

**Model Terms of Reference (ToR)**  
**Construction of Wereda Roads Class DC1 and DC2**  
**Design and Supervision Services**

**Procurement Reference Number:**

## TERMS OF REFERENCE (ToR)

### 1 Description of the Services

#### 1.1 Background

The average road density in Ethiopia is about 44.3km per 1000 square kilometres. This is lower than the average road density of 54km per 1000 square kilometre for sub-Saharan African countries. Similarly, the road density per 1000 population of 0.58km is also low. The Rural Access Index, RAI, which measures the number of rural people who live within two kilometres of an all-season road (typically equivalent to a walk of 20-25 minutes) as a proportion of the total rural population, is on average 27% for the country.

Improved road access features strongly in the Government's strategic Growth and Transformation Plan (GTP), which is also directly linked to the Road Sector Development Programme, RSDP-IV. The GTP (2010-2015) embodies targets to improve the condition, integration and reach of the road network and includes an ambitious rural access expansion programme.

The RSDP-IV includes a major investment in wereda and kebele access roads under the Universal Rural Road Access Programme (URRAP). The objective of URRAP is to connect all kebeles by roads of a standard that provides all-weather, year round access, meets the needs of the rural communities, and is affordable and maintainable. URRAP is designed to improve rural livelihoods by reducing isolation for rural populations and to provide year round access to their markets, social and other services.

URRAP is an ambitious programme targeting the construction of some 45,800km of new all weather access roads and upgrading of some 27,000 km existing kebele access roads to all weather standards. The programme will maximise use of one of the country's least expensive and most abundant resources – labour – as well as naturally occurring road construction materials. Road works implemented under the programme will be predominantly labour or intermediate equipment based. Low cost solutions will be used to achieve all weather access.

In accordance with the above and under its overall road sector strategy, the FDRE, represented by XXXX Wereda Administration, has allocated a budget to finance payments for consultancy services for the design and supervision of prioritised kebele access roads.

### 2 Objectives of the Services

The objectives of the consultancy service are:

- Assist the Wereda in wereda road network planning and formulation and development of the road improvement project;
- Preliminary Design of the road and evaluation of improvement options, including Environmental and Social Impact Assessment and associated Mitigation Measures and Complimentary Interventions;
- Project implementation management of the first phase of construction by the local community (labour based clearing and levelling);
- Detailed Engineering Design of additional works to be undertaken by Contract

- Prepare tender documents and assist the wereda road office in procurement of the works contract;
- Contract management and supervision of the road construction operation by the contractor.

### **3 Detailed Scope of services**

The services shall be carried out in accordance with generally accepted standards of professional practice, following recognized engineering procedures. The Consultant's scope of work is understood to cover all activities necessary to accomplish the stated objectives of these services, while adhering to best practices of the profession, whether or not a specific activity is cited in this Terms of Reference.

The scope of services shall include all the services necessary to achieve the objectives described in Item No. "2" above. In so doing the Consultant shall execute not less than the tasks described below, with the following provisos:

1. If the Wereda Administration and Regional Road Authority require a "fast track" approach to the project, the detailed design of the road will be carried out simultaneously with the construction (i.e. Phase IV and Phase V will be combined). Under these circumstances the contractor will be awarded a contract with a schedule of rates and indicative quantities.
2. For DC2 roads it might be necessary to prepare conventional road design drawings and details instead of strip maps / line drawings (to be agreed between the Consultant, RRA and Wereda Road Office).
3. The scope of the social impact and economic analysis will depend on the road class. The design of DC2 roads will require more data collection and analysis than the design of DC1 roads. The scope of these activities will be agreed between the Consultant, RRA and Wereda Road Office.

### **Phase I – Project Formulation**

#### **3.1 Wereda Road Network Master Plan**

The Consultant will assist the Wereda to prepare a wereda road network master plan. The plan should group the roads into the "core road network" and "access roads". The Consultant is expected to make reference to the five year ERA and RRA road network development plans, as well as possible influences that could affect the development of the wereda road network, including traffic growth.

#### **3.2 Project Identification**

The Consultant shall assist the Wereda to identify key links that connect a kebele or a group of kebeles to an existing all weather roads and to prioritise these links for upgrading under the project. Prioritisation shall be based on existing traffic levels on the identified links and the total population served by each road. The Consultant shall assist the Wereda to select the project road in accordance with the budget available for improvement works.

### 3.3 Project Identification Report

The Consultant shall submit a Project Identification Report detailing the findings of Phase I. The report shall include the following:

- Wereda map indicating core road network and access roads;
- List of prioritised kebele access roads;
- Justification for selection of project road;
- Brief description of the project road
- Budget available for improvement works.

## **Phase II – Preliminary Design**

### 3.4 Route Survey

- a) Road Engineering Survey; The consultant will inspect the project road and conduct a visual survey and GPS survey covering
  - (i) Existing horizontal and vertical alignment and location of existing drainage structures, intersections and other features
  - (ii) Existing pavement type, age, thickness, signs of distress or defects, surface roughness
  - (iii) Year round passability – existence of dry and wet season rupture points
  - (iv) Condition of side drains, minor and major structures, if they exist
  - (v) Road geometry and width
  - (vi) Nature of surrounding terrain, materials, adjacent use of land and vegetation
  - (vii) Major problems likely to arise from side slopes, fills and cut area, and any areas of potential land slide
  - (viii) Current maintenance practice/input.
- b) Socio-economic Survey, Demography and Settlement Pattern: to establish communication and interaction with the communities who will be affected by the road, and whose views are vital for the completion of a successful project. Through focal group discussions with selected community groups, identify and assess existing and potential economic activities, social services, development projects, agricultural and other production, food security status, existing infrastructure, energy sources and water supply in the corridor. The socio-economic survey shall also include an assessment of population size and characteristics, density, towns, villages and market centres in the route corridor of 5 km on either side of the road. It shall also include pre-identification of activities that could be included as Complimentary Interventions under the project. Land take and resettlement issues and mitigation measures should be investigated and the costs estimated.
- c) Transport Survey: including an assessment of the existing transport pattern, available facilities, vehicles and services, accessibility problems, and latent demand for mobility in the route corridor. This includes transport means, travel distances, time and cost involved, nature and level of traffic and other relevant factors.
- d) Environmental Survey: involving the scoping of the area of influence to establish the relevant environmental characteristics of the route corridor, and identifying possible changes due to the improvement of the road. Particular attention shall be given to the impact of borrow and spoil areas, and likely changes in drainage patterns.

### 3.5 Traffic Studies

- a) Traffic Surveys. The Consultant shall conduct vehicle traffic surveys on the project road. Counting existing traffic should be for not less than three days for 12 hours per day. Traffic volumes and composition should be estimated, including an estimate of the largest vehicle that is likely to use the road. The traffic survey should be undertaken of all movements including pedestrians, animals, animal-carts and different types of motor vehicles.
- b) Traffic Forecasts: including the best estimate of likely demand based on current economic activity, past economic growth trends, growth in vehicle population, etc. Consideration must be taken of any local economic development plans which may indicate anticipated traffic growth.
- c) Axle load survey: based on existing data from weigh stations in the project area, or other historical data on axle loads. The Consultant is not expected to conduct additional axle load surveys unless specifically requested by the Client.

### 3.6 Geotechnical and Soils Investigation

The Consultant shall carry out a soils investigation for the project road in accordance with the requirements of the Low Volume Roads Design Manual Part D. The subgrade characteristics may be assessed through trial pits and laboratory testing of samples, or using the DCP method. Tests should be carried out at a minimum of 500 metre intervals, ensuring that all soil types are included in the testing.

### 3.7 Hydrology/Hydraulics Study

The Consultant shall analyze the hydrology of the project area in sufficient detail to design bridge structures, drifts, culverts, side drains and cut-off drains. Flood estimates and sizing of drainage structures should be made in accordance with the guidelines and procedures stated in ERA's Low Volume Roads Design Manual.

### 3.8 Design of Bridges

The Consultant shall carry out the designs of bridges in accordance with the ERA Low Volume Roads Design Manual Part E. This manual caters for bridge spans up to a maximum of 10 metres. Where a bridge span of more than 10 metres is necessary the Consultant should consider a low level submersible structure. Surveys of the bridge sites are required as well as appropriate geotechnical investigations and hydrological studies.

#### *a) Survey for design of bridges*

The Consultant shall carry out longitudinal surveys of the sites of the proposed structures. The minimum requirements for the survey are a line of levels along the centerline of the road 50 metres either side of the crossing point, and a line of levels in the water course 50 metres upstream and downstream.

#### *b) Geotechnical investigations for design of bridges*

The Consultant shall carry out a geotechnical survey using a dynamic cone penetrometer in order to determine the anticipated rock horizon. Tests will be carried out on a 5m by 5m grid along the length of the structure to a width of 20m either side of the anticipated centre-line of the structure. A minimum of one inspection pit is required to the level of the

rock or other acceptable founding material on culverts, and two inspection pits on larger structures.

### **3.9 Preliminary Geometric Design of the Road**

The preliminary geometric design of the road shall be conducted according to the methodologies and technical specifications established in the ERA Design Manual for Low Volume Roads (Part B). The design by eye approach may be adopted with site measurements only where necessary to ensure that minimum sight stopping distances and radii of curvatures can be achieved. These measurements may be made using a GPS.

It is expected that the road will largely follow the lie of the existing land. Significant earthworks to improve the vertical or horizontal alignment are not envisaged. The Consultant should consider alternative alignments within or close to the existing road corridor where this may lead to improved geometric design or avoid problematic soils.

### **3.10 Preliminary Pavement Design of the Road**

The Consultant shall carry out a preliminary pavement and surfacing design based on subgrade conditions and estimated traffic loading. The road should be designed using the Environmentally Optimised Design approach, with each section of the road treated on its own merits. Particular attention should be given to sections of the road that may become impassable in the rains or may require high levels of maintenance. On these sections the Consultant shall propose alternative surfacing options utilizing locally available resources as far as possible. These alternatives should be evaluated and compared in accordance with their estimated Whole Life Costs.

### **3.11 Complimentary Interventions**

The Consultant shall investigate options and develop preliminary designs and cost estimates for Complementary Interventions to be included in the works contract (for guidance see ERA Low Volume Roads Design Manual Part C). During Phase II the Consultant shall identify and develop the Complementary Interventions to a sufficient level of detail to enable cost estimates to an accuracy of 25% to be prepared. The proposed interventions must be responsive to the needs of local communities and the local environment identified during the initial Route Survey. The Consultant shall liaise with the Wereda Development Committee, Wereda Sector Offices and Wereda Road Office for the identification and design of Complimentary Interventions.

### **3.12 Preliminary construction quantities and estimated costs**

The Consultant shall make a realistic evaluation of the cost of the project options to an accuracy of 25%. The evaluation should take into account the location and size of the project as well as the current status of the construction market. The Consultant shall consider right of way acquisition and environmental mitigation measures in the cost estimate.

### **3.13 Economic Evaluation:**

The purpose of the economic evaluation is to assist in decision making on the design standards for the road. The decision will be based on which option has the lowest estimated Whole Life Cost.

The Whole Life Cost shall include investment and maintenance costs specified in **economic price terms**. The Consultant shall make a year-by-year determination of the costs of the different options over the design life using discounted cash flow techniques to bring them all to their **present value**. Residual values of an investment may be used when there is a good case that the remaining economic life stretches beyond the end of the design life. The Consultant shall discount costs and benefits from the investment to take into account the different economic values of costs and benefits made at different times during the analysis period using the planning discount rate for Ethiopia.

Initial estimates of construction costs may be derived from past experience of completed projects. This should be compared with detailed investment cost estimates based on the traditional bill of quantity approach together with estimates of unit rates for different components of the works. The quantities of work should be estimated from the preliminary engineering design of the road.

The value of land taken for the project should be incorporated into the costing of the project even if payment for the land is not made. The value may be derived from a rental income or the value of the lost agricultural production.

### 3.14 Preliminary Design Report

The Consultant shall submit a Preliminary Design Report detailing the findings of the Phase II and providing recommendations for subsequent phases. The report shall include the following sections:

- i. Route Survey
  - Road Engineering Survey including a simple map of project area based on GPS survey output, conventional survey techniques, or low-technology methods using Abney levels, Inclometers, line levels, ranging rods , tape measures, profile boards,strings, etc. .
  - Socio-economic conditions in project area, demography and settlement pattern
  - Transport facilities
  - Environmental Survey
- ii. Traffic Study Findings
  - Traffic Surveys
  - Traffic Forecasts
  - Axle load survey
- iii. Results from Geotechnical and Soils Investigations
- iv. Recommendations for Culverts and Bridges including outline designs
- v. Preliminary Geometric and Pavement Design of the Road shown on simple preliminary Strip Maps / Line Drawings. One A3 sheet is required for each kilometre of road with information provided at 10 metre intervals. Separate Strip Maps shall be provided where alternative geometric alignments or pavement and surfacing designs are to be considered by the Client. The Strip Maps shall include the following minimum information:
  - Chainage
  - Existing features (e.g. culverts, intersections)
  - Vertical gradient
  - Subgrade type and class
  - Locations of proposed changes to geometric alignment

- Location of new culverts and bridges, lined drains and other drainage structures
- Pavement design and surfacing.

Conventional road design drawings may be required for DC2 roads. (It is to be agreed with the RRA and Wereda Road office).

- vi. Typical Cross Sections.
- vii. Recommendations for Complimentary Interventions.
- viii. Economic Evaluation with recommendations for least cost solution.

### **Phase III - Clearing and Levelling by Community Groups**

The Wereda will decide on the preferred alignment of the road where alternatives exist based on the recommendations of the Consultant. The clearing of the road alignment and levelling of the road base will be carried out by community groups organised by the Wereda. The Consultant shall assist the Wereda in the implementation of this component of the project including:

- Setting out the horizontal and vertical alignment of the road– this may be carried out using simple labour-based survey equipment (ranging rods, profile boards, line levels, tape measures, Abney levels, Inclinometers , strings, etc), with conventional survey instruments, GPS, etc;
- Marking the extremities of the area to be cleared of vegetation and other obstructions
- Organisation of the community into work groups with gang leaders;
- Establishing daily productivity work norms for the work groups for each of the work activities (grass cutting, bush clearing, tree removal, rock removal, filling ruts, and cut/fill to level the road platform);
- Instructing the work groups on their daily work requirements;
- Approval of the Works carried out by the community groups;
- Liaison with the Wereda Administration to ensure that assessment of Compensation in respect of crops and buildings within the Right of Way is carried out before the start of site clearance.

### **Phase IV - Final Design**

#### **3.15 Detailed Pavement Design**

The Client will decide on the most appropriate design standards for each section of the road based on the recommendations of the Consultant. The Client shall also advise on any Complimentary Interventions to be included in the Contract.

The detailed design of the pavement on each section of the road will be based on the results of the soils and materials investigations and the traffic data collected during Phase II. The pavement layers shall be derived from the design catalogues included in the ERA Low Volume Roads Design manual.

#### **3.16 Design of Culverts and Bridges**

The Consultant shall carry out additional topographic surveys, hydrological studies and any other studies that are deemed necessary to prepare structurally sound and cost effective design layouts for culverts and bridges along the project road. These structures and any associated erosion protection works shall be designed in accordance with the ERA Low Volume Roads Design Manual.



### **3.17 Preparation of Design Drawings**

The Consultant shall update the preliminary Strip Maps / Line Drawings in accordance with the final design options selected by the Wereda and taking into account the works completed by the community work groups.

The Consultant shall prepare detailed construction drawings for all culverts and bridges.

### **3.18 Construction Quantities and Cost Estimate**

The Consultant shall update the Cost Estimate prepared in Phase II based on the final design drawings to prepare the final Engineers Estimate for the construction contract. The Consultant shall also separately indicate the total cost of main construction items such as fuel, cement, reinforcement bar, bitumen, equipment usage, labour (local and foreign), etc.

If provisional sums and a contingency are to be included, the amounts and percentages proposed must be justified and indicated in the project cost estimate. Provisional sums may be specified by the Employer, and these will be entered in the relevant bidding forms. These sums shall be added into the Consultant's estimates unaltered.

The Consultant shall prepare and submit a Book of Computations containing calculations and summaries of quantities organized in pay item sequences. The book shall show the back up calculations which substantiate the summary of quantities and the basis of estimating the quantities. The Consultant shall produce and submit a confidential final Bill of Quantities and estimated cost for the project.

### **3.19 Complimentary Interventions**

The Consultant shall prepare Particular Specifications, Bill Items and Provisional Sums to clearly describe the requirements for Complimentary Interventions. The Consultant shall also prepare drawings and other construction details if the interventions include structures such as a Trail Bridge. The Consultant shall prepare any Conditions of Particular Application which may be required to clarify responsibilities for asset transfer or to strengthen clauses aimed at promoting sub-contracting/assignment, local employment and the participation of women.

### **3.20 Tender Document Preparation**

The Consultant shall prepare final complete sets of tender documents, which will serve as a basis for tendering the project. The documentation shall reflect the procurement method as agreed by the Client (Minor or Micro Works) including the appropriate Conditions of Contract and Specifications appropriate to the use of Labour Based Methods and Intermediate Equipment. All documentation shall be provided in accordance with ERA guidelines

### **3.21 Procurement**

The Consultant shall assist Wereda in the procurement of a contractor to undertake the Works. This shall include the technical and financial evaluation of bids and preparation of a Tender Evaluation Report.

## **Phase V - Construction Management and Supervision**

### 3.22 Consultant's Responsibilities (Supervision)

The Consultant is required to fulfil the role of the Engineer [*Minor Works*] / Employer's Representative [*Micro Works*], as defined under the Works Contract and to supervise construction of the works on behalf of the Client throughout the entire construction period, including the defects liability (maintenance) period.

The Consultant is required to:

- i) ensure that the road is constructed in accordance with the Technical Specifications, Engineering Drawings or any amendments thereto;
- ii) optimize the use of available material resources to minimize costs to the Client, to maximize the quality of the Works, to expedite construction and to optimize the use of natural resources and ensure environmentally as well as socially sustainable construction ; and
- iii) Ensure that the road is constructed within the Contract Price and Time for Completion allowed under the Contract or any agreed amendments thereto.

### 3.23 Scope of Services (Supervision)

The Consultant shall fulfil all the duties and responsibilities as detailed under the Contract for construction of the Works. The services consist of furnishing complete engineering services in all respects, including all field and office work in strict accordance with the highest standards of the civil engineering profession and with proper interpretation of the duties and responsibilities of the Engineer/Employer's Representative.

The scope of the Services shall include all the services necessary to achieve the objectives described above and, in so doing, the Consultant shall expeditiously execute not less than the following tasks:

- i) The Consultant shall review the design, in relation to site conditions, during the whole construction period and propose necessary changes to the Employer and shall make necessary amendments.
- ii) The Consultant shall make a survey of existing utility services and liaise closely with authorities concerned on the proposed relocation of such services. The Consultant shall prepare detailed plans and proposals for the relocation of these services if affected by the proposed work. All official dealings with any service agencies shall be done through the Employer.
- iii) Issue the Contractor with all necessary copies of the Drawings, Technical Specifications and Contract Documents or timely provide any such supplementary information requested by the Contractor, necessary for the Contractor to carry out the Works.
- iv) With due diligence and efficiency supervise fully the construction of the works which are to be executed in accordance with sound technical administration, financial and economic practices. The Consultant shall perform all duties associated with such tasks to ensure that only the best construction practice is

- followed and that the final product is in all respects equal to that specified, at the most economic cost and is executed in full compliance with the Specifications.
- v) Check and verify on a regular basis the validity of all insurance/guarantees which the Contractor is obliged to have in place.
  - vi) Check that the Contractor follows safe working practices in all operations and immediately draw attention to any instances where this policy is not followed, directing the Contractor to carry out all such works deemed necessary in case of emergency/ affecting the safety of personnel, works and adjacent property. Ensure that the minimum impediment is caused to the flow of traffic and that safe acceptable detours are provided and maintained at all times.
  - vii) Organize the supervision of the works contract with proper allocation of responsibilities to individual members of the supervision team and supervise their work in order to ensure that it is effectively executed.
  - viii) Prepare any design changes as necessary or advisable to suit field conditions including improvement of alignments during construction or which could result in reduction of construction costs without sacrificing strength or quality of the work. In particular supervise any ground investigations at bridge sites carried out by the Contractor and review and modify the design of structures as necessary. Prepare Instructions and Variation Orders (VO) as recommended or necessary complete with the associated measurement and payment instructions. Issue such Instructions and VOs to the Contractor in writing - whilst advising the Employer of such Instructions and VOs and of the associated implications. (The Particular Conditions of Contract may require the Employer's approval prior to issue of some instructions or variations).
  - ix) Routinely and at not more than quarterly intervals, advise the Employer of the estimated total cost of completion of the Works.
  - x) The Consultant shall check the horizontal and vertical alignments set out by the Contractor, as well as the setting out of cross-sections and reference control points, prior to issuing approval to construct the Works. The Consultant may use low-technology survey methods including Abney levels, Inclinometers, line levels, ranging rods, profile boards, tape measures, conventional survey instruments, etc;
  - xi) Carry out soils and materials investigations as necessary or advisable to minimize overhaul, to optimize the use of available resources, to enhance economy etc.
  - xii) For all soils and materials proposed and used by the Contractor in the Works conduct all necessary and advisable inspection, sampling, testing and analysis for compliance with the Technical Specifications at source and in the laboratory and approve or reject the use of the soils or materials proposed for or used in the Works. Whenever necessary order removal and substitution of unsatisfactory material and workmanship.
  - xiii) Routinely or as requested by the Contractor, inspect the Works both under construction and completed, for compliance with the Specifications and the

- agreed method of working, as a basis for payment. The Consultant should check the tolerances achieved by the Contractor using conventional labour-based equipment including camber boards, ditch templates, straight edges, string lines, line levels, ranging rods, profile boards, tape measures, conventional survey instruments, etc .
- xiv) Formally arrange joint inspections with the Contractor, in the presence of the Employer, of completed sections of the Works for acceptance and/or identification of defects, both at substantial completion and upon the expiry of the defects liability period and issue the appropriate Certificate in accordance with the Contract.
  - xv) Keep and maintain up-to-date detailed Daily Site Diary and detailed records (making them available for inspection by the Employer or his representatives when requested to do so) of all contractual correspondence and data; all work stoppages or delays; accidents on Site; official visitors to Site; weather records; all activities in progress at any time on site showing the start and end time and full details of the resources employed per activity.
  - xvi) Keep and maintain detailed records (and make available for inspection) of the Contractor's equipment on Site and its precise date of arrival or removal from Site, its date of manufacture, previous hours worked and condition, the date commissioned to commence work, its availability, and utilization. Establish equipment availability figures for each category of equipment.
  - xvii) Review the Contractor's proposed work programs and associated work method statements, resource analysis and requirements in relation to the required rate of progress, and approve or reject the proposals accordingly. Identify any changes or additional resources required. Make sure that the program submitted for the execution of the works shall, in addition to the program for pure construction activities, include an alleviation program for Site staff and Labour in respect of Sexually Transmitted Diseases (STD) including HIV/AIDS, and any Complimentary Interventions specified in the Contract.
  - xviii) Continuously monitor the Contractor's progress against programme and his method of working in respect of each and all construction activities. Advise the Contractor when additional resources or revised methods of working or revised programme of the works are deemed to be required.
  - xix) Review and familiarize themselves with the Client's HIV/AIDS policy and strategy, and follow up and report in the monthly reports on how the Contractor is implementing the alleviation program for Site staff and labour in respect of Sexually Transmitted Diseases (STD) including HIV/AIDS. In consultation with the Client's responsible environmental office, advise the contractors of new developments and additional needs in respect of the STDs and HIV-AIDS as and when they occur.
  - xxiii) Review and check the Contractor's Payment Applications and, after verifying the accuracy of the measurement and costing calculations and the sufficiency of the supporting documentation, prepare and issue interim payment certificates for

- processing by the Employer within 7 days of receiving such statement from the Contractor. Advise the Employer on whether liquidated damages are due from the Contractor. Prepare and issue final certificate.
- xxiv) Monitor the payment process and alert the Employer when payment delays accrue to a point when; (a) interest charges will become due and (b) the Employer will be in Default for late payment.
- xxv) Thoroughly review and analyze all the Contractor's applications for extensions of time or claims for additional payment and furnish the Employer with a detailed analysis of such applications and recommended rulings and, subject to the Employer's approval (where necessary), advise the Contractor accordingly.
- xxvi) Ensure that all materials, tools, plant, equipment, facilities, etc, which have to be handed over to the Client after completion of the works are properly dismantled, packed, stored and maintained until the official handing over to the Client. Furthermore, the Consultant shall arrange for the handing over of these items to take place as provided in the works contract.
- xxvii) In the event of adjudication or arbitration, provide the necessary personnel and expertise to advise and assist the Employer in any such process and prepare any further analysis of the Contractors claims submissions as may be necessary to assist the Employer in the presentation of his case.
- xxviii) Provide on-the-job training to not more than 2 graduate civil engineers at a time (furnished by the Employer) in the various aspects of construction supervision and application of the Works Contract including, but not limited to, training in respect of the various contractual issues which arise. Deploy the trainees as practicable to supervision tasks on the Works.
- xxix) Immediately prior to commencement of works and immediately prior to final hand-over/acceptance of the whole of the Works, the Consultant shall conduct 2 days 24 hour and 5 days 12 hours traffic counts at count/survey station locations agreed with the Client. The counts shall use the Client's standard forms and shall differentiate between the various vehicle type categories shown on the form. The results and analysis shall be presented in the Final Report.
- xxx) Take digital colour progress photographs throughout the duration of the Contract, keep and maintain an official photographic record (available for inspection) of monthly progress at set locations and also of any construction activity of technical or contractual interest at any time. Each photograph to be captioned with: reference number, time, date, precise location, subject, and points of particular note. All digital data should be stored on computer hard drive with back-up.
- xxxi) Submit progress reports (to fully acquaint the Client with all aspects likely to affect the Technical and Financial implementation of the project), final reports and records, and other hard outputs regarding construction progress and the status of the Works Contract and the consulting services contract in accordance with Section 10 herein.

- xxxii) Review, approve and submit two full sets of as-built drawings within two months of completion of the Works, including strip maps / line drawings detailing all alignment and level information, pavement design, position and sizes of drainage structures, services information, and structural drawings (including type and positions of reinforcement).
- xxxiii) Review and get familiar with the Client's Environmental Procedures Manual, as well as with Government of Ethiopia's policies on environmental aspects and ensure proper implementation of the project as per these guidelines. Monitor the implementation of environmental safeguards in collaboration with the Client's environmental officer.

Recommendations made to minimize potential adverse impacts during construction include, but not limited to: -

- Minimize water and soil pollution.
- Ensure safety during construction by installing the appropriate signs and signals and wearing of appropriate safety equipment.
- All borrow pit areas will be reclaimed as much as possible to their original state.
- Minimize the risk of soil erosion by grassing the embankments; stabilize with gabions or stone pitching at bridges and at the inlets and outlets of culverts on sandy soils.
- Long traffic diversion roads shall be avoided so as to minimize the effect of dust on the surrounding environment.
- Spillage of oil, fuel, and lubricants, shall be avoided. If spilt, they shall be collected and disposed of in such a way as to not adversely affect the natural environment.
- Rock blasting near settlement areas shall be properly coordinated with the relevant officers of the Employer's Government Authorities in an attempt to minimize levels of noise pollution and community interference.
- Camp sites will be located in an area so as to minimize disruption to local population, fauna and flora and water courses; adequate drainage facilities and treatment of sewerage and waste disposals will be provided. Camp area will be dismantled and rehabilitated once construction is completed.

The Consultant shall also have full consultation with the Local Authorities during implementation of above mitigation measures. In administering the contract implementation, the Consultant is to ensure the minimization of the negative impact of the project to the society of project influence area.

### **3.24 Quality Control (QC)**

It is the intention of the Client that Consultants are held fully responsible for their work, including all documentation and drawings. The Client will not undertake detailed checking of Consultants' documentation and drawings or assist in designing portions of the project for the Consultant.

The Consultant shall be responsible for the professional quality, technical accuracy and coordination of all surveys, designs, drawings, and specifications and other services furnished by the Consultant under this contract.

The Consultant shall provide a Quality Control Plan that describes the procedures to be utilized to verify, independently check, and review all design drawings, specifications and other documentation prepared as a part of the contract. The Consultant shall describe how checking and review processes are to be documented to verify that the required procedures were followed. The Quality Control Plan may be one utilized by the Consultant as part of the firm's normal operation or it may be specifically designed for this project. The Consultant shall submit a Quality Control Plan for approval within 21 (twenty one) calendar days of the written notice to commence. A marked up set of prints from the Quality Control review will be submitted with each deliverables review. The responsible Professional Engineer that performed the Quality Control review will sign a statement certifying that the review was conducted.

The Consultant shall, without additional compensation, correct all errors or deficiencies in the designs, drawings, specifications and/ or other services. The Consultant shall include a narrative describing the general approach to QC during design, including but not necessarily limited to:

1. How the quality control function will be organized, including the names of quality control managers, the name of personnel at various certification levels planned for the project;
2. A detailed summary of the Consultant's proposed design Quality Management Plan.

The Consultant's performance will be evaluated on the full service provided. If the service does not meet the expected professional standards, the Consultant may be overlooked for future bid invitations. The Consultant will be informed of the findings of this evaluation by the Client.

#### **4 Deliverables**

The deliverables to be provided by the Consultant shall be of a high standard, presented in the appropriate format, neatly bound and clearly labelled with the project title, procurement number and date. The details of the various reports and documents to be submitted and the numbers of copies required are given in Section 10 of the TOR.

#### **5 Key Personnel and Sub Consultants**

All of the Consultant's personnel shall be fluent in the full use (i.e. the writing, reading and speaking) of the contract language, which is **English/Amharic**. In addition, all the key staff described herein, shall be fully computer literate regarding word processing and spread sheets.

The Consultant shall provide competent personnel for the services, who shall be managed by the Team Leader and who will represent the Consultant in performing the services. The minimum requirements for the team are as follows:

##### **A. Key Personnel**

##### **1. Rural Roads Design and Supervision Engineer/ Team Leader**

- B.Sc. Degree in Civil Engineering with minimum of 8 years experience in road projects.
- Five years experience as a Rural Roads Engineer of which two years shall have been experience as a Team Leader in road design projects.
- One year experience in site supervision of rural road works using labour based methods and intermediate equipment.

- Permanent employee of the firm/associate firm for the last one (1) year or extended working relationship with the firm/associate firm for the last two (2) year.

**Estimated Man Month: Total XX M-M**

**2. Geotechnical/Materials Engineer**

- A minimum of B.Sc. in Geology or Civil Engineering or Geotechnical Engineering with minimum of 5 years experience in ground investigation, testing and interpretation of results for road and bridge projects.
- Two years of experience in supervision of ground investigation, testing and interpretation of results for the design of structural foundations.
- Permanent employee of the firm/associate firm for the last one (1) year or extended working relationship with the firm/associate firm for the last two (2) years.

**Estimated Man Month: Total XX M-M**

**3. Hydrologist**

- A minimum of B.Sc. in Civil Engineering or equivalent with minimum of 5 years experience in hydrological investigations and drainage design for road and bridge projects.
- Permanent employee of the firm/associate firm for the last one (1) year or extended working relationship with the firm/associate firm for the last two (2) years.

**Estimated Man Month: Total XX M-M**

**4. Contracts Engineer**

- BSc. degree in civil engineering or in related field with minimum of 5 years of experience in road projects.
- Experience as a specialist on contracts and tender document preparation and cost estimation on at least three road projects.
- Experience with basic economic analysis including the calculation of discounted cash flows would be an advantage.
- Permanent employee of the firm/associate firm for the last one (1) year or extended working relationship with the firm/associate firm for the last two (2) years.

**Estimated Man Month: XX M - M**

**5. Inspector of Works**

BSc degree in civil engineering or related fields from a Technical College or University with zero years' experience

OR

Diploma in related fields from a Technical College or University with a minimum of three (3) years experience as an Inspector on rural roads construction using labour based methods

OR

A certificate in related fields from Technical school with a minimum of five (5) years experience as an Inspector on rural roads construction using labour based methods.



Inspection of road works includes ensuring compliance with the Standards and Specifications of the contract for the:

- Construction/improvement of sub grades and fill
- Construction of drainage works
- Construction of pavement layers and wearing course
- Construction of structures and other ancillary works
- Construction of all temporary works.

**Estimated Minimum Man Month: XX M-M**

**Note:**

- *At least one member of the team must be able to demonstrate competence in assessing social and environmental impacts of rural roads improvement programmes.*
- *Only Personnel having the minimum educational qualification set will be considered for evaluation.*
- *Personnel who scored below 60%, of the allotted points for their respective criteria, will be replaced by a better-qualified one, prior to concluding the Contract signing.*
- *The induction of any staff including the intermittent ones shall be subject to the Client prior approval.*
- *CVs of the support staff shall be submitted when and as required during the implementation period of the project.*

## 6 Service Duration

The duration of the Services is as stated in Part 3 **Section 8 Special Condition of Contract** under clause 13.1.

## 7 Facilities, Services and Resources to be provided by the Procuring Entity

The Client will make available to the Consultant, upon request and free of charge, any documents relevant to the project.

The Client will provide liaison with other departments of the administration in order to introduce the Consultant and to provide support in specific areas, in particular environmental impacts, community liaison and the design of Complimentary Interventions. The Consultant shall be fully responsible for collection of data and information from these departments.

## 8 Liaison with Client

The Consultant shall maintain close liaison with a project counterpart to be designated by the Client. A formal joint meeting shall be arranged by the Consultant at least once a month to facilitate monitoring of the services; the Consultant is also responsible for the formal minutes of such meetings.

## 9 Additional Responsibilities of the Consultant

The Consultant shall provide himself with offices, accommodation, transport and all other facilities, equipment, utilities, consumables, staff, support staff and any other resources

necessary for the complete execution of the services. The costs of provision of each and all the aforesaid shall be detailed in the Consultant's financial proposal.

The Consultant shall attend monthly joint/progress meetings with the Client and shall take minutes of those meetings and submit the minutes to the Client.

The Consultant is also responsible for providing any required assistance to the Client for problems that arise from the design document and survey benchmarks/data during pre-construction and construction periods. He shall also make available all relevant personnel for specific presentations at any time when called upon by the Client, whether or not the Consultant is normally locally resident. The Consultant shall make provision for any costs associated with these requirements.

### **10 Reporting Requirements**

The Consultant shall prepare and submit the following documents for the assignment. A brief description of the contents of these reports is presented as follows:

#### **10.1 Inception Report**

The Consultant shall submit an inception report and this report will outline the Consultants' initial findings and confirm the methodology and detailed work program, while also identifying constraints and proposed solutions together with any action required by the Client to facilitate the successful implementation of the study.

#### **10.2 Progress Reports**

These shall be submitted at monthly intervals from the date of commencement of the service and shall give a brief statement of work performed during the preceding month and a schedule of work for the next month. The reports shall be submitted not later than the end of the first week of each month including idle months, if any, and are to be numbered sequentially until the completion of the service, including any extension period (if relevant).

#### **10.3 Project Identification Report**

Project Identification Report shall summarise the process and justification for the selection of the project road and shall provide a brief description of the selected road. It shall be submitted within **two months** of the commencement of the consultancy services.

#### **10.4 Preliminary Design Report**

This report shall be in sufficient detail to allow the Client to make an informed decision on the design standards and geometric alignment of the road. It shall contain the preliminary design, soils & materials investigations, hydrology and drainage, bridge site investigations, Environmental Impact Assessment, Complimentary Interventions, and cost estimates for the alternative alignments and alternative surfacing options on particular sections of the road. It should include the comparative analysis of Whole Life Costs for different options.

#### **10.5 Drawings**

The Consultant shall prepare and submit tender drawings which shall be the final construction drawings. These drawings shall include, but not be limited to:

- The layout plan for the road based on the GPS survey.
- Strip Maps / Line Drawings of the road (one sheet per kilometre of road).
- Typical cross-sections
- Drawings and details for culverts, drifts and bridges.

#### **10.6 Engineering Cost Estimate**

A confidential Engineering Cost Estimate of the works based on the calculated quantities shall be prepared and submitted separately, together with a bound volume of the Book of Computations supporting the estimate.

#### **10.7 Tender Documents**

The Consultant shall prepare sets of final and complete tender documents for the contract to call for bids in accordance with the procurement method specified by the Client.

#### **10.8 Tender Evaluation Report**

The report shall summarise the technical and financial evaluation of the bids submitted for the works contract and shall provide a recommendation to the Wereda for the award of the Contract.

#### **10.9 Consultancy Completion Report**

This report shall be prepared and submitted after the completion of the consultancy service. It shall be a comprehensive report on the services provided throughout the project. The Completion Report shall include but not be limited to:

- Executive summary;
- Mobilization/ Demobilization details;
- Description of Project and implementation arrangements;
- Financial cost details together with a breakdown of the same, detailing and assessing extra expenditures and cost increases inclusive of the justification for such increases;
- Details of the work executed and of the techniques employed and type, quality, quantities and sources of materials used in the pavement;
- Contract changes and variations;
- Contractor's performance;
- Assessment of any complaints and/or claims by the Contractor;
- Comments on Technical Specifications and Conditions of Contract;
- As-built drawings;
- Assessment of any Complimentary Interventions;
- Summary of environmental and social impact mitigation measures undertaken by the Contractor;
- Assessment of counterpart training, if any;
- Summary of Consultant's inputs over the project period;
- Details of Final Account;
- Conclusions.

#### **10.10 Formal Minutes of Meetings / Copies of Presentations**

Throughout the project, the Consultant shall arrange formal monthly meetings with the Client's project coordinator, and shall take and circulate minutes of such meetings. All presentations made to the Client shall also be submitted to the project coordinator.

**10.11 PC Diskette Copies**

The Consultant shall submit all final reports and drawings in a **CD** copy prepared in appropriate software in formats as agreed by the Client.

ANNEX A

FORM OF DECLARATION OF INTEREST

**PROPOSED POSITION:**        —

**NAME OF FIRM:**               -

**NAME OF STAFF:**             -

I, the under signed staff, confirm that I am interested and will be available for the proposed position mentioned here above for the Consultancy services for Identification, Design and Supervision of a Kebele Access Road in the XXXX Wereda to work with \_\_\_\_\_ [name of consultant] in the above mentioned position. I also declare that I have submitted my CV and signed a declaration of interest not for more than two consultants including this consultant in this particular project. I understand that, I will take full individual responsibility, if I am found signing a declaration of interest for more than two consultants in this particular project.

\_\_\_\_\_  
Full name and signature of Staff member

\_\_\_\_\_  
Day/Month/Year

\_\_\_\_\_  
Full name and signature of authorized representative of the firm

\_\_\_\_\_  
Day/Month/Year