing Schedule	(20)
	3. Key Staff	**450**
	4. Performance Certification from clients	**100**
	5. Present Commitments (current engagement and available strength – justification)	**50**
	6. Transfer of Knowledge*(Methodology/ Plans)	**50**
	Total Points:	**1000**
	Minimum qualifying technical score:	**700**
	* Transfer of knowledge would be in the form of joint venture with new/ less experienced firm(s) by sharing at least 20% of Assignment with them for promoting the consultancy industry in the country.	

The points earmarked for evaluation sub-criteria (3) for suitability of Key Staff are:-

	Description / Items	**Points (%)**
i.	Academic and General Qualifications	**30**
ii.	Professional experience related to the Project	**60**
iii.	Status with the firm (Permanent & duration with Firm as per LOI Clause 3.1.4 (d))	**10**
	Total Points:	**100**

5.3.1 Following is added:

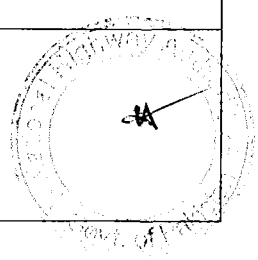
The words "three top-ranking qualifying consulting firms" is deleted in its entirety and replaced with the words "qualifying consultants"

The date, time, and address of the financial proposal opening are:

After evaluation and approval of technical proposals **(TO BE INFORMED LATER).**

5.3.3 The weights given to the Technical and Financial Proposals are:

Technical: 80%
Financial: 20%



6.3	Add following at the end of this Para: The final person-months of each expert are subject to adjustment at the stage of contract negotiation in line with demonstrated approaches methodology and need basis.
7.2	The assignment is expected to commence in: **May, 2018**
8	The Clause is deleted in its entirety

Checklist for Completeness of Proposal

S. No.	Description	Must attach Documents	
		In case of Single Entity	**In case of JV/ Sub-Consultants**
1.	Power of Attorney to submit the Proposal **(Original, scanned copy is not acceptable)**	a. By the owner/owners of Firm to authorized representative. b. In case of more than one owner, legal authority of issuing Power of Attorney of Executant itself.	a. By the owner/owners of each Firm to authorized representative. b. In case of more than one owner, legal authority of issuing Power of Attorney of Executant itself. c. Power of Attorney by the duly authorized representative(s) of member firm(s)/sub-consultant(s) to the authorized representative of Lead Firm
2.	Power of Attorney to sign the Proposal **(Original, scanned copy is not acceptable)**	a. By the owner/owners of Firm to authorized representative. b. In case of more than one owner, legal authority of issuing Power of Attorney of Executant itself.	a. By the owner/owners of each Firm to authorized representative. b. In case of more than one owner, legal authority of issuing Power of Attorney of Executants itself. c. Power of Attorney by the duly authorized representative(s) of member firm(s)/ sub-consultant(s) to the authorized representative of Lead Firm
3.	Letter of Intent to form JV on firm's letterhead/ JV agreement on stamp paper **(Original, scanned copy is not acceptable)**	N.A	Each Firm (all JV members), including the Lead Firm, to sign through its authorized representative (along with authorization)
4.	TECHNICAL PROPOSAL FORMS TECH-1 to TECH-9 duly completed as per Instructions to Consultants/ Data Sheet and requirements of TOR (To be attached with Technical Proposal)	Must provide	Must provide
5.	Valid Registration Certificate of Pakistan Engineering Council with relevant Project Profile Codes	Must provide	Must provide
6.	Foreign consulting firms shall make JV in accordance with Bye-Law 6(2) and Bye-Law 9 of the Pakistan Engineering Council (Conduct and Practice of Consulting Engineers) Bye-Laws 1986	Ineligible	PEC License(s) must be provided at the time of proposal submission
7.	Affidavit on stamp paper duly attested by the Oath Commissioner to the effect that the firm has neither been blacklisted nor any contract rescinded in the past for non-fulfillment of contractual obligations	Must provide	Must be provided by all member firm(s) including the Lead firm (and sub-consultant(s) if applicable)
8.	Lists of facilities available with the Consultant to perform their functions effectively (proper office premises, software, hardware, record keeping etc.)	Must provide	Must be provided for each JV member including the Lead firm separately. In case of involvement of sub-consultant(s), will also be provided
9.	Affidavit on stamp paper duly attested by the Oath Commissioner to the effect that the proposed Personnel shall be available as per their proposed inputs in the Personnel Schedule and TOR	Must provide	Must be provided for each JV member including the Lead firm separately who has proposed Personnel. In case of involvement of Specialist sub-consultant(s), the affidavit will be signed by the individual himself
10.	Performance Certificate/ Assignment Completion Certificate (All completed projects mentioned under TECHNICAL PROPOSAL FORM A-2 CLIENT'S	Must provide	Must be provided for completed projects of each member including Lead firm

S. No.	Description	Must attach Documents	
		In case of Single Entity	In case of JV/ Sub-Consultants
	REFERENCE **Note:** Any project mentioned completed under Form TEC-2B will not be considered for evaluation unless Performance Certificate/ Assignment Completion Certificate with satisfactory remarks by the client's representative is not attached. The Client NHA reserves the right to verify the Performance/Assignment Completion Certificates.		
11.	Integrity Pact Document duly filled in the blank spaces with requisite information and signed/ stamped	Must provide	Must provide
12.	FINANCIAL PROPOSAL FORMS FIN-1 to FIN-7 duly completed as per Instructions to Consultants/ Data Sheet and requirements of TOR **(To be attached with Financial Proposal)**	Must provide	Must provide
13.	Audit Reports of the firm for past three years duly certified by Chartered Accountant **(To be attached with Financial Proposal)**	Must provide	Must be provided for each firm who proposes Personnel for the Assignment
14.	Sequential page numbering of Proposal. Signing and stamping of proposal (Technical and Financial) wherever indicated as well as initial/ signature and seal on all other pages of proposals. The Proposal is bound as hard book to deny addition/ removal of pages	Must fulfill the requirement	Must fulfill the requirement

Certification:-

I, the undersigned, certify to the best of my knowledge and belief that all above mentioned documents (as applicable), Sr. No.1 to 11 have been attached to our proposal and signed and stamped as per requirement mentioned at Sr. No.12. In the event of any sort of falsification ofthis certification, the Client NHA may at its sole discretion disqualify our firm from bidding for the Assignment named under Data Sheet Sub-Clause 1.1.

_____

Signature of authorized representative of the firm(s) Date: _____
Day/Month/Year

Full name of authorized representative: _____

For and on behalf of: _____{Name of the bidder}_____

_____
(Seal)

Note: copy or scanned signatures are not allowed

SUMMARY EVALUATION SHEET FOR FULL TECHNICAL PROPOSALS (QCBS)

EVALUATION CRITERIA		Max. Weight	Firm 1		Firm 2	
			Rating	Score	Rating	Score
1. Firms Experience		**100**				
	General Experience in road Transport Sector	25				
	Specific Experience related to particular Assignment	75				
2. Approach and Methodology		**250**				
	2-a. *Appreciation of the Project*	70				
	(i) Evidence of Site Visit with Photographs	(30)				
	(ii) Clarity of appreciation	(20)				
	(iii) Comprehensiveness of appreciation	(20)				
	2-b. Quality of Methodology	50				
	(i) Identification of Problems/ Objectives	(30)				
	(ii) Components of Proposed Services	(20)				
	2-c. Methodology	80				
	(i) Proposed Solutions for this Project	(30)				
	(ii) Quality of Methodology	(20)				
	(iii) Conciseness, clarity and completeness of proposal	(30)				
	2-d. Suggested Changes for Improvement in TOR	10				
	2-e. Work Program	20				
	2-f. Staffing Schedule	20				
3. Key Personnel		**450**				
	a. Team Leader / Sr. Highway Engineer	70				
	b. Highway Design Engineer	50				
	c. Bridge Design Engineer	35				
	d. Structural Design Engineer	40				
	e. Tunnel Design Engineer	40				
	f. Hydraulic/ Hydrology Expert	40				
	g. Soil Stabilization/ Protection Expert	30				
	h. Drainage Engineer	35				
	i. Contract Specialist	30				
	j. Highway Safety Engineer	30				
	k. Traffic Engineer	25				
	l. Transport Economist	70				
4. Performance Certification from clients		**100**				
5. Present Commitments (current engagement and available strength – justification)		**50**				
6. Transfer of Knowledge (Methodology/ Plans)		**50**				
	TOTAL:	**1000**				

Excellent - 100% Very Good - 90-99% Above Average – 80-89% Average – 70-79% Below Average – 1-69% Non-complying – 0%
Score: Maximum Weight x rating / 100.
Minimum qualifying score is 70% or 700 marks.

PERSONNEL EVALUATION SHEET

POSITION / AREA OF EXPERTISE	Name	Academic and General Qualification* Weight 30%		Project related Experience Weight 60%		Status with the Firm** 10%		OVERALL RATING (Sum of Weighted Ratings)
(Show all experts to be evaluated)		Percentage Rating	Weighted Rating (A)	Percentage Rating	Weighted Rating (B)	Percentage Rating	Weighted Rating (C)	(A+B+C)
a) Team Leader / Sr. Highway Engineer								
b) Highway Design Engineer								
c) Bridge Design Engineer								
d) Structural Design Engineer								
e) Tunnel Design Engineer								
f) Hydraulic/ Hydrology Expert								
g) Soil Stabilization/ Protection Expert								
h) Drainage Engineer								
i) Contract Specialist								
j) Highway Safety Engineer								
k) Traffic Engineer								
l) Transport Economist								

Rating: - Excellent - 100% **Very good – 90-99%** **Above Average – 80-89%** **Average – 70-79%** **Below Average – 1-69%** **Non-complying - 0%**

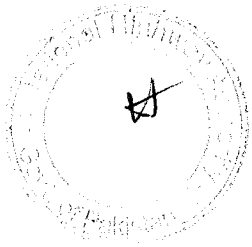
Score: Maximum Weight X rating / 100.

* For Team Leader/ Sr. Highway Engineer, Highway Design Engineer, Bridge Design Engineer, Structural Design Engineer, Hydraulic/ Hydrology Expert, Soil Stabilization/Protection Expert, Drainage Engineer, Contract Specialist, Highway Safety Engineer, Traffic Engineer, Transport Economist: M.Sc. with additional trainings/courses relevant to assignment -100%; M.Sc. - 90%; B.Sc. with additional trainings/ courses relevant to assignment - 80%; B.Sc. - 70%

For Tunnel Design Engineer: M.Sc. with additional trainings/courses relevant to assignment -100%; M.Sc. - 90%

** Regular Employee - 100%;
First time for this assignment- 0%

TECHNICAL PROPOSAL FORMS



Form A-1

TECHNICAL PROPOSAL SUBMISSION FORM

{Location, Date}

To: [Name and address of Client]

Dear Sirs:

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

[{If the Consultant is a joint venture, insert the following: We are submitting our Proposal in a joint venture with: {Insert a list with full name and the legal address of each member, and indicate the lead member}.We have attached a copy {insert: "of our letter of intent to form a joint venture" or, if a JV is already formed, "of the JV agreement"} signed by every participating member, which details the likely legal structure of and the confirmation of joint and severable liability of the members of the said joint venture.

OR

If the Consultant's Proposal includes Sub-consultants, insert the following: We are submitting our Proposal with the following firm(s) as Sub-consultants: {Insert a list with full name and country of each Sub-consultant.}]

We hereby declare that:

(a) All the information and statements made in this Proposal are true and we accept that any misinterpretation or misrepresentation contained in this Proposal may lead to our disqualification and/or may be sanctioned by the Client.

(b) Our Proposal shall be valid and remain binding upon us for the period of time specified in the Data Sheet, Clause 4.5.

(c) We have no conflict of interest in accordance with LOI Clause 1.9.

(d) We meet the eligibility requirements as stated in Data Sheet Clause 1.8.

(e) Neither we, nor our JV Partner(s)/sub-consultant(s) or any of the proposed experts prepared the TOR for this consulting assignment.

(f) Within the time limit stated in the Data Sheet, Clause 4.5, we undertake to negotiate a Contract on the basis of the proposed Key Experts. We accept that the substitution of Key Experts for reasons other than those stated in Letter of Invitation, Clause 6.5 may lead to the termination of Contract negotiations.

(g) Our Proposal is binding upon us and subject to any modifications resulting from the Contract negotiations.

(h). Our firm/ each member of our JV is not participating in any other proposal for this Assignment.

We undertake, if our Proposal is accepted and the Contract is signed, to initiate the Services related to the Assignment not later than the date mentioned in Data Sheet 4.5 (*or the date extended with the written consent of Consultant in case of delay in procurement process)*

We understand that the Client is not bound to accept any or all Proposal(s) that the Client receives.

We remain,

Yours sincerely,

Authorized Signature {In full and initials}: _____

Name and Title of Signatory: _____

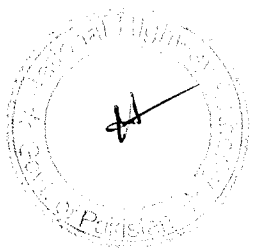
Name of Consultant (company's name or JV's name): _____

In the capacity of: _____

Address: _____

Contact information (phone and e-mail):_____

{For a joint venture, either all members shall sign or only the representative member, in which case the power of attorney to sign on behalf of all members shall be attached}



Form A-2

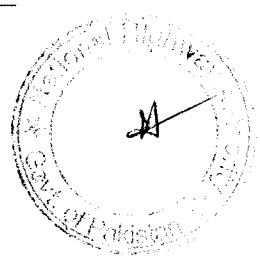
CLIENT'S REFERENCE

Relevant Services (as per RFP notice) Carried Out in the Last Ten Years Which Best Illustrate Qualifications

Using in the format below, provide information on each reference assignment for which your firm, either individually as a corporate entity or as one of the major companies within a consortium, was largely contracted.

Assignment Name:		Country:
Location within Country:		Professional Staff Provided by Your Firm:
Name of Client:		No of Staff:
Address:		No of Staff Months:
Start Date (Month/Year):	Completion Date (Month/Year):	Approx. Value of Services (in Current US$/Rs.)
Name of Associated Firm (s), if any:		No. of Months of Professional Staff Provided by Associated Firm(s)
Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed:		
Narrative Description of Project		
Description of Actual Services Provided by Your Staff		

Consultants' Name: _____



Form A-3

APPROACH PAPER ON METHODOLOGY PROPOSED FOR PERFORMING THE ASSIGNMENT

Form A-4

COMMENTS/SUGGESTIONS OF CONSULTANT

On the Terms of Reference (TOR)

1.

2.

3.

4.

5.

6.

Etc.

On the data, services and facilities to be provided by the Client specified in the TOR.

1.

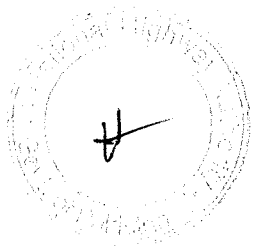
2.

3.

4.

5.

Etc.



Form A-5

FORMAT OF CURRICULUM VITAE (CV) FOR PROPOSED KEY STAFF

1. Proposed Position: _____
2. Name of Firm: _____
3. Name of Staff: _____
4. Profession: _____
5. Date of Birth: _____
6. Years with Firm: _____
7. Nationality: _____
8. N.I.C Number: _____
9. Cell Number: _____
10. Membership in Professional Societies: _____
    (Membership of PEC is Mandatory)
11. Detailed Tasks Assigned on the Project: _____

_____

- Key Qualifications:

[Give an outline of staff member's experience and training most pertinent to tasks on assignment. Describe degree of responsibility held by staff member on relevant previous assignments and give dates and locations. Use up to one page].

- Education

[Summarize college/university and other specialized education of staff member, giving names of institutions, dates attended and degrees obtained].

- Employment Record

[Starting with present position, list in reverse order every employment held. List all positions held by staff member since graduation, giving dates, names of employing organizations, title of positions held and location of assignments. For experience in last ten years, also give types of activities performed and Client references, where appropriate].

- Languages

[Indicate proficiency in speaking, reading and writing of each language: excellent, good, fair, or poor].

- Certification

I, the undersigned, certify to the best of my knowledge and belief that

(i) This CV correctly describes my qualifications and experience.

(ii) I am not a current employee of the Executing or the Implementing Agency.

(iii) In the absence of medical incapacity, I will undertake this assignment for the duration and in terms of the inputs specified for me in Form A-9 provided team mobilization takes place within the validity of this proposal.

(iv) I was not part of the team who wrote the terms of reference for this consulting services assignment

(v) I am not currently debarred by any department/organization/ (semi-autonomous/ autonomous) bodies or such like institutions in Pakistan.

(vi) I certify that I have been informed by the firm that it is including my CV in the Proposal for the {name of project and contract}.I confirm that I will be available to carry out the assignment for which my CV has been submitted in accordance with the implementation arrangements and schedule set out in the Proposal.

If CV is signed by the firm's authorized representative:

(vii) I, as the authorized representative of the firm submitting this Proposal for the {name of project and contract}, certify that I have obtained the consent of the named expert to submit his/her CV, and that s/he will be available to carry out the assignment in accordance with the implementation arrangements and schedule set out in the Proposal, and confirm his/her compliance with paras (i) to (v) above.

(viii) Latest colored attested photograph stapled attached with the CV.

I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.

Signature of expert or authorized representative of the firm

Date: _____
Day/Month/Year

Full name of authorized representative: _____

Note: copy or scanned signatures are not allowed

Form A-6

COMPLETION AND SUBMISSION OF REPORTS AS PER TOR

Reports		Date
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Form A-7

COMPOSITION OF THE TEAM PERSONNEL AND THE TASKS TO BE ASSIGNED TO EACH TEAM MEMBER

1. Technical/Managerial Staff

NAME	POSITION	Tasks Assignment	Present location	Name of assignment involved and clients name

Form A-8

WORK PLAN /ACTIVITY SCHEDULE

Items of Work/Activities	Monthly Program from date of assignment (in the form of a Bar Chart)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Form A-9

WORK PLAN AND TIME SCHEDULE FOR KEY PERSONNEL

Name	Position	Months (in the form of a Bar Chart)															Number of Months
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

Full Time: _____
Part Time: _____ Activities Duration _____

Yours faithfully,

Signature _____
(Authorized Representative)

Full Name _____
Designation _____
Address _____

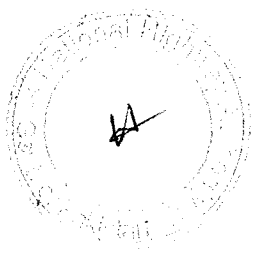
Form A-10

CURRENT COMMITMENTS OF THE FIRM

(List MUST be comprehensive including projects from clients other than NHA as well)

Name of project	Single or JV	Task Assignment	Start date of the project	Expected date of completion

FINANCIAL PROPOSAL FORMS



Form A-11

FINANCIAL PROPOSAL SUBMISSION FORM

{Location, Date}

To: [Name and address of Client]

Dear Sirs:

We, the undersigned, offer to provide the consulting services for [**Insert theProject Name**]in accordance with your Request for Proposal dated [Insert Date] and our Technical Proposal.

Our attached Financial Proposal is for the amount of {Insert amount in words and figures}, *including all Federal, Provincial &Local taxes applicable as per law of the land.* {Please note that all amounts shall be the same as in Financial Proposal Form A-17}.

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 Clause 4.5 of the Data Sheet.

We confirm that we have no condition to state that may have financial implications over and above the amount quoted above.

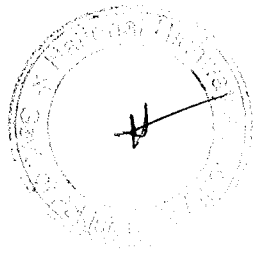
We understand you are not bound to accept any Proposal you receive.

We remain,

Yours sincerely,

Authorized Signature {In full and initials}: _____
Name and Title of Signatory: _____
In the capacity of: _____
Address: _____
E-mail: _____

{For a joint venture, either all members shall sign or only the representative member/consultant, in which case the power of attorney to sign on behalf of all members shall be attached.}



Form A-12

BREAKDOWN OF RATES FOR CONSULTANCY CONTRACT

Project: _____ Consultant: _____

Name	Position	Basic Salary per Cal. Month	Social Charges (%age of 1)	Overhead (%age of 1+2)	Sub-Total (1+2+3)	Fee (%age of 4)	Rate per Month for project Office	Field Allow. (%age of 1)	Rate per Month for Field Work
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

Notes:

Item No. 1 Basic salary shall include actual gross salary before deduction of taxes. Payroll sheet for each proposed personnel should be submitted at the time of negotiations.

Item No. 2 Social charges shall include Client's contribution to social security, paid vacation, average sick leave and other standard benefits paid by the company to the employee. Breakdown of proposed percentage charges should be submitted and supported (see Form A-13).

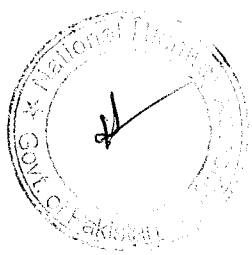
Item No. 3 Overhead shall include general administration cost, rent, clerical and junior professional staff and business getting expenses, etc. Breakdown of proposed percentage charges for overhead should be submitted and supported (see Form A-14).

Item No. 5 Fee shall include company profit and share of salary of partners and directors (if not billed individually for the project) or specified in overhead costs of the Company.

Item No. 7 Normally payable only in case of field work under hard and arduous conditions.

Note 1 The minimum percentage of item (1) should preferably be 50% of (8).

Note 2 The consultant is to provide appointment letter and affidavit/undertaking duly signed by each of the individual staff members showing salary rates as above. Further during execution each invoice will also be provided showing that the professionals have been paid their salaries as per basic rates specified therein. Failing to which, the Client will take punitive action against the consultant and shall deduct the deficient amount from his monthly invoice. Moreover, it will be considered as a negative mark on his performance that will be considered for future projects.

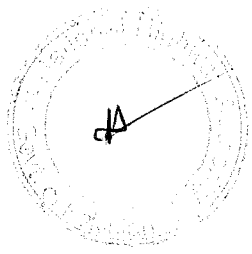


Full Name: _____
Signature: _____
Title: _____

Form A-13

BREAKDOWN OF SOCIAL CHARGES

Sr.No.	Detailed Description	As a %age of Basic Salary



Form A-14

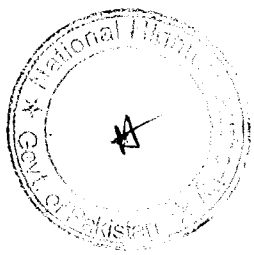
BREAKDOWN OF OVERHEAD COSTS

Sr.No.	Detailed Description	As a %age of Basic Salary and Social Charges

Form A-15
Page 1 of 2

ESTIMATED LOCAL CURRENCY SALARY COSTS/REMUNERATION

Sr. No.	Position	Name	Staff-Months	Monthly Billing Rate	Total Estimated Amount (Rs.)
I.	**Professional / Key Staff**				
Sub-Total:					

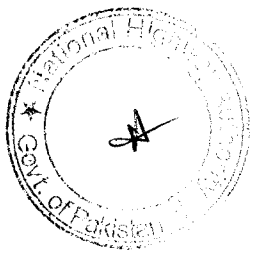


Form A-15
Page 2 of 2

ESTIMATED LOCAL CURRENCY SALARY COSTS/REMUNERATION

Sr. No.	Position	Staff-Months	Monthly Billing Rate	Total Estimated Amount (Rs.)
II.	**Non-Key / Support Staff**			
Sub-Total:				

Note: The bidders are required to quote the rates of Non Key/Support Staff given in the TOR in above table. The bidder(s) may propose Non Key/ Support Staff Person-Months in addition to those given in TOR; however, in such a case tenable reasons must be given in the Technical Proposal Submission Form A-4 "Comments on TOR". The Client's negotiation committee will deliberate on the requirement of additional staff during negotiation meeting. It is also to be noted that the Client is not bound to agree to the reasons given in Form A-4.



Form A-16

DIRECT (NON-SALARY) COSTS

Sr. No.	Nomenclature	Unit	Qty.	Unit Price (Rs.)	Total Amount (Rs.)
1.	Rent for Office Accommodation	L.S			
2.	Office Utilities Costs	L.S			
3.	Cost / Rental of Furniture / Furnishings	L.S			
4.	Cost (rentals) of Office/Other Equipment i Computers and accessories ii Photocopy machines iii Communication equipment iv Drafting / Engineering equipment v Surveying instruments (rentals) vi Transport Vehicles (Rentals) vii Site visits and Meetings in Islamabad during currency of Project and coordination during supervision	L.S			
5.	Communication expenses	P.Month	6		
6.	Drafting/ Reproduction of Reports	L.S			
7.	Office/ Drafting Supplies	L.S			
8.	Cost of EIA Study	L.S			
9.	Soil and Material Investigation along the Alignment	L.S			
10.	Provisional Sum Items				
	Geotechnical Investigation	P.S			4,000,000
	Satellite Images	P.S			1,000,000
	Cost of ROW Markers	P.S			2,000,000
11.	Others not covered above to comply with TOR requirement *				
	Total				

* Any additional item/ cost quoted against this line item must be supported by solid/ tenable justification(s) detailed in Technical Proposal Submission Form A-4 "Comments on TOR" without indicating financial value therein. The negotiation committee of the Client may negotiate this cost on the basis of justification provided in the form A-4 with the prospective successful bidder in the light of Clause ITC 6.6 of RFP. Moreover, if no justification is given or Client does not agree to the justifications, the Client in both the cases **shall not** include this cost in the total cost offered by the Consultants for this assignment, particularly in case any amount against this line item is deemed to have been covered in other pay items.

Form A-17

SUMMARY OF COST

Sr. No.	Description	Amount (Rs.)
1.	Salary Cost/Remuneration	
2.	Direct (Non-Salary) Cost	
3.	Sub Total (1+2):	
4.	Sales Tax @ 16% on item S.No.3 above which shall be kept as Provisional Sum in the Contract Agreement	
5.	**Grand Total:**	

Note: 1- This cost is supposed to be built up in bid price and if anything is left blank it shall be deemed to be included in the cost.

2- The dues and salaries of staff are payable by the consultant in time and not later than 10th of the following month positively. In case of failure to do so Client shall intervene and pay these dues and salaries of the concerned Personnel and recover from the invoice of the consultant at actual charges paid plus 1% of the amount. This will also be accounted for adversely in making assessment of the Consultants in the next evaluation process for selection of consultants with report of such defaults.

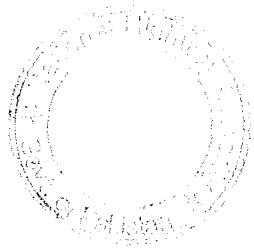
3- The grand total is inclusive of all the applicable Federal, Provincial and Local taxes. All these taxes (except the Sales Tax) are required to be built in the quoted rates and not be mentioned separately.

4- Any Omission or arithmetical error made by the Consultants in entering the amount against item 4 above shall also be rectified during evaluation of the Financial Proposal.

APPENDIX-A

TERMS OF REFERENCE

(TOR)



CHAPTER NO. 1

INTRODUCTION

1.1 BACKGROUND

In the 6th JCC of CPEC meeting, JCC agreed to include Chitral CPEC link road from Gilgit, Shandoor, Chitral to Chakdara in CEPEC portfolio.

The Chief Ministers of KPK and GB provinces have requested to federalize the said road to implement the entire Project through NHA.

The current status of the road is as under: -

i.	Gilgit -Shandoor	216 km in Gilgit Baltistan
ii.	Shandoor-Chitral	148 km in KPK Province
iii.	Chitral-Chakdara	131 km in KPK Province

The road starts from Gilgit town located on N-35 (545 km) and ends at Chitral town N-45 (310 km). The total length of the road is about 364 km. The feasibility study of Shandoor-Chitral section (148 km) is already completed whereas the process for feasibility study and preliminary design of the remaining section i.e. Gilgit-Shandoor section (216 Km) is required to be initiated for the execution of project under the CEPEC Corridor umbrella.

1.2 NEED ASSESSMENT

The Project falls in hilly to mountainous terrain; Shandoor is the highest point on this road. The road was constructed by the provincial government in 2002 which is blacktopped from Gilgit to Phandur town and from Phandur town upto Shandoor is a shingle. The carriageway width varies between 3 - 4 meters. The sharp curves and steep gradient make movement of traffic difficult and unsuitable for the heavy traffic. From Yaseen, Mastuj, Booni and Chitral connected to Afghanistan and Tajikistan through local roads.

Local people are using these connecting roads for trade with Central Asian Countries since centuries. This area has great potential of tourism due to passing through beautiful valleys and highly rich in minerals. After completion of Lowari Tunnel this road is reliable and efficient alternative of KKH highway.

1.3 PROJECT DEFINITION

The project comprises feasibility study and preliminary design for construction of 2-lane carriage way from Gilgit to Shandoor (216 Km).

1.4 PROJECT OBJECTIVES

The main tangible and non-tangible objectives envisaged through this study is summarized below:

i. Connection to adjoining areas and valleys.

ii. Comfort for local people in travelling.

iii. Tourism will be increased/ improved to a great extent.

iv. It will create more job opportunities for local residents.

v. The said project will provide a basic need better communication system to the people of area.

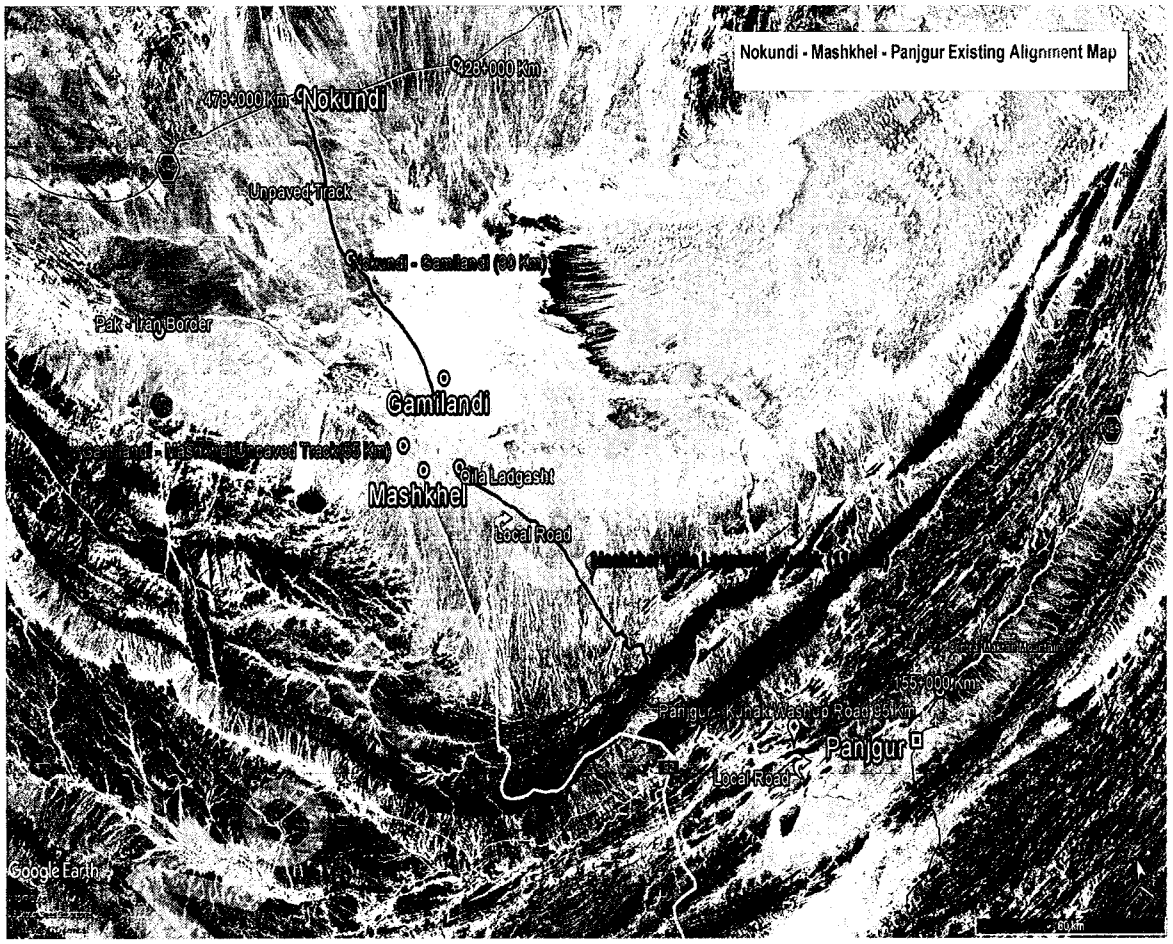
vi. After completion of Lowari Tunnel this road shall serve as an alternative to the KKH highway.

CHAPTER NO. 2

DESCRIPTION OF THE PROJECT

2.1 LOCATION OF PROJECT

The road starts from Gilgit town located on N-35 (at 545 km) and ends at Shandoor. Total length is (216 km). (Location map enclosed).



2.2 PROJECT WORKS

The scheme envisages the construction of "Gilgit to Shandoor (216 Km)" as per NHA Standards and Specifications.

The scope of work broadly covers the following but not limited to:

- Land surveys and fixing of bench marks;
- Geological Investigation Report;
- Geotechnical Investigation Report;
- Soil Stabilization Report;

- Hydraulic Study of Rivers and nullahs;
- EPC based Tender Documents and Drawings;
- Preparation of PC-I.

ROAD FEATURES:

•	Total length:	216 km
•	Starting Point:	N-35 at km 540
•	Towns:	Gilgit, Ghakuch, Gupis, Phandur, Shandur Pass

Existing Road Condition:

I. Gilgit - Phandur:

i.	Length:	136 Km
ii.	Surface Type	TST
iii.	Carriage way	3.65 m
iv.	Shoulder	2m + 2m

II. Phandur - Shandoor:

i.	Length:	80 Km
ii.	Surface Type	Earthen/Shingle
iii.	Carriage way	7.0 meters

Technical Parameters to be Followed:

•	Road Design parameter.	
•	Carriageway Width:	7.3 meters.
•	No. of Lane:	2-lane Single Carriageway
•	Shoulder width (Plain/ Rolling):	2-meter on either side.
•	Shoulder width (Hilly):	2-m hill side and 1.5m on river side
•	Cross fall:	Carriageway=2%. Shoulders=4%
•	Design Speed (Hilly):	60 km/hour.
•	Design Speed (Plain):	120 km/hour.

2.3 COMMENCEMENT Of SERVICES

The Consultants shall commence the services immediately upon signing of the Contract Agreement, or such other time period as the Parties may agree in writing.

2.4. TIME OF COMPLETION

The period of completion of services shall be **four (4.0) months** from the commencement of services or such other period as the Parties may agree in writing, and the Consultants shall submit all the Reports mentioned in the TOR in the form and format acceptable to the Employer.

****

CHAPTER NO. 3

SCOPE OF WORK

3.1 SCOPE OF WORK

The Scope of Work for the Present Terms of Reference comprises of following but not limited to:

- Detailed topographic survey
- Detailed soil investigation survey on the proposed alignment+ Existing Alignment
- Detail Conditional survey of existing road.
- Identification of quarry sites and construction material survey
- Geotechnical Investigation survey for bridges and structures
- Geological Survey
- Remedial measures for scouring, Land sliding, Slope Protection report.
- Design of Toll Plazas, weigh stations and Service Areas
- Geometric Design of Sharp Curves
- Road furniture design including traffic signs and gantries
- Hydrology & Hydraulic design of structures
- Structure Design of Bridges, Culverts, Retaining structures
- Traffic survey and Axle load survey or collection of data from nearby weigh stations
- Pavement Design with surface and subsurface drainage.
- Tourism Potential of the Area.
- International Connectivity Report
- Plan for Energy Potential Development report
- Plan for Mineral Potential Report along the corridor.
- Plan to connect Towns and Villages with the corridor.
- Provision of ducts/crossing of future utilities like OFC, pipelines etc.
- Tender Documents, BOQ, Engineer's Estimate PC-1(EPC Mode)
- Utility folders and Land acquisition plans using imageries, cadastral maps on GIS
- EIA and SIA Study indicating poverty and social assessments and also resettlement impact report.

- Preparation of PC-1

3.2 GOVERNING DESIGN STANDARDS

3.2.1 DESIGN STANDARDS

Geometric Design: AASHTO (American Association of state highway and Transportation officials) standard. A policy on geometric design of highways and streets 2011 AASHTO.

Pavement Design: AASHTO (American Association of state highway and Transportation officials) guide for design of pavement structures 1993. AASHTO Mechanistic-Empirical pavement design guide will also be used.

"Material Testing: ASTM (American Society for Testing and Materials) and (American Association of State Highways and Transportation officials). (Latest Edition)

For analysis and design of structures following standards and loads will be adopted.

i. AASHTO (Current Edition):
For Analysis and Design for all loads and load combinations, AASHTO current edition be used.

ii. ASTM:
For Material Specification & Testing only in case where details are not specified in AASHTO.

iii. ACI:
For analysis, design and detailing, only in case where details are not specified in AASHTO.

iv. Check Deck Slab for Punching Shear:
Deck Slab Thickness should not be less than 8 inch (205mm). Concrete strength should not be less than 4000 PSI (28MPa)

Seismic design
Earth Quake forces are calculated according to AASHTO. Peak Ground acceleration will be considered accordingly as per Pakistan Building Code 2007.

3.2.2 ROAD DESIGN STANDARDS

2 lane (7.3 meter width)

- Design speed 70 km/h or allowable as per Prevailing Geometry.
- Outer shoulder 2meter
- Inner Shoulder 3 meter with V shaped Drain
- Utility service lanes.

- Mini service areas
- Proper informatory signs on road.

Above standards are derived from "A Policy on Geometric Design of Highway & Streets 2011". Any Design element not mentioned above should confirm to the same design guide for Rural Arterial standard.

3.3 GOVERNING WORK METHODOLOGY:

The Task No1 and task No 2 described in Chapter 4 should include stage No 1

The Study is divided in two stages:

Stage-I

- Alignment Identification for Approval of M (P)
- Preparation of Corridor Development Plan for Approval of M (P)

Stage-II

- Land surveys and fixing of bench marks
- Geological Investigation Report
- Geotechnical Investigations reports
- Construction material Investigation Report
- Soil Stabilization Report
- Hydraulic Study of Rivers and nullahs
- Cross & Longitudinal drainage study report
- Traffic survey Report
- Traffic demand forecasting report
- Economic Analysis
- EIA report and certifications
- Land Acquisition, Poverty and Social assessments
- Resettlement impact assessment report
- Resettlement action/mitigation plan
- Geometric Design
- Pavement Design
- Bridges and drainage structures design
- Hydraulic structures designs
- Slope protection works designs
- Tunnel construction and Allied works (if required)

- Toll Stations, Weigh stations and rest areas designs
- Tourism Potential of area
- International Connectivity report
- Plan of Energy potential development report
- Plan for Mineral potential report along the corridor
- Plan to connection Towns & villages with corridor.
- EPC based tender documents and drawings
- Preparation of PC-I document.

Correctness of Design & Co-ordination Engineer

Consultant is entrusted with the Scope of Work outlined above. It is required that the consultant should undertake the job in a professional manner to the best of his ability and resources. NHA as Client may offer comments through in-house review.

Any comments offered by the Client do not absolve the consultant from its obligation to develop correct and cost-effective engineering solutions for the Projects. NHA reserves the right to take punitive actions as required at appropriate forum even during construction stage.

The consultant is required to deploy a qualified co-ordination engineer for the first six months at the Project site. He will have an experience between 5 to 10 years. In case of any design ambiguities, he will liaison with the Design engineer for correcting deficiencies. His boarding and lodging shall be the responsibility of the Design Consultant. It is obligation of the Consultant to provide complete support to the Construction team even if he does not have the supervision.

CHAPTER NO. 4

TASKS

Task 1:	**Data Collection & Co-ordination with local Departments**
Approximate Duration:	**15 days**
Outcome:	**Consultant get hold of relevant information, SOP Maps, Satellite imageries and liaison with local departments/police etc.**

1.1 DATA COLLECTION & CO-ORDINATION WITH LOCAL DEPARTMENTS

Immediately after signing of the Contract, the consultant will get procession of the relevant maps, reports and imageries for the detailed design of the Project. After the Completion of the design, SOP maps and imageries shall be returned back to the Client in Original and un-damaged. In case any authorization is required by the concerned office for delivering the required information, same shall be provided by NHA in the form of Authority letter. The Consultant should inform the local police and administration before conducting all types of filed surveys. Before planning the field reconnaissance, the consultant should co-ordinate meeting with the local city development / Highway Department to know any future plans for city expansion and provincial roads etc. Tips for design of Bypasses/realignment shall be obtained as per local requirements.

Task 2:	**Inception report and preparation of the corridor Development plan**
Approximate Duration:	**20 days**
Outcome:	**Consultant should submit Inception Report and the corridor development plan. (5 hard+1 soft)**

2.1 RECONNAISSANCE VISIT

After the completion of the Task 1, the consultant shall carry out field visit and desk study to develop inventory and identify possible rehabilitation of existing and alignment plans and also bypasses on major cities where urbanization is fast growing. The site visits shall be carried out by a senior highway engineer of not less than 15 years of experience. Coordinated meetings with local departments shall be done and minutes recorded (same shall be made part of the Alignment report).

During the reconnaissance visit, particular requirements of project shall be identified that will be addressed in the detailed design. Other requirement of Task-2 is the submission of Inception Report. Inception Report should elaborate the methodologies for detail design for requirements spelled out in the TOR and observations made in the site visit.

After submission of Inception report, the Consultant will give his presentation to the Member (Planning) in NHA Auditorium that will include the points mentioned in Chapter 3 para 3.3 stage 1.

At the reconnaissance stage social, economic and environmental aspects shall be considered. The resulting information will form part of the recommendations for adoption of a particular corridor. Bypasses will be provided in major Towns where urbanization is fast growing or where the road becomes narrow passing through inside of villages.

District Chitral consists of numerous valleys having high potential of Hydropower and mineral resources. The consultant will develop a corridor development plan along with reservoir capacity, identifying all potential of DAMS, Hydropower potential, Mineral resources in all valleys.

1. Feasibility report will be prepared for DAMS their capacity with respect storage and Hydropower potential in all valleys of District Chitral. Moreover all the hydropower potential available will also be a part of report along with cost estimate.

2. Moreover all mineral resource available in the project area must be identified and preliminary cost estimate for access road to those mineral resources sites shall also be made part of report. The consultant will finally make presentation to Chairman NHA and Member (Planning) in this regard.

The consultant will separately submit the Plan for the following Aspects:

i. Plan for Energy Development Report.
ii. Tourism Potential of the Area.
iii. International Connectivity Report.
iv. Plan for Mineral Potential report along the corridor.
v. Plan to connect Towns and Villages with the corridor.
vi. EPC Based Tender Documents and Drawings.

The copies of the aforementioned 06 reports shall be submitted separately to the Planning Section and the invoice will be cleared upon satisfactory certificate from the Planning Section.

Data from various sources shall be collected at this stage:

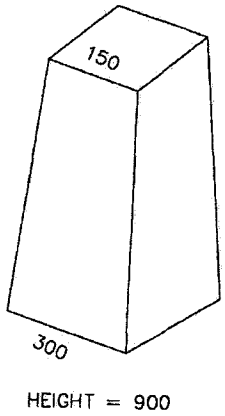
- Topographic Maps
- Geological reports available (from local departments, adjacent projects)
- Use of Satellite imagery
- Input from concerned Maintenance office of Punjab C&W Department and the minutes of meeting shall be made part of inception report.

One set of the each data set will be provided to NHA for record purpose

Task 3:	**Detailed Topographic Survey**
Approximate Duration:	**60 days**
Outcome:	**Consultant will get approval of Topographic Survey Program** **Submit survey Report (5 Hard + 1 Soft)** **Submit Draft and Final Topographic Plans (5 Hard + 1 Soft)**

Please note that as per recent "Surveying & Mapping Act 2014" The survey company must comply with the requirements of the Act.

3.1 DETAILED TOPOGRAPHIC SURVEY (*PRE-REQUISITES*)



Permanent Ground Monument made of Concrete 1:4:8 with 75 mm steel nail embedded at center. Using spray paint and a stencil, the monument number shall be painted.

The size of monument shall be 150 mm square at top and 300 mm square at bottom. The height of monument shall be 900 mm. Out of which 750mm shall be buried in the ground.

Topographic survey forms the basis for the detailed design. Poor quality of survey work produces not only incorrect designs but also results in post construction problems with variations in cost and claims. It will be ensured by NHA that the Survey work is of top most order. It is therefore recommended that consultant should use the latest technology for the topographic surveys, which include GPSDF (4-5 in number) for establishment of high accuracy control points. In case the consultant does not have the requisite number of GPSDF, he is advised to hire services of professional survey companies having the required expertise. The GPSDF shall be simultaneously used on SOP Bench Marks as well as BMs established for the Projects (Start and End).

Before mobilizing to site for Survey, the Consultant shall submit to the Client detailed topographic survey program with actual human resources *planned to be deployed*. The consultant shall specify *the time line of survey program*. Total *number of equipment's* with models and *calibration certificates not more than 6 months* old shall be produced. The *name and qualifications of surveyors* shall also be submitted. NHA reserves the right interview the surveyor if required. Upon request, the consultant should change the surveyor. If *consultant wants to outsource the Survey work, it will be mandatory to take prior approval of the Client*. NHA will ensure that the survey firm is not black listed and has sufficient resources.

3.3.1 Survey Monuments

The type and dimensions of Survey monuments to be installed at site is shown here. Besides start and at the end, it is required that these markers shall be fixed in the traverse line at an interval of about 300 to 400 meters. These shall be fixed at such locations that these are least susceptible to disturbance and damage. The Consultants shall fill out a Performa for each traverse station as attached in Annexure II.

3.3.2 Control for Traverse

The control for traverse shall be established with the Survey of Pakistan Grid Lambert Conical Projection with Everest datum. GPSDF sets shall be used to connect the Traverse with the SOP BM.

3.3.3 Survey corridor

The detailed topographic survey shall be carried out in a corridor of 100 m. At locations of crossing rivers, nullahs the detail of survey extent is given in respective sections.

3.3.4 Survey Accuracy

The accuracy of the Traverse should not be less 1:20,000. During leveling control of all traverse stations, double circuit leveling shall be carried out. The datum of all reduced levels is mean sea level and shall conform to Survey of Pakistan Bench mark levels.

Vertical disclosures within the leveling net and between Survey of Pakistan Benchmarks shall not exceed the lesser of the following:

a) ± 16mm
b) ± (20 / K) mm
c) where K is the sum of the distances leveled in kilometers.

The Survey Department Benchmarks which exceed these tolerances shall be omitted from the adjustment. The Surveyor shall inform to the Client and the Survey Department where the Survey Department Benchmarks are found to be damaged or not in order.

All leveling shall be done in sections of approximately 1 km in length

3.3.5 Mapping (Unit of Measurement)

Metric units shall be used throughout.

3.3.6 Scale

Besides soft copy, mapping of drawings shall be plotted to a scale of 1:2000.

3.3.7 Grid and Detailed Accuracy

Mapping shall be based on the grid system defined above. Gridlines and Permanent Ground Markers shall be drawn using plotter. Well defined points of detail shall be plotted in their true positions at map scale to ± 0.3mm root mean square error when coordinated scale off the map from the nearest grid line are compared with coordinates determined by measurement on the ground from the nearest Permanent Ground Markers (90% of a representative sample of well-defined points shall be within ± 0.5mm).

3.3.8 Details to be Shown

The horizontal and vertical control established shall be used for topographic survey of the required areas. Acquisition of field data such as natural and man-made features like roads, buildings, utilities (overhead / underground) along with type, sizes & height (at road crossing) if exist at the time of field survey and spot elevations in 25 m x 25 m grid plus at change of slope shall be collected / taken to show the terrain condition within the project area. Most of the data shall be recorded electronically. Moreover, in case of trees in the survey corridor, the surveyor has to assign a code defining the girth of the tree. Trees with varying girth as specified in the CSR for payment shall be in respective layers, Terraced slopes, Borrow pits / Quarries, Retaining wall, Rock outcrops, Electricity sub-stations and switch boxes (boundary fences only),Pylon lines (indicate levels at lowest point at sag and at pylon towers),Manholes (circular and square),Lakes, Rivers (name to be indicated),Streams, Swamps, Slope conventions shall be drawn as near as possible to indicate the actual shape of the slope face, i.e., all berms and terraces shall be detailed.

Any other features not listed, which are requested by the Client shall also be shown.

3.3.9 Spot Height

Spot heights shall be shown on the final drawings at spacing not exceeding 20 m at the following locations: -

- At salient points such as hilltops, bottoms of depressions and saddles.
- Along the center and edges of all roads and public accesses, at road intersections and significant changes of gradient.
- At water level at the time of survey along river, streams, major watercourses and ditches.
- On bed levels of rivers, streams, canals and other watercourses.

In flat areas, where the horizontal distance between contours generally exceeds 40 m Supplementary Spot Height shall be shown at intervals not exceeding 20 m parallel to the contours.

3.3.10 Bridge details

The bridge details shall be shown on a separate drawing for each bridge. The bridge observations in form of coordinates shall include the following: -

- The coordinates and levels of the four corners of the bridge (points shall be on the adjacent road surface), the two edges of the piers, abutment and wing walls.
- The coordinates and levels of the bridge deck to the intermediate piers (if any) of the bridge.
- Length, width and type of construction of bridge.

- The type and location of services adjacent to the bridge.
- The coordinates and levels of the centerline and the road on the bridge at approximate intervals of 5 m.
- The cross-sectional clearance envelope at the two sides of an overpass ridge (with respect to the road centerline passing underneath) showing all the relevant levels, offsets and skew angle.

3.3.11 Culvert details

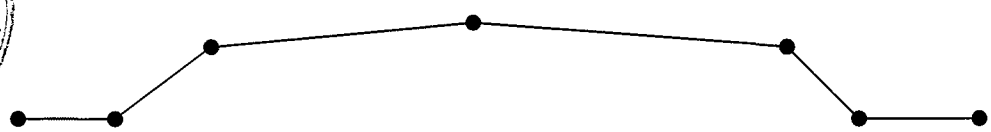
Details of each culvert are to be shown on the survey plans and a separate sheet (annexure) tabulation of the following information is to be submitted with the plans: -

- Type of culvert and diameter.
- Chainage of culvert at the road centerline.
- Skew angle of the culvert from the centerline.
- Length of culvert from each side of the centerline.
- Invert levels of the inlet and outlet.
- A sketch of the inlet and outlet structures including all visible dimensions to a scale of 1:200.

For major culverts (dia.>2.0m) the outlet structures are to be properly measured enough points shall be recorded so that the culvert can be modeled in CAD.

3.3.12 Existing Road/embankment

In case alignment runs along the existing road, sufficient points should be taken across the existing road to fully define the cross-section. Below are **minimum** points shown for the existing road way cross-section. For the existing carriageway, the width of carriageway, inner and outer shoulders should be clearly identified and coded.



3.3.13 Details of junctions and existing roads (if required)

The Surveyor shall survey all junctions to enable the designer to design the junction properly. A corridor width of 70m and shall be taken for a distance of not less than 150 meters up and down the proposed intersection of the road or as required by the client.

All paved roads, main roads and footpaths or tracks having the width greater than 2m shall have a minimum of two (2) points defining both edges of the carriageways. Consecutive points along the road feature shall not exceed 20m in rural areas and 10m in urban or built-

up areas. More points are generally needed to define curved feature such as slip roads, islands, etc.

Levels of the road centerline shall be recorded for paved roads having widths greater than 6.0m. The main destination of the road from the junction shall be recorded by the Surveyor.

Where necessary to survey along an existing road, the Surveyor shall follow the marked chainages along the centerline. In addition to the road edges consecutive points along the edges of the carriageway (i.e. along the edge line marking on both sides) shall be picked up and shall not exceed 10 m. More points are generally to define super-elevation changes at curve sections.

3.4 Digital Ground Models (DGM)

The product of the filed survey data, after processing shall be DGM. The accuracy of DGM shall depend upon the accuracy of the digital data collected in the field. Before processing the data, it is important to run the data filtration. All data points with incorrect x, y or z values shall be removed. It is also important as well to properly identify the break lines like road, nullah edge with natural faults. Void areas like buildings shall also be marked. The topography shall be fully labeled for every object recorded.

All survey feature lines will herein be referred as 'strings'. The data shall be presented by the Surveyor in a form suitable for input to the software to be used for generation of DGM. Using the recorded data in x, y, z format on data logger, the ground surface over the required area shall be simulated by strings of coordinated information along characteristic lines on the terrain. The models shall consist of three dimensional (3D) contour strings.

The existing road surface over the required area shall be simulated by 3D strings of coordinated information along characteristic lines on the existing carriageway. Any other strings that do not affect the accuracy of the ground surface may be assigned a null level.

The Surveyor shall obtain prior approval from the Client for any strings that are to be digitized but that do not absolve the Surveyor from the subsequent accuracy and definition of the model.

TIN (Triangular irregular network) shall be developed by using software. Using TIN, Contour generation shall be done. Since the NHA uses Eagle Point for vetting, same shall be used by the consultant.

3.5 Grid

The coordinates of the DGM shall be referred to the grid system as described in the Section 4.3.7. The coordinates of the DGM shall be in Easting, Northing and elevations.

3.6 String Labeling

The ground features including break lines shall be labeled with the exact description shown

under AUTOCAD LAYER NAME for the AutoCAD or compatible formats. Any additional labels may be considered and the Surveyor shall submit the list for approval prior to their usage in the DGM.

3.7 Property Model

This model shall be stimulated by a series of 3D null level strings and text strings and includes the following: -

- Strings of land lots (null level strings)
- Land use and type (Text Strings)

Attributes to land type and use shall be appended to in the AutoCAD format. Such information shall be used by the Surveyor when preparing Land Utility folders at the end.

3.8 Contours

After digital data collection of survey points at site, the contour generation shall be done by using computer software. **The interval shall be 1m**. The smoothness factor to be defined in the software should be such that it should not distort the ground contour representation. The contours should be well labeled.

During data collection, break lines on the ground should be very well picked that affects the contour generation.

If in the project, where steep slopes are likely to be encountered, the surveyor is required to use the laser equipped total stations that does not require and prism to record the co-ordinates.

Contours shall be shown by continuous lines with a thicker line for every fifth contour (Prominent Contour). Contour and spot heights shall be differentiated from other detail. The value of each contour shall be indicated along the contours at intervals not exceeding 200 mm and / or the edges of the Mapping area.

Where because of undergrowth, on-going earthworks, swampy areas, or other obstructions, the ground surface is obscured, or access is restricted, and provided the Client prior agreement is obtained, contour can be shown by broken lines to indicate that their accuracy cannot be guaranteed.

THE SURVEY COORDINATES IN UTM AND WGS84 DATUM MUST BE PROVIDED TO THE DESIGN SECTION IN CSV FORMAT

Task 4:	**Traffic & Axle Load Survey report**
Approximate Duration:	**20 Days**
Outcome:	**Classified Traffic Surveys after approval of Client.** **Submit Traffic & Axle load survey report (5 Hard+1 soft)**

4.1 TRAFFIC COUNT

Traffic count forms the basis for capacity analysis, pavement design and economic analysis etc. consultant is required to carry out classified traffic counts at required locations along the project and on the connected network to develop an understanding of traffic pattern in future. The study will also entail the estimation of diversion and generated traffic. The consultant shall submit in Inception report, detailed program of traffic count along with locations, duration and repetitions. Same shall be exercised after the approval of the Client.

The classified traffic count shall include following classifications:

- Non motorized traffic	Animal drawn, bicycle
- Motorized traffic	M/cycle, Car/Pickup/Jeep, Minibus/wagon, Bus, 2-Axle, 3- Axle, 4-Axle, 5-Axle, 6-Axle Tractor trolley

The traffic count shall be done with hourly classification. In peak hour, 15-minute interval count shall be done to ascertain PHF.

4.2 Journey Time

For with and without Project scenario, the journey time survey of various classes of vehicles in peak hours and off peak hours shall be done. It shall be used in economic analysis.

4.3 Origin & Destination Survey

If required, the O&D Survey shall be carried out to identify the traffic like to be diverted to Bypass.

4.4 Axle Load Survey

Consultant shall undertake axle load survey using portable weighing machine. Consultant shall confirm in his technical proposal the availability of such equipment (ownership / rental basis). Sufficient samples of all axle groups shall be weighed. In addition to axle load, tire pressure shall also be measured. Data shall be annexed in the final report and used in the pavement design.

4.5 Underpass/ Cattle Creep Survey

Using satellite imageries, field survey and site consultation, consultant shall identify exact number & locations of the underpass/cattle creep survey to be provided for convenience of local residents.

Task 5:	**Soil & Material Investigation Report and Slope Stabilization Report**
Approximate Duration:	**60 Days**
Outcome:	**Soil and Material Investigation Report and Slope Stabilization Report ((5 Hard + 1 soft) for each report)**

5.1 SOIL & MATERIAL INVESTIGATION

Soil & Material investigation is done to ascertain the index and engineering properties of soil & rock encountered. The consultant is required to seek, interpret and evaluate subsurface and surface data both for the existing and additional carriageway in order to predict the behavior of the soils and materials along, and adjacent to, the alignment. The resulting information should be presented in a logical and intelligible manner so that it can be used correctly and efficiently interpreted.

The consultant is required to carry out following steps:

- Determine needs of the design
- Carry out complete ground investigations
- Carry out complete laboratory testing
- Evaluate results for final design

As per fixed horizontal and vertical alignment, identify the areas of deep cuts and high fills. Study precise geometry of the roadway structures and develop design requirements.

Field investigations shall be carried out in three main areas.

- Investigation along the length of the proposed alignment and to determine the pavement support potential offered by the subgrade soils
- Investigation to determine the source and quantity of naturally-occurring construction materials
- Examine specific sites such as deep cuts, retaining walls and culverts etc.

Following table shows the guidelines for the quantity of roadway pits or borings and testing required for the Final Design Report. The values given are average investigation requirements for normal highway work and that actual scope will depend upon the complexity of the problem.

Roadway type	Height (m)	Terrain type	Spacing (m)	Depth (m)
Embankment	<2	Uniform Rolling Hilly	1000 500 250	1.0
	2-10	Uniform Rolling Hilly	500 400 200	1/3 of embankment of refusal
	>10	Uniform Rolling Hilly	600 300 150	2/3 of embankment of refusal

Cut	<2	Uniform Rolling Hilly	1000 500 250	1.0 below subgrade
	2-10	Uniform Rolling Hilly	800 400 200	1.0 below subgrade
	>10	Uniform Rolling Hilly	600 300 150	1.0 below subgrade

Guidelines for testing requirements are given below:

Test	TEST REQUIREMENT		FREQUENCY	
	EMBANKMENT	SUBGRADE	ALIGNMENT	BORROW AREA
Gradation	•	•	1 per km	1 per boring/ pit
Moisture Content	•	•	1 per km	1 per boring/ pit
Classification	•	•	1 per km	1 per boring/ pit
Moisture Density	•	•	2 per 5 km	1 per borrow area
CBR	-	•	1 per 1 km	1 per borrow area

For testing of materials, following codes and standards shall be followed:

a) ASTM - American Society for Testing & Materials.

b) AASHTO - American Association of State Highway and Transportation Officials.

5.2 Material Investigation

Every effort should be made to locate sufficient quantities of naturally occurring construction materials at regular intervals along the alignment and as close to the alignment as possible. In case of potential quarry sites, test borings are likely to be necessary to confirm the quantity and quality of material available. Bulk samples for quality testing may be obtained from adjoining bedrock outcrops provided that the samples obtained from such sources are truly representative. Test results from any nearby operational quarries should also be included.

Considerable amount of water is likely to be required for the proper compaction of earthworks, and water points will be necessary at frequent intervals along the alignment. An assessment should be made of the likely sources of water from any existing wells and from the geological formations underlying the route. Samples for tests to assess the suitability of water for concrete will be necessary.

Following table shows guidelines for the testing requirements for aggregates and water.

Test	Test Requirement					
	Fine Aggregate		Coarse Aggregate			Water
	Asphalt Concrete	P.C. Concrete	Subbase/ Base	Asphalt Concrete	P.C. Concrete	
Gradation	●	●	●	●	●	
Atterberg Limits	●		●	●		
Sulphate Soundness	●	●	●	●	●	
Loss by Abrasion			●	●	●	
Organic Impurities		●				
Sand Equivalent		●	●	●		
Soluble Sulphates		●			●	
Soluble Clorides		●			●	
Friable Particles		●	●	●	●	
Thin & Elongated Particles			●	●	●	
Fineness Modulus		●		●		
Water Quality						●
Marshall Test				●		
Stripping Test				●		

5.3 Soil Classification

Soil description is necessary for all test pits and boring logs. The descriptions should be standardized so that the main characteristics are given in the same order i.e. Mass Characteristics shall include field strength, moisture content, bedding state if applicable discontinuities and state of weathering. Material Characteristics shall cover Colour, Composition, and grading. Particle shape, soil name and soil group. Both Unified and AASHTO classification shall be used.

5.4 Slope Stability Report.

The consultant shall identify all areas prone to failure with respect to slope either in slip circle or Shear Failure and propose the methodology for stabilization. The report shall be in line with the soil investigation report and Geologic Investigation report supported with Laboratory Tests.

Task 6:	**Environmental Impact Assessment (EIA) and Social Impact Assessment Report.**
Approximate	**Duration: 60 days**
Outcome:	**EIA Report submission and obtaining NOC from PEPA along with SIA Report (5 Hard + 1 Soft for Each EIA and SIA reports)**

6.1 Environmental Impact Assessment (EIA)

As per EPA Rules, Consultant is required to carry out the EIA Study for the Project. It involves collection of required data from site, formulation of Report, getting it reviewed

from NHA EALS Section. Submission of EIA Report to EPA Punjab, addressing their requirements, to their entire satisfaction (Including submission fee). Conducting the Field hearing and obtaining NOC for NHA.

For EIA, Consultants shall directly coordinate with GM (EALS) office. And all the correspondence shall be done directly with the EALS section. Moreover, the payment will be made to the consultant after getting clearance and satisfaction certificate from the EALS section The Consultancy fee against the EIA shall be verified and Processed by the office of GM (EALS). The payment will be made to the consultant after clearance certificate from the EALS section of NHA. The consultant must also give recommendation for growing best suitable plants inside the ROW.

The IEE report must be submitted with consultation of Environment section of the EALS section.

The Consultants must also submit the Social Impact Assessment Report indicating poverty and social assessments. Resettlement impact assessment report.

The Consultants shall submit these reports directly to the EALS Section to Director (Environment) NHA and all coordination shall be done directly. The payment shall be made upon receiving satisfactory certificate from the Director (Environment) NHA.

Task 7:	**Geotechnical for Structures and Geological Investigations report**
Approximate Duration:	**90 Days**
Outcome:	**Geotechnical Investigation Report (5 Hard + 1 Soft)**

7.1 GEOTECHNICAL INVESTIGATION FOR STRUCTURES

Sub-surface investigations consisting of boreholes / drill holes / test pits of required depth, supplemented by field and laboratory testing to accurately assess the engineering properties of the underlying soil strata for detailed design of foundations, substructures and roads shall be undertaken. A separate report will be prepared to this effect and will be submitted to NHA for approval. Original lab reports shall be attached in the soil report along with colored photographs.

Bore logs shall be included in the Soil Investigation Report along with the laboratory results. Testing of samples collected from site shall be carried out in a reputed laboratory, under strict quality control and adherence to relevant ASTM procedures / standards. Depth of boring shall be decided by the geological formation at site and the type of foundations proposed for the structures. Standard penetration tests shall be started from the ground surface and carried out in accordance with ASTM D1586 Penetration Test and Split Barrel sampling of soils. Where clayey soils are encountered, undisturbed samples shall be obtained in accordance with ASTM thin-walled sampling of soils.

The site investigation to be undertaken shall consist of the following: -

- Deep Machine boring to a maximum depth of fifty 50 m below ground level and associated field-tests for River Bridge Piles and 30 m for other structures.
- Trial Pits to a maximum depth of 3 meters.
- Hand auger holes to a maximum depth of 7.5 meters.
- Separate BOQ shall be prepared by the Consultant with all required tests for deep boring. It is required to carry out grain size analysis at required scour depth.
- Submission of proper site investigation report comprising all relevant notes and pertinent information required by this Specification together with laboratory test results. The above scope of work may be varied or deleted depending on the findings as the investigation proceeds. All Sections in this Specification and the Bill of Quantities, which relate to work or materials not required shall be deemed not to apply.

The Consultants' methodology for Geotechnical Investigations shall comprise detailed field investigations and laboratory testing to assess global stability of the site and to determine the technical requirements for design of foundations. These investigations and tests would necessarily include: 1.Surface Geological Mapping and Landslide Hazard Studies (Task-1) 2.Geotechnical Studies (Task-2, on the basis of data collected in Task-1) including field investigations and tests. Field work and laboratory testing shall be performed through independent well reputed firm. All field works and laboratory testing shall be supervised by the consultant. Field and laboratory testing data shall be analyzed and foundation design parameters shall be developed. The entire work shall be documented and submitted to the Client for record and reference. Field investigation shall be started immediately after signing of Contract Agreement.

Following shall be the scope of work for Geological/Geotechnical studies:

a) Geological mapping for the identification and distribution of lithological units, faults, liniments, major joints or any other important structural feature having significant impact on the study objectives.

b) Identification of other potential geological and geotechnical hazards with remedial measures suggested.

c) Characterize the landslide, their type/range of ground movement such as rock falls, deep failure of slopes, shallow debris flow, slump, cut-bank, etc. identification of their primary driving force, contributing factors affecting the original slope stability, pre-Conditional factors, and building up sub-surface conditions that make the areal slope prone to failure. Highlight and characterize slope instability factors, such as groundwater, pore-water pressure of the soil, soil structure, earthquake loads, and

unplanned construction, etc. with their remedial measures and typical engineering design for the slope stability.

Task 8:	**Pavement Design Report**
Approximate Duration:	**15 Days**
Outcome:	**Pavement Design Report (5 Hard + 1Soft)**

8.1 PAVEMENT DESIGN REPORT

After the traffic count and projections for designed life of 10 years are done, the soil investigations data is available; the pavement design shall be done both for Asphalt and underlying Layers and complete rehabilitation plan for existing pavement and Detail Design report for additional carriageway/Expressway shall be submitted. For Pavement Design: AASHTO Guide for design of pavement structures 1993. AASHTO Mechanistic-Empirical Pavement Design guide will also be used.

Flexible, Rigid and Composite Pavement shall be evaluated and cost comparison shall also be carried out.

Task 9:	**Structural Design report (Bridges, Culverts, and Retaining Structures etc.)**
Approximate Duration:	**15 Days**
Outcome:	**Structural Design Report (5 Hard + 1 soft)**

All additional structures (Bridges, culverts etc.) must be designed as per specifications and codes specified in Para 3.3 of Chapter 3. The Structures Design reports must contain complete detail design reports of all the proposed Structures (Bridges, and Culverts, Retaining structures) etc. along with drawings. Back up Calculations must be provided for design of all bridges.

In Case of rehabilitation of Existing Structures the consultant must suggest the rehabilitation for either re-decking, Pier Jacque ting, replacement of Girders etc and shall be made a part of the report. If a Bridge condition is satisfactory of existing road than the consultant must mention it in the report.

The Structure Design Report must also include the complete detail design of Toll plazas and weigh stations.

Task 10:	**Existing Pavement and Structure Condition Survey**
Approximate Duration:	**25 Days**
Outcome:	**Existing Pavement & Structure Condition Survey report (5 Hard + 1 Soft)**

10.1 The consultant must carry out detail conditional survey. The consultant shall study in detail the existing pavement condition. The worst areas of fatigue Cracking, Alligator Cracks , Hair Cracks, Pot holes, rutting condition of Overlying layers and underlying layers of

Asphalt wearing course may be identified based on the soil tests performed. The condition of the underlying Layers may be identified at every 200 meter interval. Moreover also the condition of the existing structures (Bridges and culverts) may be shown in the report. The existing Bridge Condition survey may also be done for identification of any problems associated with scouring near piles or re-decking is required or any other problem associated with the existing Bridge And if a Bridge condition is found satisfactory than it must be mentioned in the report. The consultant may also provide its recommendation for life and condition of existing structures or whether new structures are necessary or present structures can meet the future heavy traffic requirement. Previous maintenance record C&W Department is also required to consider prior to start assignment.

The report must also include the detail inventory of all existing structures and their condition.

The consultant must also comment on the causes of these failures and recommend future Plans for avoiding such kind of Failures. The weigh stations must also be identified on all such kind of areas where the chances of overloading may be permitted on the road. FWD Data shall be provided by RAMD. Consultant shall be responsible for its interpretation and outcome of Results.

Task 11:	**Hydrologic and Hydraulic Study**
Approximate Duration:	**25 Days**
Outcome:	**Hydrologic and Hydraulic study Report (5 Hard + 1 Soft)**

11.1 HYDROLOGY & HYDRAULIC STUDY

The hydrologic analysis performed on Project shall be compiled in a hydrologic report. The Report shall consist of two sections; a data section, where the hydrological background information shall be recorded. Other part shall be an analysis section, where the design computations shall be recorded.

The following items shall be used as a checklist of the data that shall be included in the hydrological report. The comprehensiveness of the report shall depend upon the nature of the valley, or flood plain to be traversed, the cost of proposed drainage structures, and class of highway.

11.1.1 Hydrological Data

Data shall comprise of following items:

1. Topographic Maps

   Maps are required to show the proposed highway alignment in relation to the drainage characteristics of the area being traversed. The available maps in this

regard are Survey of Pakistan maps of 1:50,000 scale. Proper catchment areas shall be marked for rivers & nullas. Same shall be made part of the reports.

2. Satellite Imagery

The satellite imagery shall be used for upstream and downstream to identify the land use and drainage characteristics. Photographs shall be taken for all crossings whose design flow exceeds 20 m3/s. Same shall be made part of the report. These photographs shall be of sufficient quality to enable the engineer to estimate channel roughness characteristics, nature & extent of vegetation cover, and land use. These pictures may be placed in the text or referenced in the text and compiled at the end of the Report.

3. Land Use (Classification by Remote Sensing)

Using the topographic maps, satellite imagery and site visits, the engineer shall comment on the nature of the land use in the affected water sheds. Similarly engineer shall comment on the nature of vegetation and soil characteristics of the basins. Individual types of land use, vegetation, and soil classifications shall be indicated as percentages of basin area. The extent of anticipated changes within any of these areas shall also be indicated.

4. Water Use

Engineer shall comment on the use of the water within the affected drainage basins. If reservoirs are within the watersheds, the operational procedures of these reservoirs shall be described. Condition of bunds of reservoir if made by locals shall also be commented upon.

5. Rainfall Data (For at least 30 years Past record)

Rainfall data for the Project area, obtained from Meteorological department shall be made part of the report. The data shall consist of a brief description, the length of record, the accuracy, and the source (if other than Met department). Data collection shall be responsibility of the Consultant including paying any required fee from any source. If the area consists of ungauged sections than spatial analysis may be performed for predicting the storm discharge.

6. River Discharge Data

In case a major river is encountered, its maximum discharge shall be obtained from the relevant department. In case of current Project, the Model study report is already available. Consultant to confirm the maximum discharge. All the extreme events for 100 years past must be made a part of the report.

7. High Water Marks (HFL)

HFL for all the Bridges must be made part of report.

Intensity Duration Curves

IDF curves of all gauged stations must me mentioned in the report else if the IDF curves are not available with the PMD Department than the method adopted to take the intensity for a given time duration for a predicted frequency must be mentioned in the report.

11.1.2 Hydrologic Analysis (By ARC GIS)

Hydrologic analysis shall comprise of following steps:

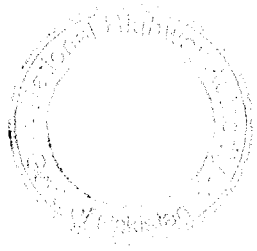
1. Drainage Area

   The Drainage area should be marked by Arc GIS and must be made part of the report.

2. Watershed Parameters

   Drainage basin characteristics shall be determined in the field with the help of GIS software. The list of parameters below is based on the information needed by the various models used in the hydrological analysis. Some parameters will be inserted directly into a particular formula and others will be used in comparing one watershed to another for use in transferring data.

   a. Basin Length
   b. Basin Slope
   c. Percent Impervious
   d. Infiltration
   e. Detention Depression Storage
   f. Drainage Basin Roughness coefficient
   g. Channel or Conduit slope
   h. Channel or Conduit Cross-section
   i. Channel or Conduit Roughness



3. Flood Models

   Best Statistical approach must be selected to estimate the Peak Flow runoff for given return period.

4. Rainfall Intensity

   The rainfall intensity value used in the Rational Equation is based on the amount of rainfall that occurs, the time it takes for that rainfall to occur, and the recurrence interval associated with each design class.

The following things must be included in the report

i. Retaining structures must also be suggested far away from the roadway to divert the water in case of flood so to protect the road embankment.

ii. Although it is mentioned that Topographic Maps of Survey of Pakistan of 1:50,000 scale. are required to show the proposed highway alignment in relation to the drainage characteristics of the area being traversed and also the Proper catchment areas shall be marked for rivers & nulla *But* these may be used as supporting documents. The Report will not be acceptable unless and until the latest modern scientific approach for Hydrological Study may be adopted, i.e. use of ARC GIS, and evidence must be shown along with detailed background of the study.

Task 12:	**Land Acquisition & Utility Folders**
Approximate Duration:	**20 Days**
Outcome:	**Land Acquisition & Utility Folders (5 hard + 1 Soft)**

12.1 LAND ACQUISITION AND UTILITY INFRASTRUCTURE REPORT

The consultant shall identify land and property falling in the right of way (ROW) to be acquired. The consultants shall submit ROW plans showing the alignment to facilitate timely action for acquisition of land to define the right of way. The Consultant shall prepare estimate for acquiring any additional and removal of structures and utilities, particularly in the built up areas. Folders shall be submitted in soft format in CAD with reference to grid coordinates. All the utilities falling in the proposed ROW and the building line must be shown in the report. Proper places must also be identified for construction of service areas, Trauma Centres, and weigh stations. The Land Acquisition and The utility Folders shall be submitted directly to GM (EALS) Section, with intimation to the design section. **It is pertinent to mention here that resettlement impact assessment report and resettlement action/ mitigation plan must also be mentioned in the project area and a separate report shall be submitted for this.**

All coordination shall be done directly with EALS Section and the Payment shall be done upon by getting satisfactory certificate from the GM EASLS.STAKEOUT OF ALIGNMENT ON GROUND

Task 13:	**Development of GIS for Corridor**
Approximate Duration:	**20 Days**
Outcome:	**Development of GIS folder (5 hard + 1 Soft)**

13.1 Consultant shall develop a detail GIS database for 500 meter corridor for whole alignment that shall be used by NHA for monitoring and Management of the corridor. GIS shall include but not limited to all the existing features-natural/ manmade. The utilities and road way parameters structure detailing and ancillary works with photographs. The layers shall include vectorization of data superimposed by the satellite imagery and cross referenced with data base of all physical infrastructures. Besides the consultant shall prepare a separate

GIS folder with satellite imagery, cadastral maps, and pictures of the physical infrastructure with ROW and ownership.

Task 14:	**Geometric design Report and Tunnel Construction (along with allied works) Report.**
Approximate Duration:	**20 Days**
Outcome:	**Geometric Design report and Tunnel Feasibility Report ((5 hard + 1 Soft) for each Report.**

14.1 GEOMETRIC DESIGN REPORT

The consultant will check and design all geometric requirements for roads and structures as per Geometric design standards as mentioned in Chapter 3 Para 3.2.1.

Moreover pedestrian crossing must be discouraged and proper sinology must be suggested at important locations.

Service ducts must be provided throughout the project. The existing position should be evaluated and components should be used accordingly. Grading requirement should be to the extent that safety is ensured. Input of the modern software's e.g. Infra works 360 or Civil 3D must be shown in the report and due to consideration must be given to all the Geometric aspects of the road especially where geometric improvement of the existing road is required.

Tunnel Feasibility Report

The Consultants must also study the Feasibility for Tunnel Construction to improve the geometry and shorten the length at suitable Locations. The design of the tunnel along with the allied works should be verified from third Party Firm having suitable Experience in the tunnel construction. For this purpose the consultant shall suggest three reputable firms and NHA will nominate the firm to validate the design of the tunnel and allied works.

Task 15:	**Construction Machinery Report and Availability of Construction Material Availability Report.**
Approximate Duration:	**20 Days**
Outcome:	**Construction Machinery Report and Availability of Construction Availability Report. ((5 Hard + 1 Soft) for Each Report**

15.1 CONSTRUCTION MACHINERY REPORT

A detailed report on construction resource shall be prepared. It will include, based on the construction duration, the amount and type of construction machinery required. Based on the Construction plan developed in Primavera/Microsoft Project, the resource allocation/ the Cash flow required shall be stated. Computations and assumptions for productions shall be attached in the report. The cost of any equipment required to be imported shall be reflected in the foreign currency portions of the cost estimates and PC-I.

15.2 CONSTRUCTION MATERIAL REPORT

The consultant shall also indicate the locations of nearby construction material availability. The report shall indicate the type of material supported by Laboratory Tests from Reputable Laboratory. The Picture showing type and along with the GPS co-ordinates shall be also shown in the report.

Task 16:	**Traffic Management Plan**
Approximate\ Duration:	**10 Days**
Outcome:	**Traffic management Plan (5 Hard + 1 Soft)**

16.1 TRAFFIC DIVERSION PLANS

Traffic Diversion Plans shall be provided for the following situations:

a. In urban areas including methodology for separating the local and through traffic.

b. At places where underground construction like construction of box culverts and underpasses, proper traffic diversion plans shall be provided.

c. At places where overhead bridge construction is likely to take place, proper traffic diversion plans shall be provided.

Consultant shall fully define the methodology for construction sequence, diverting traffic and maintaining the diversion roads.

Client will conduct highway safety audit and consultant will have to cooperate fully. Highway safety expert will produce traffic management plan and work zone safety requirement in detail. Service areas will be provided if deemed necessary and also provision of weigh station for proper check on overloading.

The Consultants will arrange field visit for the Highway safety auditor and NHA Team along with Boarding and Lodging Facilities. All the expenses shall be borne by the consultant.

Task 17:	**Formulation of PC-I and Economic Analysis Performa**
Approximate\ Duration:	**10 Days**
Outcome:	**Submission of PC-I and Economic Analysis Performa ((80 Hard + 1 Soft) for Each PC-1 and Economic Analysis Performa)**

17.1 FORMULATION OF PC-I

The Consultants shall update and improve the PC-I for the project road sections including economic analysis on prescribed Performa of PC-I by Planning Commission. Prime focus will be on technical & financial feasibility which will cover environment measures and social safeguard issues.

Separate PC-I for land acquisition shall be prepared and submitted separately.

Economic Analysis Performa:

Separate report of Economic Analysis Performa must be submitted showing all the necessary parameters for economic analysis. Detail calculations must be provided to the Planning section both in Hard and Soft Form.

From initial submission to final submission of PC-I, direct coordination with GM Planning shall be done. Payment for PC-I shall be made after the approval of invoice from GM (Planning) office.

Task 18:	**Tender Documents (EPC Based)**
Approximate Duration:	**20 Days**
Outcome:	**Submission of Tender Documents (10 Hard + 1 Soft)**

18.1 TENDER DOCUMENTS

Tender Documents shall comprise of the following: -

a. **Volume-I**

- Instructions to Bidders.
- Conditions of Contract (Part-I) (General Conditions)
- Conditions of Contract (Part-II), (Conditions of Particular Application).
- Conditions of Contract (Part-III), (Supplementary Conditions)
- Forms and Appendices

b. **Volume-II**

- General Specifications.

c. **Volume-III**

- Particular Specifications, Special Provisions and Bills of Quantities.

d. **Volume-IV**

- Drawings as per the following detail:
- Title Sheet
- Sheet Index
- Key & Location Plan with Co-ordinates and alignment with stationing. Pits of soil investigations shall also be marked.
- Sheet of Legends & Symbols
- Traverse, Bench Mark and Design alignment data including curve data
- Typical Cross-Sections with locations of applications

- Super-elevation details and Linear Plan
- Road Furniture Details (Guard rails, Pavement Markings & Traffic signs etc.)
- For Road furniture, location tables
- Retaining walls with location tables
- Soil investigation linear plan
- Intersection Details
- Drainage plan for surface runoff and urban areas
- Mass Haul Diagram
- Plan and Profile Drawings
- General Notes for Structural Drawings
- Drawings for Small drainage structures
- Drawings for Large structures
- Drawings earth retaining structures
- Landscaping details
- Miscellaneous Details/ Ancillary Works including training works.
- Detail drawing folders of Utilities/Infrastructure for Land Acquisition and removal of all utilities/ infrastructure etc., having all the requisite information.
- The Engineer's Estimate along with the Bill of Quantities of Mini Service Areas, Tauma Center and weigh stations must also be included in the report along with the tender drawings.
- Drawings related to Environmental Mitigation Measures
- Detailed design calculation for all the relevant structures (Excel Sheets, Models and Hard copies)

NHA has standardized Volume-I (Part-I) and Volume-II. Consultants shall study and adopt these documents after careful scrutiny and modification where required.

e. Contract Conditions (Legal Part):

NHA has prepared Standard Tender Documents sections on instructions to Bidders. Conditions of Contract, Bid Forms etc. and has used them for similar project in the past. Consultant shall study these standardized contract conditions and amend them in accordance with the requirements of this project. The Special Conditions of Contract can be added pertaining to the project as supplement to the General Conditions of Contract.

f. Technical Specifications:

The consultants shall study the NHA Specifications and prepare particular specification for the project for specified items not covered in the General Specifications.

g. Bill of Quantities:

Consultant shall prepare comprehensive Bill of Quantities to be calculated to accuracy of ± 5% encompassing all the items of work, properly cross referenced to the Technical Specifications. Standard format of Bill of Quantities shall be adopted.

h. Construction Drawings

The Consultant shall prepare construction drawings (Contract Plans) in a clear, concise and uniform manner in Digital Format using AutoCad. The drawings shall be A1/A3 size. Scale for horizontal alignment shall be 1:1000 and for vertical shall be 1:100. All drawings shall be signed in original. For draft submissions, the consultant shall stamp on every page Draft 1,2, until final submission is made. On final submission, the stamp "Final Tender Drawings" shall be printed on every page with signatures. At the end of drawings a jacket containing CD shall be placed, in which the soft copy of drawings with all drawings in AutoCAD format. For every drawing shall be made ready in layout mode. Not fulfilling these requirements will result in returning of drawings as un-acceptable.

i. Engineer's Estimate

Consultant shall prepare the Engineer's Estimate of the project based on the detailed design, drawings and final Bill of Quantities, using NHA Prevailing CSR. For items not specified in NHA CSR, rate analysis shall be provided based upon market price.

Note All payment for Task No 18 shall be made to the consultant after getting clearance from the Director QS. The consultant shall also provide all the backup calculation in soft form (editable) to the QS Section for the Engineer's Estimate and Appendix-C to Bid.

19.1 FINAL PRESENTATION

The Consultant at the end of design shall make a final presentation with following details. At the end of Presentation, on box containing all documents and drawings shall be handed over for record section.

Important Features of Presentation:

1) Consultant will describe the selected road alignment, merits, demerits, land acquisition and other impediments (if any).

2) Consultants will highlight important components of project like major bridges, flyovers, interchanges, service areas and landslides etc.

3) Important parameters of sub-soil investigation like CBR, Pile Capacity and General Soil Classification etc.

4) Consultant will also highlight the environmental impact of the road construction on the road influence areas.

5) Important hydraulic parameters used in the design of bridges over rivers/ canals.

6) Results of traffic study and axle load survey.

7) Location of quarry sites

8) Consultant shall clearly explain the traffic management plans.

9) Complete description of design criteria and functional requirements.

10) Description of specialized equipment and machinery required for the construction.

11) Description of methodology/ codes for pavement and structural design including details of computer models.

12) For Structural Design, Summary of results of computer output (especially maximum and minimum forces for all elements) in tabulated form shall be presented.

13) A plan showing major quarry sites/ borrow area sites including mass diagram showing cut and full along the finally selected alignment shall be presented.

Any other points, which the consultant may like to highlight, should be included.

19.2 SUBMISSION OF DOCUMENTS

All the Reports associated with each Task shall be submitted as stated in respective sections. **In the technical proposal, consultant shall develop a Work programme Task wise with submission dates. Failing to provide the same, the proposal shall not be evaluated.**

All documents/ drawings shall be subject to review and checking by NHA's Experts. Consultant will incorporate any comments/ modifications made by the Experts (if agreed, The Responsibility for correctness of design lies with the Consultant).

Consultants will provide two additional sets of the tender documents and reports to the Client at a later stage at no extra cost to the Client. Additional number of sets (if required) shall be provided at a cost of Rs. 5,000/- per set.

19.3 PERFORMANCE OF THE CONSULTANT

The consultant shall attend the pre-bid meeting and his performance with reference to the queries of the contractors shall be evaluated and recorded by GM(P&CA) & GM(Design).

a) During the construction phase, the design review shall finally reveal the performance status recorded by the Design Section

b) Finally, the performance of the consultant shall be evaluated based on the performance recorded by the Design Section

The Performance rating shall be made in the following manner: -

i.	A+	Excellent
ii.	A	Good
iii.	B	Required Improvement
iv.	Poor	Poor

"B" performance rating without subsequent improvement shall drop the Consultants performance to the stage "Poor". If "Poor" persist in two consecutive stages, the Design section shall propose penalty and P&CA shall implement the recommend in the light of legality of the matter

19.4 TRAINING OPPORTUNITY

The Consultants will manage to train four (04) fresh graduates Civil Engineers as Trainee Engineers. Moreover, the Consultants is also responsible to pay a minimum stipend of Rs.40,000/- per month after deduction of all applicable taxes and Consultants' overheads to each Trainee Engineer.

Annexure-I

MODE OF PAYMENT

S. No	Activity	Percentage of "A"
1.	Task 1& Task 2	10% (2.5 % for inception report, 7.5 % for corridor development Plan)
2.	Task 3	5 %
3.	Task 4	5 %
4.	Task 5	5 % (2.5 % Soil Investigation report and 2.5 % for slope Stability Report)
5.	Task 6	L.S
6.	Task 7	L.S
7.	Task 8	5 %
8.	Task 9	5 %
9.	Task 10	5 %
10.	Task 11	15 %
11.	Task 12	5 %
12.	Task 13	5 %
13.	Task 14	10 % (2.5 % for Geometric Design Report and 7.5 % for Tunnel Feasibility Report)
14.	Task 15	2.5 % (1.25 % for Construction Machinery Report and 1.25 % for the Construction Material Availability Report)
15.	Task 16	2.5 %
16.	Task 17	10 % (5 % for PC-1 and 5 % for Economic Analysis Performa)
17.	Task 18	10 %

Upon submission of Reports, 25% payment shall be released. Remaining shall be released upon acceptable quality is ensured. Upon initial submission, a checklist correlating to TOR requirement shall be attached and checked for requirement spelled out.

Note:- **The Consultants shall submit complete set of documents and drawings listed above on three (03) digital CD-ROMs. Files (Word, Excel, Auto Cad editable format, Graphical Images, Photographs etc.) shall be properly indexed/ catalogued for record purposes and use/ reproduction at a later stage by NHA.**

Note: - * For all above deliverables, **25%** payment will be made on submission, **25%** on acceptance and **50%** on approval of deliverables by NHA.

Annexure-II

INFORMATION FOR FIXED TRAVERSE STATIONS

Name of Traverse Stations:

_____

_____

Northing: _____

Easting: _____

Elevation: _____

Affix Photograph of Traverse station

Sketch of the fixed traverse stations with reference to permanent features

MINIMUM PERSONNEL PROPOSED BY THE CLIENT

S. No.	Position	Nos.	Months	Person-Months[1]
A.	**KEY PERSONNEL**			
1.	Team Leader/ Sr. Highway Engineer	01	04	4
2.	Highway Design Engineer	01	3.50	3.5
3.	Bridge Design Engineer	01	2.50	2.5
4.	Structural Design Engineer	01	03	3
5.	Tunnel Design Engineer	01	03	3
6.	Hydraulic/ Hydrology Expert	01	3.50	3.5
7.	Soil Stabilization/ Protection Expert	01	03	3
8.	Drainage Engineer	01	03	3
9.	Contract Specialist	01	02	2
10.	Highway Safety Engineer	01	02	2
11.	Traffic Engineer	01	02	2
12.	Transport Economist	01	02	2
	Sub-Total (A):	***12***		***33.50***
B.	**NON KEY PERSONNEL**			
13.	Geologist	01	03	3
14.	GIS Expert	01	02	2
15.	Electrical Engineer	01	01	1
16.	Mechanical Engineer	01	01	1
17.	Social Development Expert	01	02	2
18.	Quantity Surveyors	02	03	6
19.	Chief Surveyors	02	04	8
20.	Surveyors	05	04	20
	Sub-Total (B):	***14***		***43***
C.	**SUPPORT STAFF**			
21.	CAD Operator	01	04	4
22.	Computer Operators	02	04	8
23.	Surveyor Helpers	12	04	48
24.*	Office Boy	04	04	16

[1] The proposed man-months are as per Clients assessment; if the consultant has reservation/opinion/suggestion regarding proposed man-months it may convey same in writing during Pre-Proposal Meeting or even after Pre-Proposal Meeting but before the last date for seeking clarification, for review and decision of NHA which will be communicated to all the prospective bidders.

S. No.	Position	Nos.	Months	Person-Months[1]
25.**	Security Staff	04	04	16
	Sub-Total (C):	***23***		***92***
	Total (A + B + C):	**49**		**168.50**

* Consultants are required to submit voucher/proof for payment of Indirect Cost,

** Consultants are required to submit voucher/proof for payment of Indirect Cost as per actual,

*** NHA will verify the Survey teams mobilized at Site.

CHAPTER NO.5

ENVIRONMENTAL IMPACT ASSESSMENT OF ROADS/ HIGHWAYS PROJECTS

1. Need for Environmental Impact Assessment (EIA)

Highway projects are generally undertaken to improve the economic and social welfare of the people. At the same time, they may also create adverse impacts on the surrounding environment. People and property in the direct path of the road works are affected. The environmental and social impact of highway projects include damage to sensitive eco-systems, soil erosion, changes to drainage pattern and thereby groundwater, interference with animal and plant life, loss of productive agricultural lands, resettlement of people, disruption of local economic activities, demographic changes, accelerated urbanization and increase in air pollution. Highway development and operation should, therefore, be planned with careful consideration of the environmental impact. To minimize these adverse effects that may be created by highway development projects, the techniques of EIA become necessary. Identification and assessment of potential environmental impact should be an integral part of the project cycle it should commence early in the planning process to enable a full consideration of alternatives and to avoid later delays and complications.

2. In view of the above, an EIA will be carried out for the Environmental aspects of all stages of the projects i.e. preconstruction, construction and post construction with the following objectives:

- Establishing the environmental baseline in the study area and identifying any significant environmental issue;
- Assessing these impacts and providing for the requisite avoidance, mitigation and compensation measures;
- Integrating the identified environmental issues in the project planning and design;
- Developing appropriate management plans for implementing, monitoring and reporting of the environmental mitigation and enhancement measures suggested;

The EIA studies and reporting requirements to be undertaken this TOR must conform to the guidelines and regulations issued by the Pakistan Environmental Protection Agency (Pak EPA), Ministry of Climate Change, Govt. of Pakistan (GOP) which comprise mainly of the Pakistan Environmental Protection Act 1997, its implementing regulations, the EIA Guidelines and Review of IEE and EIA Regulations, 2000. These guidelines include the amendments and subsequent rules for the EIA of projects.

i) **Regulations and Standards.** Describe the pertinent legislation, regulations and standards, and environmental policies that are relevant and applicable to the proposed project, and identify the appropriate authority jurisdictions that will specifically apply to the project.

ii) **Project Categorization.** The Consultants should categorize the project (category A or B and IEE or EIA) as per Environmental Protection Act and guidelines & procedures derived therein and as per donor agencies Environmental Safeguards and Policies which ever are applicable.

iii) **Project Description.** The Consultants should provide a brief history of the project, a detailed location and maps with scales (km) of the projects with any alignment (starting point to end point). In the project description the Consultants should also highlight but not limited to bridges information, project components, scope and schedule of operation and construction, construction camps, and construction materials.

iv) **Description of Environment.** Assemble, evaluate and present baseline data on the relevant environmental characteristics of the project area. In addition to general information, the Consultants should provide methodology for preparing the essential environmental data. The data should emphasize but may not be limited to the information about Physical Environment which could include, meteorology and climate, geology and soil, seismology, air and water quality, noise, topography and drainage patterns, hydrology and/or hydraulic regime, surface and ground water and land use. Ecological Resources should discuss about forests/flora/vegetation profile, crop and horticulture activities, and fauna/wild life and local livestock species (should specify mammals, birds, fish, reptiles and insects), protected and/or endangered wildlife species. Social and Cultural Resources may discuss about the methodology of surveys, settlement pattern, political and administrative setup, population and communities, socioeconomic conditions, protective and sensitive areas, archaeological and cultural sites, health and facilities, educational facilities, industrial/commercial activities, physical and cultural heritage, utilities, railway links or alignment, tourism facilities and potentials and others. Availability of Resources for Construction should also highlight about borrow soils, construction material, water and power availability and any other resources. Hazard vulnerability-identify vulnerability of area to flooding, hurricanes, storm surge, and earthquakes. Characterize the extent and quality of the available data, indicating significant information, deficiencies and any uncertainties associated with the prediction of impacts.

v) **Environmental Impacts and Mitigation Measures.** Identify any negative positive, direct, indirect, short term and long term impacts of the project, during pre-construction/design, construction and operation phases. Identify any information gaps and evaluate their importance for decision-making. The Consultants must recommend appropriate mitigation and rehabilitation measures for the environmental damage and other impacts identified for specific road corridors, and how they would be implemented with regards to: coordination between highway design and environmental issues, ambient air, water and noise quality, water resources,

drainage, mineral resources, flora and fauna, social and cultural environment, historical sites. The Consultants should attempt to identify creative measures that would also have positive social implications, such as participatory tree planting that would also serve as job creation for affected communities. Consultants should identify biological environment, and must discuss about national parks, game reserves and endangered species. Consultants should also identify the impacts and mitigation measures for topography, social / cultural issues, land acquisition and resettlement, community development, borrow open pits, waste disposal, geology and soil, surface and ground water, hydrologic regime, traffic flow, wastage of fertile humus layer, utilities issue and poverty alleviation etc.

However, report should not be limited to the above mentioned constituents of the environmental impacts and their mitigation measures. The Consultants should be more creative according to the specified project alignment. It should also include maps, figures and photographs when necessary.

In order to assess environmental impacts and recommend various mitigation measures to minimize the environmental impacts, identify and develop data.

vi) **Development of Environmental Data.** Identify EPA NEQS and guidelines and analyze following parameters to develop base line environmental data of the project:

- Ambient air quality.
- Noise levels.
- Water.
- Biological environment.
- Socio economic profiles.

i) AMBIENT AIR QUALITY:

Consultants should monitor the ambient air quality along the selected road site.

The parameters need to be monitored include Ozone (O_3) Carbon monoxide (CO) Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2), and particulate matter (PM_{10}). Acceptable standard analysis methodology should be selected to measure the NEQS parameters.

Air quality data will be collected over a 24-hour period at all the sampling points *(a reasonable number of sampling and their analysis should depend upon the road length and other environmental factors which should provide a reasonable image of air quality).*

High pollutant concentrations spots should be selected for sampling to assess 'worst-case' scenarios, and measurements will be made in areas with extensive

ribbon development and schools/hospitals where traffic will be expected to be a little heavier.

ii) NOISE LEVELS:

Roadside noise level measurements should be taken at a distance of ~ 6 m from the edge of the highway (corresponding roughly to 7.5 m from source vehicles). The noise parameter should be measured for 24 hours at various locations of the specified site. The permissible limit of noise is 85 dBA prescribed by the NEQS for motor vehicles. The NEQS do not prescribe a noise level limit for receptors. *(a reasonable number of sampling and their analysis should depend upon the road length and other environmental factors which should provide a reasonable image of noise pollution).*

iii) WATER QUALITY:

During field investigations, water samples from various sources in the vicinity of the proposed sections should be analyzed for important parameters with respect to human consumption. Although, NEQS include 32 water criteria pollutants for effluents and 16 NEQS for gaseous emissions, NHA prefer and recommend basic water quality analysis which may include but not limited to pH, turbidity, alkalinity, TDS, TSS, 5 day BOD at 20oC, COD, OD, total hardness, chloride, sodium nitrates, lead, mercury, arsenic, cadmium, total toxic metals, phenolic compounds as phenols, pesticides / herbicides / fungicides *(in farmland areas) and E-coli. (a reasonable number of sampling and their analysis should depend upon the road length, other environmental factors which should provide a reasonable representation of water quality).*

Consultants **must identify** standard and recognized laboratories. Consultants should also provide Analytical Laboratory Reports along with methodologies and analytical techniques used for each parameter. The analysis reports must include information, address and contact persons of analytical laboratories.

vii) Analysis of Alternatives. Describe the alternatives examined for the proposed project that would achieve the same objective including the "no change in alignment". Distinguish the most environmentally friendly alternatives. In case of minor impacts, which can be successfully mitigated within the ROW and without change in alignment, there will be no need for the analysis of alternative. In all other cases, and especially in the case of major or critical issues, a systematic comparison will be undertaken of the proposed design, site technology and operational alternatives in terms of:

Their potential environmental and social impacts;

Capital and recurrent costs;

Suitability under local conditions; and

Institutional, training and monitoring requirements.

For each alternative, the environmental cost and benefits should be quantified to the possible extent, and economic values should be attached where feasible. The basis for the selection of alternative proposal for the project design must be stated.

viii) (A) **Public Consultation, Involvement and Disclosure.** During the field surveys the Consultants will organize workshops and formal public consultation sessions at province level to identify main stakeholder, their categories, their views on the existing condition of the project, volume of traffic concern's stemming from the impact of improvement works, as well as safety related issues. If possible, Consultants will assist in inter-agency coordination, and public/NGO participation.

(B) Grievance Redress Mechanism (GRM). An effective, feasible and project Specific GRM will be proposed with all required details.

ix) **Environmental Management Plan (EMP).** Identify and prepare EMP including an implementation schedule and supervision program with associated costs and contracting procedures for the execution of environmental mitigation and social issues for pre-construction, design, construction and implementation phases. The EMP cost plus monitoring cost together will be minimum 1% of total project cost so that these can be implemented in true letter & spirit at later stages. Same cost will be given in PC-1 for EMP. This cost will be part of Bill of Quantities as separate item. The Consultants should describe the objectives of EMP and key environmental and social components, role of functionaries, and road safety. The key components of EMP should emphasize but not limited to:

alignment and shoulder width options, road side safety, structural recommendations, topography, geology and soil, seismic activities, flood hazards, environmentally sound camp sites & borrow pits identification, mapping and characterization, archaeological sites, land acquisition and resettlement, local communities their social and cultural heritage, archaeological sites, waste disposal, air and water quality including ground and surface water, noise, flora including roadside vegetation cutting and plantation, fauna including wildlife, endangered species and their protection, traffic management, utilities, use of fertile humus soil recommendation of environmental protection sign boards, and health risk of workers. EMP should identify the training and workshops programs.

x) **Environmental Monitoring Plan.** Identify the critical issues requiring monitoring to ensure compliance to mitigation and environmental management plans and to measure and monitor the environmental impacts during construction and operation. The objectives of the plan are to monitor the actual impact of the works on the project corridor's physical, biological and socio-economic receptors within the corridor. This will indicate the adequacy of the EIA. The monitoring plan should

recommend mitigation measures for any unexpected impact or where the impact level exceeds the limits. The plan should ensure compliance with legal and community obligations including safety on construction sites. Consultants should monitor the rehabilitation of borrow areas and the restoration construction campsites according to EMP report. The monitoring plan should ensure the safe disposal of excess construction materials. Consultants should also evaluate the effectiveness of the mitigation measures proposed in the EMP and recommend improvements if necessary. Apart from regular compliance checks the Consultants should generate a tabular matrix for air, water and noise analysis, asphalt plant emissions, soil erosion and contamination, plantation, safety and traffic rules compliance for construction and operation phases.

Environmental Monitoring Plan will list the procedure through which mitigation measures proposed in EIA will be implemented. It will also include environmental parameter need monitoring, frequency and responsibilities of key players. In case of disagreement with local communities or stakeholders, grievances addressable mechanism shall be part of plan. The management plan will develop the institutional requirement and type of training to enhance the capabilities of staff. The total environmental mitigation, Monitoring, equipment and training cost shall also be included.

xi) **Economic Assessment.** This section should include the overall cost estimate in relation to the project benefits, environmental costs and total cost of the proposed project. The Consultants should address the cost analysis of training, monitoring activities, environmental analysis and activities, resettlement, land and property acquisition, and mitigation measures.

xii) **Role of Functionaries and Government Agencies Involvement.** This section should include role of all the functionaries and variable involvement of government agencies or authorities for the project accomplishment.

xiii) **Recommendation and Conclusions.** An adequate summary should emphasize on the project description and environment, environmental impacts and mitigation measures, alternatives, socio-cultural and socio economics, public consultation and the resulting issues and recommendations, environmental management and monitoring plans, economic assessment, recommendation and conclusions.

xiv) **Submission of Reports.** The report should be prepared and presented in strict conformity to IEE/EIA regulations, 2000 and Guidelines for preparation and submission of IEE/EIA 1997 issued under the Pakistan Environmental Protection Act, 1997.

The title page of the report should specify the report name, project name, highway length, scaled maps and / or colored photographs, date of the report, Consultants company name, address, phone numbers, e-mail and logos.

The reports should include acronyms list and a copy right certificate in the name of NHA. The reports should include all the key articles but not limited to the executive summary, introduction, description of the project, policy, all legal and administrative framework, description of the project environment, alternative analysis, environmental impacts and mitigation measures, public consultation and resettlement action plan, inter-agency and public/ NGO consultation process, environmental Management & monitoring plans, economic assessment, conclusions and recommendations.

All figures, maps, appendices, tables, photographs, matrices and list of references should be chronologically organized and each page should be numbered.

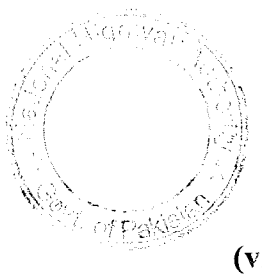
(i) Initially Consultants should submit two draft copies of the report to NHA.

(ii) It will be the responsibility of EIA Consultant to arrange joint visit (Consultant and Environment NHA HQ team) to the field before finalization of EIA Report.

(iii) After incorporating the comments from NHA, bureau of Environmental Protection/Provincial EPAs and donor agencies Consultants should finalize the report.

(iv) Consultants required submitting two hard copies and one soft copy of final EIA report to NHA.

(v) Must fill and attach the application form for Environmental approval under Sec (12) of Pakistan Environmental Protection Agency (PEPA) Act 1997 (PEPA- Review of IEE and EIA-Schedule IV regulations, 2000). The form requires information of the description, Location, objective, alternative alignment, topography and land use of the project. In addition it also required information about the land acquisition in acres, environmental quality standard (NEQS) analyzed and measured, estimates & sources of water & powers usage, estimates of liquid & solid waste generation for the project construction and number of labor force (employees) required for the project construction and operation phases.



(vi) The prepared Environmental Impact Assessment (EIA) report will be submitted to the concerned EPA for formal concurrence and will be disclosed to the public, stake holders etc.

* Ten hard copies and two electronic copies (format on CD) of the report are to be submitted should be labeled properly.

Public Hearing:

It will be the responsibility of the Consultants to obtain NOC from the respective EPA fulfilling all codal requirements. Further to this publishing of advertisements regarding public hearing and

preparation of presentations, banners, sitting arrangements and all other will be responsibility of the consultant.

Consultants' Fee for Services:

The payments to the Consultants for EIA shall be made in the following manner:

Sr. No.	Description	% of A'
(i)	Inception Report for services (within first 7 days of commencement).	10%
(ii)	Submission of draft EIA/IEE report.	20%
(iii)	Submission of final EIA/IEE report (ten hard and two soft copies) to concerned EPA.	20%
(iv)	Submission of final EIA/IEE report after attending all observation and comments of EPA.	30%
(v)	Obtain NOC from concerned EPA including public hearing aspects.	20%
	Total:	**100%**

Where A' is the total payable amount in respect of EIA Study.

Consulting Service Period: Consultants shall submit the final report within four (04) months from the Date of Commencement of Services.

Non Compliance: If Consultants fails to comply NHA's instruction and is not able to obtain NOC from concerned EPA in minimum defined period in law; 50% of total cost will be deducted whatsoever be the reasons.