ISLAMIC REPULIC OF PAKISTAN

GOVERNMENT OF KHYBER PAKHTUNKHWA (GOKP)
KHYBER PAKHTUNKHWA RURAL ACCESSIBILITY PROJECT (KP-RAP)

TERMS OF REFERENCE
for
CONSULTANCY SERVICES
Phase-1: Preparation of Feasibility and Detailed Engineering Design including Procurement Assistance; and Phase-2: Construction Supervision & Contract Administration of Works under KP-RAP

A. BACKGROUND:

1. The Government of Khyber Pakhtunkhwa has received financing from the World Bank towards the cost of the Khyber Pakhtunkhwa Rural Accessibility Project (KP-RAP) and intends to apply part of the proceeds for consulting services. The primary objective of the Project is the improvement of resilience, rehabilitation, and maintenance of selected rural roads across the province, including the Newly Merged Districts (NMDs). The improvement of existing roads would be selected based on geo-spatial analysis focused on improving accessibility to education, health and market facilities and climate change risks considerations. This will include new rural roads, rehabilitation of paved roads (asphaltic and concrete, etc.) and upgradation from unpaved (gravel, earthen etc.) to paved roads and routine maintenance of unpaved and paved roads within the existing right of way. Improvement will include resilience measures, including but not limited to route realignments to avoid areas with slopes / hydraulic sections vulnerable to climate risks, enhanced slope protection and drainage structures, changes in design standards for pavements that reflects a higher level of climate resilience, and a decision to seal previously gravel roads for climate resilience. In addition, the component will include the introduction of new and green technics to mitigate rainfalls and high temperatures. The loan will also finance road safety infrastructure for safe walking and cycling environment to and from schools. The project will consult female commuters on design and implementation of safety and anti-harassment features in infrastructure. A Gender Based Violence (GBV) action plan will be implemented to prevent/mitigate this risk in construction activities. The project comprises of three main components:

a) **Provision of the Rural Road Network:** The proposed road network is to be provided through out across the province including Newly Merged Districts as well as improvement of the existing roads of the rural areas through Resilient Access.
b) **Improvement of the Transport and Logistic Services**. Through this component the bus services and cold chain management is to be improved.
c) **Project Management & Institutional Strengthening**. This component is aimed to provide technical assistance to the concerned government departments and to cover administrative and operational related to the proper implementation and monitoring of the KP-RAP as well as the costs of the Feasibility Study & Detailed Engineering Design and Construction Supervision of the Consultants

2. The Communication and Works Department (C&WD) of Khyber Pakhtunkhwa will be the Implementation Agency of the Project and Project Implementation Unit (PIU) has been established headed by a Project Director (Client's Representative).

B. OBJECTIVE OF THE ASSIGNMENT

3. Prepare (a) Pre-Feasibility Study of C&W Department Roads Network and Bridges; (b) Feasibility Study and Detailed Engineering Design of 1,768 Km Roads; (c) Feasibility Study and Detailed Engineering Design of 50 Number of Bridges; (d) preparation of procurement documents; and (e) preparation of PC-Is.

a) Assist the Client in preparation of bidding documents for construction contracts.
b) Supervise the works to ensure that the executed works comply with the approved design, internationally acceptable technical specifications, environmental and social safeguards, and sound engineering practice.
c) Prepare final construction reports and compile full set of as-built drawings of all completed works, as well as full set of documents for entry into cadaster books/records.

C. SCOPE OF SERVICES

4. The scope of services, grouped in two phases, consist of the following major tasks:

Phase 1: FEASIBILITY STUDY AND DETAILED ENGINEERING DESIGN

- Task-1: (a) Pre-Feasibility Study of C&W Department Roads Network and Bridges; (b) Feasibility Study and Detailed Engineering Design of 1,768 Km Roads; (c) Feasibility Study and Detailed Engineering Design of 50 Number of Bridges; (d) preparation of procurement documents; and (e) preparation of PC-Is.
- Task-2: Preparation of Bidding Documents for Civil Works Contracts and support to the Client in convening the bidding process (e.g., clarifications to bidders' questions on technical aspects during bid preparation, site visit, bid evaluation, etc.) leading to the contracts awards.
- Contract Modality for Phase-1 will be Lump Sum Based Contract.

Phase 2: CONSTRUCTION SUPERVISION

- Task-3: Construction Supervision and Contracts Administration, including post-construction activities.
- Contract Modality for Phase-2 will be Time Based Contract.

PHASE 1: FEASIBILITY STUDY AND DETAILED ENGINEERING DESIGN

- Task-1: (a) Pre-Feasibility Study of C&W Department Roads Network and Bridges; (b) Feasibility Study and Detailed Engineering Design of 1,768 Km Roads; (c) Feasibility Study and Detailed Engineering Design of 50 Number of Bridges; (d) preparation of procurement documents; and (e) preparation of PC-Is.
- Task-2: Preparation of Bidding Documents for Civil Works Contracts.

Detailed TORs of Consultancy Services for *(a) Pre-Feasibility Study of C&W Department Roads Network and Bridges; (b) Feasibility Study and Detailed Engineering Design of 1,768 Km Roads; (c) Feasibility Study and Detailed Engineering Design of 50 Number of Bridges; (d) preparation of procurement documents; and (e) preparation of PC-Is.*

A. Justification:

5. The Consultant is required to *(i) Surveys and Prefeasibility of C&W Department Roads Network and Bridges; (ii) Surveys and Investigations of the proposed shortlisted 1,768 Km Roads and 50 numbers of proposed shortlisted Bridges; (ii) Draft Detailed Engineering Design of the proposed shortlisted 1,768 Km Roads and 50 numbers of proposed shortlisted Bridges; and (iv) Detailed Engineering Design of the proposed shortlisted 1,768 Km Roads and 50 numbers of proposed shortlisted Bridges* as per details given in the attached **Annexure-1** and **Annexure-2** in accordance with the tasks under the Consultancy Services of Phase-1 of "Detailed Engineering Design and Construction Supervision Consultants, to be engaged for the purpose; (v) conduct the due diligence required, (vi) familiarize the government officials with World Bank policies and procedures on safeguards, procurement, financial management, audit and administrative requirements to process and implement the project.

6. The Consultancy assignment will include Due Diligence, Detailed Engineering Design, and Preparation of Procurement Documents as well as Planning Commission Pro-Forma-Is (PC-1s). Due diligence works will include, but not limited to: Topographic and Hydrological Survey, Road Roughness / Condition Survey, Traffic Survey, Economic and Financial Analysis. Detailed Engineering Design will incorporate envisaged impacts of climate change and environmental and social safeguards, road safety features and other requirements.

B. Major Outputs and Activities

7. The major outputs and activities are summarized in Table below:

Table: Summary of Major Outputs and Activities

Major Activities	Expected Completion Date
Conduct due diligence on technical, economic, financial, institutional capacity	March 2023
Feasibility study, detailed engineering design. The results of feasibility study and detailed engineering design will be presented to the Client in seeking consensus among the stakeholders.	March 2023

C. Consulting Services

8. Deliverables. The consultant will advise on packaging of civil works, procurement methods, market approach etc. with appropriate justifications. The consultant will deliver the following documents at the satisfactory quality to the Client for approval.

(i) Feasibility Study and Detailed Engineering Design. The consultant will demonstrate the results of feasibility study in this report. The report will show all relevant engineering, social, and environmental considerations given in the studies including but not limited to the following: (a) how the design criteria are set for the natural conditions (such as waves) and socioeconomic conditions and other conditions; (b) how facilities to be constructed are determined for each road subproject; (c) types of structure compared and selected in consideration of design criteria; (d) measures to minimize environmental impacts; (e) the project facilities can be constructed by contractors available in the region; and (f) economic analysis and presentation of relevant parameters to determine feasibility of the proposed interventions and prioritization through the Project lifetime.

(ii) Climate Risk Assessment and Management Report. The report should include (a) the methodological framework for the climate risk and vulnerability assessment; (b) projected climate change in the project area, including assumptions and data used; (c) assessment of projected climate change impacts on key project components; and (d) analysis of potential adaptation measures in terms of their effectiveness, cost, technical feasibility, and cultural acceptance.

(iii) Procurement Strategy. The consultant will carry out (i) market survey to identify the possible locations of potential bidders for the civil works and their capacities; (ii) assessment of risks to be involved in the project's procurement and (iii) procurement scenario analysis in accordance with World Bank's Procurement Regulations for IPF Borrowers November 2020 and other associated documents; and develop the project's procurement plan to attract competent bidders to the bidding. The procurement plan will include packaging of works, procurement procedures, advertisement methods with justifications etc to carry out procurement transactions in accordance with the requirements under World Bank's Systematic Tracking of Exchanges in Procurement (STEP) system.

9. Further, the **Broad Technical Scope** of Work under Phase-1 for the present Terms of Reference comprises the following but not limited to:

- Data Collection/Co-ordination with all concerned local departments.
- Traffic count & O&D survey (if required).
- Inventory for structures, bridges after detailed field visits.
- Detailed survey and design of new bridge(s) (if any).
- Condition survey of structures.
- Detailed soil investigation, Hydrology and Geometric Design with Highway Safety duly furnished in it,
- Feasibility study with cost estimates on best effort basis.
- Detailed topographic survey or use of Stereo DEM with Ground Control Point (GCP) validation.
- Design of Toll Plazas associated buildings, and rest areas, including architectural drawings and detailing construction specifications (where required).

- Geometric Design of Highway with detailed Highway Safety Report. Detailed design of up gradation of existing road.
- Road furniture design including traffic signs and gantries.
- Hydrology & hydraulic design of structures.
- Structure design including electrical design of lighting for bridges (if any).
- Horticulture and Landscaping of intersections.
- Axle load survey or collection of data from nearby permanent weigh stations (if available).
- Pavement design with surface and subsurface drainage.
- Provision of ducts/crossing of future utilities like Optical Fiber Cable pipelines etc.
- Bidding documents, BOQ, Engineer's Estimate.
- Utility folders and land acquisition plans using Google imageries.
- Fixation of ROW markers when required by the Client.
- Preparation of PC-Is.

10. Design Review and Road Safety Audit (RSA)

The Client shall arrange for the review of the prepared documentation immediately upon submission of relevant deliverables. The Consultant is obliged to follow the reasonable and implementable findings of the review so that the Client would be able to receive approval of the design and implement the works. If deemed to be necessary, the Consultant will be invited to attend meetings with the review committee.

The Client shall arrange for performance of the Road Safety Audit (RSA) through an independent detailed systematic and technical safety check relating to the design characteristics of a road infrastructure. The road safety auditor shall be an independent person/entity outside the team of experts who were involved in the design or design review of the subject project. The Client will hire the independent Road Safety Auditor under a separate contract. The auditor will be encouraged to interact with the E&S and HS Specialists, and vice versa, for integrating environmental and safety recommendations in SG documents.

The third-party RSA would be practically performed in three stages, namely:

(i) **RSA of the Detailed Design** prepared by the Consultant to evaluate final geometric design features, traffic signing and pavement marking plans, landscaping, intersections' details, facilities for other participants in traffic and operation, drainage, guardrails, and other roadside objects.

(ii) **RSA of the executed work during the construction stage** to evaluate execution of geometric design features, traffic signing and pavement marking plans, landscaping, intersections' details, facilities for other participants in traffic and operation, drainage, guardrails, and other roadside objects. It will also cover the audit of activities performed by the contractors in the field during the works performance in terms of compliance with the Detailed Design, TMP, and legal and regulatory defined procedures.

(iii) **RSA post completion of construction work** to suggest further improvements in the **as-build** infrastructure which the contractor shall rectify during the DNP.

Principally, the audit will follow the RSA Guideline issued by the World Road Association (2007).

The Consultant will ensure that results from RSAs are reflected in the detailed design, during construction, during the DNP and in SG documents where appropriate.

11. Guidelines on Safe Rural Roads Design

The consultant will be responsible for the (i) Guidelines on safe rural roads design; (ii) Material for training of Client and other relevant staffs; and (iii) Material for public awareness-raising etc.

The Consultant shall also be responsible for the following:

1. Engineering Principles

The consultancy work shall be carried out in accordance with the standard engineering principles followed in construction of roads / highways & bridges in the country.

2. Coordination with other Agencies

The consultant will coordinate the design of the road with any government agencies or other consultants who are responsible for the planning, design implementation, or operation of any road or bridge facilities being executed in the project area that may be affected by or have an impact on the proposed road.

3. Specific Tasks

The work of consultants will fall into four (04) broad stages:

Stage 1: **Surveys and Prefeasibility** of C&W Department Roads Network and Bridges

Stage 2: **Surveys and Investigations** of the proposed shortlisted 1,768 Km Roads and 50 numbers of proposed shortlisted Bridges

Stage 3: **Draft Detailed Engineering Design** of the proposed shortlisted 1,768 Km Roads and 50 numbers of proposed shortlisted Bridges

Stage 4: **Final Detailed Engineering Design** of the proposed shortlisted 1,768 Km Roads and 50 numbers of proposed shortlisted Bridges

Stage 1: Surveys and Prefeasibility:

1. The Consultant are required to carry out field surveys *(reconnaissance survey)* of all the C&W Department Roads and assess the condition of each and every road section based on the predefined assessment criteria agreed between the Client and the World Bank for selection of candidate roads. In the same manner, the Consultant will assess the condition of all the 50 number of bridges based on the predefined assessment criteria for selection of candidate bridges. The Consultant will furnish the shortlisted candidate roads and bridges for approval of the Client.

2. Client will undertake the review in accordance with the program of the work of terms of reference; the consultants shall not proceed with the next stage of work until Client gives them approval for the previous stage.

3. Further it will comprise of the following:

   - **Data Collection:**
     The Consultant will collect all available information / data from C&W department and other concerned quarters, required to prepare the pre-

feasibility study of C&W Department Roads and Bridges through predefined and approved survey forms for roads and bridges.

- **Reconnaissance Site Visits:**
  Consultant shall conduct reconnaissance site visits that will enable the Consultant to develop understanding of proposed rural roads / bridges and their associated structures and identify and confirm the right of way (ROW) of each road with relevant local authorities.

- **Road / Bridges Inventory and Pavement / Structural Condition Survey:**
  The Consultant will conduct roads / bridges inventory and pavement/structural condition survey to obtain information on the existing condition of the proposed roads/bridges with particular reference to the pavement surfacing, width and condition, assessment of distresses, type of terrain, soils, embankment height and width, water logged areas, horizontal and vertical curvature, longitudinal grades, type and name of major and minor junctions, right-of-way and assess the structural conditions *(structural soundness)* of the proposed bridges.

  The data will then be reviewed and utilized for the shortlisting of candidate 1,768 KM roads and 50 numbers of bridges.

- **Condition Survey of Structures / Bridges:**
  Consultants will visually carry out Condition Survey / Assessment of Structures / Bridges for the selection and shortlisting of 50 numbers of bridges.

Stage 2: Surveys and Investigations:

General

1. The consultants shall limit all surveys and investigations work to the optimum that is necessary to enable them to adequately perform the services for the shortlisted 1,768 KM candidate roads and 50 numbers of bridges. It is expected that four (04) broad types of surveys and investigations may be required:
   - Topographic surveys.
   - Soil Survey.
   - Traffic Counts.
   - To study the condition of existing Bridge Structures / Culverts / Retaining Walls and its structural soundness certified duly supported by structural analysis through standard testing (where applicable).

2. Further it will comprise the following:
   - **Data Collection:**
     The Consultant will collect all available information / data from Client and other concerned quarters, required to prepare the feasibility study and detailed engineering design.

   - **Site Visits:**
     Consultant shall conduct site visits that will enable the Consultant to develop understanding of proposed rural roads / bridges and their associated structures and identify and confirm the right of way (ROW) of each road with relevant local authorities.

- **Road / Bridges Inventory and Pavement / Structural Condition Survey:**
  The Consultant will conduct roads / bridges inventory and pavement / structural condition survey to obtain information on the existing condition of the proposed roads/bridges with particular reference to the pavement surfacing, width and condition, assessment of distresses, type of terrain, soils, embankment height and width, water logged areas, horizontal and vertical curvature, longitudinal grades, type and name of major and minor junctions, right-of-way and assess the structural conditions of the proposed bridges.

  The data will then be reviewed and utilized for the evaluation of existing pavement / bridges. All these data will be utilized for pavement rehabilitation strategies development and pavement structural design as well as bridges design. Data relating to the existing road / bridges condition will also be required for economic analysis.

- **Condition Survey of Structures / Bridges:**
  Consultants will carry out Condition Survey / Assessment of Structures / Bridges and its input is used in cost analysis. Preliminary drawings / sketches will be prepared.

- **Topographic Surveys:**
  The Consultant will conduct Topographic Survey of the shortlisted rural/C&WD roads with approximately 1,768 Km in length using Total Station / DFGPS. The GPS coordinates will be established first by using GPS coordinates.

  Topographic survey should be undertaken to update the maps and verify the location of major buildings, structures and other physical features that are likely to be affected by the road. Detailed topographic surveys should be undertaken at the scale of 1:500 along the alignment of the proposed road. This survey should extend to the Right of Way (ROW) of the road. However, if more features will be required the survey should be extended up to the required corridor. The survey done through Total Station / DFGPS should be verified through Level Machine, with X-Sections taken at 25-meter interval for more authenticity and avoiding variation in Earth Work Quantities at the construction stage. In addition to the above, survey level shall be taken across the all X-Sections at every changing point including 2-3 points within the existing carriageway to find out the actual surface level of carriageway.

- **Soil Survey and Geotechnical Investigation:**
  <u>Road and Approaches</u>
  Detailed soil survey should be undertaken along the alignment of the road to determine the general soil condition, bearing capacity, moisture content, water table level and type of soil etc. Particular emphasis should be given to those locations where structures such as piles, back walls etc. will be situated. The soil investigations for structure (sub-structures) would be got done by the Consultant and results would be provided to the Client.

The consultant is required to investigate the soil through pits at 5-kilometer interval. The consultant will have to study the following properties:

- Sieve Analysis
- Atterburg Limits
- P.I.
- Moisture Content
- CBR
- MR Value if CBR>10%
- Pile capacity in case of Bridge etc.
- Residual strength of existing pavement structure.

A bore log should also be submitted to Client for approval. The consultant is also required to coordinate with the Client during the soil investigation and also declare their pit's location to the Client as well.

Investigate the suitability of local construction materials and, where necessary, locate new quarries and borrow pits and assess the quality and quantity of materials and hauling distance.

- **Hydrological Study.**

The Consultant shall collect fresh hydrological data for the Feasibility report and detailed design of the proposed roads and bridges. The hydrological study shall include but not limited to:

- Location and extents of catchments area.
- High flood levels.
- Maximum Peak Flood Discharge.
- Maximum Velocity.
- Type of Bed Material (Manning's n).
- Waterway.
- Scour depth.
- Clearance.
- Structure Profile.
- Bed slope.
- Encroachment in the natural stream (if any).

- **Traffic Survey:**

The Consultant will undertake 24 hours traffic count surveys and Origin / Destination Survey (if required, such as for rural roads connecting to national or provincial highways and district roads) along each road. All the available traffic data from Client and other concerned quarters will be collected. The Consultant will analyze the collected data and field data to determine the traffic growth rates, diverted and generated traffic. On the basis of traffic forecasts, adopted growth rates, and the axle load damaging factors defined by the 1995 National Transport Research Council (NTRC) Axle Load Study, cumulative equivalent standard axles (ESA) will be calculated for 10 years pavement design service life.

The details of task to be furnished by the consultant are as follow:

- 7-Days classified traffic counts at the locations approved by Client.
- Estimation of ESAL based on latest Axle load surveys conducted by NHA / NTRC.

- Based upon traffic survey, peak hour and ADT traffic volume shall be established.
- Make forecast for next 10 and 20 years.
- Where required, capacity analysis, weaving analysis, signal and intersection capacity and delay shall be conducted using computer models.
- Level of service, volumes to capacity ratio, queue length on each approach, time space diagram to plan the road. (Wherever required)

During the course of traffic count the consultant will have to coordinate with the Client and will also declare the count section to that PIU office.

Stage 3: Draft Detailed Engineering Design:

General

1. Based on traffic forecast, topographic surveys, soil investigations and conceptual framework and design criteria for the proposed 1,768 Km candidate roads and 50 numbers of bridges, the Consultants shall submit preliminary design. The design will include right of way plans Pavement Design, Structural Design, Intersection Design (where required) and Preliminary Cost Estimates.

2. The Consultant will carry out the following tasks, including but not be limited to:
   - The consultant will carry out the detailed engineering design of the proposed shortlisted 1,768 Km roads as well as 50 numbers of the shortlisted bridges.
   - Carry out engineering surveys as required.
   - Prepare design based on representative and homogeneous pavement sections applying sound engineering practice (design standards and specifications) and giving due regard to environmental and social safeguards aspects in accordance with the World Bank's Safeguard Policy and Government of Khyber Pakhtunkhwa related regulations and policies. Specifically, the feasibility study and detailed engineering design should permit preparation of final bidding documents with BOQs and cost estimates.
   - Assess longitudinal and cross drainage requirements and structural soundness of drainage structures and propose improvements to hydraulically inadequate and/or structurally unsound bridges, culverts, causeways and other structures etc) particularly considering the severe truck overloading.
   - Prepare practical and cost-effective geometric (horizontal, vertical, intersection, etc.) pavement and structural designs on the basis of projected traffic levels; pavement structures studies using roughness (IRI) and other tests and environmental assessment; projected changes.
   - Determine the most cost-effective improvement option for each project road section (such as reconstruction, rehabilitation, structural and functional overlays, or resealing). Where new pavements are to be provided, they will be designed using an internationally recognized procedure, for a 10-year life, with provision for overlays during or at the end of that period to extend the life to 15 to 20 years.
   - Prepare engineering technical specifications for each work item, taking into account relevant specifications in use in the country and elsewhere for similar works.

- Prepare engineering drawings as per requirements of Client, minimum requirements for list of the drawings are as follows.
    - General
        - Key Map
        - Location Plan
        - Alignment Plan
        - Symbols & Abbreviations
        - General Notes
    - Typical Cross Section
    - Plan & Profiles (1:1,000)
    - Traffic Control Devices
    - Miscellaneous Details
        - Pavement Marking
        - Reflectors, Studs & Delineators
        - Superelevation Details
        - Guard Rail
        - Typical Embankment Protection Detail
        - Road Furniture
    - Layout Data
        - Center Line
        - Horizontal Curve
    - Structural (In case of presence)
        - Box Culverts
        - Pipe Culverts
        - Slab Culverts
        - Side Drains
        - Retaining Walls
        - Causeways
        - Bridges

        .
- Prepare cost estimates and Bills of Quantities for the proposed 1,768 KM shortlisted roads and 50 numbers of the shortlisted bridges, using available indices validated by reference to market prices / prevailing Market Rate System (Provincial), separating foreign exchange, local currency, and tax and duty elements.
- In consultation with Client establishes contract packages taking into account the location of project roads, size of contracts, and other project specific factors;
- Prepare engineering project implementation schedules showing anticipated progress of works and expenditures for each contract package. The schedules will reflect seasonal climatic effects at the work sites and take into account typical outputs on earlier World Bank financed road projects; and
- Prepare bidding documents for the road contracts.

Geometric Design

The Consultant will prepare geometric design of the road as per standard with the design speed of 50-70 KPH. Based on these standards in the route alignment study, the Consultant will produce preliminary horizontal, vertical and typical road cross sections. The topographic survey done through Total Station / DFGPS should also be verified through Level Machine with X-Sections taken at 25-meter interval, so as to avoid quantitative variation at the Construction stage.

The Consultant will also clearly mention the grade and in case grades are more than 5% to 6%, they will have to quote the specification reference and length i.e., up to how much length we can maintain that excessive grade.

The consultant will also submit details for super elevation runoff, transition curve etc. A presentation will be given on geometric design and FRL to the competent authority.

Pavement

- Pavement designs based on different design methods and different materials are to be prepared for selection of a suitable and economical option. An economical pavement design for ten (10) years so selected is to be adopted for estimation of quantities of various pavement layers involved in the project. The Consultant will work out the residual strength ($S_{N\,res}$). The Consultant will submit the analysis to Client for record. The Consultant will submit a detailed report containing the total strength (S_{Ntotal}) required, Residual Strength of the existing pavement and the additional strength required for rehabilitation, reconditioning of the highway. A presentation on the pavement design to be adopted for the scheme is to be made to the employer for approval. The consultants will also recommend a stage construction technique for pavement design life of 20 years based on axle-load data and soil investigation.
- The Consultants are required to work out residual MR of the existing structure using CBR Test
- The shoulder shall be treated one as per the requirement of site.

Drainage

- The Consultant will investigate the existing drainage system of the project area including canals, rivers, streams and seasonal water courses and prepare outline proposals for protecting the same in those areas where it is affected by the improvement / widening etc. of the candidate road sections. The Consultant will also prepare complete drainage plan comprising culverts, drains and other drainage structures without-line design for the road-drainage system based on rainfall statistics. The drain should be provided on both sites of road in built-up area.

Structure

- The consultants will provide structural design of all the cross-drainage structure including bridges / flyovers or any other, their location, type, and level etc. with 75 years design life. The consultants will also identify the existing structures that will need protection, strengthening modification or replacement.

Benefit Analysis

- The Consultant will undertake an evaluation of the benefits, expected from the road. These could include but not necessarily be limited to time saving, reduce accidents, enhance land values, reduce vehicles operating cost, reduction of carbon dioxides etc. the cost and benefits should be quantified as far as possible.

Economic and Financial Analysis

- A detailed economic and financial analysis based on the cost estimates, NPV, EIRR and Cost Benefits Analysis should be prepared.
    1. The Consultant shall undertake economic evaluation and ranking on the basis of life cycle costs and benefits using NPV, IRR, B/C Ratio as decision criteria of the candidate 1,768 KM roads and 50 numbers of bridges.

2. All the economic analysis of candidate 1,768 KM roads and 50 numbers of bridges need a lot of socio-economic data which will be collected by the Consultant to analyze the actual benefits of the project improvement and its viability.
3. A detailed economic and financial analysis based on the cost estimates, EIRR and benefits analysis should be prepared.
4. The consulting team is required to undertake the following tasks, but not be limited to:
   - Prepare an assessment for rural roads and its management.
   - Review the current and likely future capacity of the existing roads to cope with traffic flows. Prepare projections of current and future levels of service. Prepare an options analysis reviewing the options available and on the basis of a multi-criteria analysis select the preferred option in terms of both alignments (where relevant) and carriage type.
   - Review existing International Roughness Index (IRI) data, pavement condition index data, existing traffic data, traffic count data and axle-load surveys.
   - Arrange for additional traffic count as needed.
   - Produce estimates of traffic flows (annual average daily traffic) on the project roads and all other parts of the network experiencing non-trivial changes to flows resulting from the new project. Estimates are to be produced for the without project scenario and with the project scenario (considering traffic reassignment from competing corridors and traffic generated by the project). The traffic forecasting methodology (e.g., traffic counts, origin-destination surveys, modeling requirements and forecasting mythology) to be performed for each subproject is to be agreed with World Bank in advance. For cases involving offline construction a basic traffic assignment model may be required.
   - Produce 20-years demand forecasts of traffic on each project road, for both with and without project scenarios, based on forecast growth in e.g., vehicle ownership each vehicle type, GDP and/or population.
   - Prepare an economic analysis of the proposed road improvements using software acceptable to Client and World Bank. Calculate the Economic Internal Rate of Return (EIRR) for each subproject.
   - Undertake sensitivity analysis on the risk factor basis for various scenarios such as changes to the cost, generated and diversion traffic, constructions period etc.
   - The economic analysis is to be undertaken in accordance with the agreed Economic Analysis of Project. Client and World Bank will review (i) methodology; and (ii) draft economic analysis report and provide comments (if any). The Consultant shall be responsible for producing final versions taking into consideration comments made by Client and World Bank.
   - Prepare and submit economic analysis report, presenting the following:
     - Introduction (including macroeconomic, sector specific context and economic rationale for the project).
     - Demand analysis, describing the results of the data collection, baseline demand estimation and forecasting work undertaken.
     - Options analysis, presenting the write-up of the work review of the option and selection of the preferred alternative.
     - Definition of the without and with project scenarios.
     - Write-up of investment and operation costs including conversion from financial to economic prices.

- Write-up of benefits estimation including but not limited to parameter values (e.g., appraisal period, value of time, vehicle operating costs), methodology (e.g., discounted cash flow analysis, use of domestic or border prices), conversion factors applied.
- Presentation of the results of the economic analysis (i.e., Economic Internal Rate of Return, Benefit to Cost Ratio, Net Present Value).
- Sensitivity and scenario analysis. Write-up of the sensitive tests performed, and scenario studied.

➢ Conclusions – summarizing the economic assessment, approach and methodology, findings (EIRRs and sensitivity analysis) and overall economic viability.

➢ Discuss the project's financial sustainability, based on the abovementioned maintenance strategies to be implemented to the project infrastructure.

Feasibility Report

➢ Feasibility report summarizing all the technical investigations and studies, engineering analysis and design, costs and benefits and the economic evaluation of the project and recommendations etc. should be prepared.

Using the data from above surveys, traffic and costs, results arrived, recommendations developed, and the feasibility study report prepared.

All the technical work for feasibility will be carried out on preliminary basis for its initial viability. Upon having the initial viability, the candidate 1,768 KM roads and 50 numbers of bridges based on economic analysis, the roads and bridges will be finalized / selected as per Guidelines of World Bank and taken up for Detailed Engineering Design and preparation of other related documents.

Implementation Programme

➢ An outline of implementation programmed should be prepared on Microsoft Project / Primavera.

Stage-4: Detailed Engineering Design:

The Consultant shall furnish copies of all engineering drawings, specifications and bidding documents including geo-technical and material reports and Bill of Quantities to Client as mentioned below. The Consultant will also submit originals of all engineering drawings, detailed cost estimates and design calculations to Client. All final documents shall be submitted by the Consultant within 30 days of receipt of consolidated comments from Client / World Bank. Additional copies shall be provided at mutually agreed rates.

➢ **Preparation of Design Drawings (Roadway and Structures):**
Consultant will prepare the Design Drawings of Roadway and their associated structures.

➢ **Climate Change Assessment:**
The Consultant shall undertake the following tasks to ensure that the project roads design properly incorporated climate adaptation measures which suit the project areas: (i) Collect and review relevant documents of baseline (historical) levels of key parameters (temperature, precipitations, flood/disaster records) at national and provisional levels (at least), identify any potential climate-related risks (floods,

landslides, and/or hazards) being occurred in future along each road and its surrounding areas and develop a profile of each road; (ii) Examine the proposed design measures, including ones being taken during construction and operation, in consultation with the other team members; and (iii) Assess and present appropriate adaptation options in consideration of each project road site and design objectives, including physical and non-physical approaches, and estimate the climate adaptation cost. Results of (i) – (iii) will be documented in a Climate Change Risk Report and submitted.

- **Bill of Quantities (BOQs) and Cost Estimates:**
  The Consultant will prepare detailed BOQs for all elements of works and work out the Cost Estimates based on MRS 2022 or latest Schedule of Rates (prior approval of the Client).

4. Commencement

The Consultant shall commence the Services immediately after signing of the Contract Agreement or such other time as the Parties may agree in writing.

5. Time Period

The Services specified in the TOR shall be completed and all relevant reports submitted to the Client in the form and format acceptable to the Client, within **Six (06) months** from the Date of Commencement.

Experts Terms of Reference:

S/No	Title	Experience, Qualification & Responsibilities	
Key Experts			
1	**Team Leader / Highway Design Engineer** ***[01 Position with 03 Person-Months]***	**Experience:**	Bachelor's degrees in Civil Engineering – preferably Masters in Civil Engineering / Highway Engineering / Transportation Engineering or equivalent
		Qualification:	Twelve (12) years relevant international experience and eight (8) years of experience as Team Leader/Project Manager in Design of Highway Geometric and Pavement
		Responsibilities:	Overall responsibility for the organization, conduct and delivery of consultancy services and reporting to C&W Department, Project Director, PIU, KP-RAP. The Team Leader / Highway Design Engineer will head the Consultant team and will work directly to manage the project and will maintain liaison with C&W Department, Project Director, PIU, KP-RAP in connection with scope of work as mentioned in Terms of Reference for feasibility study and detailed design for the KP-RAP roads and environment impact assessment. It is obligation of Team Leader of consulting firm to provide complete support to construction team if his consulting firm does not emerge to be the supervision consultant. Responsibilities of the Team Leader / Highway Design Engineer will include but not limited to the following: • Assume full responsibility for the consulting team and performance of services under the consultancy contract. • Keep the Employer informed of technical issues and progress of all works both by informal and formal meetings and correspondence and assist in any project issue which the Employer as may require. **Major Activities:** **(1) For Feasibility Study** • Collect all relevant data on economy, population, traffic, industry, trade, with all concerned local Departments • Conduct traffic count & O&D survey for the proposed alignment • Prepare a 3-D simulation for the various alternative analysis • Prepare the standard feasibility study report **(2) For Detailed Design** • Conduct detailed survey and geometric design for the approved alignment including L. profile, cross sections, layout design of all structures such as bridges,

S/No	Title	Experience, Qualification & Responsibilities	
			culverts, interchanges, underpasses, retaining structures, any other structures use for slope stabilization etc. • Conduct soil investigation, and Geometric Design with Highway Safety duly furnished in it. • Detailed topographic survey or use of Stereo DEM with Ground Control Point (GCP) validation. • Detailed Soil investigation survey, and hydrology survey, on the proposed alignment. • Identification of quarry sites and borrow areas and construction material survey. • Identification of problematic areas as regards to deposition of ice / sand dunes along with appropriate design to address shifting of ice / sand dunes on roadway with cost effective remedial measures. • Geotechnical Investigation survey for bridges and related structures. • Remedial measures for scouring etc. if any. • Hydraulic Model Study if required. • Design of Toll Plazas associated buildings, and rest areas, including architectural drawings and detailing construction specifications. • Geometric Design of Highway with detailed Highway Safety Report. Detailed design of up gradation of existing road. • Road furniture design including traffic signs and gantries. • Hydrology & Hydraulic design of structures. • Structure Design including electrical design of lightening for bridge etc. • Horticulture and Landscaping of intersections. • Axle load survey or collection of data from nearby weigh stations. • Pavement Design with surface and subsurface drainage. • Provision of ducts/crossing of future utilities like OFC, pipelines etc. • Stakeout of design alignment after approval for ground validation. • Utility folders and Land acquisition plans using imageries, cadastral maps on GIS. • Fixation of ROW markers when required by the Client. • Preparation of Bidding Documents, BOQ, Engineers Estimate. • Preparation/revisions of PC-1s. • Prepare design report of all design drawings. • Team leader at the end of design shall make final presentation with following details: ➢ Team leader will describe the selected road alignment, merits, demerits, land acquisition and other impediments (if any).

S/No	Title	Experience, Qualification & Responsibilities	
			➢ Team leader will highlight important components of project like major bridges, flyovers, interchanges, service areas and landslides (if any) etc. ➢ Important parameters of sub-soil investigation like CBR, Pile Capacity and General Soil Classification etc. ➢ Team leader will also highlight the environmental impact of the road construction on the road influence areas. ➢ Important hydraulic parameters used in the design of bridges over rivers/ canals. ➢ Results of traffic study and axle load survey. ➢ Location of quarry sites. ➢ Team leader shall clearly explain the traffic management plans. ➢ Complete description of design criteria and functional requirements. ➢ Description of specialized equipment and machinery required for the construction. ➢ Description of methodology/ codes for pavement and structural design including details of computer models. ➢ For Structural Design, Summary of results of computer output. ➢ Maximum and minimum forces for all elements) in tabulated form shall be presented. ➢ A plan showing major quarry sites/ borrows area sites including mass diagram showing cut and full along the finally selected alignment shall be presented. • Any other points, which the TL may like to highlight, should be included.
2	**Senior Structural / Bridge Design Engineer** ***[01 Position with 03 Person-Months]***	**Experience:**	Ten (10) years relevant international experience and five (5) years of experience in major structural / bridge design of major Road Projects.
		Qualification:	Bachelor's degrees in Civil Engineering – preferably Masters in Structural Engineering
		Responsibilities:	He/she will be responsible for Design and Design Review of structural elements of road components i.e., bridges, culverts, interchanges, underpasses, retaining walls and specifications on cost effective multi hazard resistant design including detailed structural drawing specification and estimates. Responsibilities of Senior Structure/Bridge Design Engineer will include but not limited to: • He will assist the TL in the performance of his tasks. • It is required that Senior Structure/Bridge Design Engineer should undertake the job in professional manner to best of its ability and resources.

S/No	Title	Experience, Qualification & Responsibilities	
			(a) Feasibility Study • Provide details about existing structures, damages, assessment, development necessity with respect to engineering parameters. **(b) Detail design of KP-RAP** • Detailed design of structural elements of road components on basis of traffic surveys and analysis for different traffic module and forecast methodology. • Design of new structures, retaining works, intersections, flood, and erosion protections works, training works, interchanges, under passes etc. on basis geotechnical investigations as well as on basis on basis of relevant engineering data on required standard and detailing construction specification. • Structural design including electrical design of lightening for bridges etc. • Any other task that may assigned to perform the task under the consultancy assignment.
3	**Deputy Team Leader** ***[01 Position with 06 Person-Months]***	**Experience:**	10 years' experience as Design and/or Design reviewer of road and highways with proven credentials in pavement designing.
		Qualification:	Master's in civil engineering / Pavement Engineering / Highway Engineering or equivalent / Transportation Engineering or equivalent.
		Responsibilities:	He/she will be act as Acting Team Leader in absence of Team Leader. He/she will be responsible for Design of Highway Design and Specifications on cost effective multi hazard resistant design. He/she will also be responsible for designing especially in geometric design, designs for road features and road safety/traffic control features, drainage designs, rehabilitation and repair plan, traffic plans and amenities including detailed drawings and specifications Responsibilities of Deputy Team Leader / Project Coordinator will include but not limited to: • He will assist the TL in the performance of his tasks. • He will be responsible for coordination and liaison with all stakeholders. • It is required that Deputy Team Leader / Project Coordinator should undertake the job in professional manner to best of its ability and resources. • Maintaining and monitoring project plans, project schedules, work hours, budgets, and expenditures. • Organizing, attending, and participating in stakeholder meetings.

S/No	Title	Experience, Qualification & Responsibilities	
			• Documenting and following up on important actions and decisions from meetings. • Preparing necessary presentation materials for meetings. • Ensuring project deadlines are met. • Determining project changes. • Providing administrative support as needed. • Undertaking project tasks as required. • Developing project strategies. • Assess project risks and issues and provide solutions where applicable. • Ensure stakeholder views are managed towards the best solution. • Chair and facilitate meetings where appropriate and distribute minutes to all project team members. **(a) For Feasibility Study:** • Provide details about existing structures, damages, assessment, development necessity with respect to engineering parameters. **(b) For Detailed Design:** • Assist in detailed design of all elements of road components on basis of traffic surveys and analysis for different traffic module and forecast methodology. • Assist in design of new structures, retaining works, intersections, flood, and erosion protections works, training works, interchanges, under passes etc. on basis geotechnical investigations as well as on basis on basis of relevant engineering data adopting four lane carriageways on NHA standard and detailing construction specification. • Structural design including electrical design of lightening for bridges etc. • AASHTO (LRFD), ASTM, ACI standard and loads will be adopted. • He/she will be responsible for design and design review of highway payment design, detailed geometric design with detailed highway safety report and pavement design with surface and subsurface drainage on basis of detailed soil investigation, axle load study and traffic surveys (Traffic count for 10 years design life). • He/she will be responsible for designing road furniture design including traffic signs and geometrics, traffic control features, drainage designs, rehabilitation and repair plans, traffic plans and amenities with detailed specifications and cost effective multi hazard resistant design following acceptable standard. AASHTO,

S/No	Title	Experience, Qualification & Responsibilities	
			ASTM, ACI codes will be adopted. Final pavement design shall be done using empirical-mechanistic method. Asphalt institute and shell model shall be used. • Geometric design with detailed highway safety report of up-gradation of existing road. • Pavement design with surface and subsurface drainage. • Provision of ducts/crossing of future utilities like OFC, pipelines etc. • To evaluate for flexible, rigid, and composite pavement along with cost comparison.
Non-Key Experts			
1	**Procurement & Contract Specialist** ***[01 Position with 05 Person-Months]***	**Experience:**	10 years' experience as Procurement and Contract Specialist on major road projects based on FIDIC form / conditions of contract, Experience, and knowledge of World Bank procurement procedures is essential. Proven credentials in contract administration, evaluating contractor's claims and dispute resolution, preferable experience/track record of an arbitrator, mediator, adjudicator and/or dispute resolution adviser.
		Qualification:	Bachelor's degree with a major in Civil Engineering, Law, Contracts, Purchasing, or Management - preferably MSc in Civil Engineering, Law, or Contracts / Procurement, or equivalent.
		Responsibilities:	The responsibility shall include but not limited to • He/she will be responsible for assisting TL in all the activities pertaining to procurement. • Assist in preparation of procurement and contract documents. • Responsible for preparation of bidding documents. • Shall update and improve PC-I for the project on prescribed proforma by planning commission. • To assist in preparation of separate PC-I for land acquisition (if any). • Support TL in drafting, for submittal to World Bank through employer. • Shall also prepare documents for acquiring any additional or removal of structures and utilities particularly in built up areas;
2	**Pavement Design Engineer** ***[05 Positions and total 30 Person-Months]***	**Experience:**	10 years as Payment Design Engineer for major road projects with proven credential in geometric design of highways
		Qualification:	Bachelor's in civil engineering Preferably Master in Civil Engineering/Highway Engineering or equivalent with specialization in pavement design.
		Responsibilities:	Responsibilities of Pavement Design Engineer will include but not limited to • He/she will assist Senior Payment Design Engineer.

S/No	Title	Experience, Qualification & Responsibilities	
			• He/she will be responsible for design and design review of highway payment design, detailed geometric design with detailed highway safety report and pavement design with surface and subsurface drainage on basis of detailed soil investigation, axle load study and traffic surveys (Traffic count for 10 years design life). • He/she will be responsible for designing road furniture design including traffic signs and geometrics, traffic control features, drainage designs, rehabilitation and repair plans, traffic plans and amenities with detailed specifications and cost effective multi hazard resistant design following four lane carriageways on NHA standard. AASHTO, ASTM, ACI codes will be adopted. Final pavement design shall be done using empirical-mechanistic material. Asphalt institute and shell model shall be used. • Geometric design of highway safety report of up-gradation of existing road. • Pavement design with surface and subsurface drainage. • Provision of ducts/crossing of future utilities like OFC, pipelines etc. • To evaluate for flexible, rigid and composite pavement along with cost comparison.
3	**Geometric Highway Design Engineer** ***[05 Positions and total 30 Person-Months]***	**Experience:**	10 years as Geometric Pavement Design Engineer for major road projects with proven credential in geometric design of highways
		Qualification:	Master's in civil engineering or equivalent with specialization in Transportation/Traffic Engineering.
		Responsibilities:	Responsibilities of Geometric Pavement Design Engineer will include but not limited to • He/she will be responsible for design and design review of highway payment design, detailed geometric design with detailed highway safety report and pavement design with surface and subsurface drainage on basis of detailed soil investigation, axle load study and traffic surveys. • He/she will be responsible for designing road furniture design including traffic signs and geometrics, traffic control features, drainage designs, rehabilitation and repair plans, traffic plans and amenities with detailed specifications and cost effective multi hazard resistant design following four lane carriageways on NHA standard. AASHTO, ASTM, ACI codes will be adopted. Final pavement design shall be done using empirical-mechanistic method. Asphalt institute and shell model shall be used. • Geometric design with detailed highway safety report of up-gradation of existing road. • Pavement design with surface and subsurface drainage.

S/No	Title	Experience, Qualification & Responsibilities	
			• Provision of ducts/crossing of future utilities like OFC, pipelines etc. • To evaluate for flexible, rigid and composite pavement along with cost comparison.
4	**Structure / Bridge Design Engineer** ***[05 Positions and total 30 Person-Months]***	**Experience:**	10 years' experience as Designer and/or Design reviewer of Structures with proven credentials in Bridge Designing.
		Qualification:	Master's in civil engineering / Structural Engineering / Highway Engineering or equivalent, preferably PhD in Structural Engineering or equivalent.
		Responsibilities:	Responsibilities of Structure/Bridge Design Engineer will include but not limited to. He/she will assist Senior Structure/Bridge Design Engineer in connection with design of structural elements of road components i.e., bridges, culverts interchanges, under passes retaining walls. **(a) For Feasibility Study** Provide details about existing structures, damages, assessment, development necessity with respect to engineering parameters. **(b) Detail Design** • Detailed design of structural elements of road components on basis of traffic surveys and analysis for different traffic module and forecast methodology. • Design of new structures, retaining works, intersections, flood, and erosion protections works, training works, interchanges, under passes etc. on basis geotechnical investigations as well as on basis on basis of relevant engineer data, adopting four lane carriageways on NHA standard. • Structural design including electrical design of lightening for bridges etc. • Prepare separate drawings for bridges and culverts and other related structure as mentioned in 4.3.16.3 and 4.3.16.4 of TOR. • AASHTO (LRFD), ASTM, ACI standard and loads will be adopted.
5	**Hydrologist / Drainage Engineer** ***[05 Positions and total 30 Person-Months]***	**Experience:**	10 years' experience as Hydrology/Drainage/Water Resources Engineer on major road project of same magnitude.
		Qualification:	Bachelor's in civil engineering, Masters in Hydraulic/Drainage/ Water Resources Engineer, with sound knowledge of hydrology.
		Responsibilities:	The responsibility shall include but not limited to • Field visits to access site condition with regard to hydrology study. • He/she will be responsible to access hydrological data of the area of road alignment and comprehensive report shall be prepared which shall depend upon the nature of the valley, or flood plain to be traversed, the cost of proposed

S/No	Title	Experience, Qualification & Responsibilities	
			drainage structures and class of highway with help of topographic maps showing drainage characters, satellite imaginary to be used for upstream and downstream to identify the land use and drainage characteristic. • Evaluate the topography and gradients, water formation of the area. Analyze existing side/cross drainage conditions along the road alignment. • He/she will be responsible for vetting the condition of drainage crossing structures keeping in view the past available data of floods and rains. • To provide expert technical advice in respect of drainage proposals, undertaking flood risk assessments. • Using topographic map, satellite imagery and site visit, the hydrology/drainage engineer required to comment nature of land use in affected water sheds nature of vegetation and soil characteristic of the basin, water within affected drainage basins along with operational procedures of these reservoirs. • To collect rainfall data for the project area from metrological department with brief description. • To collect river discharge data of river Indus from relevant department. • A brief history is required to be prepared in connection with dates of occurrence of the flooding and elevation of high-water marks as well as rain fall intensity.
6	**Geotechnical Engineer / Geologist** ***[05 Positions and total 30 Person-Months]***	**Experience:**	10 years international experience as Geotechnical Engineer on Major Road Projects, knowledge of soil bio engineering / biotechnical application for slope stabilization.
		Qualification:	Bachelor's degree in Geotechnical Engineering, Civil Engineering – preferably M.Sc. or PhD in Geotechnical Engineering.
		Responsibilities:	Responsibilities of Structure/Bridge Design Engineer will include but not limited to • To perform geotechnical investigation including field and laboratory testing, for canal, road and river bridges. • To carry out 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 under strict quality control and adherence to relevant ASTM procedures / standards. • Identify risks of natural disasters such as mud slides, earthquakes, and provide advice on ways in which potential damage can be mitigated. • Measure characteristics of the earth such as gravity and magnetic fields using equipment such as seismographs gravimeters, torsion balances, and magnetometers. • Develop applied software for the analysis and interpretation of geological data.

S/No	Title	Experience, Qualification & Responsibilities	
			• Identify deposits of construction materials and assess the materials' characteristics and suitability for use as concrete aggregates, road fill, or in other applications. • Prepare Geological maps cross-sectional diagrams, charts and reports, land use, and resource managements using result of field work and laboratory research. • To evaluate causes of movement and tagging mechanism along the physical route and propose remedial measures required to stabilize the slope. • Identification of problematic area as regards deposition of sand dunes and to address shifting of sand dunes along with remedial measures. • Geotechnical investigation survey for bridges and structures. • Soil and material investigation shall be done to ascertain the index and engineer properties of soil and rock encountered and evaluate result for final design.
7	**Transport Economist** ***[02 Positions and total 10 Person-Months]***	**Experience:**	At least 10 years relevant professional experience in transport sector including preparation and implementation of transport policies in Highways projects of same magnitude.
		Qualification:	Master's degree or equivalent in Transport/Transport Economics with specialize experience in transport sector.
		Responsibilities:	The responsibility shall include but not limited to • Evaluate cost benefits of the project in terms of Transport Economy. • To develop an understanding of traffic pattern, he/she is required to carry out classified traffic count at required location along the project and on connected network for economic analysis. • To calculate delays of vehicle to be used in economic analysis. • To carryout study for diversion and general traffic as traffic count forms the basis for capacity analysis, pavement design and economic analysis. • To collect any relevant traffic data from concerned agencies. • Calculate average time taken by different sort of vehicles while passing through the candidate roads to up or down country. • Calculate delays of vehicles to be used in economic analysis. • Traffic volume at count station to be forecast for 10 years design period. Various alternative growth rates (if available) from agencies or based on historical increases in fuel consumptions, vehicle registration etc., shall be utilized. After review of the various growth rates and resulting traffic volume, the transport economist will recommend the growth rate to be adopted as basis for design and coordinate.

S/No	Title	Experience, Qualification & Responsibilities	
			• The traffic forecast will be made individually for each vehicle category including cars, buses, wagons, dual axle and multi axle trucks and tailors according to NTRC format. Generated traffic if any shall also be assessed and included in the traffic economy. • Access the existing level of service with the proposed solution.
8	**Traffic / Road Safety Expert** ***[05 Positions and total 30 Person-Months]***	**Experience:**	12 years relevant experience with proven credential as traffic engineer / road safety specialist on major road projects
		Qualifications:	Bachelor's degree preferably master's in civil engineering / Transportation Engineering / Highway Engineering / Traffic Engineering and certification as safety auditor or equivalent.
		Responsibilities:	The Traffic /Road Safety Specialist is part of the services team and will be providing all necessary assistance to the construction supervision team with respect to work zone safety, and implementation of safety audit recommendations. He/she will assist to the TL + other team members in review and approve the safety plans of the contractor and he will monitor the safety of the works and the safety of the traffic diversions and ensure compliance with the regulations. He/she will review hazardous location(s) and conditions, evaluate audit results, and safety and operational deficiencies, identify potential safety and operational improvement and recommend appropriate improvements. The Road safety specialist will train the national staff on the team.
9	**Financial Analyst** ***[03 Positions and total 18 Person-Months]***	**Experience:**	Experience in financial and economic analysis and regulation of road infrastructure and services is required. Knowledge of Financial Management Systems (FMS). Preferably more than 10 years' working experience in program/project finance, accounting and financial reporting under projects financed by international financial institutions including WB.
		Qualification:	Master's degree with a major in Finance/Accounting/Economics/Management or equivalent – preferably advanced degree in Finance / Accounting / Economics / Management or equivalent or accounting qualification such as Certified Public Accountant/Chartered Certified Accountant.
		Responsibilities:	• Assistance to the team and work closely with team to assess current financial practices of C&W Department and identify gaps for rectification. • Assistance to team to assess financial management system (FMS), including Project Performance Monitoring System (PPMS), project financial information and accounting system used by C&W Department.

S/No	Title	Experience, Qualification & Responsibilities	
			• Elaborate and propose procedures for setting-up and maintaining consolidated accounts. • Lead the periodical review of the work plan and budget of the C&W Department. • Assist the C&W Department in preparing the Project financial progress reports provide required inputs and information necessary for the preparation of periodical progress reports and completion report. • Review the OSR at the city level, identify measures and steps for improving OSR, develop a time bound action plan for OSR improvement and monitor and guide their implementation. • Design measures for targeted subsides for poor household where affordability of services is an issue, including cross subsidies to ensure funds are available within OSR or tariff streams to pay the subsides, rather than dependence on provincial or federal transfers. • Elaborate and propose procedures for setting-up and maintaining consolidated accounts. • Assist in the periodical review of the work plan and budget of the C&W Department. • Coordinate efforts with Financial Specialist in C&W Department in undertaking financial and economic analysis, as required, of C&W Department. Assist in providing advice on capacity building needs of WSSCs staff, review financial management capacity building programs, FMS software, and provide assistance during the delivery of training sessions.
10	**Architect / Landscape Architect** ***[03 Positions and total 18 Person-Months]***	**Experience:**	12 years relevant experience preferably three major road projects specially landscape architect in the design and preparation of plans of Landscape Architectural Projects.
		Qualification:	Bachelor's degree in Architect with major course work in landscape architecture or related field
		Responsibilities:	The responsibility shall include but not limited to the following: • Prepare landscape design and construction plans and cost estimates for proposed alignment. • Respond to citizen enquiries and complains on landscape requirements. • Recommended and assist in the implementation of goals and objectives implement approved policies and produces along the proposed route. • Perform related duties as required. • To calculate angular, linear and area measurements shall identify the problematic areas in specific to landslide area and suggest proper mitigation measures.

S/No	Title	Experience, Qualification & Responsibilities	
			• Identification of problematic areas as regard to deposition of sand dunes and to address shifting of sand dune with cost effect remedial measure. • To prepare architectural drawing of toll plaza associated building and rest area. Landscaping of intersections.
11	**Planning Expert** ***[01 Position and total 06 Person-Months]***	**Experience:**	10 years' experience in planning and development of highways of similar nature.
		Qualification:	Bachelor's degree in Civil Engineering preferably master's in civil engineering/Transport and Planning.
		Responsibilities:	The responsibility shall include but not limited to: • Coordinate with TL for consistency of approach, exchange of experiences, and continues improvement of practices and integration of social development to the management and planning activity of the project. • Ensure that key technical, economic, financial issues are incorporated into project. • To plan the project so that it must be completed in stipulated time period. The planning engineer should undertake the job in professional manner to best of his ability and resources so that objective of project in connection with economic and social development of project may be achieved which will in turn will bring more population into stream of benefits and will change social complexion of people around this road.
12	**Chief Quantity Surveyor** ***[10 Positions and total 40 Person-Months]***	**Experience:**	10 years relevant experience as Quantity Surveyor
		Qualification:	Bachelor's degree in Civil Engineering – preferably master's in civil engineering / Highway Engineering / Structure Engineering / Transportation Engineering / Construction Management / Project Management or equivalent
		Responsibilities:	He/she will be responsible for measurement of all type of quantities and preparation of measurement sheet in accordance with approved drawings for the purpose of preparing interim and final payment certificates. He/she will be responsible for preparing the Bills of Quantities and the Engineer's Estimates for the individual subprojects. The quantity surveyors shall review detailed estimates for quantities (considering designs and mass haul diagram) and project cost for the entire project (civil packages wise), including the cost of environmental and social safeguards proposed and market rate for the inputs or the local schedule of rates. The quantity surveyors will ensure correctness of documentation, IPCs and quantities during the construction and confirming the computation and processing of interim payment certificate, producing details of the final bill and total quantities consumed during the project.

S/No	Title	Experience, Qualification & Responsibilities	
			The quantity surveyors prepare quantitative estimates for any suggested variation with its cost impact on the project. • Assist in establishing design consultant's requirements and undertake feasibility studies. • Run cost analyses of the various types of work as a forerunner to tender preparation. • Select price and source construction materials. • Advise the team on procurement strategies. • Factor in the implications of health and safety regulations. • Identify commercial risks and help develop suitable responses. • Prepare the bidding and contract documents, including bills of quantities, with the architect and the other team member(s). • Identify risks surrounding the project and the likelihood of cost variation. • Prepare reports for the team and other relevant stakeholders. Run cost analyses for ongoing repair and maintenance work;
13	**Chief Surveyor** ***[10 Positions and total 60 Person-Months]***	**Experience:**	12 years relevant experience on preferably three major road projects
		Qualification:	Bachelor's degree in Civil Engineering – preferably master's in civil engineering / Highway Engineering / Structure Engineering / Transportation Engineering / Construction Management / Project Management or equivalent
		Responsibilities:	• Prepare and maintain sketches, maps, reports, and legal descriptions of surveys. • Verify the accuracy of survey data, including measurements and calculations conducted at survey sites. • Direct or conduct surveys in order to establish legal boundaries for properties, based on legal deeds and titles. • Record the results of surveys, including the shape, contour, location, elevation, and dimensions of land or land features. • Calculate heights, depths, relative positions, property lines, and other characteristics of terrain. • Prepare or supervise preparation of all data, charts, plots, maps, records, and documents related to surveys. • Write descriptions of property boundary surveys for use in deeds, leases, or other legal documents. • Plan and conduct ground surveys designed to establish baselines, elevations, and other geodetic measurements.

S/No	Title	Experience, Qualification & Responsibilities	
			• Search legal records, survey records, and land titles in order to obtain information about property boundaries in areas to be surveyed. • Adjust surveying instruments in order to maintain their accuracy. • Establish fixed points for use in making maps, using geodetic and engineering instruments. • Determine longitudes and latitudes of important features and boundaries in survey areas, using theodolites, transits, levels, and satellite-based global positioning systems (GPS). • Train assistants and helpers and direct their work in such activities as performing surveys or drafting maps. • Analyze survey objectives and specifications in order to prepare survey proposals or to direct others in survey proposal preparation. • Compute geodetic measurements and interpret survey data in order to determine positions, shapes, and elevations of geomorphic and topographic features. • Develop criteria for survey methods and procedures. • Develop criteria for the design and modification of survey instruments. • Conduct research in surveying and mapping methods, using knowledge of techniques of photogrammetric map compilation and electronic data processing. • Locate and mark sites selected for geophysical prospecting activities, such as efforts to locate petroleum or other mineral products. • Survey bodies of water in order to determine navigable channels and to secure data for construction of breakwaters, piers, and other marine structures. • Direct aerial surveys of specified geographical areas; and Determine specifications for photographic equipment to be used for aerial photography, as well as altitudes from which to photograph terrain
14	**GIS Specialist** ***[05 Positions and total 15 Person-Months]***	**Experience:**	Preferably 10 years' of demonstrated relevant professional experience at the national or international level in GIS applications. Preference will be given to those who possess relevant experience with Donors (ADB and WB) or their funded projects and overseas relevant experience / relevant experience with international organization and Government Institutions.
		Qualification:	Preferably a master's degree in GIS and Remote Sensing or equivalent qualification
		Responsibilities:	GIS Specialist will perform the following functions, including but not limited to:

S/No	Title	Experience, Qualification & Responsibilities	
			• Review assessment studies of all C&W Road network digital data, reports, maps and other multi source data including satellite imagery and digital elevation models (imagery of past events where possible and fresh imagery for baseline mapping, satellite record of roads, bridges, and settlements along with health and education facilities access etc through multiple criteria GIS analysis identify roads at feasibility level. • Perform any other tasks / assignment that may be assigned by PIU and/or WB etc.
15	**Material Engineer** ***[10 Positions and total 60 Person-Months]***	**Experience:**	10 years as Material Engineer on five Highways Projects / Expressways of same magnitude projects, preferably with experience of asphalt concrete mix design in countries having similar climate and/or truck overloading problems like Pakistan.
		Qualification:	Bachelor's degree in (Civil Engineering) or master's in engineering Geology or equivalent.
		Responsibilities:	Responsibilities of Material Engineer will include but not limited to He/she is required to seek, interpret, and evaluate subsurface and surface data in order to predict the behavior of soil and materials along the route and adjacent to the alignment. He/she will assist and will be responsible for quality of materials used in construction by performing field and laboratory tests and certifying their acceptance based on recommended specifications for the material, will also identify the sources of material and query sites. • Stipulate Material Testing Procedures and Specifications. • Identify sources of materials, quarry sites and borrow areas. • Confirm the suitability and availability of material in the borrow pits and quarries for pavement. • Identify and evaluate additional sources of materials. • Undertake field and laboratory testing of the materials to determine their suitability for various components of the work; and to ascertain the index and engineering properties of soil and rock encountered. • Prepare mass haul diagram for haulage purposes giving quarry charts indicating the location of selected borrow areas, quarries. • Make suitable recommendations regarding making good the borrow and quarry areas after the exploitation of materials for construction of works. • Be responsible for Material Testing and specification & certification of material quality.

S/No	Title	Experience, Qualification & Responsibilities
		• Preparation and testing of concrete mixes of different design mix grades using suitable materials (binders, aggregates, sand filler etc.) as identified during Material Investigation to conform to specification applicable in Pakistan. • Survey of material with topmost quality complying with material testing ASTM (American Society for Testing and Materials) and AASHTO (American Association of State Highways & Transportation Officials) latest edition.

Support Staff

S/No	Title	Professional Experience (years)	Qualification
1.	Quantity Surveyor	6	B.Sc. Civil Engineer
2.	Surveyor	6	(DAE Civil)
3.	Inspectors (Highways)	03	(B.Sc. Civil Engineer)
4.	Inspectors (Structures)	03	(B.Sc. Civil Engineer)
5.	Inspectors (QA/QC)	03	(B.Sc. Civil Engineer)
6.	AutoCAD Operator	5	(DAE Civil) with proven AutoCAD experience
7.	Quantity Surveyors	6	(DAE Civil)
8.	Lab Tech	03	(DAE Civil) Probably (B.Sc. Civil Engineer)
9.	Office Assistant	03	Bs. Sociology
10.	Computer Operators	5	Diploma in IT or equivalent
11.	Junior Engineer	02	(B.Sc. Civil Engineer) / DAE Civil

Jr. Engineers	*[40 Positions] [4 each for 10 Regions]*
Surveyors	*[120 Positions] [12 each for the 10 Regions]*
Quantity Surveyors	*[80 Positions] [8 each for the 10 Regions]*
Survey Helpers	*[160 Positions] [16 each for the 10 Regions]*
CAD Engineers / CAD Operators	*[100 Positions] [10 each for the 10 Regions]*
Secretary/ Computer Operator	*[20 Positions] [02 each for the 10 Regions]*
Office Assistants/ Document Controller	*[20 Positions] [02 each for the 10 Regions]*
Office Boy	*[30 Positions] [03 each for the 10 Regions]*
Security Guards	*[30 Positions] [03 each for the 10 Regions]*
Cook	*[10 Positions] [01 each for the 10 Regions]*
Office Manager	*[10 Positions] [01 each for the 10 Regions]*

- **Deliverables:**
  - Preparation of PC-1 following the government's format
  - Engineering Design Report including Cost Estimation and BOQs
  - Bidding Document(s)
  - Economic and Financial Analysis Report
  - Reports of the Surveys (Road Inventory and Pavement Condition Survey, Structure Condition Survey, Topographic Survey, Traffic Survey and Origin-Destination Survey (if required))

Documents

Documents	**No of Sets**
Tender Drawings	03 Sets
Construction Drawings	03 Sets
Bill of Quantities	03 Sets
Technical Specifications for each payable item Comprising of: - Description - Material Requirement - Construction Requirement/Method of Working (Techniques) - Equipment to be used - Testing and quality control - Method of measurement & payment	03 Sets
Tender/ Contract Documents Comprising of: - Invitation for Bid - Instruction to Bidder - Form of Contract - General Conditions of Contract (GCC) - Particular Conditions of Contract (PCC) - Rate Analysis of Non-Schedule Items - Bill of Quantities	03 Sets
PC-1 Proforma including: - Engineer's cost Estimate - Geo Technical Investigation - Hydrology and Hydraulic study report - Economic analysis - Traffic study report - Pavement design report	03 Sets
Detailed Cost Estimate for Technical Sanction	03 Sets
Design Calculation for Road Pavement and Road Structure including analysis	03 Sets
Land Acquisition Plan showing boundaries of land to be acquired for road construction. Identify separately the road with high development potential adjacent to the road	03 Sets
Back-up calculation of BOQs in MS-Excel or MS-Word	03 Sets
Soft copies of all documents mentioned above in relevant software file extension *[3 CDs / DVD each (along with USB)]*	03 Sets
The Consultant will frame and prepare PC-1 for the Project. The Consultant will be responsible to defend the design till the approval of the PC-1 from PDWP, CDWP / ECNEC.	03 Sets

- **Mode of Payment for Services**

"A" is the **Contract amount**, excluding of (i) Provisional Sum; (ii) Contingency; and (iii) Indirect Local Tax.

S/No	Activity	Percentage of "A"	Days
1	Inception Report / Pre-Feasibility Report	15%	35
2	Submission of Surveys *(Topographic Survey, Traffic Count, Soil Surveys, IRI Survey through Profilometer)*	30%	60
3	Draft Detailed Engineering Design, Material Quarry Report, Geotechnical Investigations Report	30%	45
4	Final Detailed Engineering Design with Cost Estimates, PC-I, Tender Drawings and Technical Specifications	15%	30
5	Bidding Documents and Construction Drawings	10%	10
Total		**100%**	**180**

Upon submission of Draft Reports, 70% 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.

Terms of Reference

CONSULTANCY SERVICES
FOR
PHASE-2: CONSTRUCTION SUPERVISION & CONTRACT ADMINISTRATION OF WORKS UNDER KHYBER PAKHTUNKHWA RURAL ACCESSIBILITY PROJECT (KP-RAP)

1. BACKGROUND:

1.1 *In order to provide all weather improved road facilities, the provincial government has decided to launch the proposed project of Khyber Pakhtunkhwa Rural Accessibility Project (KP-RAP) with the assistance of the World Bank which includes the following major components:*

(i) ***Provision of the Rural Road Network:*** *The proposed road network is to be provided through out across the province including Newly Merged Districts as well as improvement of the existing roads of the rural areas through Resilient Access.*

(ii) ***Improvement of the Transport and Logistic Services.*** *Through this component the bus services and cold chain management is to be improved.*

(iii) ***Project Management & Institutional Strengthening.*** *This component is aimed to provide technical assistance to the concerned government departments and to cover administrative and operational related to the proper implementation and monitoring of the KP-RAP as well as the costs of the Feasibility Study & Detailed Engineering Design and Construction Supervision of the Consultants.*

1.2 *The Government of Khyber Pakhtunkhwa has received financing from the World Bank to finance the development of the Khyber Pakhtunkhwa Rural Accessibility Project (KP-RAP). The primary objective of the Project is the improvement of resilience, rehabilitation and maintenance of selected rural roads across the province, including the Newly Merged Districts (NMDs). The improvement of existing roads would be selected based on geo-spatial analysis focused on improving accessibility to education, health and market facilities and climate change risks considerations. This will include new rural roads, rehabilitation of paved roads (asphaltic and concrete, etc.) and upgradation from unpaved (gravel, earthen etc.) to paved roads and routine maintenance of unpaved and paved roads within the existing right of way. Improvement will include resilience measures, including but not limited to route realignments to avoid areas with slopes / hydraulic sections vulnerable to climate risks, enhanced slope protection and drainage structures, changes in design standards for pavements that reflects a higher level of climate resilience, and a decision to seal previously gravel roads for climate resilience. In addition, the component will include the introduction of new and green technics to mitigate rainfalls and high temperatures. The loan will also finance road safety infrastructure for safe walking and cycling environment to and from schools. The project will consult female commuters on design and implementation of safety and anti-harassment features in infrastructure. A Gender Based Violence (GBV) action plan will be implemented to prevent/ mitigate this risk in construction activities.*

1.3 *The Communication and Works Department (C&WD) Khyber Pakhtunkhwa will be the Executing Agency and the Project Implementation Unit (PIU) under C&WD will be the Implementation Agency, which has already been established with the Project Director "PD" (Employer's Representative) as the head. C&WD requires the services of Construction Supervision Consultants to carry out the design cognizance, contract administration, implementation & monitoring of environmental management plans and social safeguard plans, and construction supervision where required.*

1.4 *The Consultant will perform the duties of* ***The Engineer*** *specified in the FIDIC conditions of contract and will be required to nominate Resident Engineers for the contract(s) who will be full-time residents in the areas or located in the proximity of project areas. In case other form of contract is applicable, the supervisory consultant will perform the duties assigned under the contract accordingly. In addition to the primary role, the Consultants will assist the Employer in the efficient administration and implementation of the sub-projects, support and strengthen it in its tasks, monitor progress, financial management, social, design review problems during construction (if arised) and environmental safeguards and gender mainstreaming in the project. The Consultant will report to the Project Director, Client (the concerned Chief Engineer as head of procuring agency). The Consultant will work under the overall guidance, coordination, and directions of the PD.*

2. Objective

The overall objectives of the services are to:

a. Ensure that the detailed engineering design is reviewed, and updated if required, in accordance with the specified parameters / standards and best international practices prior to implementation of civil works contracts.

b. Ensure that high quality construction is achieved in time within budget and that all work is carried out in full compliance with the approved engineering designs, technical specifications, agreed work schedule, and within the terms and conditions of all other contract documents and sound engineering practices.

c. Demonstrate the efficacy of contract administration and supervision by independent external agencies.

d. Ensure safeguards management of projects i.e., updating, and implementation of the LARPs, and incorporating EMPs in the works contracts, preparation, and implementation of site-specific EMPs which are fully consistent with the Bank's safeguards requirements. Monitor and evaluate the implementation of environmental management plan, resettlement plan and other social safeguard measures to be taken by the contractor and Employer.

e. Promote technology transfer and the introduction of modern Contract Administration practices within transport sector.

3. Scope of Consultancy Services

3.1 *General Duties and Responsibilities of the Consultants are:*

- The Consultants will carry out a critical review (if required) of the detailed engineering design prior to the commencement of works to identify anomalies or omissions that constitutes inconsistency in the design and completeness of works. The design report (if required)

should clearly indicate if any section of the road requires adjustment in the horizontal and vertical alignment, changes to the structures and identify the LARP and non LARP areas. On completion of the review, the Consultant will prepare a report, setting out all findings and recommendations for correcting any deficiency or omissions identified. Notwithstanding these, the Consultant will immediately inform the employer of any deficiency or omission that may have a substantial impact on the Project at the time the defect or omission is uncovered.

- Civil works will be carried out based on the FIDIC Conditions of Contract for Construction, 2nd Edition – 2017 or Pakistan Engineering Council (PEC) Standard Conditions of Contract or any Government approved form of contract / conditions of contract. The consultant will administer the civil work's contracts, make engineering decisions, be responsible for quality assurance, provide general guidance and furnish timely responses to the contractors in all matters relating to the civil works, and ensure that all clauses of the contract agreement between the civil works contractors and PIU are adhered to and respected; and
- The consultants will advise PIU on all matters relating to the efficient and successful execution of the civil works contracts, and will act at all times to protect the interests of the project and will take all reasonable steps to keep the construction costs to a minimum, consistent with sound economic and engineering practices; and prior to execution work, will prepare a "Contract Administration and Construction Supervision Manual" outlining routines and standard operating procedures to be applied in contract administration and construction supervision, based on sound internationally recognized practice, NHA / C&WD specifications and civil work contract of the project.

3.2 Contract Administration & Construction Supervision:

The scope of construction supervision and contract administration services of the Consultant shall include but will not be limited to the following tasks/functions /duties /responsibilities. For the purpose of facilitation, the tasks, functions/ duties/ responsibilities of the consultant are being divided into groups/stages, but some duties/functions overlap to other groups/stages, therefore, the consultant shall not be relieved from its functions/ duties/ responsibilities if it falls in other group/stage or overlaps to other group/stage.

A- PRE-EXECUTION

a. Manual, Documents & Procedures

- Prepare Construction Supervision Manual and get its approval from the Client 15 days prior to execution of work.
- Prepare Contract Administration Manual and get its approval from the Client 15 days prior to execution of work.
- Prepare Self-Evaluation System in accordance with ISO 9001: 2015.
- Prepare Standard Operating Procedures ("SOPs") for Pre-Requisite to Payment Certificate.

b. Design Review / Cognizance

- Consultant will leave no fault or discrepancy, which may cause for delay of project during its execution.

- The consultant is responsible to check survey data provided in the road design (CPs, benchmarks and random locations to verify the survey).
- To verify the data used in design process by the design consultant.
- Consultant shall perform the design review / cognizance prior to mobilization of the contractors.

c. Quality Assurance

- Prepare Project Quality Plan (PQP) and Inspection and Test Plan linked with the specifications.
- Prepare Mock-up Programme and its implementation report.
- Update online Running Distance ("RD") wise Check request management system, wherein upload check request / test results with evidence of photographs and video clips, if non-conformance, repeat check request.

d. Value Engineering

- Assist the Employer in evaluating the value engineering proposals during contract execution, in line with the provisions of value engineering in the FIDIC or similar conditions of contracts.

e. Management

- Prepare the Pre-Construction meeting agenda, and conduct the Pre-construction meeting, record, and distribute the minutes.
- Appoint various members of the Engineer's construction supervision team as the Engineer's Assistants (Resident Engineers, Material Engineers, Inspectors, etc.) and notify the Contractor and the Employer, and approve the Contractor's Representative.
- Verify whether the Performance Security complies with the form provided in the Contract, whether it is in the correct amount and currencies, and notify the Employer accordingly.
- Verify whether the bank guarantee for advance payment is in the form specified under the Contract and in the amount and currencies stated in the Particular Conditions of the Contract.

f. Survey

- Obtain the benchmarks and other information from the design consultant experts / C&WD (if required) for review of survey work by the designer prior to commencement of construction activities.
- Consultant will establish suitable number of permanent benchmarks and base stations at suitable place & point preferably at employer's subordinate office or estate building in each corridor by using Differential Global Positioning System ("DGPS") duly verified by the employer's representative.
- The supervisory consultant is responsible for joint survey prior to execution of earthwork with the designer representative, contractor representative and employer representative/Deputy Director Construction Client.
- Inform the employer promptly regarding any variation from the basic survey data received from the design consultant.
- All levels and references will be referred to permanent benchmarks.

- Establish a system for validation of data both levels and RD's through Real Time Kinematic Positioning ("RTK") Rover and DGPS, by employer or 3rd party.

B- DURING EXECUTION

a. Contract Administration

- The Engineer will make sure that all Conditions of Contract are fulfilled.
- Issue instruction to the Contractor to commence the works and record the Parties agreement according to the Conditions of Contract.
- Request the Contractor to top up the performance security if consumed partially or fully as per condition of contract or increased with the increment of contract price and monitor the validity of the Performance Security until the issue of the Performance Certificate.
- Verify whether the bank guarantee for advance payment conforms to the Contract requirements and that the guarantee is valid until the entire advance payment is recovered from the Contractor's payment certificates.
- Interpret the specific provisions of the Contract related to the Employer's obligation to give possession of the Site, and the Contractor's Work Program, assess the contractual consequences of any specific land acquisition issue and advise the Employer on the appropriate mitigation measures.
- If required, determine the Contractor's entitlements to time extensions on the basis of the Contractor's Work Program.
- Determine Delay Damages on the basis of the Work Program and advise the Employer of the relevant contractual remedies if the Contractor's progress is behind schedule.
- Verify the sources of indices or prices for price adjustment determine a provisional value of an index/reference price until it is published, but, if the index is not published in certain period(s), apply the last available published value.
- Initiate and process variations promptly when it is necessary for the additional construction of the works.
- Request the Contractor's technical and cost proposal, prior to its determination, as required, consult both parties in all matters in connection to variation work.
- Value variations obtain the Employer's approval of any variation, issue variations under the Contract, keep record of all variations issued under the Contract and report the summary of the variations in the Consultant's Monthly Progress Reports.
- Assess objectively the Contractor's claims and give professional and objective advice to the Employer, consult both parties before determining an extension of time.
- Extension of Time (EOT) – Determine Contractor's claims of EOT on the basis of the Contractor's approved Work Program, the impact of the delay(s) event on the Critical Path and the particulars submitted by the Contractor, and not to act as the Contractor's advisor in this matter.
- Maintain an Events Log since the beginning of Contract.
- Assist the parties establish Dispute Board (DB), provide all necessary information to DB members, and attempt to facilitate amicable settlement of the dispute between the Employer and the Contractor.

b. The Engineer Duties

- The Engineer has no authority to alter or amend the contract.
- Carry out any subsequent design changes, variation orders and day work orders.
- Obtain the Employer's specific approval before taking any action for determination of extension of time, additional costs and the Contractor's claims for additional time or costs, for all events for which the Employer's express approval is required under the Conditions of Contract.
- Review and approval of the work program
- Review the contractor work program with respect to the resources' efficiency such as equipment's efficiency, manpower efficiency and material supply chain and thereafter advise the contractor accordingly.
- Reviews the Contractor's Work Program and notify the Contractor if the program does not comply with the Contract and advising the contractor to co-opt with the contractual timelines accordingly.
- Monitor the progress against the Work Program and the cash flow estimate and request revisions, if required.
- Conduct regular weekly site meetings and monthly progress review meetings, record and distribute the minutes.
- Assess minimum construction equipment, plant and machinery requirements, by type and specification, and monitor, keep and regularly update a list of the Contractors' equipment, plant and machinery in order to keep a check on the Contractors' mobilization. Inspect and evaluate the Contractor's establishments including in particular the laboratory facilities to ensure compliance with the terms and conditions of the Contract.
- Keep and maintain daily records of labor, equipment and weather conditions on the site along with records of activity, progress and other events happening on the site having relevance to the works.

c. Inspection, Monitoring & Evaluation (IM&E)

Inspite of the following activities of the supervisory consultant the client may hire the 3rd party IT based Monitoring & Evaluation by developing Mobile App for prompt data sheet information sharing mechanism.

- Ensure that the Contractors have all necessary data for setting out and check the Contractors setting out including staking the right-of-way limits, centreline, and grade and confirm permanent monuments in the construction area.
- Dealing with site issues expeditiously to avoid delay, issuing supplementary drawings working drawings, issuing site instructions to ensure that the works are executed in accordance with Contract/ specifications/ standards.
- Adhere to the check request disposal within timelines as specified in the check request management system.
- Without relieving the Contractors of their obligations under the Contract, check and approve the contractors' Working Drawings, Shop Drawings, and Method Statements and Temporary Works proposals.
- Verify whether the progress charts in the Contractor's Monthly Progress Report reflect the actual progress and correspond to the

latest revision of the Work Program and the cash flow estimate, and instruct the Contractor to correct the report, if required.

- Verify the Contractor's Monthly Progress Reports and notify the Contractor of any incorrect or inconsistent information.
- Daily data updating on the "Real Time Monitoring and Financial Management Portal", upon excess provided by the employer.
- Undertake project performance monitoring and evaluation in accordance with the Project Framework and Bank's Project Performance Management System (PPMS) Handbook including the baseline data survey and the following annual survey and reporting up to project completion.
- All activities in terms of volume will be duly verified by getting levels from benchmarks through DGPS surveys.
- Consultant will be responsible for uploading on daily basis the activities of contractors on monitoring dashboard including but not limited to the following:
  - Levels reading.
  - Tests performed with pictorial / video clip evidence.
  - Physical progress with location & pictorial evidence.

d. Payment

- Perform quantity take-offs from drawings to verify Bill of Quantities (BOQs).
- Issue regular notices to the Contractors of intended field measurements, measure the Works, compute the quantities for payment, and determine the amounts due to the Contractor within the period specified in the Contract.
- Establish and maintain throughout the works contracts a structured system of measurement records, supporting documents and calculations for the payment of all BOQs items, that is transparent for auditing purposes.
- Establish with the Contractor a standard format for the Contractor's Statement and the Interim Payment Certificates.
- Issue the interim certificates to PIU for payment to the Contractors in accordance with Conditions of Contract, having regard to any contractual provisions for advance payment, variation of price, and exchange rate fluctuation etc. Certify the completion of the Activities/Works or parts thereof and process final payments to the Contractors.
- Prepare and maintain the Estimates of Cost of Works to Completion continuously, update the Estimates after each Variation instruction or a Variation Order issue and after each Interim Payment Certificate (IPC), and present the latest Estimate in the Consultant's Monthly Progress Reports.

e. Quality Assurance and Quality Control (QA/QC)

- Discharge fully the Engineer's obligations with respect to approval of materials and workmanship, approval and auditing of the Contractor's Quality Assurance System and the QA Personnel and the compliance testing by the Engineer.

- Inspect quarries and borrow pits, and crushing plants, and order tests of materials and ensure adherence to specifications and approve the sources of materials.
- Without relieving the Contractors of their obligations under the Contract, monitor the Contractors' laboratory testing, evaluate the Portland cement concrete and bituminous mixture designs prepared by the Contractors, and recommend improvements (if any) to ensure the desired performance, and accord approval thereof.
- Carry out independent testing in the field and/or in the laboratory of the "Engineer/Project Manager" and approve or disapprove and certify the works that conform with the specifications and maintain permanent records of results of all the tests made along with all Check Requests.
- Suggest / approve Job Mix Formula ("JMF") for Asphalt Concrete Layers in consultation with the PIU or PIU representative.
- Give notice to Contractors of any defects and deficiencies, and issue instructions for the removal and substitution of the improper works, where provided under the contract. If required, order suspension of the work(s) and/or recommend to PIU other recourse available under the Contract.

f. Insurance

- Verify whether the form and substance of the evidence of the Contractor's insurances is satisfactory, whether insurance premiums have been paid and the required insurances are effective on the dates required by the Contract.
- Verify that the terms of the Contractor's insurance policies fully comply with the requirements of the Contract including:
  - whether both the Employer and the Contractor are adequately covered as insured Principals.
  - amounts insured and currencies of payment, validity of the insurance policies, special conditions.
  - limits of insurance per event and in aggregate, deductibles, excess, conditions related to locations; and
  - Whether and which subcontractors are covered by the insurances, and whether additional insurances will be required if the Contractor engages new subcontractors.
- Monitor whether the Contractor maintains adequate insurance in the course of performance of the Contract, particularly if the Contractor provides insurances for a fixed period which is shorter than the period required under the Contract.
- Advise the Employer on the appropriate action and contractual remedies in case the Contractor does not perform its insurance obligations in accordance with Contract.

g. Reporting

- Submit semi-annual reports during construction and annual reports thereafter with separate environmental and social Safeguards Monitoring Reports to the Bank and disclose relevant information from such reports to affected people promptly upon submission.
- Report any actual or potential breach of compliance with the measures and requirements set forth in the Environmental and Social

Management Plan ("EMP"), the Site Specific Environmental and Social Management Plan ("SSEMP") or the Land Acquisition and Resettlement Plan ("LARP") promptly after becoming aware of the breach. Provide C&WD with a written notice of any unanticipated environmental, or resettlement or indigenous peoples risks or impacts that arise during construction, implementation or operation of the Project that were not considered in the Environmental Impact Assessment ("EIA"), the EMP, the SSEMP or the LARP.

- Report in the Consultant's Monthly Report the work progress against the Contractor's Work Program and the cash flow estimate.
- Prepare standard Daily Diary forms and ensure that all supervision staff maintain daily diaries of Contractor's and its own activities.
- Regularly monitor and report on the results indicators during the construction period following the schedule of Project reports

h. Environment, Social, Health and Safety (ESHS)

- Without relieving the Contractors of their obligations under the Contract, review and approve the traffic management and safety plan, and ensure compliance such that the Works are carried out at all times in a safe and secure manner and damage or injury to persons or property is avoided.
- If any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project that were not considered in the EIA, the CEIA, the EMP, the SSEMP or the LARP, promptly inform the Bank of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan.
- Carry out the following duties related to environmental management with particular reference to the technical requirements of sound environmental standards on the basis of the Environmental Assessment and Review Framework (EARF), the Initial Environmental Examinations (IEEs), and the Environmental Management Plans during construction: (i) review and endorse site specific Environmental Management Plans (EMPs) for the projects sections, prepared by the Contractors; (ii) ensure that all the environmental mitigation measures required to be implemented are incorporated into the contract documents; (iii) ensure that the Contractors comply with the measures and requirements relevant to the contractors set forth in each IEE and EMP, and any corrective or preventative actions set out in Environment Monitoring Reports; (iv) conduct environmental monitoring and ensure that the day-to-day construction activities are carried out in an environmentally sound and sustainable manner; (v) prepare and submit semi-annual environmental monitoring reports on the implementation of the 'Environmental Management Plan (EMP) to PIU within 14 days after a completion of the monitoring period; (vi) Prepare additional environmental impact assessments, if required, compliant with World Bank's Environment and Social Safeguards policies and ensure that all required mitigation measures are identified and acceptable in accordance with the KP EPA in addition to the requirement of the Bank; (vii) in the event of unanticipated environmental and/or social risks and impacts, that were not considered in the applicable IEE, or EMP, promptly inform PIU and the Bank of the occurrence of such risks or impacts, with detailed

description of the event and proposed corrective action plan; (viii) report to the Bank/PIU of any actual or potential breach of compliance with the measures and requirements set forth in the applicable EMP promptly after becoming aware of the breach.

- With respect to the prevention of COVID-19, HIV/AIDs and Human Trafficking, monitor that the contractors comply and carry out required actions as provided in the respective contract documents, such as awareness and education of laborers and workers.
- Ensure that the contractors do not involve child labor for the execution of the civil works contracts in accordance with the provisions of the contract agreement.
- Ensure that the Contractor(s) provide a safe workplace for their workforce, supervisory personnel and for members of the public requiring access through the sites in full conformity with Health and Safety regulations including the ones related to coronavirus disease (COVID-19).
- Ensure that the contractor(s) provide a safe workplace for their workforce, supervisory personnel and for members of the public requiring access through the sites in full conformity with Health and Safety regulations.
- Ensure that the contractor(s) comply fully with contractual obligations relating to care of the environment (both specified and legislated) and provide all reports and obtain all permits and permissions required in relation to spoil areas, borrow areas quarries and the like.
- Provide any other specialist services requested by PIU under conditions to be mutually agreed ensure that the construction methods as proposed by the contractor for carrying out the works are satisfactory, inspection of contractor's construction equipment; and safety of the works, property, personnel, and general public; the schedule of mitigation measures for adverse environmental impacts.
- Road Safety Awareness Program. The Construction Supervision Consultants will design road safety awareness campaigns for communities living along the project road and provide these to the Client for dissemination to the Construction Supervision Consultants.
- HIV/AIDs, COVID-19 and Human Trafficking Awareness Program. The civil works contractor will be required to design HIV/Aids, COVID-19 and Human Trafficking Awareness program, for the Consultant's review and approval. The Construction Supervision Consultants will facilitate and monitor implementation of the programs.
- The Contractor(s) will prepare and submit Health and Safety COVID-19 Management Plan, in accordance with Standard Operating Procedures (SOPs) issued by the Government of Pakistan from time to time on COVID-19 prevention and controls, and with international good practice guidelines [World Health Organization, Considerations for public health and social measures in the workplace in the context of COVID-19. Geneva. Available here: https://www.who.int/publications-detail/considerations-for-public-health-and-social-measures-in-the-workplace-in-the-context-of-covid-19.]. The Contractor(s) should demonstrate in the Plan the health and safety measures they will put in place on site in relation to COVID-19 prevention and controls, including but not limited to, PPE requirements, site set up, training, induction and mobilization of new personnel, equipment and plants cleaning and other hazard

management measures while undertaking site work activities, site visitors health and safety protocols, as well as the approach to the monitoring and reporting of the Plan. The Plan should be fit for purpose for the particular construction works of this contract and be aligned with Standard Operating Procedures (SOPs) issued by the Government of Pakistan from time to time on COVID-19 prevention and controls, as well as workplace safety requirements, with international good practice guidelines [World Health Organization, Considerations for public health and social measures in the workplace in the context of COVID-19. Geneva. Available here: *https://www.who.int/publications-detail/considerations-for-public-health-and-social-measures-in-the-workplace-in-the-context-of-covid-19].* The Construction Supervision Consultant will review and monitor that the approved Health and Safety COVID-19 Management Plan should be adopted and complied by the labors and others involved in the construction of the subprojects and also the staffs of the Construction Supervision Consultant should adopt the same for their own safety.

- The consultant will be responsible for their own health and safety in relation to this assignment and shall comply with the country specific requirements and regulations in relation to COVID-19.
- Review the Site-Specific Health and Safety Management Plan (SSHSMP) for the Project that is prepared and submitted by the Contractor. Then, make recommendation to the Employer in relation to the approval of the SSHSMP. Communicate the approved SSHSMP to all consultants and contractors throughout all project stages. Should any unforeseen events occur, review the updated SSHSMP and make recommendation to the Employer in relation to the approval of the SSHSMP.
- In addition to the obligation to maintain safety on site, the Construction Supervision Consultant will be required to undertake formal monthly safety audits throughout all stages of the Project.
- Prepare the Project Execution Plan, which inter alia, includes how management of SSHSMP is to be addressed throughout all stages of the Project.

i. LARP

- Ensure that all land and all rights-of-way required for the Project and all Project facilities are made available to the Works contractor in accordance with the schedule agreed under the related Works contract and all land acquisition and resettlement activities are implemented in compliance with (a) all applicable laws and regulations of the Borrower relating to land acquisition and involuntary resettlement; (b) the Involuntary Resettlement Safeguards; and (c) all measures and requirements set forth in the LARP, and any corrective or preventative actions plan set forth in a Safeguards Monitoring Report.
- Assist the PIU in notifying the contractors on LAR and non-LAR sections and ensuring that works are conducted only in LAR-free areas and areas where LARP implementation has been completed.

j. Records

- Establish and maintain an effective documents management system in the Engineer's office, which provides for separate filing of incoming

and outgoing correspondence and documents, as well as the filing by subject matter.

- Ensure the receipt of and maintain as permanent records of all warranties required under terms and conditions of the Contract for materials including their source and equipment accepted and incorporated in the project.

k. Capacity Building

- Develop training programs for EA staff and develop on the job training on innovative construction methods, project management and value engineering.

l. Indemnification

- For any laps in design review, quality / workmanship, quantity, or financial irregularity related to the performance of the Consultancy Services and subsequently health of project works, the Consultants shall indemnify the Client.

m. Audit

- Provide all necessary assistance to the Employer and external auditors for conducting regular quarterly audits of the measurement records, supporting documents and calculations for the payment of all BOQ items.
- Assist C&WD for settlement of Audit Para's and objections raised, prepare replies related to project, and provide the entire relevant documents / papers / letters etc. to support the replies-until 1 year after completion of works. The cost to be incurred may be built in the rates/ Contract Price (no additional cost will be granted in this account).

n. Completion of Work

- When the works are completed in accordance with the Contract, issue a Taking over Certificate to the contractor(s).
- Consultant will perform test on completion along with pavement distress & IRI through laser Profilometer
- Undertake an inspection of the works at the completion of the respective road sections and certify the contractor(s)' final accounts or issue Punch List / defects to be rectified.

C- POST EXECUTION *(Defect Notification Period)*

- Carry out detailed inspections of the works after notice to engineer for final inspection and performance certificate.
- Prepare detailed recommendation reports / Punch List and improvement since last inspection, for the Employer after each inspection.
- Issue performance certificate and process final statement and final payment certificate thereafter.
- Regularly monitor and report on the results indicators during the DNP following the schedule of Project reports

D- PROJECT CLOSURE

- The consultant is responsible to prepare all reports to satisfy the requirements of the Bank as well as Government of Khyber Pakhtunkhwa.

E- GENERAL RESPONSIBILITY

- Advise PIU on need for effective liaison with local authorities, police, landowners, utility owners, complainants, the public and other organizations affected by the Works in order to minimize or avoid unnecessary delays or disputes.
  a. Based on the design data provided, prepare revised PC-Is (if required) for the project including economic analysis and Environmental Impact Assessment (EIA) on Proforma of PC-Is prescribed by Planning Commission.
  b. The Consultants will assist the Client with holding stakeholder outreach meetings in the project area to update local communities with project progress. Specific communications materials will be provided to community members in Urdu and English and other languages as appropriate, describing the project, relevant governing the Bank policies and procedures, benefit entitlements (for AP), grievance redress mechanism, HIV/AIDs, COVID-19, safe working conditions, etc. A basic tracking system will be maintained to record consultation activities, the provision of project information, to register concerns and/or complaints received, and to track follow-up action.

F- Consultant Performance Evaluation (CPE)

- To achieve Sustainable Performance Quality, the performance of the Consultant will be measured, evaluated, and controlled through CPE proforma. The CPE proforma will be designed keeping in view the ToR of the Consultant and will be improved time to time. This consultant performance evaluation proforma will be pre-requisite to consultant's monthly invoice.

4. Staffing and Deployment

Chief Resident Engineer / Team Leader will be mobilized in advance for a period of 02 months

i)	Design cognizance and preparation of manuals	= 02 months
ii)	Construction supervision period	= 12 to 30 months
iii)	Defect notification period	= 12 months
iv)	Project handing / taking over	= 02 months
v)	Project closure	= 02 months
vi)	**Total Duration of Assignment**	**= 48 months**

4.1 Staffing

The total person-months of key experts are 474 as detail provided in the table below. The construction supervision consultants are required to carry out design review / cognizance, construction supervision / contract administration, financial management, safeguard compliance, test on completion, taking over, statement at completion, project closure phase and issuance of performance certificate. The consultancy services would be required for a period of 48 months. The civil work will comprise of 10 regions.

4.2 Deployment

There will be ten "site supervision teams", for the supervision of entire roads under KP-RAP.

4.2.1 Project Management / Administration and Advisory Team

The consultant team will be responsible for project management, contract administration, troubleshooting and specifically for operation of Contract Management Plan (CPM) for each civil work contract. The CPM should include risk analysis and risk management plan, identifying resources, communication management, contract administration procedure, quality management, managing payments, record management, managing changes, claim & disputes and finally handling DNP and issuance of Performance Certificate and Project Closure procedure & requirement etc. The updated contract management reports should be satisfying the Bank as well as Government of KP requirements. The CPM should be prepared before signing of each civil work contract or within two months after the commencement of the consultant (as the case may be). The team will comprise on the following team members during supervisory phase.

Key Experts

- Chief Resident Engineer/Team Leader
- Senior Material Engineer
- Senior Contract Specialist
- Deputy Team Leader / Project Coordinator
- Resident Engineers

The team would be deployed in accordance with the in hand civil work contracts / lots. The number of staff could be varied while considering the quantum of work.

4.2.3 Staff Deployment

4.2.3.1 Design Cognizance / Review, Preparation for Supervisory & Contract Administration Manual

The Team Leader of the Consultants along with its design cognizance and document preparation team are expected to be full time and be mobilized at least two months in advance of the commencement of the works. The team will work from its office and expected to undertake design cognizance / review, preparation for supervisory & contract administration manual for all the civil work packages at a time and to assist PIU with activities leading up to mobilization of the Contractors.

4.2.3.2 Project Site Supervisory Team

The supervisory team is expected to mobilize at the project site on the date of actual commencement of works by the contractors. The formulation of the team is proposed in para 4.2.1 and 4.2.2 above. The team will continuously work up to issuance of *"taking over certificate"* to the contractor and continue with the minimum required team *(comprising of Team Leader, Resident Engineer, Material Engineer, Quantity Surveyor, Surveyor and Site Inspector etc to be agreed with the Client)* up to the issuance of *"statement at completion"*.

4.2.3.3 Defect Notification Period (DNP)

After issuance of "Statement of Completion" of a certain lot / civil contract, the consultant team will be demobilized except team leader and some skeletal staff as mentioned under Para 4.2.3.2 above. The staff will work intermittently during the DNP. The PIU field staff (concerned Deputy Director (Construction) and its team) will support the team leader during

the Defect Notification Period (DNP). One month prior to expiry of DNP, the minimum required consultant team will be mobilized on the project site for inspection and getting completion of outstanding work and remedying defects and contract administration; accordingly, on intermittent period. The contractor will get approval of staff deployment schedule by the Project Director, PIU.

4.2.3.5 Project Closure Team

It is expected that the team will provide complete deliverables for all civil work contracts in given time frame (intermittently). It is planned that this team is capable to handle all subprojects simultaneously. However, the consultant is required to get approval of deployment plan prior to mobilization of the team.

The general instructions for deployment of staff are as under:

- Consultant will submit staff deployment schedule every month for the period of next two months.
- This deployment schedule will be pre-requisite to consultant monthly invoice.
- Client is entitled to amend the deployment schedule and can demobilize the surplus staff any time.
- For deployment of staff provided on intermittent period, the consultant is required to provide deliverable with timeline as justification of deployment schedule, prior to mobilization of staff.
- After completion of each phase of every lot, the surplus staff will be shifted to other lots where shortage of staff occurs or demobilize the surplus staff.
- The PIU will conduct consultant performance evaluation every month, for its Personnel's as well as performance of the team / firm. The consultant shall replace the low rated Personnel with the suitable and qualified ones, by the approval of the PIU.
- The consultant required to get attendance certification of deployed team on the certain month from the concerned Deputy Director (Construction) of PIU for field staff and from PIU representative for the rest of the staff.

The tentative complete supervisory team for all ten lots is as below:

S/No	Name of Position	Position	Person-Months	Total Person-Months
A	**Key-Experts**			
1	Chief Resident Engineer/Team Leader	1	30	30
2	Senior Material Engineer	1	18	18
3	Senior Contract Specialist	1	24	24
4	Deputy Team Leader / Project Coordinator	1	42	42
5	Resident Engineers	10	36	360
	Total (A)	**14**	**150**	**474**

**Station at PIU and work with the concerned Deputy Director as per instruction of the Project Director, PIU.*

S/No	Name of Position	Position	Person-Months	Total Person-Months
C	**Non-Key Experts**			

S/No	Name of Position	Position	Person-Months	Total Person-Months
1	Contract Specialist	2	24	48
2	Environmental Specialist	2	24	48
3	Resettlement Specialist	2	24	48
4	Pavement Design Engineer	1	4	4
5	Geometric Highway Design Engineer	1	4	4
6	Structure / Bridge Design Engineer	1	4	4
7	Hydrologist/Drainage Engineer	1	4	4
8	Geotechnical Engineer	1	4	4
9	Social / Gender Expert	1	4	4
10	Traffic / Road Safety Expert	1	4	4
11	Architect / Landscape Architect	1	12	12
	Sub-Total (B)	**14**	**112**	**184**

POSITION BASED TERMS OF REFERENCE AND QUALIFICATIONS:

KEY EXPERTS

1. Title: Chief Resident Engineer (CRE) / Team Leader

Experience:
15 years' experience as Resident Engineer and 10 years as Chief Resident Engineer / Team Leader on major road projects. Preferably minimum 5 years having International Experience.

Qualification:
Bachelor's degree in Civil Engineering and registration with Pakistan Engineering Council as Professional Engineer – preferably master's in civil engineering / Highway Engineering / Transportation Engineering / Construction Management / Project Management or equivalent.

Responsibilities:
Overall responsibility for the organization, conduct and delivery of consultancy services and reporting to Client. The CRE / Team Leader will head the Consultants' team and will work directly to manage the project and will maintain liaison with Client.
Responsibilities of the CRE / Team Leader will include, but is not limited to the following:

- The CRE/Team Leader is responsible to ensure compliance of all ToRs as prescribed in the para 3.2 of the ToRs and all deliverables and reports specified in the reporting requirements.
- Assist the PIU in Project implementation.
- Assume full responsibility for the consulting team and performance of services under the consultancy contract.
- Review and update / improve the Contract Administration Manual yearly.
- As a mentor – make continuous improvement in team building through perpetual training programme.
- Ensure that the consulting team undertakes comprehensive review of the designs and specifications which were prepared by the design consultant.
- Ensure that the consulting team undertakes comprehensive construction supervision and contract administration of the civil works.
- Oversee the consultants' activities ensuring compliance to details provided in the construction drawings and strict adherence to construction specifications.
- Oversee and supervise construction of works in accordance with details provided in the construction drawings ensuring strict adherence to construction specifications.
- Ensure preparation of detailed and quantitative progress reports to support the contractor's requests for progress payments.
- Keep the Employer informed of technical issues and progress of all works both by informal and formal meetings and correspondence and assist in any project issue which the Employer may require.
- Participate in the Dispute Board meetings to explain and discuss issues raised by the Contractor/Employer or dispute board.
- Ensure implementation of environment and social safeguards requirements.

- Assist the Employer in preparing responses to audit objections and queries of the financiers or other Government Authorities.
- Coordinate with all concerned Employer's organizations on project issues.
- At the end of the construction activities, guide and ensure that the team prepares a comprehensive Construction Completion Report inclusive of "as-built drawings" as appropriate.
- Perform any other tasks / assignment that may be assigned by PIU or the Bank.

2. Title: Senior Material Engineer

Experience:
12 years' experience as Material Engineer on major road projects. Preferably two years' experience of asphalt concrete mix design in countries having similar climate condition and/or truck over loading problems like Pakistan

Qualification:
Bachelor's degree preferably master's in civil engineering / Engineering Geology or equivalent

Responsibilities:
He /She will be responsible to stipulate material testing procedures and specifications, make suitable recommendations regarding the borrows and query areas for construction materials, prepare JMF and responsible for preparation and testing of concrete mixes of different design mix grades using suitable materials (binders, aggregates, sand filler etc.) as identified during material investigation to confirm specifications applicable in Pakistan

Qualified Civil Engineer holding bachelor's degree or higher with at least 15-year experience of working in the similar capacity on road construction projects. Material Engineer will assist the CRE/TL and will be responsible for quality of material used in construction by performing field and laboratory tests and certifying their acceptance based on his/her recommended specifications for the materials.

Responsibilities of the Material Engineer will include, but is not limited to the following:
- Stipulate Material Testing Procedures and Specifications.
- Identify sources of materials, quarry sites and borrow areas.
- Confirm the suitability and availability of material in the borrow pits and quarries for pavement.
- If required, identify, and evaluate additional sources of materials.
- Undertake field and laboratory testing of the materials to determine their suitability for various components of the work.
- Prepare mass haul diagram for haulage purposes giving quarry charts indicating the location of selected borrow areas, quarries, and the respective estimated quantities.
- Make suitable recommendations regarding making good the borrow and quarry areas after the exploitation of materials for construction of works.
- Be responsible for Material Testing and specification and certification of material quality.

- Preparation and testing of concrete mixes of different design mix grades using suitable materials (binders, aggregates, sand filler etc.) as identified during Material Investigation to conform to specification applicable in Pakistan; and
- Preparation of JMF.

---

3. Title: Senior Contract Specialist

Experience:
15 years' experience in procurement and/or contract administration. Experience in project procurement and contract administration in 05 infrastructure and similar nature projects on FIDIC conditions of contracts. Well versed in GoP and World Bank (WB) Procurement Regulations. Well versed knowledge of evaluation of bids and bid evaluation report. Excellent written and spoken communication skills in English and working experience in the Khyber Pakhtunkhwa region will be considered favorably. Experience with World Bank and other IFIs will be preferred.

Qualification:
Bachelor's degree with a major in Civil Engineering, law, contracts, purchasing, or management – preferably master's degree in Civil Engineering, law, contracts / procurement, or equivalent.

Responsibilities:
He/she will be responsible for assistance in contract administration of works contracts, taking timely contractual actions related to cost, time and quality controls and closure of the contracts, and in case of dispute its referral to the adjudication and arbitration in case of dispute.

15 years' experience in civil works contracts, procurement and management. Experience and knowledge of World Bank (WB) Procurement Regulations and procurement procedures is essential. He/she will be responsible for assisting the Client and Team Leader in all the activities pertaining to procurement and contract management of civil works contracts, early warning of key contractual actions, schedule and document contract management meetings and evaluating / resolving contractor's claims and contractual disputes.

---

4. Title: Deputy Team Leader

Experience:
15 years' experience as Deputy Team Leader / SRE on major road projects.

Qualification:
Bachelor's degree in Civil Engineering and registration with Pakistan Engineering Council as Professional Engineer - preferably master's in civil engineering / Highway Engineering / Transportation Engineering / Construction Management / Project Management or equivalent.

Responsibilities:

Responsible for construction supervision and ensuring that the project is implemented in accordance with the required specifications and approved drawings. Assist Team Leader for issues relating to Highway Geometry etc. when required.

Responsibilities of the Deputy Team Leader/ SRE will include, but are not limited to the following:

- The Deputy Team Leader / Coordinator is responsible to assist CRE/Team Leader for compliance of all ToRs as prescribed in the para 3.2 of the ToRs and all deliverables and reports specified in the reporting requirements.
- Prepare/draft PMP, PQP, ITP, review & update/improve "Construction Supervision Manual" yearly.
- Review PMP, PQP and ITP of the contractor and approve with the consent of employer.
- Update data on "Real Time Monitoring & Financial Management Portal" regularly.
- Report any event may cause for EOT/Variation in Qty/Additional Payment under the contract.
- Inform promptly if found any variation (addition/reduction) from the quantities provided in the engineering estimate/BOQ/contractor's agreement/contract in result of joint survey/existing condition of road/design Review / cognizance etc.
- Certifying that all pre-requisite documents/data to the IPC/EPC/Claim have been appended with the contractor invoice, such as built drawings, backup, calculation of quantities (x-section etc), quality record (RD wise passed check requests) etc.
- Certifying on the invoice that there is no over payment and that the works have been executed strictly in accordance with the approved design / drawings / specifications.
- Review/prepare working drawings with respect to geometric design/approves the shop drawings, as-built drawings supporting will all setting-out data, recording hard and soft copy of the project and providing the same to the PIU.
- Act as the Team Leader during the absence of Team Leader.
- Assist the Team leader in ensuring that the consulting team undertakes comprehensive design Review / cognizance and specifications and carries out construction supervision and contract administration of the civil works for the Project assuming the role of "the Engineer" and undertake all tasks as defined under FIDIC General Conditions of Contract for Construction.
- Assist the team leader in overseeing the consultants' activities ensuring compliance to detail provided in the construction drawings and strict adherence to construction specifications.
- Assist the Team Leader in overseeing quality control methodology put in place, confirming its adequacy, & ensuring that its employment is satisfactorily carried out.
- Render necessary advice and assist the Team leader in contract administration and procurement issues/assignments/contractual claims.
- Assist the Team Leader in resolving any contractual issues.
- Determine extension of time for completion and other claims in accordance with the conditions of contract in consultation with the CRE / Team Leader.
- Provide technical assistance to the Employer in dispute resolution as per provisions in the conditions of contract.
- Assist the Team Leader in keeping the Employer informed of contractual and claims issues by direct contacts and through discussions or correspondence.
- Assist the CRE/Team Leader in holding meetings with the Contractor on contract and claims issues.

- Assist the team leader in preparing a comprehensive Project Completion Report (PCR) and any other duty/ assignment the Team Leader may entrust.
- Perform any other tasks / assignment that may be assigned by CSC, PIU or the Bank.

5. Title: Resident Engineer (RE)

Experience:
12 years' experience as Resident Engineer on Highways or major road projects.

Qualification:
Bachelor's degree in Civil Engineering and registration with Pakistan Engineering Council as Professional Engineer – preferably master's in civil engineering / Highway Engineering / Structure Engineering / Transportation Engineering / Construction Management / Project Management or equivalent.

Responsibilities:
RE will be responsible for construction supervision of the road and ensuring that the subject project is implemented in accordance with the required specification and approved drawings.

He will be responsible for construction supervision and review and approval of contractor's bills. RE will assist the Deputy Team Leader / Coordinator in the performance of his tasks. The main responsibilities of the position will include but not limited to the following:

- Inspect the site and collect the condition data for the design Review / cognizance and necessary changes if any.
- Perform joint land survey with contractor representative, design consultant surveyor and PIU representative prior to execution of work.
- Preparation of technical details such as specifications and estimates.
- Provide details about existing pavement, damages, and assessment.
- Inform promptly if found any variation (addition/reduction) from the quantities provided in the engineering estimate/BOQ/contractor's agreement/contract in result of joint survey/existing condition of road/ design Review / cognizance etc.
- Review/prepare working drawings with respect to geometric design/approves the shop drawings, as-built drawings supporting will all setting-out data, recording hard and soft copy of the project and providing the same to the PIU.
- Assist the Deputy Team Leader / Coordinator and recommend approval of contractor's work program, method statements, material sources, etc.
- Assist the Deputy Team Leader / Coordinator in preparing and issuing reports as defined subsequently.
- Review and recommend approval and/or issuing working drawings/shop drawings, approval of the setting out of the works, and instruction to the contractor.
- Taking measurements and keep measurement records.
- Maintaining records, correspondence, and diaries, maintenance of quality record including photographs, video clips showing location/RDs.
- Certifying work volume and recommending interim payment certificates.
- Assist in maintaining consolidated project accounts and preparing of financial statements and withdrawal applications for submission to the Bank.

- Provide feedback to the Deputy Team Leader / Coordinator on the certification of completion of part or all of the works.
- Processing the contractor's possible claims.
- Ensuring minimum disruption/damage to the environment by approval of contractors' work statement/methodology, including monitoring the impact of construction works on the environment and local settlements and providing information to PIU and the Bank on the monthly progress reports.
- Certifying that all pre-requisite documents/data to the IPC/EPC/Claim have been appended with the contractor invoice, such as built drawings, backup, calculation of quantities (x-section etc.), quality record (RD wise passed check requests) etc.
- Certifying on the invoice that there is no over payment and that the works have been executed strictly in accordance with the approved design / drawings / specifications.
- Providing the employer with complete records and reports and approves the contractors' as - built drawings for the works.
- Assist in the compilation of a Project completion report data, providing details of Project implementation, problems encountered, and solutions adopted, and detailing and explaining any variation in Project costs and implementation schedules from the original estimates.
- Perform any other tasks / assignment that may be assigned by CSC, PIU or the Bank.

NON-KEY EXPERTS (NATIONAL EXPERIENCE)

1. Title: Contract Specialist

Experience:
12 years' experience as Procurement/ Contract Specialist on major road projects based on FIDIC conditions of contract, Experience, and knowledge of the Bank's procurement procedures is essential. Proven credentials in contract administration, evaluating contractor's claims and dispute resolution; preferably having experience of preparing and interpreting of the procurement and contract documents besides making response on behalf of the Employer to settle Audit Para's.

Qualification:
Bachelor's degree in Civil Engineering and registration with Pakistan Engineering Council as Professional Engineer, law, contracts, purchasing, or management – preferably master's degree in Civil Engineering, law, contracts / procurement, or equivalent.

Responsibilities:
Responsible for assistance in procurement and contract administration, taking timely contractual actions related to cost, time and quality controls and closure of the contracts, and in case of dispute its referral to the adjudication and arbitration.

He/she will be responsible for assisting in all the activities pertaining to procurement and contract administration, early warning of key contractual actions, scheduling and documenting contract management meetings and evaluating/resolving contractor's claims and contractual disputes.

Responsibilities of the Contract Specialist will include, but not limited to the following:

- Assist Employer and TL in coordinating contract management and planning activities for the work package with Engineering, Project Controls and Construction.
- Assist to organize meetings for negotiating and resolving technical and contract completion issues.
- Assist Employer and TL in effect the timely distribution of reports and pertinent commercial information to and from Contractors in accordance with agreed schedule.
- Assist in schedule turnover meetings with Site Personnel, where required.
- Assist to check timesheets for contract conformance (rates, backup and extensions).
- Assist in review of Contractors' invoices and prepare Progress Payment Certificates with Cost Control.
- Assist in review of Contractors' costs, forecasts and requests for extras.
- Assist in review and issue for approval and post Substantial Performance documents.
- Participate in contract cost review meetings and regular Project progress and assist with preparation of monthly contracts and Project progress reports.
- Assist in procurement and contracts administration and assistance actions such as contracts solicitations, modifications, delivery schedules, plans and coordination with relevant departments.
- Assist in preparation of procurement and contract documents.
- Assist in the review of procedural aspects of contract actions. Participate in contracts administration sufficient to ensure contract terms and conditions are met and that the contractor delivers the required services in a timely manner to achieve the objectives of the project.
- Assist in the termination of contracts for the convenience of the Project by the contractor. The incumbent is responsible for the preparation of all documentation necessary to support and defend termination decisions.
- Recommend actions when the contractor is not in compliance with contract provisions.
- Coordinate with contractors to determine and recommend alternative courses of action, such as extension of delivery schedule.
- Conduct contract reviews to evaluate contractor's performance and monitor contractor activity to assure compliance.
- Monitor such matters as payments, claims, and contractual changes to ensure requirements of the contract are met.
- Review completed contract file to ensure routine administrative matters are resolved or completed; and
- Support to TL in drafting, for submittal to the Bank through Employer, any requests for consent to extension of time/variation orders.
- Perform any other tasks / assignment that may be assigned by CSC, PIU or the Bank etc.

---

2. Title: Environmental Specialist

Experience:
15 years' experience as Environment Specialist supervising and monitoring environmental management plans on donor financed road projects and familiarity with the World Bank's Environment and Social Safeguards policies. Specific experience in a similar position on road projects in accordance with GOP and the Bank's Environmental Guidelines will be preferred.

Qualification:
Bachelor's degree in Environmental Engineering or Sciences / Civil and registration with Pakistan Engineering Council as Professional Engineer – preferably master's in environmental sciences / engineering or equivalent.

Responsibilities:
Responsible for preparing Environmental screening check list and classifying sub projects that have not been yet classified, preparing, and obtaining IEEs and Environmental management plans (EMP), ensuring prior clearance, monitoring, course correction, consultations, due diligence and disclosures.

Responsibilities of the Environmental Specialist will include but not limited to the following:

- Conduct monitoring at each subproject site where works are being conducted and ensure that the Environmental Management Plan (EMP) is implemented in its true letter and spirit and document the monitoring findings and submit to the PIU/ the Bank for review.
- Maintain close liaison with the Bank, Government of the Khyber Pakhtunkhwa, Construction Supervision Consultant with respect to implementation of Initial Environmental Examination / Environmental Impact Assessment (IEE/EIA) requirements and compliance to Khyber Pakhtunkhwa Environmental Protection Agency (EPA) No Objection Certificates (NOCs).
- Support the PIU in conducting the contract award process and reviewing the bidding documents to ensure that EIA/IEE/EMP requirements are incorporated. This task will also include capacity evaluation of bidders towards EMP implementation.
- Identify any gaps in compliance relating to EMP implementation and provide inputs to prepare a Corrective Action Plan (CAP) and monitor its implementation.
- Monitor environmental safeguards compliance including review/preparation of environmental monitoring reports for submission to the Bank and disclosure at EA's website.
- Oversee the implementation of the mitigating measures identified in the respective EMPs of the subprojects and implemented by project contractors as part of an environmental monitoring report to be delivered to the Bank for review and approval.
- Ensure the Grievance Redress Mechanism (GRM) prepared as a part of the EIA(s)/IEE(s) is implemented in its entirety and is fully functional and any grievances are efficiently and effectively addressed and resolved.
- Support the PIU in providing any data from the project sites, in preparation of bi-annual environmental monitoring reports (BAEMR) for submission to the Bank.
- Support CSC towards developing EMP implementation mechanism and ensure that the Contractors are executing the activities in compliance to EIA/IEE/EMP requirements.
- Coordinate and facilitate third-party environmental audits of Category A sub-projects which relate to construction of landfill sites.
- Inform the Bank project team and PIU on environmental non-compliance issues.
- Conduct consultations with stakeholders including project affected persons to obtain their views on implementation of environmental safeguards and mitigation measures.
- Attend to comments/ suggestions made by the Bank project team, PIU and KP EPA.

- Provide any other additional support as requested by the PIU to ensure compliance with national safeguard regulatory requirements and World Bank's Environment and Social Safeguards policies.
- Perform any other tasks / assignment that may be assigned by CSC, PIU or the Bank etc.

---

3. Title: Resettlement Specialist

Experience:
12 years' experience in planning, preparation, implementation, and monitoring of Social Safeguards (Involuntary Resettlement and Indigenous People) as Resettlement Specialist on IFI financed development projects and familiarity with the Bank's Social Safeguard Policies.

Qualification:
Master's degree in social sciences (e.g., economics, sociology, anthropology, development studies, etc.) or relevant field.

Responsibilities:
He/she will be responsible to support PIU in C&WD to ensure compliance to social safeguards (Involuntary Resettlement and Indigenous People) while planning, preparation, implementation and monitoring of resettlement plans for the sub-projects as required under World Bank's Environment and Social Safeguards policies. During event he/she will facilitate C&WD in screening of subprojects for IR/IP requirements, identify, assess, and update impact inventory linked to the Displaced Persons (DPs) based on design Review / cognizance; conduct consultations with project affected/displaced persons and update the resettlement plans as per marked construction limits; establish updated Land Acquisition and Resettlement (LAR) database and grievance redress system for social safeguards. Monitor day to day Resettlement Plan (RP) implementation and consolidate RP implementation progress in monthly progress reports, facilitate Client in recording and redress of grievances of project affected people and prepare Social Monitoring (internal monitoring) reports biannually or as provided in the Bank cleared Land Acquisition and Resettlement Plans (LARPs) and project documents for the Bank's review as well as final report on social safeguards implementation at completion of project.

Responsibilities will include but not limited to the following:
- Will be responsible for preparation and submission of all LARP/Resettlement Reports as per the format and requirement of the Bank/Client.
- Screen subprojects for involuntary resettlement impacts to determine IR/IP impact significance and eligibility of the subproject for social safeguards due diligence and preparation/updating of LARPs/IPPs under the project.
- For subprojects with involuntary resettlement impacts, prepare/update Resettlement Plans in accordance with provisions outlined the Resettlement Framework for the Project.
- Coordinate with design Review / cognizance team during review of detailed design to discuss and explore design measure/options to avoid/minimize the resettlement impacts of subprojects and ensure involuntary resettlement impacts are minimized, if not avoided.

- Based on detailed design Review / cognizance, prepare social safeguards due diligence reports conforming sub-projects/project road sections with and without LAR impacts including linear plans with clearly marked LAR and non-LAR sections and assist PIU and the Engineer in notifying the LAR sections to contractors that are not open for construction.
- Assist and supervise in conducting detailed measurement survey of impacted assets, updating of the impact inventory, census of DPs and shall prepare updated Land Acquisition and Resettlement Plans for the Bank's review and clearance in accordance with provisions outlined in the Resettlement Framework for the Project.
- Assist in organizing and conducting meaningful consultations with affected/displaced people to ensure the concerns raised are adequately addressed during design Review / cognizance, the Land Acquisition Resettlement Plans have been fully disclosed and the DPs are informed on the eligibility criteria, entitlements, compensation payment mechanism and project-based grievance redress system.
- Assist PIU and field staff to maintain updated LAR database and in implementation of Resettlement Plans in the subproject areas before physical or economical displacement and subsequent commencement of works.
- Assist PIU to establish and operationalize the project-based grievance redress system and coordinate (on regular basis) with the Grievance Redress Committee (GRC) and assist the GRC in delivery of its functions including but not limited to recording, review and tracking of progress on complaints, information dissemination and consultations with the complainants during complaints resolution process.
- Assist PIU in review of LAR issues that may emerge during execution of civil works, prepare, and implement corrective actions/measure consistent with project safeguards requirements as outlined in the LARF and LARPs.
- Track and monitor day to day LAR implementation progress and make adjustments in implementation schedule to achieve the targeted timelines and provide safeguards related input in project implementation monthly progress reports.
- Develop and conduct training sessions for PIU staff involved in project LAR management to improve their understanding on the Bank's safeguards requirements and ensure proper understanding and implementation of Resettlement Plans.
- Monitor implementation of Resettlement Plans, consolidate LARP implementation progress and prepare quality social monitoring reports periodically (biannual or as provided in the Bank cleared LARPs and other project documents) and share with the Bank for review, clearance, and disclosure.
- Perform any other tasks / assignment that may be assigned by CSC, PIU or the Bank etc.
- Consultant's deliverables include, but are not limited to:
  - Inception Report (submitted within 15 Days after NTP).
  - 2 Quarterly Monitoring Reports (one submitted after each quarter).
  - 2 Biannual External Monitoring Report.
  - Project Completion Report.
  - Social Audit Reports (submitted as and when required by the project based on compensation payments).

---

4. Title: Pavement Design Engineer / Pavement Specialist

Experience:

12 years' experience in major road construction works with a focus on pavement design engineering and materials testing. Relevant experience should include: (i) supervising the Contractor's compliance with material specifications and testing; (ii) providing input to the design team to source suitable materials; (iii) engineering design of flexible Asphaltic Concrete (AC) pavements, (iv) coordinating and supervising the work of field teams in supervising and certifying construction in accordance with contract conditions including acceptance standards of materials, approval of source supply, establishing QAJQC procedures, setting up laboratories, mix designs and testing procedures.

Qualification:
Bachelor's degree in Civil Engineering and registration with Pakistan Engineering Council as Professional Engineer – preferably master's in civil engineering / Highway Engineering / Transportation Engineering or equivalent.

Responsibilities:
He/she will be responsible for designing JMF and its real time implementation on mockup reaches. He will also be responsible for pavement design, designs for road features and road safety/traffic control features, drainage designs, rehabilitation and repair plan, traffic plans and amenities including detailed drawings and specifications and JMF.

Responsibilities of the Pavement Design Engineer will include, but not limited to the following:

- Coordination of design Review / cognizance and construction supervision of all Project pavements, including the management of the Materials/Pavement engineering team in coordination with the Team Leader and the other senior officials of the Consultant Team.
- Lead the design Review / cognizance of pavement works in the Detailed Engineering Design (DED) including proposed material specifications and sources and asphalt and concrete mix designs.
- Review and approve the Contractor's proposed geotechnical investigations for pavements and pavement materials.
- Liaise with the Bridge/Structural Engineer on the geotechnical requirements for bridge design.
- Design Review / cognizance and construction supervision of all Project pavements.
- Design Review / cognizance of pavement works proposed material specifications and sources and asphalt and concrete mix designs.
- Review the construction schedule for all pavement works.
- Perform any other tasks / assignment that may be assigned by CSC, PIU, or the World Bank.

---

5. Title: Geometric Design Engineer

Experience:
10 years in roads (geometrics) and bridges design experience; strong background in access management and traffic control systems is highly desirable.

Qualification:

Bachelor's degree in Civil Engineering and registration with Pakistan Engineering Council as Professional Engineer - preferably master's in civil engineering / Highway Engineering / Structure Engineering / Transportation Engineering or equivalent.

Responsibilities:
He/she will be responsible for designing especially in pavement geometric design. Responsibilities of the Geometric Design Engineer will include, but not limited to the following:

- Agree upon the category of road to be developed to make sure relevant design standards are applied and relevant guidelines are followed during the design process. It could be any category ranging from motorway to rural access roads or mountainous roads in rural settings and urban freeways, primary roads, secondary roads, laterals, and access roads in case of urban situation.
- Provide design plans for various road segments including links (sections between road crossings) and road crossings. In case of motorways/expressways, only grade separated crossings and interchanges are involved whereas in case of lower order roads multiple choices are available requiring option analysis for selection of relevant form of road crossings.
- Review/prepare working drawings with respect to geometric design/approves the shop drawings, as-built drawings supporting will all setting-out data, recording hard and soft copy of the project and providing the same to the PIU.
- Perform any other tasks / assignment that may be assigned by CSC, PIU or the Bank.

---

6. Title: Structural Design Engineer

Experience:
12 years' experience as Designer and/or Design reviewer of Structures with proven credentials in Bridge Designing.

Qualification:
Masters in civil engineering/Structural Engineering/Highway Engineering or equivalent and registration with Pakistan Engineering Council as Professional Engineer, preferably PhD in Structural Engineering or equivalent.

Responsibilities:
He/she will be responsible for Design and design Review / cognizance of structural elements of road components and bridges Design and Specifications on cost effective multi hazard resistant design.

He/she will be responsible for designing especially on cost effective, multi-hazard resistant design, design the structural elements of roads component and bridges, including detailed structural drawings and specifications.

If required by the Client, he / she will be responsible for construction supervision and of structural components of the road and ensuring that the subject project is implemented in accordance with the required specification and approved drawings.

He will be responsible for construction supervision and review and approval of contractor's bills. He will assist the Resident Engineer (RE) in the performance of his tasks. He will be responsible for designing especially on cost effective, multi-hazard resistant design, design the structural elements of roads component and bridges, including detailed structural drawings and specifications. During the construction supervision, responsibilities of the position will include but not limited to the following:

- Inspect the site and collect the condition data for the design Review / cognizance and necessary changes if any.
- Assist in preparation of technical details such as specifications and estimates.
- Provide details about existing structures, damages, and assessment.
- Assist and recommend approval of contractor's work program, method statements, material sources, etc.
- Assist in preparing and issuing reports as defined subsequently.
- Review and recommend approval and/or issuing working drawings, approval of the setting out of the works, and instruction to the contractor.
- Taking measurements and keep measurement records.
- Maintaining records, correspondence, and diaries.
- Certifying work volume and recommending interim certificates for progress payments.
- Assist in maintaining consolidated project accounts and preparing of financial statements and withdrawal applications for submission to the Bank.
- Provide feedback on the certification of completion of part or all of the works.
- Inspecting the works at appropriate intervals during the defects notification period and issuing the performance certificate.
- Processing the contractor's possible claims.
- Ensuring minimum disruption/damage to the environment by approval of contractors' work statement/methodology, including monitoring the impact of construction works on the environment and local settlements and providing information to Client and the Bank on the monthly progress reports.
- Providing the employer with complete records and reports, and recommend the contractors' as -built drawings for the works; and
- Assist in the compilation of a Project completion report data, providing details of Project implementation, problems encountered, and solutions adopted, and detailing and explaining any variation in Project costs and implementation schedules from the original estimate; and
- Perform any other tasks / assignment that may be assigned by CSC, PIU, or the Bank.

---

7. Title: Hydrologist/Drainage Engineer

Experience:
10 years' experience in hydrological design of roads and bridges.

Qualification:
Bachelor's degree in Civil Engineering and registration with Pakistan Engineering Council as Professional Engineer - preferably Masters in Hydrology or equivalent.

Responsibilities:
Responsibilities of the Hydrologist will include, but not limited to the following:

- He/ she will perform its duties under the guidance of the Team Leader.
- Work in the survey and design team and will be responsible for collecting and assessing the hydrological data, finalizing the design discharges for the required drainages, cross drainages, sub surface drainages.
- Provide assistance to the design team in designing the appropriate and cost-effective design/ design Review / cognizance of drainage structures.
- Shall collect relevant field data and estimate the design discharges for various drainages structure for the design/ design Review / cognizance purpose.
- Field visits to assess site conditions
- He / She will be responsible to assess hydrological data of the area of road alignment.
- Evaluate the Topography and gradients, water formation of the area. Analyze existing side/cross drainage conditions along the road alignment.
- He /She will be responsible for vetting the condition of drainage crossing structures keeping in view the past available data of floods and rains.
- To provide expert technical advice in respect of drainage proposals; undertake flood risk assessments.

---

8. Title: Geotechnical Design Engineer

Experience:
12 years' experience as Resident Geotechnical Engineer on major road projects; knowledge of soil bioengineering/biotechnical applications for slope stabilization.

Qualification:
Bachelor's degree in Civil Engineering and registration with Pakistan Engineering Council as Professional Engineer – preferably master's or PhD in Geotechnical Engineering.

Responsibilities:

He/she is responsible for the operation and quality function of Batching Plant and also be responsible for reviewing slope stabilization needs of the project roads. He/she should have experience in designing and implementing cost effective slope stabilization and erosion control measures.
He/she will be responsible for function of consultant's Lab and its quality. He/she will also supervise the Lab testing against the check request of the contractor.
In addition to the above, the duties of Geotechnical Engineer may also include but not limited to the following:

- Prepare JMF and its real time implementation on each mockup reaches.
- Supervise the testing of material with respect to contractor's check request.
- Maintain the check request register showing conformance or non-conformance of each reach.
- Supervision of slope stabilization works.
- Proposing measures to control erosion and siltation at construction sites.
- Providing advice on proper disposal of construction debris to avoid side-casting of excavated materials, ensuring compliance with environmental standards.
- Approve unsuitable material in subgrade/earthwork and better fill material if required.
- Perform any other tasks / assignment that may be assigned by CSC, PIU or the Bank.

9. Title: Social / Gender Expert

Experience:
Preferably 10 years in the field of Gender Mainstreaming. Well versed with environmental concerns with transport sector dynamics as well as applicable government regulations. Preference will be given to those who possess relevant experience with Donors (WB and ADB) or their funded projects and overseas relevant experience / relevant experience with international organization and Government Institutions.

Qualification:
Bachelor's degree in Social Sciences or equivalent qualification. Master's degree preferred.

Responsibilities:
The gender specialist will be responsible for the development & implementation of gender mainstreaming features in the project. Gender Specialist will perform the following functions, including but not limited to:

- Prepare gender analysis and collate baseline data (gender disaggregated) relevant to the scope and nature of the sub-projects.
- Inform the projects' design about the key gender features which could maximize women's access to the benefits from the investments in the targeted areas and provide them an opportunity to exercise their abilities as “active players in the system”.
- Conduct stakeholder consultations/limited household surveys in the targeted cities on the challenges and issues faced by both men and women particularly vulnerable groups including elderly, women headed households, minorities, people with disabilities and transgender to inform the projects' design.
- Update the gender mainstreaming strategy and gender action framework for the project.
- Assess the capacity of the executing and implementing agencies in gender-inclusive planning and implementation; based on the assessment, develop a capacity building program for the EAs and IAs.
- Assist in planning and scheduling Project work plan and identify gender specific aspects and needs in individual projects.
- Assist in managing technical assistance so that the projects are designed keeping in mind the Bank’s policy on Gender and Development (GAD) such that these outputs are achieved.
- Conduct FGDs and consultations with the relevant stakeholders in the selected cities to collect information on the existing challenges faced by the cities in relation to urbanization (in general) and pertaining to the scope of project.
- He/she will carry out an assessment of institutional capacity of organization.
- Facilitate and assist in gender analysis of proposed projects, prepare reports for subprojects.
- Utilize systems for planning (including gender equality), design (including gender responsive features), and implementation, according to required guidelines) and incorporate current thinking on gender and development issues.

- Develop and deepen innovative approaches to gender integration, gender equality, and inclusive development, and participate actively in relevant professional (formal and informal) communities.
- Assist in development and monitoring of project specific Gender Action Plans (GAP).
- Liaison with the relevant provincial, district administration for managing GAP in each of the subprojects.
- Assist in ensuring project monitoring and compliance with donor reporting requirements for GAP.
- Assist in generating increase in women involvement in community surveys, feedbacks and impact evaluations; and
- Perform any other tasks / assignment that may be assigned by CSC, PIU or the Bank.

---

10. Title: Traffic / Road Safety Expert

Experience:
12 years' relevant experience with proven credential as safety specialist on major road projects.

Qualification:
Bachelor's degree in civil engineering and registration with Pakistan Engineering Council as Professional Engineer preferably master's in civil engineering / Transportation Engineering / Highway Engineering / Traffic Engineering and a certified safety specialist or equivalent.

Responsibilities:
- The Road Safety Specialist is part of the services team who will prepare SOPs/templates for implementation of EHS Standards and will be providing all necessary assistance to the construction supervision team with respect to all safety, health and environmental issues. He will review and approve the safety plans of the contractor and he will monitor the safety health and safety of workers, safety of works and the safety of the traffic diversions and ensure compliance with the regulations.

- Road Safety Specialist will also identify hazardous location(s) and conditions, conduct a highway safety study, collect, and analyses preliminary data, identify and collect field data, select and conduct appropriate detailed studies, evaluate study results, determine safety and operational deficiencies, identify potential safety and operational improvement and to select appropriate improvements. He / She will also be responsible to prepare the road safety report of the design/ design Review / cognizance. Perform any other tasks / assignment that may be assigned by CSC, PIU or the Bank.

---

11. Title: Architect / Landscape Architect

Experience:
12 years relevant experience specially landscape architect in the design and preparation of plans of landscape architectural on road / highway projects.

Qualification:

Shall hold bachelor's degree in Architect with major course work in landscape architecture or related field. Preference will be given to master's degree in Architect and certificate of registration as professional landscape architect.

Responsibilities:

Responsibilities of the Land Scape Architect will include, but not limited to the following:

- Prepare landscape design and construction plans and cost estimates for proposed alignment.
- Respond to citizen inquiries and complains on landscape requirement.
- Recommend and assist in the implementation of goals and objectives approved policies and produces along the proposed route.
- Perform related duties as required.
- To calculate angular, linear and area measurements shall identify the problematic areas in specific to landslide area and suggest proper mitigation measures.
- Identify problematic areas as regard to deposition of sand dunes and to address shifting of sand dune with cost effect remedial measure.
- Prepare architectural drawing of toll plaza associated building and rest area.
- Landscaping of intersections.
- Perform any other tasks / assignment that may be assigned by Consultant, PIU or the Bank.

---

12. Title: Assistant Resident Engineer (Highways)

Experience:
10 years' experience as Highway Engineer in Highways or major road projects.

Qualification:
Bachelor's degree in Civil Engineering and registration with Pakistan Engineering Council as Professional Engineer – preferably master's in civil engineering / Highway Engineering / Transportation Engineering or equivalent.

Responsibilities:
He/she will report to Resident Engineer (RE) and assist Resident Engineer (RE)/Chief Resident Engineer (CRE) and will be full time station on site of work for real time inspection and supervision of works and shall be responsible for execution of works strictly in accordance with the working drawings, shop drawings and specification. Assistant Resident Engineer (ARE) decide where to place traffic control systems, calculating slopes, and ensuring a safe transport system.
Main responsibilities of the position will include but not limited to the following:

- Undertake services within an engineering environment which may include (but not limited to); scheme investigation, site and structure inspections, data collection and analysis, traffic order making, works/construction inspection and supervision to progress scheme design, development, and construction.
- The Assistant Resident Engineer (ARE) will be supported with Inspectors who will also full-time station on the site of work.
- Assist in preparing technical designs or drawings, documents and by using specialist software in accordance with approved design procedures and systems.

- Assist with the management delivery of small projects or a small program of work with minimal supervision.
- Be a proactive and collaborative team member, work closely with colleagues and fit seamlessly into a delivery team.
- Be flexible and proactive and liaise with other teams from other engineering disciplines.
- Assist in the development of others.
- Shall use different techniques to determine asphalt thickness (ABC & AWC), laying of asphalt (Asphalt temperature at plant before and after laying), rejection of over burnt asphalt material, will check calibration of asphalt pavers, pneumatic type roller, vibratory rollers, rate of spray of prime/tack coat etc.
- Shall prepare register showing date/time, detail showing weight of each dumper with asphalt, time of laying etc.
- Shall carry out hot bin test, calibration of asphalt paver, qualification of plant operator, JMF implementation, bitumen extraction test at site lab etc.
- Perform any other tasks / assignment that may be assigned by CSC, PIU or the Bank.

---

13. Title: Assistant Resident Engineer (Structures)

Experience:
12 years' experience as Bridge/ Structure Engineer preferably on major road / bridge projects.

Qualification:
Bachelor's degree in Civil Engineering and registration with Pakistan Engineering Council as Professional Engineer - preferably master's in civil engineering / Highway Engineering / Structure Engineering / Transportation Engineering or equivalent.

Responsibilities:
He/she will be responsible for construction supervision of bridges/culverts and of structural components of the road and ensuring that the subject project is implemented in accordance with the required specification and approved drawings.

He will be responsible for construction supervision and review and approval of contractor's bills. He will assist the Resident Engineer (RE) in the performance of his tasks. He will be responsible for designing especially on cost effective, multi-hazard resistant design, design the structural elements of roads component and bridges/ culverts, including detailed structural drawings and specifications. The main responsibilities of the position will include but not limited to the following:

- Inspect the site and collect the condition data for the design Review / cognizance and necessary changes if any.
- Assist in preparation of technical details such as specifications and estimates.
- Provide details about existing structures, damages and assessment.
- Assist and recommend approval of contractor's work program, method statements, material sources, etc.
- Assist in preparing and issuing reports as defined subsequently.
- Review and recommend approval and/or issuing working drawings, approval of the setting out of the works, and instruction to the contractor.
- Taking measurements and keeping measurement records.

- Maintaining records, correspondence, and diaries.
- Certifying work volume and recommending interim certificates for progress payments.
- Inspecting the works at appropriate intervals during the defects notification period and issuing the performance certificate.
- Processing the contractor's possible claims.
- Ensuring minimum disruption/damage to the environment by approval of contractors' work statement/methodology, including monitoring the impact of construction works on the environment and local settlements and providing information to Client and the Bank on the monthly progress reports.
- Providing the employer with complete records and reports and recommend the contractors' as -built drawings for the works.
- Assist in the compilation of a Project completion report data, providing details of Project implementation, problems encountered, and solutions adopted, and detailing and explaining any variation in Project costs and implementation schedules from the original estimate.
- Ensure execution of RCC with respect to concrete mix design/strength.
- Ensure cubes/cylinder filling for checking of strength.
- Temperature before, during and after laying of concrete will be recorded and he will ensure proper curing etc.
- Prepare and implement defect tracking system; In case of any defect, remove the poured concrete within no time and report the RE/Team Leader etc.
- Perform any other tasks / assignment that may be assigned by CSC, PIU or the Bank.

---

14. Title: Material Engineer

Experience:
12 years' Project-related Experience Minimum 8 years' experience of Material Engineering in highway construction projects with various experiences in sample collection, material testing, mixes such as Granular Subbase (GSB), Water Bound Macadam (WBM), JMF of Bituminous mixes & concrete mixes, etc.

Qualification:
Bachelor's degree in Civil Engineering and registration with Pakistan Engineering Council as Professional Engineer – preferably Masters in Geotechnical Engineering.

Responsibilities:
The major responsibility of the material engineer to supervise the material testing lab with respect to quality and efficiency of the test results; calibration of the lab equipment; conduct and discipline of the quality team.
He/she will also supervise the Lab testing against the check request of the contractor.
He/she is responsible for the operation and quality function of Batching Plant and also be responsible for reviewing slope stabilization needs of the project roads. He/she should have experience in designing and implementing cost effective slope stabilization and erosion control measures.
He/she will be responsible for quality of materials used in construction by performing field and laboratory tests and certifying their acceptance based on recommended specifications for the materials, will also identify the sources of material and query sites. Coordinate with Geotechnical Engineer and support to the Deputy Team Leader / RE

and the Client with respect to the following: Main responsibilities of the position will include but not limited to the following:

- Review project quality plan submit by the contractor and advise accordingly.
- Prepare ITP wherein specify their testing frequency of material at source, material at site and composite item of work as per BOQ, etc.
- Undertake overall management of quality control related to Construction Work Lot wise.
- Provide protocols for material testing; assist with test formats, procedures of quality control tests required by the project.
- Overall quality control and quality administration/ assurance.
- Approve / disapprove contractor check request after performing standard necessary tests.
- Stipulate material testing procedures and specifications.
- Identify sources of materials, quarry sites and borrow areas.
- Confirm the suitability and availability of material in the borrow pits and quarries for pavement.
- If required, identify, and evaluate additional sources of materials.
- Undertake field and laboratory testing of the materials to determine their suitability for various components of the work.
- Prepare mass haul diagram for haulage purposes giving quarry charts indicating the location of selected borrow areas, quarries, and the respective estimated quantities.
- Make suitable recommendations regarding making good the borrow and quarry areas after the exploitation of materials for construction of works.
- Prepare JMF and its real time implementation on each mockup reaches.
- Maintain the check request register showing conformance or non-conformance of each reach.
- Supervision of slope stabilization works.
- Proposing measures to control erosion and siltation at construction sites.
- Providing advice on proper disposal of construction debris to avoid side-casting of excavated materials, ensuring compliance with environmental standards.
- Approve unsuitable material in subgrade/earthwork and better fill material if required.
- Be responsible for material testing and specification and certification of material quality.
- Preparation and testing of concrete mixes of different design mix grades using suitable materials (binders, aggregates, sand filler, etc.) as identified during material investigation to conform to specification applicable in Pakistan.
- Shall use different techniques to determine asphalt thickness (ABC & AWC), laying of asphalt (Asphalt temperature at plant before and after laying), rejection of over burnt asphalt material, will check calibration of asphalt pavers, pneumatic type roller, vibratory rollers, rate of spray of prime/tack coat etc.
- Shall prepare register showing date/time, detail showing weight of each dumper with asphalt, time of laying etc.
- Shall carry out hot bin test, calibration of asphalt paver, qualification of plant operator, JMF implementation, bitumen extraction test at site lab etc.
- Perform any other tasks / assignment that may be assigned by Consultant, PIU or the Bank.

15. Title: Chief Quantity Surveyor

Experience:
15 years' experience as Quantity Surveyor on road mega projects that administered under FIDIC contract conditions, preference will be given to those who has working experience with the Bank or Loan Aided Projects. Familiarity with international and National design standards. Hands-on experience in using various quantity-estimation software. Preference will be given to those who has hands on experience on Civil-3D for extraction of quantity reports.

Qualification:
Shall hold bachelor's degree in civil engineering and registration with Pakistan Engineering Council as Professional Engineer / highway engineering / structure engineering / transportation engineering / construction management / project management or equivalent. Preferably master's degree in the said relevant field.

Responsibilities:
Responsibilities of the Chief Quantity Surveyor will include, but not limited to the following:

- He will be responsible for preparation and reviewing of engineering estimate by fulfilling all codal and legal formalities of the Client Department.
- He will be responsible for measurement of all type of quantities and preparation of measurement sheet in accordance with approved drawings for the purpose of reviewing interim and final payment certificates.
- He will be responsible for preparing of revised PC-I if required.
- The quantity surveyors shall review detailed estimates for quantities (considering designs and mass haul diagram) and project cost for the entire project (Lot wise), including the cost of environmental and social safeguards proposed and market rate for the MRS or the local schedule of rates.
- He will ensure correctness of documentation, IPCs and quantities during the construction and confirming the computation and processing of interim payment certificate, producing details of the final bill and total quantities consumed during the project.
- The quantity surveyors prepare quantitative estimates for any suggested variation with its cost impact on the project.
- Maintain a permanent record of all measurement for the work quantities.
- Perform any other tasks / assignment that may be assigned by Consultant, PIU or the Bank.

---

16. Title: Chief Surveyor

Experience:
15 years' experience as Land Surveyor on road mega projects by using total station, GPS, DGPS and RTK Rover.

Qualification:
Shall hold bachelor's degree in civil engineering and registration with Pakistan Engineering Council as Professional Engineer / highway engineering / structure

engineering / transportation engineering / construction management / project management or equivalent. Preferably master's degree in the said relevant field.

Responsibilities:
Responsibilities of the Chief Quantity Surveyor will include, but not limited to the following:

- Obtain the benchmarks and other information from the C&WD as required for review of survey work by the designer prior to commencement of construction activities.
- He will be responsible to establish suitable number of permanent benchmarks at suitable place & point preferably at employer's subordinate office or estate building in each corridor by using DGPS duly verified by the employer's representative.
- He will be responsible for joint survey prior to execution of earthwork with the designer representative, contractor representative and employer representative/Deputy Director Construction Client.
- Inform the employer promptly regarding any variation established during the joint survey from the basic survey data received from the designer.
- All levels and references will be referred to permanent benchmarks.
- Establish a system for validation of data both levels and RD's through RTK Rover and DGPS, by employer or 3rd party.
- Assist the resident engineer in checking the correctness of layout drawn at site by the contractors during executing for the road construction.
- Maintain all documentation on survey works, record of control points and benchmarks and ensure that works commences according to the working drawings approved by the resident engineer.
- Perform any other tasks / assignment that may be assigned by Consultant, PIU or the Bank.

---

5. Reporting Requirements & Time Schedule for Deliverables

5.1 Table below sets out the Construction Supervision Consultant reporting requirements. All reports will be submitted in English in hard copy to the Client and the Bank (5 copies and 2 copies respectively) and in electronic form as PDF files through an appropriate large file transfer application. The Client and the Bank will agree on suitable formats for the progress reports prior to the submission of the first such report.

Table: Reporting Requirements

MONITORING AND PROGRESS REPORT:

Reports	Content	Submission date
Inception Report	Report will contain consultant's supervision, & contract administration manuals, detailed work program, a brief description of the updated work methods proposed for carrying out the services in accordance with the Terms of	4 weeks after commencement of services

Reports	Content	Submission date
	Reference. The report will also identify any major issues and problems likely to be encountered as well as staff plan with supporting CVs of professional staff and projected monthly billing. **Summary:** ➢ Detailed work program and staffing schedule. ➢ Updated methodology (where appropriate) in line with the TOR. ➢ Baseline data on project expected outcomes and outputs. ➢ Identification of major likely issues and problems, and proposition of recommendations. ➢ Format is to be agreed with the Bank and the Client. **Documents & Manuals Required:** The consultants will also prepare following documents to be approved by the Employer for efficient contract administration & construction supervision: ➢ Contract Administration Manual included but not limited to the following: ➢ Quality Control & Assurance Manual included but not limited to the following: ➢ Laboratory Manual ➢ Environmental Monitoring Checklist ➢ Safeguard Monitoring Check list	
Monthly Reports	Monthly Report to summarize the following progress of the project. • The work accomplished. • Any problems encountered during the month. • Environmental and resettlement status. • A work plan for the next month. • Minutes of site meetings. • The report will present progress information in graphical form, relative to the contractors' approved contract schedules.	At the end of each month till 10th of each month.

Reports	Content	Submission date
	(i) **Monthly Contract Administration Reports:** The Consultant will, no later than the 10th of each month, prepare a narrative progress report summarizing: a. Construction progress during the month and cumulative to date for each individual contract drawing specific attention to any major causes of delay (administrative, technical, or financial) with details of remedial action taken or recommended to the Employer. b. A comparison of actual and forecast expenditure both during the month and cumulative to date for each individual contract, and a record of the status of payment of the Contractors' monthly invoices, of all claims for cost or time extensions, and of actions required of Client to permit unconstrained works implementation. The Consultant will also advise on the final estimated cost for each individual contract and draw attention to any major changes in the project budget including details of remedial action taken or recommended to the Employer. c. Brief on all correspondence exchanged with the contractors particularly relating to contractual clauses, with financial and time implications.	

Reports	Content	Submission date
	d. Summary of check request register showing RD wise and each layer wise quality test results and test performer Engineer/Manager. e. For quality calculation reflecting levels on x-sections and Avg. thickness of each layer. f. Technical appreciation of any design or quality control problems for each individual contract including details of remedial action taken or recommended to the Employer. g. Status of compliance with the Environmental & Resettlement gender, health & safety implementation plant. **Summary:** ➢ Summary in graphical form to the extent possible of project progress (physical, financial, safeguards), work accomplished, and any problems encountered during the month. ➢ Proposition of work plan for next month with recommendations to achieve the objectives. ➢ Format is to be agreed with the Bank and the Client.	
Mid-Term Review Report	Consultant will assist in. ➢ Comprehensive review of project progress, achievements, and problems at mid-term review stage. ➢ Description of any revisions made or estimated to be made to the project design. ➢ Format is to be agreed with the Bank and with the Client	At least 21 days prior to the Bank mid-term review Mission

Reports	Content	Submission date
Draft Completion Report / Interim Contract Completion Reports	The report will be based on the standard the Bank format for project completion reports and will provide additional information relevant to the overall project implementation. The Consultant will prepare completion report for each contract after issuance of Taking-over-Certificate / Certification of Completion. This report shall summarize the implementation and financial history of the project. The defects list provided to the contractor and all outstanding claims pending resolution.	Not later than 3 months after to completion of the civil works contract.
Final Project Completion Report (Statement at completion)	The Consultant will prepare a comprehensive final Completion Report within 84 days after Issuance of the Taking-over-Certificate of the last civil works contract. The Consultant shall summarize the method of construction, as built drawings/record showing the location and details of all works carried out, all defects and certification of the satisfactory correction of such defects for each of the construction contracts, the construction supervision performed, and recommendations for future projects of similar nature to be undertaken by C&WD. A safeguards implementation completion (final) report will also be included as appendix to the final project completion report. This report will update the draft report with contract completion information and will reflect comments provided on the draft completion report.	Within 84 days after receiving the Taking-Over Certificate for the Works
DNP Report	The Consultant will prepare a comprehensive DNP report after completion of the sub-projects.	After the completion of DNP.

SPECIFIC REPORTS AND DELIVERABLES:

Reports	Content	Submission date
Consultant's Quality Assurance Manual	➢ Procedures and Systems for construction supervision with respect to QAQC showing SOPs of material testing and Lab management including equipment calibration; check request register and check request management system. ➢ Format is to be agreed with the Bank and with the Client.	Within 60 days after commencement of services but at least 15 days prior to commencement of Civil Works.
Guidelines on Safe Rural Roads Design	➢ Guidelines on safe rural roads design. ➢ Material for training of C&WD and other relevant staffs. ➢ Material for public awareness-raising. ➢ Format is to be agreed with the Bank and with the Client.	To be agreed with the Bank and the Client
Resettlement Monitoring Reports	➢ LARP implementation compliance report	After completion of disbursement of compensation as per the approved LARP
	➢ A semi-annual social monitoring report highlighting the progress on implementation of resettlement and monitoring any unanticipated LAR issues during construction, documenting all activities including restoration of temporarily used land, grievance redress, formal and informal consultation, gender issues, socioeconomic aspects, child labor, drug trafficking, hygiene and safety, and other social aspects.	Within 15 days after the end of each 6-month reporting period
	➢ LARP completion report	Upon completion of the civil works
Land Acquisition and Resettlement Plan Update, LARP Addendum or Corrective Action Plan	➢ Final impacts, APs, and compensation payments based on detailed design or design changes resulting in LAR impacts.	After completion of design or changes in design'
Environmental Safeguards	➢ Environmental monitoring report to include status of compliance	Within 15 days after the end of

Reports	Content	Submission date
Monitoring Reports	with the project SEMP, records of related activities, status of grievance redress mechanism, issues and solutions, and results of environmental baselines and monitoring. ➢ Bi-annual review of implementation of the Contractor's SSEMPs. ➢ Format is to be agreed with the Bank and with the Client.	each 6-month reporting period, i.e. Each six month after commencement of contract implementation until contract completion.
Inspection Report during Defects Notification Period	➢ Detailed inspection findings. ➢ Detailed technical and contractual recommendations. ➢ Format is to be agreed with the Bank and with the Client.	Monthly basis after issuing the Taking-over-Certificate till issuance of performance certificate
Performance Certificate	➢ The team will be mobilized one month prior to end of DNP till issuance of performance certificate. ➢ After detailed inspection / findings, the consultant shall ensure that the no liability left on the part of the contractor. ➢ Format is to be agreed with the Bank and with the Client.	Within 28 days after the latest of the expiry dates of the Defects Notification Periods, or as provided in the condition of contract of civil work.
Project Closure	Consultant shall prepare final reports lot wise / package wise in accordance with the Bank requirement as well as to satisfy the requirement of Government of KP.	Within 30 days after issuance of performance certificate.
Technical Reports	The Consultant will produce as necessary technical / due diligence reports and position papers dealing with project matters during implementation	As and when necessary
Review of Traffic Diversion Plan and Safety measures	The Construction Supervision Consultant will make ensure to finalize the proper traffic diversion plan of contract and to provide proper guidelines to contractor to maintain smooth traffic flow and to make ensure proper safety measures to save human life during construction activities of	

Reports	Content	Submission date
	the contractor and to avoid any traffic accident during construction	
Revised PC-1	The Consultant shall prepare the revised PC-1 of the project, before completion of the project, if required by incorporating all changes in the scope of work and prepare completion report (PC-IV), at the completion of the project	As and when required by C&WD

5.2 Location of Services

It is anticipated that for the duration of the project, the locations for the Construction Supervision Consultant office(s) establishments will be done by the Contractor as follows:

(i) Team Leader – Construction Supervision Consultant office in Peshawar.
(ii) Site Team / Resident Team – suitable location near the project roads, or the contractor's compound, to be decided later, however, as the project roads are spread over the entire Khyber Pakhtunkhwa Province (26-Districts) and the Newly Merged Tribal District *(Ex-Federally Administered Tribal Areas 'FATA', i.e., 7 Ex-Tribal Agencies (North Waziristan Agency, South Waziristan Agency, Kurram Agency, Orakzai Agency, Khyber Agency, Mohmand Agency and Bajaur Agency)* and 05-Frontier Regions 'FRs) *(FR Peshawar, FR Kohat, FR Bennu, FR Lakki Marwat, FR Tank and FR DI Khan)*, therefore, the Site Office(s) will be established based on the shortlisted roads and bridges in these areas.

5.3 Schedule

The civil works contract period will be between 12 to 30 months with 12 months Defect Notification Period from the commencement date. The commencement date is anticipated to be in Q1, 2023.

6. Support, Counterpart Personnel, and Information

6.1 All the requirements will be part of the CSC contract and Client expects that the firm(s) will quote their prices for all the items mentioned in RFP under Reimbursable Expenses like: Rental of Office/Residence; Vehicles, IT Equipment etc.

6.2 The Client will provide counterpart staff to work with the Construction Supervision Consultant. The counterpart staffs are to be trained by the Construction Supervision Consultant to gain hands-on experience in all aspects of project management and contract supervision. The counterpart staff will not work as members of the Construction Supervision Consultant team for delivering the services and they will be paid salaries by the Government. The cost of these counterpart staff will not be included in the Consultant's proposal and subsequent contract agreement.

6.3 The Client will provide all relevant existing reports *(which are but not limited to, Detailed Engineering Design Reports, BOQs, Specifications, Contract Agreements, Employer's Requirements, IEE, LARPs Reports etc)* and available documents to the Construction Supervision Consultant during the implementation of the services. The Client will assist with facilitating access by the Construction Supervision Consultant to other government agencies for communications, collecting of relevant information, data, documents, etc. and other activities required for the services. These documents can be download from below weblinks:

7. CLIENT'S INPUT AND COUNTERPART PERSONNEL

7.1 The Employer will provide the following assistance to the Consultant:

- Services, facilities, and property to be made available to the Consultant by the Employer: Design Reports, Drawings and related data for the sub-projects will be shared with the consultants.
- Professional and support counterpart personnel to be assigned by the Employer to the Consultant's team: The Employer shall establish a functional Project Implementation Unit for support and liaison with the Consultants
- Provide assistance to obtain the necessary visas, work permits and to comply with any other requirements for the purpose of undertaking the consultancy services.
- Provide liaison with other Government offices and departments as required for facilitating the consultant's work.
- Furnish all necessary data, documentation, and information relevant to the Project.

7.2 Employer's Staff:

- The Employer has nominated a Project Steering Committee to provide guidance and oversight to the Project Implementation Unit, Communication and Works Department KP. The PIU will be established under a Project Director, assisted by other technical and social / environmental safeguard staff, and will be located in the field.

7.3 The Consultants are encouraged to familiarize with Construction Work before submitting their proposals. Draft sample documents regarding EMP, Resettlement, and Environment as per the instruction of the Client.

7.4 After completion of the services the consultant will hand over to the Employer all vehicles, equipment and furniture provided under this Project.