

# **ROAD INFRASTRUCTURE PROGRAMME SOMALIA (RIP-SOMALIA)**

## **TERMS OF REFERENCE FOR PRELIMINARY AND DETAILED DESIGN OF 82KM SECTION OF BELEDWEYNE-GALKAYO ROAD (LOT 1)**

### **1. INTRODUCTION**

As part of the Somalia New Deal Compact, the Federal Government of Somalia (FGS) requested the African Development Bank (AfDB) to establish and manage a Somali Infrastructure Fund (SIF) that will support the planning, rehabilitation, and development of infrastructure in the country. The SIF is part of the Somali Development and Reconstruction Facility (SDRF), a new financial architecture. As part of this architecture the SDRF coordinates the actions of separate Multi-Partner Trust Funds managed respectively by the World Bank, United Nations, and the African Development Bank (the SIF).

The Road Infrastructure Programme Somalia (RIP-Somalia) is addressing constraints related to poor road infrastructure and the lack of sufficient regulatory and technical capacity to oversee reconstruction and preserve road infrastructure. The project will also facilitate market linkages, services and partnerships to increase competitiveness and performance of traditional and emerging economic sectors and facilitate private investments.

According to the AfDB's 2016 Africa infrastructure development index, Somalia is ranked lowest among all African countries. The country has no railway infrastructure; coastal shipping is limited. Somalia's primary mode of internal connectivity is roads, but investments in the sector declined in the late 1980s. As such, out of Somalia's close to 22,000 km of road networks, only 2,860 km are paved, leaving most of the rural areas (where more than 63% of the population live) inaccessible to motor vehicles, especially, during the rainy season. Due to lack of maintenance, of the 2,860 km of roads, 90% have deteriorated and are no longer "all-season" roads. A road network that is widely destroyed has left the Somali people suffering from high transportation costs, and difficult or no access to markets and social services.

The poor conditions of the road network in Somalia can be ascribed to the age of the road network, a severe lack of maintenance for decades, and overloading due to insufficient axle-load control. The main problem leading to this severe lack of maintenance of road assets is lack of public sector support for the road networks. The RIP-Somalia aims to improve management of the road sector at the national level and improve transport connectivity for road users in the targeted road corridors for rehabilitation while reinforcing the capacities of federal and regional institutions that manage road infrastructure.

The RIP-Somalia will contribute to jobs creation, skills development and acquisition, creating economic opportunities, reducing vulnerabilities and delivering social dividends to the population in order to consolidate peace and strengthen stability in Somalia. Furthermore, rehabilitation, reconstruction and construction of roads and some connections to key locations within Somalia (urban areas and/or ports) will improve access to the country's neighbours and to domestic, regional, and international markets.

Under the RIP-Somalia, four priority roads have been identified for intervention, namely:

- Rehabilitation and surface dressing of 7.3m wide, 82km section of the existing BeledWeyne-Galkayo paved road: BeledWeyne-Kalabeyr (22km) and Dhusamareb-Qaradhi (60km). The estimated length of the existing BeledWeyne-Galkayo road is 327km
- Rehabilitation and surface dressing of 7.3m wide, 85km section of the existing Galkayo-Garowe paved road. The estimated length of the existing Galkayo-Garowe road is 240km
- Construction of 7.3 wide, 100km Galkayo-Hobyro feeder road to compacted gravel standard. The estimated length of Galkayo Hobyro road is 241km
- Rehabilitation and construction 7.3m wide 80km existing Luuq Ganane-Dolow earth road to compacted gravel standard. The estimated length of Luuq Ganane-Dolow road is 80km

This Terms of Reference address preliminary design, economic/financial study and detailed design of 90km section (BeledWeyne-Kalabeyr; Dhusamareb-Qaradhi), 7.3m wide of the existing BeledWeyne-Galkayo paved road. The limits of the sections determined by the Ordnance Survey National Grid References are:

	Starting Point (Easting, Northing)	Finishing Point (Easting, Northing)
BeledWeyne-Kalabeyr	-----E, -----N	-----E, -----N
Dhusamareb-Qaradhi	-----E, -----N	-----E, -----N

## 2. THE PROJECT AREA OF COVERAGE

This road is an important section of the Mogadishu-Jowhar-BeledWeyn-Galkayo Somalia North-South (NS) corridor and is a key link in the trunk road system toward Ethiopia and the Northern areas of the Somali peninsula. It links Southern Somalia and Ethiopia (via BeledWeyn and Ferfer) and the Northern regions. To the south, the road provides access to Puntland and the northern regions to the regions of Benadir and Middle Shabelle, and eventually, Mogadishu. Mogadishu is the capital and largest market, and therefore provides great trade opportunities for goods coming from the interior. On the other hand, the Shabelle Valley is an area of high potential and intensive agriculture, and opening up will make it the country's breadbasket and a solution to its food security. The road would also stabilise the area by making the preservation of security easier and more effective. The estimated length of BeledWeyne-Galkayo road is 327km.

Figure 1 is the Project Location Map.

Figure 1. Project Location Map



### **3. OBJECTIVES**

The main objectives of the Consultancy Services are:

- (i) Preliminary design, road safety assessments, economic/financial study, economic and financial analysis, land acquisition;
- (ii) Detailed engineering design of the section of the road [decided upon by the Ministry of Public Works, Reconstruction & Housing in consultation with the concerned Federal Member State (FMS) and communities themselves] including field surveys, all necessary data collection, pavement investigations/evaluations and analysis to cover all aspects of detailed design;
- (iii) Review the ESIA/Resettlement Action Plan study conducted by the previous Environmental Consultant; carry out associated surveys to identify and value property that will be affected by the road rehabilitation, reconstruction and construction works and the establishment of the road reserve;
- (iv) Preparation of bidding documents using the African Development Bank's (AfDB) Standard Bidding Documents for the Procurement of Works and preparation of priced and unpriced bill of quantities

### **4. SCOPE OF CONSULTANCY SERVICES.**

#### **Scope of Services**

The services consist of feasibility study, preliminary and detailed engineering design, and preparation of bidding documents for works in accordance with the highest professional standards.

The consultancy services shall be carried out in two phases as follows:

- **Phase 1:** Economic/Financial Study, Preliminary Design for road rehabilitation and reconstruction to comply with the design standards for such a class of road and review of existing study on Environmental and Social Impact Assessment and Resettlement Action Plan
- **Phase 2:** Preparation of a Detailed Engineering Design and Production of Bidding Documents and Priced and Unpriced Bill of Quantities, Construction Drawings, Technical Specification and Post Design Services.

The Consultant shall hold preliminary discussions with the MPWR&H and the concerned FMS and the communities to ascertain the exact 90km stretch of the existing road that will be rehabilitated and reconstructed. The said section must be decided upon and approved by the MPWR&H and the concerned FMS and the communities themselves.

All design documentation and associated reports, quantities, cost estimates, etc., shall be submitted to the MPWR&H in draft form. The ministry will share the draft with the concerned FMS for review, comment and approval.

The Consultant shall carry out the detailed design only after the MPWR&H and the concerned FMS have confirmed approval of the findings of the economic analysis, economic/financial study report and satisfactory completion of preliminary design services by the Consultant.

The Consultant shall perform all engineering, environmental, social, economic and financial analysis and related works described in the Technical Requirements below, to support the achievement of the defined project objectives, and taking into account the requirements of the MPWR&H and the concerned FMS.

The Consultant shall review all available documentation on the project road and its catchment in general. The Consultant shall be solely responsible for the analysis and interpretation of all data received, for the conclusions they reach and the recommendations they make.

The Consultant shall consider the sourcing of all major materials, sand, aggregates, bitumen, reinforcing steel, etc., and determine whether Manufacturer's certificates concerning composition and strength will be obtainable or whether sampling and testing will be needed.

The Consultant shall assist the MPWR&H and concerned FMS to ensure visibility of the project and the European Commission/Somalia cooperation at all times in line with the European Union Communication and Visibility Strategy.

## **TECHNICAL STANDARDS**

All designs and documentation shall be in accordance with Somalian standards (if any) and the following international standards (e.g., AASHTO, BS, ASTM, Euro Codes, etc.):

- (i) Geometric Road Design Manual
- (ii) Bridge Design Manual
- (iii) Drainage Design Manual
- (iv) Pavement Design Guides
  - (a). Flexible Pavement
  - (b). Gravel Pavement
  - (c). Pavement Rehabilitation
- (v) General Specification for Road and Bridge Works
- (vi) Traffic Signs Manual
- (vii) Road Safety Audit Manual

In addition, the Consultant shall follow the requirements of the following documents in carrying out the services:

- (i) Guidelines for design developed by the Federal Government of Somalia (FGS) if any;
- (ii) Regulations and Guidelines for Environmental Impact Assessment in Somalia
- (iii) Policy and operational safeguards and performance standards of development partners (AfDB, European Union - EU).
- (iv) AfDB Standard Bidding Documents for Procurement of Consulting Services and Procurement of Works

## **DOCUMENT REVIEW, PRELIMINARY CONSULTATIONS AND RISK ASSESSMENT**

The Consultant shall hold discussions with relevant parties, (such as the MPWR&H, Ministry of Transport and Aviation, the concerned FMS, other Lead Agencies with mandate to manage environmental and social issues) to the design process.

The Consultant shall hold preliminary discussions with the relevant utilities Companies to ascertain the extent and capacity of their apparatus and the potential need for such to be protected or relocated as a result of the project works. The Consultant shall obtain preliminary costs of utility works taking into account possible improvements to be initiated by the utilities.

### **Workshops**

The Consultant shall be required to hold a **stakeholder workshop** at a time agreed to with the MPWR&H and the concerned FMS. The workshops shall be widely published in the print and electronic media.

The MPWR&H and the concerned FMS will be responsible for arranging venues of workshops and will provide facilities, materials and equipment for the workshops.

Written records are to be kept of all consultation meetings and workshops summarizing the issues arising and any actions identified.

#### Preliminary Validation Workshop

After the Consultant had conducted surveys and analysed results as well as prepared reports of surveys, preliminary report and preliminary designs and cost estimate, the Consultant will arrange a two (2) day workshop to present their findings, preliminary designs and recommendations to the MPWR&H and the concerned FMS and other stakeholders for validation. The venue for the workshop will be in Mogadishu, Somalia.

#### Final Validation Workshop

After preparing and delivering the detailed engineering design, draft final reports, draft final tender documents, the Consultant will arrange a two (2) day validation workshop in Mogadishu, Somalia to present their findings, final designs and recommendations to the MPWR&H and the concerned FMS and other stakeholders for validation.

## **ECONOMIC/FINANCIAL STUDY, VISUAL ASSESSMENT AND SITE INVENTORY**

The Consultant shall visit the proposed site location, conduct a walkover survey to familiarise themselves with the area, discuss the project with the MPWR&H and the concerned FMS and hold (together with ministry's representative, the concerned FMS, communities and local authorities) preliminary discussions to inform them of the proposed project.

The consultant shall gather relevant information and maps and undertake, for the agreed section, a visual assessment of the prevailing conditions along the route and talk to local authorities and people in the area, in order to:

- i. Identify and propose the design standards;
- ii. Identify major issues e.g. risk of flooding, road safety, road access;
- iii. Determine approximate extent of road re-alignment required, both horizontal and vertical, and indicate on available mapping;
- iv. Identify if new culverts may be required and their potential location;
- v. Prepare a detailed programme for data collection and analysis;
- vi. Prepare a detailed programme for detailed engineering investigations.

### **Project Risk Assessment**

The consultant shall carry out a preliminary risk assessment of the project, develop a risk assessment matrix to include information relating to the likelihood of a risk occurring, the severity of the impact of a risk on the project, and how a risk shall be managed. Throughout the project, the Consultant shall update the risk assessment matrix and, as appropriate, include for identified risks in the project cost estimates.

### **Data Collection and Analysis**

The Consultant shall collect and analyse all necessary supportive data required to complete the design services. The amount of supportive data to be collected will depend on:

- The extent and accuracy of data available;
- The elapsed time since that data was collected;
- The availability of data from other sources; and
- The relative importance of available data to the design process.

The Consultant shall assess the need for and separately include in his proposal the cost of undertaking additional data collection, especially in relation to the following:

### **Geology**

The Consultant shall acquire and make use of maps and other information from the relevant Department of the MPWR&H and the concerned FMS and from other internationally recognised sources in order to compile a catalogue of the relevant geological features of the project area, including a description of the soils and rocks (if any) encountered along the existing and new alignments and their effect and influence on factors such as route location and design.

### **Mapping and Land Use**

The Consultant shall assemble all necessary mapping and documentation for the purposes of compiling details of land use and vegetation within watercourse catchments and within the anticipated project boundaries.

### **Growth Centres**

The Consultant shall assemble all available planning data relating to the growth of population centres along and served by the project road. Such data shall include potential developments having the capacity to generate significant numbers of goods vehicles.

Consultation with planning authorities should seek to identify the likely extent of urban and semi-urban growth along the project road during the design period, and hence the need to provide or plan for social amenities such as market stall, recreation centres, clinics/hospitals, etc.

### **Traffic Data**

The Consultant shall assemble all available traffic data on national roads having a similar function with a view to determining the present pattern of traffic growth by vehicle class. Such growth shall be reviewed against economic indicator trends.

The Consultant shall agree with the MPWR&H and the concerned FMS the location of a number of traffic count stations (to cover all major traffic nodes along the proposed road) where counts of motorised and non motorised vehicles, pedestrians and animals best represent present road usage. Counts at each location shall be for a continuous period of not less than five days for 12 hours and two days (1 week day and 1 weekend) for 24 hours, and shall take into account fluctuations caused by local factors e.g market days.

From the available data, the consultant shall determine traffic predictions by vehicle class for each count station, for assumed low, medium and high growth projections. This data shall be used for the geometric design capacity evaluation, including junction design, pavement design and the design of facilities for non-motorised traffic, including designs for traffic management during works.

### **Axle Load Data**



The Consultant shall assemble all available Axle Load Data relevant to the corridor on which the project road is located in order to assess the average current overload in relation to both axle load limits and gross vehicle weight limits.

The Consultant shall also review national axle load data over the past five years to recommend operational measures in controlling overloaded vehicles and hence the likelihood of future overload reductions. The Consultant shall determine the road damage factors attributed to the axle load records available.

### **Accident Data**

The Consultant shall assemble and evaluate available accident data and seek to identify principal causes and assess the potential for the project to reduce accidents through, for example, improved junction layouts or the provision of walkways.

### **Review of Environmental and Social Impact Study and Preparation of Environment and Social Management and Monitoring Plan (ESMMP)**

The Consultant shall review the ESIA/RAP study carried out by the previous ESIA Consultant. Furthermore, the Consultant shall prepare the ESIS report and Environment and Social Management and Monitoring Plan (ESMMP) in accordance with the African Development Bank (AfDB) Guidelines.

## **ECONOMIC AND FINANCIAL STUDY**

The Consultant shall thoroughly inspect and assess the existing condition of the project area and prepare a detailed Economic/Financial Study report. The consultant shall pay particular attention to the following specific issues and shall consider the following aspects:

### **Route Assessment**

- i. **Land Acquisition:** assessment of the extent of land acquisition and resettlement impacts based on alignment options and associated land take boundaries, preliminary public consultations, and cost estimates for land acquisition and mitigation measures.
- ii. **Utilities/Emergency Services:** assessment of the required relocation or replacement of various items, including water pipelines, telephone lines, sewer lines and electrical lines.

### **Traffic Studies**

- i. **Traffic Surveys.** The Consultant shall make use of the existing vehicle traffic surveys conducted on the project road that forms part of the route. Data from the MPWR&H and the concerned FMS's traffic count surveys, if available, should be reviewed and compared with the Consultant's traffic data as determined from the study to assist with estimating the

Annual Average Daily Traffic (AADT). Traffic volumes and composition should be estimated.

- ii. **Traffic Forecasts:** The Consultant shall quantify both the direct and indirect impact of the road development and the analytic approach must include appropriate forecasting techniques/models and be supported by appropriate survey instruments, including:
  - a) Population and Settlement survey,
  - b) Economic and market survey; and
  - c) Transport survey (for motorized and non-motorized transport (NMT), including pedestrians).

The traffic forecasts should include the generated, diverted and induced traffic. The forecasts should include best estimate of likely demand (based on economic activity, past growth trends, growth in vehicle population, etc.,) and the more critical variables should be subjected to sensitivity analysis. The forecasts should also include the impact on the project area during the construction period.

### **Economic and Financial Evaluation**

The Consultant shall carry out an economic evaluation of the road project which shall include the identification of at least two different cases or scenarios involving one 'base' or 'without investment' case and at least one 'project' or 'with investment' case. In the "with investment case", the Consultant shall examine alternative scenarios, including design standards, alternate routes and alignments and designs (in case of new construction). Estimates of benefits should include dis-benefits during the construction period, and should include the direct impact on all users of the facility (including motorized and non-motorized modes, pedestrians) and indirect impact on the community and business establishments served by the road.

- i. **Provision of improved/new access:** The Project investments should reflect the impact of generated, diverted, and induced traffic, as well as the change in accessibility and modal shift. The consultant shall develop an appropriate methodology to quantify the impact of each effect.
- ii. **Planning time horizon and residual values:** The Consultant shall choose an appropriate planning time horizon, which shall reflect the economic life of the key investment components. With discounting and uncertainty, there is little point in extending the time horizon beyond thirty years.
- iii. **Resource costs:** The Consultant shall estimate the resource costs of the project. Costs and prices need to be adjusted to ensure that they are all measured in the same unit and that they represent current market values and trends in Somalia.
- iv. **Investment costs:** The Consultant shall estimate investment costs of the project, for the agreed section. Initial estimates of construction costs may be derived from recently completed projects in Somalia and the region, however these should be compared with detailed estimates based on the traditional bill of quantity approach together with estimates of

unit rates for different components of work. The quantities of work should be estimated from a preliminary engineering design of the road which shall be produced by the Consultant as part of the feasibility study

- v. **Maintenance costs:** The Consultant shall estimate routine, recurrent and periodic maintenance costs of the design options considered for the project over the design life of the facility.
- vi. **Change in road condition:** For the agreed section of the road that involve rehabilitation or upgrading, the change in road-base parameters including road roughness should be considered. The Consultant shall input data relating to road design and maintenance into HDM-4 and/or RED models, as applicable, to provide a prediction of how road condition will change. The Consultant should ensure that the relationships used in predicting road deterioration are properly calibrated to the appropriate conditions and climatic zones related to the road alignment. The Consultant shall check that the forecast pattern of road deterioration is realistic, based on experience of roads in similar conditions.
- vii. **Vehicle operating costs (VOC) and passenger time savings:** The VOC and time savings shall be computed for both direct and indirect impact of project investments. The direct benefits shall be computed for all modes of transport (including pedestrians and other NMT). The indirect benefits shall be computed in terms of the net impact on communities and business establishments along the project road. The consultant is to collect relevant data for VOC models.
- viii. **Discounting:** 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 Somalia. Where possible, the Consultant shall make use of Modified Internal Rate of Return (MIRR) to allow different discount rates to be used for the opportunity cost of capital and for the users' time preference rate. The rate of return shall be computed for the designed road. The Consultant shall calculate and show the following five decision criteria. (i) Net Present Value (NPV), (ii) Internal Rate of Return (IRR), (iii) Net Present Value Over Cost Ratio (NPV/C), (iv) First Year Rate of Return, and (v) Switching Values.
- ix. **Economic Development:** In addition to the cost benefit analysis undertaken, the Consultant shall consider the likely wider economic development benefits from the road project. Resulting economic development from the road investment may be dependent upon the additional investments in other undertakings. When a more detailed quantified analysis is not possible, the analysis may also take the form of a qualitative description of the likely effects.
- x. **Social Benefits:** The Consultant shall consider the social benefit implications of the project. Where the levels of economic activity are low, improved accessibility may have a significant effect on poverty reduction and the long-term development of local communities through the improved access to the provision of services. Such benefits cannot be analysed easily through conventional economic analysis. A statement of the likely social benefits of the proposed road investment should be included in the feasibility study report.

- xi. **Sensitivity and risk analysis:** The Consultant shall carry out a sensitivity analysis to identify the most critical variables impacting the expected outcome. The Consultant shall take into consideration the range of possible variations in the values of the basic elements, and the extent of uncertainties attached to the outcome should be clearly indicated. Visualisation of outcomes to include spider and tornado diagrams.
- xii. **Multi-Criteria Analysis-** The consultant shall carry out a multi-criteria analysis covering economic, social, environmental, political and strategic considerations.
- xiii. **Preliminary Cost Estimates:** The Consultant shall carry out all the preliminary technical surveys, studies, investigations, and calculations which are detailed in the relevant section "Preliminary Design", and provide preliminary cost estimates for project evaluation.

## PRELIMINARY ENGINEERING DESIGN

The Consultant shall consider the following aspects:

- (i) Topographical Surveys. The Consultant shall carry out the surveys to the accuracy required. The Consultant will be required to prepare preliminary designs and alignment/design options for the approved stretch of the road **and only embark on ground topographical surveys of the section of the road approved by the MPWR&H in consultation with the concerned FMS and the communities themselves for rehabilitation and construction.**

The Consultant shall carry out topographical surveys for the entire stretch to be constructed using satellite technique - Global Navigation Satellite System (GNSS) Real Time Kinematic (RTK) through GPS, etc.). All points collected shall have the following attributes: Northing, Easting, Elevation (X,Y, Z), Digital Terrain Modelling - DTM Attribute (In/OutDTM), point connectivity - (straight/curve), point comment (Surveyor on-site specific comment). **Surveys by handheld GPS are not acceptable.**

The surveys to be carried out shall be adequate to develop a topographical contour map at 0.5 meter contour intervals. The topographical surveys should show the following information:

- site boundaries, major landmarks, survey benchmarks
- all visible physical features including existing buildings and infrastructure, all paved and unpaved roads, all streams, water bodies, trees, anthills, rock outcrops
- all underground and overhead utility systems, water supply wells and lines, cables, telephone lines and poles, electric lines and poles
- drainage, drains, channels, culverts, sewerage, invert level of drainage structure, manholes and type and diameter of connecting pipes, if present
- ground contours at 0.5m intervals

The topographical survey shall include centreline levels of the road and cross-section levels at 20m intervals and up to 30m on either side of the centreline in 5m offsets.

The Consultant shall establish points on the proposed right-of-way limits at intervals of 3km all according to the requirements of the MPWR&H and the concerned FMS.

For the topographical survey and future works, primary reference beacons and benchmarks shall be established at approximately 3km intervals in inter-visible pairs within the limits of the proposed road reserve. Secondary Reference beacons and benchmarks shall be established at approximately 500m inter-visible intervals. Additional beacons as necessary shall be provided to fix cardinal points such as horizontal intersection points, transition points etc. The beacons shall be tied to the National Survey Grid and benchmarks related to National Benchmarks. Both beacons and benchmarks shall be established in the field by permanent concrete posts. They shall be shown on plan and profile drawings and referenced appropriately. Establishing and extending Survey Controls shall be done in accordance with the guidelines set by the department of Surveys and Mapping of the MPWR&H and the concerned FMS. The Primary control network shall be registered and approved by the Department of Surveys and Mapping.

Level data shall be recorded at a maximum of 20m intervals along the road centreline.

The width of the survey corridor shall take into account the layout of the existing/preferred alignment including the extent of embankment and cut slopes and the general ground profile.

Where existing roads and main rivers/streams cross the alignment, the survey will extend a minimum of 50m either side of the road centre line and will be of sufficient width to allow improvements, including at grade intersections, to be designed. The survey will include level data taken at a maximum of 20m intervals along the centreline.

All topographical surveys undertaken by the Consultant shall be to acceptable international standards for such works. The data from the surveys shall be available in (x, y, z) format for production of a digital terrain model (DTM) which shall become the property of the MPWR&H upon the completion of the study and the MPWRH will share the document with the concerned FMS.

All topographical and design data shall be supplied in a format agreed with the MPWR&H and the concerned FMS Surveyor.

- (ii) Preliminary Geotechnical Investigation. The Consultant shall carry out a complete geotechnical investigation of the proposed route. The Consultant shall carry out boring at depths greater than 25m (reaching firm bearing strata) at bridge structure locations and DCP (Deep Cone Penetrometer) tests at locations of box culverts (at least 5.0m below existing ground level).
- (iii) Hydrology/Hydraulics Study. The Consultant shall analyse and document Hydrology/Hydraulics assumptions, check the size of existing drainage structures and propose the main drainage requirements for the road. The Consultant shall document the preliminary Drainage Design in the Hydrology/Hydraulics report. The study shall include a

narrative description and schedules of proposed drainage structures, conditions, and facilities. All Hydrologic and Hydraulic drainage computations for the design presented in the plans shall be included along with supporting design information such as drainage maps, geological data and geotechnical data. Historical flood line for the site shall be determined to compare with calculated discharge.

- (iv) Preliminary Geometric Design of the Road. The Consultant shall design the road according to agreed design criteria. The consultant shall investigate various alignments, assess and design the horizontal and vertical alignments.
- (v) Road drawings shall include:
  - a) Plan drawings at a scale of 1:1000 or as agreed with the MPWR&H and the concerned FMS to show alignments, vegetation type, main drainage elements, right of way and clearly show areas of land take and affected properties;
  - b) Profile drawings to scale 1:1000/1:100 or as agreed with the MPWR&H and the concerned FMS to include the existing road surface or natural ground level and proposed vertical alignment.
- (vi) The Consultant shall undertake the geometric design of the road using a modern and comprehensive (Computer Aided Design and Drafting) CADD package. This CADD software must be capable of allowing the designer to assess different alignments along the proposed route and also for preparation of a **visual 3D representation/drive through** of the designed road. All topographical and design data shall be supplied in a format to be agreed with the MPWR&H and the concerned FMS.
- (vii) Preliminary Pavement design. The Consultant shall propose pavement options in terms of layer type, quality and thickness of pavement considering the project traffic loadings for the section. The Consultant shall take into account availability of suitable construction materials along the route.

### **Preliminary construction quantities and cost estimate**

The Consultant shall calculate quantities for the items of construction based on the preliminary design drawings and shall prepare a preliminary bill of quantities among others, adequately addressing environmental and social concerns.

The Consultant shall make a realistic evaluation of the cost of the project, taking into account the location and size of the project as well as the current status of construction market and an evaluation of recent similar construction contracts in Somalia including trends in cost of local and imported materials. The Consultant shall consider land acquisition, implementation of environmental/ social mitigation measures and environmental and social management and items identified in the project risk matrix in the cost estimate.

## **DETAILED ENGINEERING DESIGN**

As the design progresses the Consultant shall maintain close liaison with the MPWR&H and the concerned FMS and shall submit for approval from time to time, according to the work programme, draft design proposals for the alignment, drainage, pavement and other technical aspects of the design prior to proceeding to the detailed design drawings. Where a number of options have been considered these shall be described and analysed in a Design Options Report. Similarly, the Consultant shall submit draft technical specifications and bills of quantities prior to producing the draft final bidding documents.

### **Hydrological Studies**

The Consultant shall undertake hydrological and hydraulic studies for all drainage catchments with careful analysis of available maps and field investigations.

The calculation of catchment run off and channel discharge characteristics shall be based on rainfall intensity and duration for a return periods identified in the Drainage Design Manual for the various drainage elements and bridges.

Slopes and capacity of side drains and turnouts shall be surveyed in areas where erosion or flooding presently occurs, in order to ensure adequate design of side and catch drains, erosion control measures and the protection of side slopes.

### **Geometric Investigation**

The Consultant shall develop optimum vertical and horizontal alignments having regard to:

- (i) design manual criteria or such other criteria agreed with the MPWR&H and the concerned FMS;
- (ii) the need to balance cut and fill;
- (iii) the need to minimise land take beyond the existing road reserve;
- (iv) the need for inbuilt safety measures as appropriate and to protect vulnerable road users
- (v) the need to protect or relocate utility services and the need to avoid geological, hydrological and environmental problems;

Detailed site investigation and surveys shall be carried out for areas susceptible to flooding or landslide, and at all proposed new or replacement drainage structure locations, including a sufficient length upstream and downstream to the structures.

Vertical and horizontal alignment data shall be computed for the centre line at a maximum of 20m intervals.

### **Soils Materials and Pavement Investigations**

The Consultant shall undertake extensive soils and materials testing in relation to the:

- i. adequacy of sub grade materials on existing and new alignments;
- ii. stability of existing embankments and cuttings and their capacity for raising or deepening;
- iii. suitability of cut materials to be utilised as fill;
- iv. identification of suitable borrow pit and gravel pit location and an estimate of the volumes of suitable material they may yield and potential water points;
- v. identification of suitable sources of aggregates and an estimate of the volumes they may yield.

The Consultant shall take samples along the road centre line at intervals of a maximum of 500m. Field and laboratory tests shall include soil classification (sieve analysis and Atterberg limits), modified proctor test, moisture content, CBR (4 days soaked) and CBR (un-soaked).

With regard to sampling from borrow areas and stone quarries, the consultant shall carry out tests described below.

- i. Testing of construction materials shall include grain size distribution, maximum dry density, moisture content and plasticity index.
- ii. Aggregate tests shall cover specific density, relative density and water absorption, abrasion, crushing value, flakiness index, bitumen affinity, sodium sulphate soundness and polishing value.
- iii. For borrow areas, at least three trial holes per site are to be excavated to prove overburden, quality and quantity of materials at each location.
- iv. For quarries, at least three trial holes and at least one borehole per site to prove overburden, quality of material and quantity of materials.
- v. Water tests to include  $p^H$  value, Chloride content and Sulphate content.
- vi. In conjunction with the soils and materials investigations the Consultant shall undertake such investigations of the existing road pavement as are necessary to determine:
  - a) the thickness, stiffness and bearing quality of pavement layers;
  - b) the consistency of construction depth and materials quality;
  - c) the adequacy of sub-grade drainage provisions, if any;
  - d) the cause of major pavement distress and failures; and
  - e) the residual life of the pavement.
- vii. Tests shall include the excavation of test pits at intervals not greater than 500m.
- viii. The Consultant shall carry out the following tests in the Laboratory to fully assess soil characteristics: a) Natural Moisture content; b) Liquid Limit; c) Plastic Limit; d) Linear shrinkage; e) Organic content; f) Strength tests and, g) Consolidation tests.



The Consultant shall review all available condition survey and maintenance records with a view to estimating the rate of pavement deterioration and the expected condition when the road works commence.

The Consultant shall prepare adequate price to cover soils, materials and bridge site investigations and include the same in his financial proposal. The soils and geotechnical site investigations plan and costs must be comprehensive to cover a whole range of tests required for the project. The Consultant is free to visit the project site to appraise him/herself of site conditions to ensure the pricing for this activity covers all anticipated soils and materials investigations required before submitting a proposal.

### **Culvert and Bridge Inspection and Assessment**

The Consultant shall undertake a detailed condition survey of all existing drainage culverts and all bridges to determine their structural adequacy and traffic load capacity. Assessments shall be made of their residual life and the cost of repairs or reconstruction to increase capacity. The Consultant shall make recommendations as to their retention, reconstruction or replacement.

The Consultant shall carry out any necessary non-destructive testing of the culverts and or bridges, subsurface investigations (including the taking of undisturbed soil samples at foundation level), and structural investigations (including coring, impact hammer or electronic testing).

The Consultant shall include a draft non-destructive testing programme, subsurface and structural investigations for the culverts and bridges, including cost estimates, in their proposal.

### **Geometric Design**

The Consultant shall carry out designs of the vertical and horizontal alignments. Cross-sectional design shall take into account the need for:

- i. earthworks side slopes and cuttings, including the need for benching or other slope stability measures.
- ii. requirements for open or piped side and catch-water drains, subsurface drains;
- iii. shoulders/footways;
- iv. requirements for open or piped side and catch water drains, subsurface drains;
- v. space to accommodate utility services and roadside furniture, e.g. road lighting and ducting, guardrails, road signs and the like.
- vi. Service ducts (e.g., for fibre optics, etc.,)

Full cross-section data shall be computed at 20m intervals

Where cross-sectional requirements cannot be accommodated within the existing road reserve preliminary land acquisition proposals shall be revisited.

## **Pavement Design**

The Consultant shall develop a range of standard pavement designs and associated maintenance regimes and economically evaluate each to determine which has the lowest whole life cost. The consultant shall propose pavement options in terms of layer type, quality and thickness of pavement considering the project traffic loadings for the section. The Consultant shall take into account availability of suitable construction materials along the route

## **Design of Drainage Structures (Side and Cross Drains)**

The Consultant shall engage with roadside communities and local authorities to raise awareness of the need to offer easement rights for road drainage to run-off over adjoining land to ensure adequate drainage. Where such easement rights are required, the Consultant shall submit details for inclusion in the Resettlement Action Plan and shall design such run-off drainage in consultation with the affected landowner.

## **Borrow Pits and Gravel Pits**

Following preliminary identification of borrow and gravel pit locations the Consultant shall consult with the MPWR&H and the concerned FMS and other authorities as to possible locations and environmental and social legal requirements, prepare detailed proposals and plans for their opening, operation and restoration.

## **Quarries**

The Consultant shall examine existing quarries and crushing plants and their capacity to supply aggregates and granular mixes to the required specifications.

## **DESIGN DRAWINGS**

The Consultant shall prepare and submit contract drawings as specified below. For bidding purposes, the drawings shall be reduced in scale as indicated in the section on preparation of bidding documents. The consultant is to submit and agree the layout of all drawings prior to preparation of any drawings.

<b>Drawing Type</b>		<b>Scale</b>
<b>Key Plan</b>		1:20,000
<b>Layout Plan and Longitudinal Section (1km)</b>		Hor: 1:1000 Vert:1:100
<b>Cross-sections</b>	Cross-sections are to be provided at 20m intervals and at significant changes in cross section	Hor:1:1000 Vert:1:100
<b>Typical Cross-sections</b>		

Drawing Type	Scale
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#### **Drainage Schedules**

Longitudinal Section through Culverts  
Dimensions and Levels  
Hydraulic Data  
Culvert Type.

#### **Junction and Urban Layout Drawings**

1:200

Fully dimensioned layout drawings for each major rural junction and each urban or semi urban area

### **CONSTRUCTION QUANTITIES AND COST ESTIMATE**

In order to make a fair and reasonable estimate of the construction costs the Consultant shall prepare a unit price analysis of each major item using basic cost elements (labour, material, equipment, overhead, risks, profit, etc.) but excluding and showing separately the cost for taxation. Costs shall be broken down into foreign and local currency components. The analysis shall extend to proposed weightings and price adjustment formula.

The Consultant shall consider the Government of Somalia economic and fiscal indicators and prepare the above construction cost estimates for the current base year and also prepare an adjusted cost estimate for + 1 years, + 2 years and +3 years to enable the MPWR&H and the concerned FMS understand the cost implications. The consultant's price model should include unit rate analysis and also provision for unit rate adjustment.

Cost comparisons shall be made in respect of both unit rates and per km costs with similar ongoing projects both in Somalia and elsewhere within the East African Community. These comparisons will be presented in tabular form supplemented by possible explanations for significant variances.

### **ECONOMIC ANALYSIS**

The Consultant shall review and update the economic analysis contained within the approved Feasibility Report. Should such an analysis not have been made, a full analysis shall be undertaken in accordance with parameters agreed with the MPWR&H and the concerned FMS.

The analysis shall detail expected costs and benefits for the duration of the project's post completion design life. Analysis outputs shall be the Cost/Benefit Ratio, the Economic Internal Rate of Return and the Net Present Value in relation to the opportunity cost of capital, First Year Rate of Return (FYRR), NPV/Cost Ratio.

A Sensitivity Analysis shall be carried out based on the major risks associated with construction, maintenance, user costs and anticipated project benefits.

### **CONSTRUCTION PROGRAMME**

The consultant shall prepare a construction programme and take into account the climatic conditions (rainy and dry seasons, etc.,) of the areas concerned.

## **POST DESIGN SERVICES**

The Consultant shall be available to provide clarification and explain the basis of their design to any downstream reviewer of the design and to any prospective bidder during bidding for works construction.

The Consultant shall respond in writing to written requests (from any downstream reviewer of the design and from prospective Bidders) for clarification of the Bidding Document during bidding for works, or during a pre-bid meeting provided for in the Bid Data Sheet (BDS) of the Bank's Standard Bidding Document for Procurement of Works and during an organised site visit provided for in the Bid Data Sheet (BDS).

Should it be deemed necessary to amend the Bidding Document as a result of a request for clarification, the Consultant shall amend the Bidding Document by issuing addenda. Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all the prospective Bidders that have obtained the Bidding Document from the MPWR&H (Employer).

The costs arising from responding to requests for clarification of the Bidding Document, organising a pre-bid meeting and a site visit, and amending the Bidding Document by issuing addenda are deemed to be included in the overall lump sum contract price.

## **TECHNICAL REPORTS**

In addition to the routine progress, inception and assignment completion reports described in the TOR, the Consultant shall prepare the following technical reports, initially in draft form for discussion with the MPWR&H and the concerned FMS and other relevant parties, and Final Reports as approved by the MPWR&H in consultation with the concerned FMS.

The Consultant shall submit one electronic copy in USB Memory Stick and 10 original hard copies of all draft Technical Reports to the MPWR&H. The MPWR&H and the concerned FMS shall endeavour to review and approve or comment on the draft reports and communicate its comments to the Consultant within two weeks of their receipt. The ministry will have the final decision in these. Documents and reports which are not structured comprehensively will not be considered draft and will be returned to the Consultant for revision.

The Consultant shall submit one electronic copy in USB Memory Stick and 10 signed hard copies of all Final Technical Reports to the MPWR&H. The ministry will share the copies with the concerned FMS.

The data files, if any, from calculations or drawings carried out using specialist software, for example Road Design, Structural Design or Computer Aided Design, shall also be submitted to the

MPWR&H and each concerned FMS on non-rewritable discs or other agreed format. The MPWR&H shall be the owner of all reports and documents submitted as a result of these services and the concerned FMS will own their concerned reports and documents.

### **Inception Report**

The inception report shall confirm methodology and work plan, task assignment, project team and staff schedule and Log-Frame indicators including an initial assessment of the project.

### **Initial Assessment Report**

This shall summarise the findings from their visual assessment and risk assessment, and include a detailed site inventory and photographic record. The Consultant shall liaise with the MPWR&H and the concerned FMS to agree on the actions and priorities recommended in their report.

### **Draft Economic and Financial Study Report**

This shall include a summary of all analysis carried out to assess the economic/financial viability of the proposed project, including route assessment, traffic studies, economic and financial evaluation.

### **Preliminary Design Report**

This shall include a summary of the preliminary investigation results, analyses and interpretation of findings, analysis of design options and recommendation of most viable option, preliminary findings with regard to environmental and social impact and road safety, location maps, layout plans and profiles, typical cross-sections showing cut and fill slopes, typical cross-section drawings showing pavement details, drawings for cross drainage, risk assessment matrix.

### **Geometric Survey Report**

This report shall contain a detailed description of the method of survey, a list of established control points with their coordinates, the location of traverse control points, a list of survey control points, a list of scale factor for each established control point, check control points, topographical and cadastral details, etc. All data shall be in electronic format for digital terrain model usage.

The report should be sufficiently detailed to provide the Supervision Consultant and the Contractor with adequate and easily referenced survey information during the construction stage.

### **Hydrological, Hydraulic and Structural Report**

This report shall detail all assumptions, standards and criteria used in the calculation of peak run off from each catchment, and such calculations shall be submitted in full. Hydraulic calculations shall be submitted for each existing or additional drainage structure.

The condition of each existing structure shall be summarised and reasons stated for its abandonment, extension or enlargement. The need for erosion or scour protection for each structure shall be evaluated and quantified.

### **Soils Materials and Pavements Report**

This report shall summarize all geotechnical, soils and pavement investigation findings, including investigations relating to the identification and estimated volumes of borrow pits, gravel pits and quarries.

Full details of identified geotechnical problems along the road alignment, such as weak sub-grade and slope stability problems, shall be documented and calculations provided. Remedial measures options shall be proposed and evaluated and quantified.

Testing regimes shall be described and all test results annexed.

### **Detailed Design Report**

The Report shall include a concise Design Statement, that provides a summary of all design standards, criteria and assumptions used to prepare the design, and the dates and scope of all survey and data collection activities.

The report shall include the estimated Construction Quantities, Cost Estimate and Economic Analysis of the presented design as well as a provisional traffic management plan detailing how motorised and non motorised traffic and pedestrians shall be accommodated during the construction phase.

### **Environmental and Social Impact Statement**

The Consultant shall prepare an Environmental and Social Impact Statement (ESIS) that reports on the findings, conclusions and recommended actions, supported by summaries of the data collected and citations for any references used in interpreting those data.

The ESIS should be concise and clearly addressing significant social, environmental and economic issues. The ESIS should be prepared in accordance with national and international requirements and addressing all outputs under the guidelines for Environmental Impact Assessment in Somalia.

### **Preparation of Bidding Documents and Construction Drawings**

During detailed design, the Consultant should review possible forms of contract for works and hold consultations with the relevant MPWR&H staff and the concerned FMS staff and recommend to the MPWR&H and the concerned FMS the most suitable form of contract for the works required. This will depend on the technical complexity and nature of the project works, and the capacity of local and/or international contractors to implement the works.

The Consultant shall prepare a master set of bidding documents and construction drawings for Construction Supervision Services and for Construction Works, including all project information and documentation required to accurately define the project works and services to be provided.

### **Resettlement Action Plan**

The Consultant shall review the Resettlement Action Plan (RAP) prepared by the previous ESIA/RAP Consultant. The Consultant should aim to minimise the need for involuntary resettlement

and adopt best practice in community participation at all stages to minimise the potential for future grievances and disputes.

The overall purpose of the RAP process is to ensure that all measures have been taken to efficiently clear the project area and access given to the Contractor to allow works to start on time during the construction phase, and that Project Affected Persons (PAPs) are treated as beneficiaries and do not become worse off because of the project.

The Resettlement Action Plan (RAP) summarises all the findings and outputs from the Land Acquisition (LA) preparatory work and proposes how the LA process is to be implemented.

### **Community Participation**

Effective community consultation and participation is critical to the smooth implementation of the project. The Consultant shall work closely with appropriate local Non-Governmental Organisations (NGOs) and Civil Society Organisations (CSOs) as well as local government and leadership bodies to ensure that even the poorest and socially excluded are represented fairly in the LA process.

The Consultant shall prepare a Community Participation Strategy that defines how they shall identify and engage with all communities and social groups affected by the project. This strategy should identify the local government authorities and individuals to be involved, and the local NGOs and CSOs that can help with community participation in the LA process, including mass media organisations.

### **Compensation Strategy**

The Consultant shall prepare a Compensation Strategy that includes information about eligibility criteria for compensation (based on Somalian Law), estimated values for eligible compensation payments, payment mechanisms and responsibilities.

The strategy should define the procedures to be followed for making payments to ensure accountability and transparency, and for recording and resolving grievances, in accordance with the requirements of the Government Valuer.

### **Monitoring and Evaluation Plan**

The Consultants shall prepare a Monitoring and Evaluation Plan, to enable monitoring of the RAP implementation and evaluation of the impact of the LA process.

## **LOGISTICS AND TIMING**

### **Timing**

The services to be provided shall be phased as shown below:

<b>Service / Activity</b>	<b>Duration (Months)</b>
Economic/Financial Study and Preliminary Design	2.25 months
Detailed Design and Bidding Documents and Construction Drawings	4.00 months
<b>Total</b>	<b>6.25 months</b>

## Reporting Requirements

### Progress Reports

The Consultant shall prepare the following project planning and progress reports (for BeledWeyne-Kalabeyr section and for Dhusamareb-Qaradhi section).

Report	Timing	Description
Inception Report	2 weeks after start	Confirm methodology and work plan, task assignment, project team and staff schedule and Log Frame indicators including an initial assessment of the project.
Monthly Progress Reports	Monthly (within 7 days of the end of the reporting period)	Concise summary of progress and key achievements in previous month; planned activities for coming month; Earned Value Analysis or similar update, identify critical issues to be addressed. The Monthly Progress Reporting should also include a presentation on the Monthly Report to be made by the consultant to the MPWR&H and the concerned FMS.
Draft Completion Report	4 weeks before contract end	Comparison of actual versus original planned activities, inputs, costs with reasons. Key issues raised and addressed during the assignment. Evaluation of performance against plan. Outstanding issues. Recommendations to the MPWR&H and the concerned FMS on how to improve service provision. The Draft Completion Report should also include a presentation on the Report to be made by the Consultant to the MPWR&H and the concerned FMS
Final Completion Report	1 week after contract end	As above, updated with final activities, inputs, costs together with comments from the MPWR&H and the concerned FMS

### Technical Reports

In addition to the progress reports, the Consultant shall prepare the following technical reports (for BeledWeyne-Kalabeyr section and for Dhusamareb-Qaradhi section) in accordance with the terms of reference .

Technical Service	Report	Report Time Line (months after start of assignment)
Preliminary Design	Inception Report	0.50
	Initial Assessment Report	1.00
	Economic/Financial Study, Preliminary Design and Reports	2.50
Detailed Design	Survey Report	3.00
	Hydrological, Hydraulics and Structural Report	3.00
	Soils, Materials & Pavements Report	3.00
	Draft Detailed Design Report and Bidding Documents	5.00
	Project Costing Report	5.00



<b>Technical Service</b>	<b>Report</b>	<b>Report Time Line (months after start of assignment)</b>
	Final Detailed Design Report and Bidding Documents and Construction Drawings	6.25
	Resettlement Action Plan	6.25

The above reports and all the work executed on the project shall be submitted to the MPWR&H; the MPWR&H will share the reports with the concerned FMS in both hard and soft copy (Adobe.pdf and applicable editable version). In addition, Consultants shall prepare and make presentations of all the above reports or work done to the Consultant's Forum and at progress meetings with the MPWR&H and the concerned FMS.

The Consultant shall submit 10 copies of each report (for BeledWeyne-Kalabeyr section and for Dhusamareb-Qaradhi section) in hard copy in A4 size plus a USB Memory Stick to the MPWR&H. The MPWR&H and the concerned FMS may advise on other alternative methods of submitting deliverables during the assignment.

The Consultant shall prepare 10 sets of tender documents (for BeledWeyne-Kalabeyr section and for Dhusamareb-Qaradhi section); tender drawings shall be prepared in A3 size. The Consultant shall also prepare 3 sets of Construction drawings in A1 size (for BeledWeyne-Kalabeyr section and for Dhusamareb-Qaradhi section).

## **STAFFING**

### **Team Composition**

The Consultant shall propose a team of experts that is fully able to deliver the services in accordance with the technical requirements defined in this TOR. The team composition of Key Experts and Additional Experts proposed by the Consultant shall cover all the areas of expertise defined in the Terms of Reference.

The proposed Team Leader shall be (based on the Consultant's assessment) one best able to lead the team to deliver the services and provide continuity throughout the assignment.

The inputs of Key Experts and Additional Experts are to be defined by the Consultant in the Time Schedule for Professional Staff to ensure timely delivery of the technical requirements and key deliverables. The Consultant shall complete the Team Composition and Task Assignment in sufficient detail to ensure that all technical requirements fall under the responsibility of a named expert.

The Consultant shall submit CVs for all Key and Additional Experts in their proposed team.

All personnel shall be fully fluent in reading, writing and speaking English which is the contract language, and shall be competent in the use of modern word processing and spreadsheet software as well as any technical software appropriate to their specialist area.

The Consultant shall field a team of suitably qualified and experienced personnel whose minimum qualifications are specified below:

## **Key Professional Staff**

The consultant shall provide sufficient resources to carry out all the services required under the assignment and the minimum requirements for the key professional staff are as indicated below:

### **Team Leader**

The Team Leader shall be responsible for the conduct of the entire study and therefore shall be the principal contact person between the Consultant and the MPWR&H and the concerned FMS. In addition to defining and supervising the activities of other members of the consultancy team, the team leader is expected to carry out the feasibility, preliminary and detailed geometric design of the road, hydraulic and structural design of the drainage systems and compilation of the road furniture inventory. The Team Leader shall also be responsible for the preparation of bidding documents. He shall ensure that the documents comply with the procurement guidelines as advised by the MPWR&H and the concerned FMS.

In addition to holding a graduate degree, the Team Leader shall be a registered or Chartered Civil Engineer of not less than 15 years postgraduate experience in road design and construction. The Team leader shall have specific experience of at least 10 years working in and managing consultancy teams working on feasibility studies and detailed design of roads. Fluency in written and spoken English is mandatory.

### **Highway Design Engineer**

The Road Design Engineer shall be a qualified and competent Chartered or Registered professional Civil Engineer with a degree in Civil Engineering or equivalent qualification and with a minimum of 10 years experience in road design and construction of which 5 years should have been gained as a design engineer on a road design project of similar nature, preferably in Tropical Countries. He /she should have proven ability to manage and administer a project of this nature. Fluency in both written and spoken English and ability to communicate ideas freely and easily is essential.

### **Senior Transport Economist**

The Senior Transport Economist shall be responsible for the conduct of the economic evaluation the project. He/she shall carry out a review of the underlying economic factors pertaining to the various aspects of the project over its life. The Transport Economist shall carry out a review of the benefit and cost streams attributed to the project, the Economic analysis should yield updated overall economic indicators such as the NPV and EIRR as well as the best project staging options for optimum timing and maximum benefits. The analysis should also include sensitivity tests to check the robustness of the project outcomes as indicated. He/she shall lead the socio-economic surveys on incomes and livelihoods among others.

The Economist shall have a minimum of a first degree with at least 10 years experience in carrying out economic analysis on internationally financed infrastructure projects of similar nature. The Economist shall be familiar with the traffic patterns in developing countries and shall have proficiency with the HDM technology. Proficiency in the use of producer surplus (value added)

economic evaluation approach is an added advantage. Fluency in written and spoken English is mandatory.

### **Soils and Materials Engineer**

The Materials Engineer shall be responsible for conducting and supervising the materials survey and investigations with a view to achieving optimal design and construction strategy. He shall review the information on soils and sub-grade properties. The materials Engineer shall carry out the pavement design and should be well versed with pavement construction strategies in developing countries.

In addition to holding a graduate degree, the Materials Engineer shall be a Registered or Chartered Engineer with at least 8 years post graduate experience in pavement design, materials testing and investigations on projects of similar nature. Fluency in written and spoken English is mandatory.

### **Bridge Engineer**

The Bridge Engineer shall be responsible for assessing existing bridge condition and supervising the Bridge surveys and investigations. He shall be responsible for the analysis of all bridge conditions. In addition to holding a graduate degree, the Bridge Engineer shall be a Registered or Chartered Engineer with at least 8 years post graduate experience in bridge condition surveys and Bridge Designs for projects of similar nature. Fluency in written and spoken English is mandatory.

### **Natural Resource Management/ Environmental Specialist**

The Natural Resource Management Specialist shall be responsible for carrying out an environmental and social impact assessment of the project and propose mitigating actions to be carried out in order to minimise any negative impacts that the road construction will have on the environment and the people.

The specialist should be qualified with a master's degree or its equivalent in environmental management, forestry, or related natural science degree or related physical science degree. The Specialist shall have at least 10 years professional experience working in environmental management with sound knowledge of environmental and social issues, initiatives and implementing mitigation measures. Good knowledge of Climate Risk Management, Disaster Risk Reduction and the global climate change agenda will be an added advantage. Fluency in both written and spoken English is essential. Experience in environmental management issues in construction projects would be an added advantage.

### **Senior Surveyor**

The Senior Surveyor shall be a qualified and competent professionally registered person with a relevant degree in land surveying and shall be registered to practice. The Surveyor shall have at least 8 years experience in surveying for road design, route location, topography and the valuation and acquisition of land, property and crops. Fluency in written and spoken English is essential.

### **Hydrologist**

The hydrologist shall be a qualified professional with a degree in Physical or Natural sciences or civil engineering and with not less than 10 years experience in water resources of which not less than 5 years should have been gained as a hydrologist on a project of similar nature, preferably in Tropical

countries. The hydrologist should be proficient in design of hydraulic structures and the use of flood design models. He/She should have proven ability to manage and administer a project of this nature. Fluency in both written and spoken English and ability to communicate ideas freely and easily is essential.

### **Road Safety Specialist**

The Road Safety Specialist shall be responsible for reviewing the proposed road designs and associated road furniture for conformance with the Road Safety Requirements and propose improvements to the design where the design does not comply with the safety requirements. The Road Safety Specialist should hold a graduate degree and shall be a Registered or Chartered Engineer with at least 8 years post graduate experience in Road Safety Audits. The specialist should have experience in carrying out traffic safety studies/ investigations, and relevant international experience in developing countries. Fluency in written and spoken English is mandatory.

### **Social-Gender Specialist**

The Social-Gender Specialist shall be responsible for carrying out a social impact assessment of the project and propose mitigating actions to be carried out in order to minimise any negative social impacts that the road construction will have on the people. The Specialist will also be responsible for conducting a thorough gender analysis of the project and propose actions to be carried out to ensure equal benefits to both women and men are derived from the project.

The Specialist should be qualified with a degree in Gender/ Social science management, or, related discipline. The specialist shall have at least 10 years professional experience in development work with social and gender components, including the design and/ or management, social impact assessment and mitigation measures of infrastructure programs and projects in Africa. The specialist should be cognizant of the area and local people who will be affected by the project. He/She shall have proven ability in helping developing countries to formulate and implement gender strategies. Familiarity with bilateral or multilateral development organizations is preferable. Consultancy experience in feasibility studies and program design will be necessary. Presence in the field will be a necessity. Fluency in both written and spoken English is essential.

### **Senior Land Economist/Valuer**

The Senior Land Economist/Valuer shall be responsible for the valuation of all the properties that will be affected by the road reserve. He/She shall have a minimum of a degree in land economics with at least 8 years' experience in the valuation of properties of which at least 5 years must have been in the road sub-sector. Fluency in written and spoken English is essential.

### **Staff Time Inputs**

The key professional staff input is estimated as shown below for the entire consultancy. The assignment has distinct deliverables which include the Feasibility Study, Detailed Engineering design among others, and the staffing inputs should clearly reflect these distinct tasks.

The breakdown of estimated staff-time inputs is shown in the table below: -

<b>I/No.</b>	<b>Position</b>	<b>Estimated Inputs (Person-month)</b>
1.	Team Leader	6.25

<b>I/No.</b>	<b>Position</b>	<b>Estimated Inputs (Person-month)</b>
2.	Highway Design Engineer	5.25
3.	Senior Transport Economist	2.00
4.	Soils and Materials Engineer	4.75
5.	Bridge Engineer	1.00
6.	Natural Resources Management/ Environmental Specialist	1.00
7.	Senior Surveyor	5.25
8.	Hydrologist	2.00
9.	Road Safety Specialist	1.00
10.	Social-Gender Specialist	0.75
11.	Senior land Economist/ Valuer	0.75
	<b>Total Person-Months</b>	<b>30.00</b>

#### **FACILITIES, SERVICES AND RESOURCES TO BE PROVIDED BY THE MPWR&H AND THE CONCERNED FMS**

- The MPWR&H and the concerned FMS shall provide the Consultant with all relevant Somalia technical manuals and standards, electronic copies of revisions or updated technical manuals, standard reporting formats and other documentation as and when they become available for use.
- The MPWR&H and the concerned FMS shall make adequate arrangements for security and safety of the Consultant's team, equipment, facilities and materials throughout the duration of the assignment and as the need arises;
- The MPWR&H and the concerned FMS shall facilitate liaison with, and the cooperation of, Government Ministries and other organizations as necessary for the Consultant to perform the services and to follow protocols to ensure effective and efficient implementation of the services and subsequent works.
- The MPWR&H and the concerned FMS shall provide to the Consultants such documents, data and reports available and where necessary assist them to obtain copies from third parties. The Consultant shall be responsible for the accuracy of data and correctness of the information, analysis and interpretation of the data and recommendations thereof. All such documents, data and information shall be treated as confidential and shall not be used for any other purpose not related to the study.
- The MPWR&H shall assign a Project Manager to be responsible for the coordination of the assignment including: monitoring and supervision of the Consultant's activities, assisting in the acquisition of the relevant reports, data and information and providing all the necessary support on all matters related to this assignment.
- The MPWR&H shall facilitate the entry and exit and issuance of visas, work permits and other statutory permits that the Consultant may require for the execution of the assignment. However, the Consultants should contact the relevant authorities to be advised of the taxes payable by them.

## **FACILITIES, SERVICES AND RESOURCES TO BE PROVIDED BY THE CONSULTANT**

The Consultant shall:

- Employ well qualified and competent professional staff at all times in the execution of the study and establish a dedicated project office for the assignment with furnished workspace and telecommunications facilities;
- Make all necessary arrangements for carrying out the services and supporting the staff assigned to the project. This shall include office and living accommodation, equipment, transport, telecommunications, office and other supplies;
- Ensure that the Team Leader and Experts have the full authority in the country to make any technical decisions necessary to complete the services as required

## **CLIENT LIAISON AND FEEDBACK**

The Consultant shall report to the MPWR&H and the concerned FMS Project Manager, on all matters relating to the assignment. The Consultant shall work closely with the MPWR&H and the concerned FMS Project Manager and / or their representatives to ensure the smooth running of the project and timely completion of the assignment.

The Consultant shall provide constructive feedback on all aspects of the assignment and the MPWR&H and the concerned FMS issued documentation, and assist them in their efforts of continual improvement.

## **SUPPORT/ADDITIONAL STAFF AND BACKSTOPPING**

The Consultant shall include in their financial proposal provision for all necessary additional staff and backstop support as required. The Consultant shall also make financial provision for necessary support staff including, but not limited to, administrative support staff, junior engineers, technicians etc. In other words, the costs of providing additional/supporting staff and back-stop support are considered to be included in the fee rates for the key professional staff.

## **TRANSFER OF KNOWLEDGE AND COUNTERPART STAFF**

The MPWR&H and the concerned FMS shall assign counterpart staff to work with the Consultant's team and to be provided with 'on-the-job-training'. The Consultant shall outline as to when such training may be expected to benefit concerned FMS staff. The Consultant shall be required to submit a training plan to be incorporated in the proposal clearly articulating how nominated counterpart staff shall be trained by the Consultant. The training should cover all the aspects of the project from feasibility stage to the detailed design stage of the project. During the training, it is anticipated that the counterpart staff will be fully integrated within the Consultant's operations. Remuneration and allowances for any counterpart staff shall be the responsibility of the MPWR&H's project team and the concerned FMS.

## **PAYMENT SCHEDULE**

Overall contract amount will be a lump sum

- Twenty (20) percent of the Contract Price shall be made within 30 days after signing the contract and upon submission of a bank guarantee for the same amount. The bank guarantee shall be in the amount(s) and the currency or currencies of the advance payment.
- Twenty (30) percent of the Contract Price amount shall be paid upon submission of the Feasibility study and Preliminary Design and Reports acceptable to the Client MPWR&H.
- Twenty (20) percent of the Contract Price amount shall be paid upon submission of Draft Final Report and the draft Tender Documents acceptable to the Client MPWR&H
- Twenty (20) percent of the Contract Price amount shall be paid upon submission of Final Design, Reports and Final Tender Documents and Construction Drawings acceptable to the Client MPWR&H.
- Ten (10) percent of the Contract Price amount shall be paid upon fulfilment of the post design services

**NB:** Lump Sum Contract Price is the sum of agreed Fees, Reimbursable and Miscellaneous Expenses