ENVIRONMENTAL PROJECT BRIEF & MANAGEMENT PLAN

ESSENTIAL BRIDGE REHABILITATION PROJECT (EBRP) - REGION I:
CENTRAL, EASTERN, NORTHERN AND LUAPULA PROVINCES OF ZAMBIA.

OCTOBER 2006
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**Appendix I:** Terms of Reference (8 Pages)

**Appendix II:** Special Environmental Specifications (4 Pages)
1.0 Introduction
INTRODUCTION

1.1 Project Background

As part of its efforts to achieve sustainable growth, Government of the Republic of Zambia (GRZ) has put great emphasis on the rehabilitation and construction of the country's road network - including drainage infrastructure - in order to ensure accessibility to communities and services.

Thus, it is desirous that existing drainage structures should be maintained between communities, social amenities, production centres and other such infrastructure, as accessibility is a prerequisite to sustainable development and growth. This is expected to contribute to poverty reduction among the rural and peri-urban peoples by ensuring better access and quicker transportation of agricultural inputs and produce, and access to health, schools, markets and other social amenities.

Over the years, floods have caused severe damage to river crossings throughout the country. Bridges and culverts have been washed away, cutting access to large parts of the country. This has impacted negatively on the social service delivery and economic development. These crossings are mostly on unpaved rural roads.

In support of the Road Sector Investment Programme Phase II (ROADSIP II), GRZ has applied for financing under the Essential Bridge Rehabilitation Project (EBRP) from the International Development Association (IDA) towards the cost of re-instating these damaged river crossings and intends to apply a portion of the proceeds of this credit to eligible payments under the contract for the services of this commission.

In its quest to retain the services of qualified and experienced Consultants to carry out the services described in the Terms of Reference (ToR), a copy of which is attached herewith as Appendix I for the sake of completeness, GRZ has commissioned Carl Bro a/s of Denmark in association with Bicon Zambia Limited to provide engineering consultancy services under this programme.

This Environmental Project Brief & Management Plan is submitted in accordance with contractual provisions as part of the deliverables for Phase II. Other deliverables for this phase, which include a complete set of Bidding Documents and Detailed (Confidential) Cost Estimates, have been submitted under separate cover.
1.2 Objectives

Based on the ToR, we have understood the principal objectives of the services to be provided by the Consultant to be the provision of the Scope of Works required in addressing the aforementioned emergency. The Consultant is expected to perform all the necessary detailed assessment and prioritization based on already identified crossings, engineering, economic and environmental studies to restore, rehabilitate, construct and upgrade the river crossings described in the ToR to optimal, cost-effective and economically justified standards.

We have further understood the consultancy services to be phased as follows:

- **Phase I:**
  Inspection of each of the identified network structures as listed and an assessment of the damage prioritized and costed in line with the criteria mentioned above.

- **Phase II:**
  Engineering Design, Preparation of Bidding Documents and assistance in the bidding and evaluation process for culverts and small bridges with a total deck length not exceeding 15m.

- **Phase III:**
  We have understood this Phase to be subject to downstream appointment and will include Construction Supervision for Phase II Works, Engineering Design, Preparation of Bidding Documents and assistance in bidding and evaluation process for large bridges (>15.0m Span) identified under Phase III.

- **Phase IV:**
  This Phase is also subject to downstream appointment, and will include Construction Supervision of large bridges as let out under Phase III.
1.3 Project Description

Several surveys of bridge sites in Zambia have been carried out in recent years. The purpose of these surveys was to determine rural bridging requirements, especially in flood-affected regions. The RDA – with assistance from Members of Parliament (MPs), District Councils, Village Headmen and Communities – identified and compiled a list with 626 Drainage Structures, which has been use as the basis for these consultancies.

This shortlist has been the basis for the Consultant’s Detailed Assessments, out of which the Client has made a final decision on the Scope of Works, and on which this Environmental Project Brief & Management Plan is based.

1.4 Scope of Services for Engineering Design (Phase II)

Phase II of the services follows RDA approval of the Final Assessment Report in accordance with contractual provision in the course of a meeting held on Tuesday, July 4, 2006 in the presence of representatives from IDA (The World Bank).

We have understood the Scope of Services under Phase II to be as listed below:

- **Phase II**:
  
  - Detailed Engineering Design for Drainage Structures approved under Phase I above to reinstate the structures at the identified river crossings. It is noted that "any structure that requires extensive geotechnical and hydrological investigations and comprehensive design would normally be done under Phase III" (See Clause 4.2.6 of the ToR).
  
  - Assess Seasonal Traffic Volume prevalent at the time. Employ existing data by standard procedures to determine annual and other seasonal traffic patterns
  
  - Execute topographic and geotechnical field work to establish the necessary data and basic drawings for detailed design at appropriate scale
  
  - Include in the geotechnical fieldwork prospective survey for construction materials required for the structures, river training works and approach road sections
Verify hydraulic effectiveness of the proposed dimensions of all drainage structures included in the programme, consistent with the design standards and specifications applicable in Zambia.

Carry out an Environmental Project Brief and Environmental Management Plan in accordance with the parameters provided in the ToR.

Completion of Detailed Design Drawings where required, using as far as possible Standard Drawings and Preparation of Bills of Quantities.

Review suitability of and alter as necessary the Bid Lots proposed by grouping the structures according to geographical location, equity, magnitude and nature of work.

This report has been prepared in accordance with contractual provisions with the parameters as provided in the Terms of Reference as regards the Environmental Project Brief and Management Plan.
2.0 Environmental Considerations
2 ENVIRONMENTAL CONSIDERATIONS

2.1 Environmental Project Brief

Environmental concerns have been categorized as indicated below:
- Physical Environmental Impact
- Social Environmental Impact.

2.1.1 Physical Environmental Impact

It is our considered view that the proposed construction works shall have a negative impact on the physical environment owing to the necessity of sourcing for construction materials, which will involve excavations and inherent disturbances to the physical environment. Also, because of the works taking place largely in water courses, disturbances are anticipated to the aquatic life.

However, the level of disturbance will be minimal on account of the sizes of the proposed structures and that the requirements for construction materials within the locale are almost negligible. In that regard, it is our conviction that no adverse pollution of water courses can be expected and the excavations for construction materials can be reinstated with little adverse effect.

2.1.2 Social Environmental Impact

The major concern under this item is the sudden influx of external labour gangs into local communities, upsetting the balance in terms of the economy of the area and also the social structures. In this age of HIV/AIDS, it is essential that mitigation measures are put in place for Contractors to manage their labour force in such a manner as to minimize the adverse effects on the project areas.

It is our view that because of the size of the proposed structures and therefore the nominal external labour requirements, it is unlikely that this influx will cause shocking changes to the social structures. Contractors will be encouraged to ensure that as much of the labour force as possible is garnered from within the locality.
2.2 Environmental Management Plan

Our Environmental Management Plan is based on the Special Environmental Specifications as issued by RDA. For the sake of completeness, a copy of the same is attached herewith as Appendix II.

The Environmental Management Plan incorporates the following aspects:

2.2.1 General

As a general approach to managing environmental concerns, raised in the above discourse, the following items shall be attended to:

- Stockpile all topsoil excavated or removed during execution of the works in locations where trees act as buffers to prevent dust pollution and also not to interfere with existing drainage systems
- Minimise clearing of vegetation and ensure protected trees are preserved
- All construction materials, including waste and excess spoil materials, shall be disposed off in designated disposal areas

2.2.2 Material Extraction

- Appropriate licences and permits are to be obtained from relevant authorities including traditional authorities in order to operate a quarry or borrow pit
- Material Extraction Sites shall not be located in forest reserves, national parks, agricultural land, areas of high scenic value, or vicinity of settlements, cultural or archaeological sites, wetlands, river channels or any other valued ecosystems
- In cases where there is no other practical alternative, permission shall be sought from the relevant authorities as detailed in Appendix II.

2.2.3 Reinstatement of Site

- Upon completion of Works, all borrow pits, quarry sites, access roads, diversions, camp sites and any other temporary works shall be cleared of construction debris and surplus materials and shall be reinstated as far as practicable to its original condition and topsoil reinstated over the affected areas to facilitate natural vegetation growth
- Where a pit or quarry is declared a usable water source for the local community, the same shall be reshaped to render it stable and adequately drained for desired long term use.
2.2.4 Water Resources Management

- For extraction of water, appropriate permission shall be obtained from the Water Board and the Local Authorities.
- Water flows in rivers, streams and other natural or irrigation channels shall be maintained or re-established upon completion of works.
- Temporary damming of water courses shall not disrupt water supplies to communities downstream and the ecological balance of the river system.
- Disposal of effluent into aquatic environment shall be in accordance the relevant regulations of the Environmental Council of Zambia.

2.2.5 Environmental Health & Safety Management

In ensuring the safety and health of workers and the public, the following requirements shall be met:

- Implement all measures necessary to conserve and reduce negative impacts on the existing environment.
- Carry out all necessary works to restore the site as far as practicable to its original condition.
- Abide by environmental performance indicators as specified in the National Standard Regulations and measure progress towards achieving environmental objectives during execution and upon completion of the works.
- Adhere to the activity implementation schedule agreed upon to facilitate monitoring activities and adapt impact management to changing and unforeseen conditions.

It has been provided under the Conditions of Contract for the Client to seek legal redress under appropriate national legislation and through the Environmental Council of Zambia and also to institute punitive action in the event that the Contractor fails to implement the approved Environmental Management Plan or contravenes any section of it.
3.0

Conclusion & Recommendations
3 CONCLUSIONS & RECOMMENDATIONS

- Further to the foregoing, it is our conclusion that effective implementation of the Proposed Environmental Management Plan shall ensure sustainable development and growth with minimal adverse effect to the environment.
- We recommend that measures be instituted for sustainable routine inspections and maintenance to ensure the sustainability of these proposals.
- We have carried out the requisite studies on the prioritised structures in terms of hydrological and hydraulic data collection together with geotechnical condition surveys in keeping with the size of the structures proposed for Phase III, and have proposed sufficient measures that ensure suitable mitigation in terms of environmental degradation.
Report Appendices
Section 5. Terms of Reference

TERMS OF REFERENCE
FOR
PROVISION OF CONSULTANCY SERVICES FOR
DETAILED ASSESSMENT, PRIORITISATION AND ENGINEERING DESIGN FOR
REINSTATING/CONSTRUCTING OF THE DAMAGED AND WASHED AWAY CROSSINGS IN
REGION I: CENTRAL, EASTERN, NORTHERN AND LUAPULA PROVINCES OF ZAMBIA

1. BACKGROUND

As part of its efforts to achieve sustainable growth, the Government of the Republic of Zambia (GRZ) is putting great emphasis on the rehabilitation/construction of the country’s road network, including drainage infrastructure, in order to ensure accessibility to communities and services. Thus, it is desirous that existing drainage structures (i.e. bridges, culverts etc) should be maintained between communities, social amenities, production centres and other such infrastructure, as accessibility is a prerequisite to sustainable development and growth. This will contribute to poverty reduction among the rural and peri-urban people by ensuring better access and quicker transportation of agricultural inputs and produce and access to health, school, markets and other social amenities.

Over the years, floods caused severe damage to river crossings throughout Zambia. Bridges and culverts were washed away, cutting access to large parts of the country which impacted negatively on the social service delivery and economic development. These crossings are mostly on unpaved rural roads.

In support of the Road Sector Investment Programme Phase II (ROADSIP II), the GRZ has applied for financing under the Essential Bridge Rehabilitation Project (EBRP) from the International Development Association (IDA) towards the cost of re-instating these damaged river crossings and intends to apply a portion of the proceeds of this credit to eligible payments under the contract for the services for which this TOR is issued. The GRZ now proposes to retain the services of qualified and experienced consultants (hereinafter called “the Consultants”) to carry out the services herein described (hereinafter called “the Services”).

2. OBJECTIVES

The principal, overall objective of the services is to determine the scope of works required to address the emergency. The Consultants must perform the necessary detailed assessment and prioritisation based on the already identified crossings, engineering, economic and environmental studies to restore, rehabilitate, construct and/or upgrade the river crossings described below to optimal, cost-effective and economically justified standards.

The provision of the consultancy services will be phased as follows. Phases I and II form part of this assignment. Phases III and IV are mentioned for information only and may form the basis of downstream appointments.

Phase I:

Inspection of each of the identified network structures as listed and an assessment of the damage prioritised and costed in line with the criteria mentioned below.

Phase II:

Engineering Design, Preparation of Bidding Documents and assistance in the bidding and evaluation process for culverts and small bridges with a total deck length not exceeding 15 metres. This phase will only commence after review of the assessment under Phase I.
Phase III: (Subject to downstream appointment) Construction supervision for Phase II works and Engineering Design, Preparation of Bidding Documents and assistance in bidding and evaluation process for larger bridges identified for upgrading under this Phase.

Phase IV: (Subject to downstream appointment) Construction supervision of larger bridges.

3. PROJECT DESCRIPTION

Several surveys of bridge sites in Zambia have been carried out in recent years. The purpose of these surveys was to determine rural bridging requirements, especially in flood-affected regions. The RDA compiled a long list with more than 1095 drainage structures, which is to be used as basis for these consultancies (Ref. annex 1 to this TOR). These crossings were identified with the help of Members of Parliament, Directors of Works from various district councils, village headmen and communities. The second list with 140 drainage structures was compiled by Engineers from the RDA and contains more elaborate and accurate information with pictorial exhibits of various sites visited (Ref. annex 2 to this TOR). It is desired that through these consultancy services, accurate and detailed assessment and later information regarding all the identified sites should be provided.

For administrative purposes, the country has been divided into two regions as below. Each region will be awarded separately and the Consultant shall be responsible for the services included in his region only.

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<th>Item no.</th>
<th>Region I</th>
<th>Region II</th>
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<tr>
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<td>Central prov</td>
<td>Lusaka prov</td>
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<td>2</td>
<td>Eastern prov</td>
<td>Southern prov</td>
</tr>
<tr>
<td>3</td>
<td>Northern prov</td>
<td>North-western prov</td>
</tr>
<tr>
<td>4</td>
<td>Luapula prov</td>
<td>Western prov</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Copper-belt prov</td>
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Once the detailed assessment has been completed and the Client made a final decision on the scope of the works, the Consultant shall complete the engineering designs and prepare the bidding documents for those works identified as part of Phase II. In order to expedite repair works, the Consultant shall advise the Client on the number of bidding packages given the provision that the works should be completed as soon as possible.

4. SCOPE OF SERVICES

4.1 General

The specific assignment under this Terms of Reference is to carry out the required detailed assessment, and, when approved, undertake the engineering design for the Phase II works based on the standard drawings of the Client. This will include the preparation of Tender Documents with detailed cost estimates.

It is expected that this assignment will take about twenty (20) man months with Phase I taking up about two thirds of this time.

4.2 Phase I: Assessment, Prioritisation and Preliminary cost estimates

4.2.1 General

The anticipated services would comprise of the review of the long list of river crossings with more than 626 drainage structures provided by the RDA to determine the damage caused by floods and inadequate maintenance, the assessment of the current condition of the said structures and the quantification of the necessary emergency remedial works with preliminary cost estimates. The
Consultant shall use an existing manual for bridge and culvert condition inspection and shall propose to the Client the two most favoured manuals. The Client shall review these as part of the evaluation and shall agree with the Consultant on the Manual to be used for this assessment during contract negotiations.

The consultant shall be required to break down the long list according to priority. In order to prioritize the level of damage on each structure and the desired rehabilitation measures to be undertaken, the consultant shall endeavour to use the following criteria:

**Priority Ranking I:** Suffered extensive damages requiring immediate attention and/or construction of new structures

**Priority Ranking II:** Damages not so extensive but rehabilitation measures shall include replacement of key structural components

**Priority Ranking III:** River crossings that due to age, change in design parameters, increased usage or other reasons identified, need to be upgraded as a priority

**Priority Ranking IV:** Minor damages and rehabilitation measures shall include minor repairs and protection works which could be deferred at the discretion of the Client.

### 4.2.2 Existing Data and Information to be gathered

The Consultants shall collect and review all relevant existing data as available: maps and aerial photographs if necessary; any as-built drawings for the culverts; traffic surveys; geology/stream morphology, hydrological/hydraulic data (water levels & scouring); locations of any existing and proposed utilities, present condition of crossing, and banks (character and shape including existing soils forming the embankments) etc.

The Consultant shall then, during his site assessment, complete the existing data and collect the following information:

1. GPS reading for each of the identified sites/location
2. Basic measurements and arrangements of the structures (type, length, height, skew, spans, number and diameter/size of pipes/culverts etc). Where structures are completely washed away, the Consultant shall note this as such and estimate the size of the required structure.
3. Condition of the structure, preliminary scope of works and key cause for required works;
4. Digital Photos and;
5. The nature and condition of the existing alignment and approaches.

The ascertained parameters will help the consultant to establish the exact cause and nature of the damages sustained. In order to complete the assignment in the stipulated time frame, it is envisaged that the consultant shall use several inspection teams. However, the final work plan and methodology is the responsibility of the consultant.

For smaller structures there would generally not be a need for extensive geotechnical and hydrological/hydraulic investigations, but the Consultant is required to note in his report at which structures such additional investigations would be required. A provisional sum of $25,000 is allowed in the contract for payment of such services under Phase II.

Once the field work and priority assessment is completed, the consultant shall prepare an Assessment Report. This will form the basis for the second phase of this assignment as described in 4.3 below. The Consultant shall summarise his assessment in a table grouping the different river crossing categories under the different priority categories. A proposed format is given below. The Consultant is required to agree with the Client on the final format.
### Preliminary Cost Estimates

Based on his assessment the consultant shall also prepare a preliminary cost estimate for undertaking all the works identified. This will include costs for the repair/rehabilitating/constructing and upgrading the identified drainage structures and, where required, the costs to amend the alignment of the approaches. This estimate shall be based on a unit cost analysis of bridges and culverts based on recently completed projects in Zambia and neighbouring countries, if such data is not available in Zambia. This information will form part of the draft assessment report that will be reviewed by the RDA within 2 weeks of its submission and subject to any comments or requested modifications, would then constitute the basis for preparation of the Final Assessment Report. The approval of RDA is a necessary requirement in order for the Consultant to proceed to preparation of the Final Assessment Report.

### Other Current Appointments

The Consultant shall also list in his report all the river crossings included in the provided list that are already being assessed by others. This will include a short statement of the scope of services, identified works and the estimated cost (where available). The Client will provide the successful consultant with the contact information.

### Reporting Requirements

The following reports are required,

- Inception Report describing the consultant’s initial findings, staffing, proposed methodology, implementation programme, details needed or actions to be taken later by RDA to enable the assignment to be completed shall be submitted in six (6) copies (four hard and two electronic) to RDA within four (4) weeks of commencement of the assignment.

- Draft Assessment Report with necessary preliminary assessment, prioritization and cost estimates and presenting the major findings of the study. The report shall be submitted to RDA in six (6) copies (four hard and two electronic) for review and necessary approval prior to commencement.
of the final Report. This report shall be submitted within eight (8) weeks of the start of the assignment.

- Final Assessment Report including all the comments of the Client shall be furnished to the RDA no later than fourteen (14) weeks after the start of the assignment. Ten sets of documents (Eight hard and two electronic copies) shall be prepared and submitted.

4.2.6 Completion of Phase I

The Client will review the extent of the required works based on the information contained in the Draft Assessment Report. Once this is done the Client will determine the extent of the works to be included in Phase II and instruct the Consultant accordingly.

The principal effort in Phase II would be to repair the identified damage on the smaller structures that could be constructed with the standard drawings of the Roads Development Agency. Any structure that requires extensive geotechnical and hydrological investigations and comprehensive design would normally be done under Phase III.

4.3. Phase II: Engineering Design, Preparation of Bidding Documents and assistance in bidding and evaluation process for all culverts and small bridges not exceeding 15 metres in length

4.3.1 General

This phase will focus on those structures selected for immediate repair/rehabilitation and replacement at the end of Phase I. The services will include the engineering design, completion of drawings where required (Standards drawings should be used as far as possible), preparation of a detailed (confidential) cost estimate and bidding documents and assistance with tender evaluation and contract negotiations.

The exact scope of works will be determined during Phase I and it would therefore be difficult to determine the actual cost of this phase. The following should be taken into account when preparing the proposals:

i) All identified structures larger than smaller bridges would not be included in Phase II, and

ii) Assume that the services as detailed below is required for a total number of about two hundred and fifty river crossings of varying sizes and spread out over the entire geographical assessment area. Should the final agreed number differ substantially (by more than 10%), such difference would form the basis of an addendum based on the agreed rates and time allocation for the assumed services.

4.3.2 Engineering Assessment and Design

i) The Phase I assessment should be confirmed in terms of requirements to complete the required engineering design to reinstate the structures at the identified river crossings. It is expected that the need for additional inspections would be minimal and focused only on the larger structures (larger culverts and small bridges) included in this phase.

ii) The Consultant shall assess the seasonal traffic volume prevalent at the time. For determining the annual and other seasonal traffic patterns standard procedures, of using existing data to project traffic patterns shall be applied.

iii) Execute topographic and geotechnical field work to establish the necessary data and basic drawings for the detailed design at appropriate scale to determine location, elevation, foundation levels and sizes of the new and, as needed, of the existing structures. Special attention shall be given to the required information for hydraulic dimensioning of the structures and the protective measures for the watercourses. If elevations cannot be referred to the official level system permanent benchmarks have to be placed and secured which will permit to re-establish the reference height at each structure.
ramps and modified road sections shall be included to the extent, which permits proper adoption of the existing alignment to the new situation.

It would be good to propose the scales of the design drawings, perhaps as follows:

1) Site Plan including approach roads (scale: 1/1000)
2) Longitudinal (vertical) and transverse alignment (scale: 1/500)
3) River profiles (cross section; scale: 1/100-1/250) of the present and potential crossing points marked with high water, flood water, and low water level.
4) Standard cross section of approach roads (scale: 1/100)
5) General Plan View and cross section of proposed bridges or culverts (scale: 1/250 - 1/100)
6) Structural details of the bridge and culverts (scale: 1/10 - 1/50), etc.

iv) The geotechnical fieldwork shall also include the prospective survey for construction materials required for the structures, river-training and approach road-sections as well. Laboratory tests needed for foundation design and quality analysis of construction materials shall be performed by a recognized laboratory in quantities and at schedules subject to prior approval by the RDA. The results of the geotechnical investigations shall be expounded and commented on by the Consulting Engineer in a separate part of the Engineering Report. A provisional sum of S25,000.00 is included for such work. The Consultant shall, at the time of requiring the services, submit to the Client for review a proposal for appointment of a preferred laboratory based on the Bank's Procurement Guidelines.

v) Verify the hydraulic effectiveness of the proposed dimensions of all structures included in the programme consistent with the design standards and specifications applicable to Zambia.

vi) Environmental Project Brief

For the drainage structures under Phase II, the consultant is expected to conduct an Environmental Project Brief (EPB). In conducting the EPB, the consultant shall consider the following:

- A description of the baseline conditions of these bridge and other drainage structure sites;
- The objectives and nature of the project and reasonable alternatives;
- The main activities that will be undertaken during site preparation and construction;
- The expected social-economic impact of the project and the number of the people that the project will resettle or employ directly during construction;
- The expected environmental impact of the project;
- The expected effect on the bio-diversity, natural lands and geographical resources and the area of land and water that may be affected through time and space;
- A description of adverse mitigation measures and any monitoring programmes to be implemented.

vii) The Consultant shall also complete the required Environmental Management Plan for the works included in Phase II. This document needs to be disclosed before commencement of works.

vii) Prepare the detailed design drawings for the agreed structures and, where applicable, the approach road sections at appropriate scales and in such a detail that contractors may confidently bid and execute all construction work without further design except for workshop drawings for formwork, scaffolding and other auxiliary installations. Particular attention shall be paid to the elaboration of essential standard details as transition joints, bearing, railings, etc., which shall be serviceable and easy to be maintained. Where applicable, the safety of all structural parts shall be verified by static and foundation engineering analysis (for computer-based calculations the type of computer and the programmes used shall be mentioned) using British Standards (BS) or any other internationally recognized code of practice. The loading must in any case be identical with those regularly applied for the respective types of roads in Zambia.

viii) Prepare Bills of Quantities and actual cost estimates based on unit prices
broken down in local currency. Tax and duty elements shall be presented separately. The estimate for the right-of-way acquisition, if any, shall be furnished by the Government for each land property used.

ix) Review the suitability of and alter as necessary the Bid Lots proposed by grouping the structures according to geographical location, equity, magnitude and nature of work etc.

x) Prepare a detailed Time schedule for the programme based on the proposed packaging and the individual construction time for each structure assuming a practical sequence of activities under given climatic conditions and taking into account the time needed for tendering, contract negotiations and award, mobilisation, etc. The expected Cash Flow shall also be indicated.

4.3.3 Preparation of bidding documents.

The consultants should prepare bidding documents for the contract conforming to the World Bank’s “Standard Bidding Documents for Procurement of Works”. A draft of the proposed final documents shall be furnished to the RDA within 4 weeks of the initiation of the detailed engineering design, for review and approval, which shall be completed within 2 weeks of receipt of the draft.

Final complete bidding documents including instruction to bidders, detailed engineering plans and drawings, standard technical specifications, specifications of particular applications, model contract, special conditions of contract, and bills of quantities, shall be furnished to the RDA no later than 8 weeks after the start of the detailed engineering design.

The consultant is expected to prepare environmental mitigation plans, environmental management plans outlining detailed implementation schedule, monitoring plan, reporting schedule and any other monitoring requirements.

4.3.4 Assistance in bidding process

The Consultant shall co-operate with RDA in accordance with instructions of the RDA on the following matters:-
- Answer any queries from the Tenderers during the Tender Period (Pre-tender Meeting).
- Evaluate the tenders received and summarise the findings in a Tender Evaluation Report based on the World Bank format with award recommendation. The evaluation report shall be submitted to the client within 3 weeks of the closing date of submission of Tenders.
- Assist in Contract Negotiations with preferred Contractor.

4.3.5 Reporting Requirements

- Draft Design report and bidding documents (including instruction to bidders, preliminary engineering plans and drawings, standard technical specifications, specifications of particular applications, model contract, special conditions of contract, and bills of quantities, shall be furnished to the RDA within eighteen (18) weeks of the start of the assignment. Six hard and two electronic copies shall be prepared and submitted to RDA for review and approval.

- The consultant shall submit within eighteen (18) weeks of the start of assignment seven (7) hard copies and two electronic copies of the EPB and EMP to the RDA for review and onward transmission to ECZ.

- Final Design report and bidding documents (including instruction to bidders, detailed engineering plans and drawings, standard technical specifications, specifications of particular applications, model contract, special conditions of contract, bills of quantities) shall be furnished to the RDA no later than twenty-two (22) weeks after the start of the assignment. Ten sets of documents (eight hard and two electronic) shall be prepared and submitted.

- The evaluation report shall be submitted to the client within two weeks of the closing date of submission of Tenders. Six (6) sets of documents (four hard and two electronic) shall be prepared and submitted.
5. CONSULTANTS' PERSONNEL

The consultants shall provide the following key staff to carry out the services as described above:

* Team Leader: a qualified engineer with Bsc degree in civil engineering with a minimum of 15 years project management experience with management of emergency assessments and experience in bridge works an added advantage. The Team Leader may be one of the engineering experts listed below.
* Bridge/Structural Engineer: a qualified engineer with BSc degree in bridge structural Engineering and a minimum of 15 years relevant experience in similar project, at least five must be in the region.
* Geotechnical/Materials Engineer: a qualified engineer with BSc degree in material/foundation engineering and a minimum of 10 years relevant experience.
* Drainage/Hydrology Engineer: a qualified engineer with BSc degree in Civil engineering or equivalent with minimum of 10 years relevant experience in similar projects.
* Transport Economist: a qualified transport economist with Bachelor of Arts in Economics degree or equivalent with minimum of 10 years relevant experience;
* Environmental Specialist: a qualified environmental specialist with Bachelor of Science degree or equivalent, in an appropriate field and with 10-years relevant experience in similar assignments.
* Resident Engineer (2 No.): minimum first degree holder with at least 15 years, (Road Engineer relevant experience in construction supervision of roads and drainage structures) He shall have extensive supervision experience and should be familiar with engineering contract procedures and with contract administration. They will be utilised only during the supervision phase (Phase III).

The evaluation will however be based on the following Key Staff for comparison purposes only:

- Team Leader
- Bridge/Structural Engineer
- Drainage/Hydrology Engineer
- Environmental Specialist
- Resident Engineers

6. SERVICES TO BE PROVIDED BY THE GOVERNMENT OF THE REPUBLIC OF ZAMBIA:

The RDA will make available to the consultants all relevant reports and data in its possession but the consultants shall be fully responsible for the interpretation and use of the material in question.

The RDA will liaise with other Government offices as required in order to facilitate the consultants' work in accordance with this TOR.

The RDA shall provide staff (s) from the Provincial Road Engineers' offices and the Directors of Works from all the relevant 72 districts to accompany the consultants to the identified river crossing sites. The consultant, shall however, include in the "Financial Proposal" standard subsistence allowances for the RDA staff as provisional sum.

The RDA shall provide to the consultant as part of the RFP, standard drawings for some of the drainage structures to be adopted during the execution of the assignment.

The consultants shall make own arrangements for all office and living accommodation, transportation, supplies, surveys, investigations, testing, secretarial services, etc... in connection with the services required by this Terms of Reference.
The following special environmental specifications form an integral part of the Specifications of Particular Application and shall take precedence over any requirements of Part B of the Specifications of Particular Application.

PA-9.1 General

The Contractor shall stockpile all topsoil excavated or removed during execution of the Works. The Contractor shall, as far as practicable, ensure that the stockpiles are located where trees can act as buffers to prevent dust pollution, and the stockpiles shall not interfere with existing drainage systems; all to the approval of the Project Manager.

The Contractor shall ensure that vegetation clearing is minimised during execution of the Works and that protected tree species as listed in the Forest Act are preserved.

The Contractor shall ensure that no construction waste is left anywhere on Site or disposed of other than in designated disposal areas approved by the Project Manager. Such waste and any other excess material shall be buried within the road reserve or used for reinstating borrow areas and landscaping around the road or disposed of in accordance with the Environmental Council of Zambia regulations.

The Contractor shall ensure that all waste including construction arisings generated during execution of the Works, is collected and disposed of at designated disposal sites in line with the 'Waste Management Regulations' of the Environmental Council of Zambia (Annex 1) or shall be re-used or sold for re-use locally as approved by the Project Manager.

The Contractor shall ensure that excess spoil material is disposed of increase approved by the Project Manager and upon completion of the Works all such areas shall be landscaped and rehabilitated to the approval of the Project Manager in accordance with Clause 4.3 herein.

The Contractor shall ensure that all hazardous waste, chemicals and toxic substances are handled, treated and disposed of in line with the 'Pesticides and Toxic Substances Regulations of the Environmental Council of Zambia (Annex 2)

PA-9.2 Material Extraction

Prior to execution of the Works, the Contractor shall obtain appropriate licenses/permits from relevant authorities including traditional authorities to operate each quarry or borrow area.
The Contractor shall ensure that each material extraction site is not located in a forest reserve, national parks, agricultural land, areas of high scenic value, or in the vicinity of settlement areas, cultural or archaeological sites, wetlands, river channels or any other valued ecosystem component and shall be located at not less than 500m from such areas.

However, where there is no practical alternative, permission shall be sought from the Forest Department, Wildlife Authority, Department of Agriculture, Local Authority, National Heritage Conservation Commission or the Environmental Council of Zambia respectively and an environmental impact study shall be conducted in accordance with the Environmental Impact Assessment regulations of the Environmental Council of Zambia.

**PA-9.3 Reinstatement of the Site**

Upon completion of the Works or as directed by the Project Manager, all borrow pits, quarry sites, access roads, diversions, camp sites and any other temporary Works shall be cleared of construction debris and surplus construction material and shall be reinstated as far as practicable to its original condition to the approval of the Project Manager.

After which topsoil shall be reinstated over the affected areas to a depth of not less than 150 mm to facilitate natural vegetation growth. The Contractor shall ensure that reinstated areas are inherently stable and self-draining.

Where provided for in the Contract, the Contractor shall provide and plant trees in reinstated areas as directed by the Project Manager and shall ensure the survival of planted trees by watering and protecting seedlings from fires, pests and diseases and other anthropogenic factors. The Contractor shall take care of all the required maintenance to the end of the Defects Liability Period.

For such replanting, the Contractor shall have first identified the availability and respective costs of suitable plant species readily available for replanting or reseeding for the approval of the Project Manager. The suitable plant species shall provide vegetative cover to control erosion, provide vegetative diversity and that will, through succession, and contributes to a stable and compatible ecosystem.

Where, a pit or quarry is declared a usable water source for the local community or livestock in the surrounding areas, the Contractor shall ensure that such areas are reshaped so as to be inherently stable, adequately drained and suitable for the desired long-term land use and minimize the long-term visual impact by creating landforms, which are compatible with the adjacent landscape.
PA-9.4 Water Resources Management

The Contractor shall ensure that water flows in rivers, streams and other natural or irrigation channels are maintained and/or re-established where they are disrupted due to the execution of the Works.

The Contractor shall ensure that temporary damming of streams and rivers is done in such a way that disruption of water supplies to communities downstream is avoided and the ecological balance of the river system is maintained.

The Contractor shall obtain a permit from the Water Board and the Local Authority for extraction of both surface and underground water to avoid conflicting with water demands for local communities. Water extraction shall not be permitted from wetlands.

The Contractor shall ensure that disposal of effluent (waste water or water containing spoils) into the aquatic environment shall be in accordance with the 'Water Pollution Control (Effluent and Waste Water) Regulations' of the Environmental Council of Zambia (Annex 3), to avoid water pollution.

PA-9.5 Environmental Health and Safety Management

Notwithstanding General Conditions of Contract Clauses 19.1, the Contractor shall ensure the safety and health of the public and workers and meet safety requirements for the operation of the Works, which shall include but not necessarily limited to:

(1) Sensitizing workers and local residents in consultation with other stakeholders on the dangers of contracting and spreading sexually transmitted diseases and other health risks including HIV/AIDS that may be compounded as a result of the construction activities.

(2) ensuring that stagnant water in uncovered borrow pits is treated to avoid creating breeding grounds for mosquitoes if such pits are within 500m of human settlements or workers' camps.

(3) providing his workforce and the Project Manager's Site staff with protective gear such as safety helmets, work boots, etc.; and where appropriate: safety goggles; dust masks; ear/noise protection headgear, etc.

(4) spraying water on all access roads and diversions to suppress dust emissions in accordance with the 'Air Pollution Control (Licensing and Emission Standards) Regulations' of the Environmental Council of Zambia.

(5) ensuring that noise levels emanating from machinery, vehicles and construction activities are kept to a minimum. Noise levels reaching the communities from construction activities shall not exceed 90 decibels.

(6) ensuring that blasting activities are not carried out in the vicinity of settlement areas, cultural sites, wetlands and are located not less than 1.5km from such areas; and that they are carried out during daylight hours after consulting with local communities on the proposed blasting times.
PA-9.6 Displacement and Resettlement

The Contractor shall ensure that the execution of the Works does not cause to move or disadvantage people, their property or their activities.
In the event of any people or their properties or activities are caused to move or disadvantaged, as agreed necessary by the Project Manager, the Contractor shall formally notify the Project Manager of the physical extent and time frame the Contractor requires to use the areas affected and the Contractor shall submit copies of his notification to the Employer for action in respect of compensation and any other measures required and the Employer shall formally inform, through the Project Manager, the Contractor when the resettlement arrangements have been concluded such that the Contractor shall have access to the affected areas.

PA-9.0 Measurement and Payment

Unless provided for separately in these specifications or in the Bills of Quantities all the above provisions shall be deemed to be provided at the Contractors cost and priced as part of the Contractor's overheads.