

Republic of Zambia

**Agreement for the Design
and Supervision**

of

by

The Director
Department of Water Affairs

....., 19.....

DEPARTMENT OF WATER AFFAIRS

AGREEMENT FOR DESIGN AND SUPERVISION

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REPUBLIC OF ZAMBIA

MINISTRY OF WATER DEVELOPMENT

A. MEMORANDUM OF AGREEMENT

THIS AGREEMENT is made theday of
 One thousand, nine hundred and between the
 Government of Zambia (hereinafter called "the Client") of the one part
 and
 Consulting Engineers, whose registered offices are situated in

 (hereinafter called "the Consulting Engineers") of the other part.

WHEREAS

- A. The Government intends to proceed with DESIGN,
 (hereinafter called "the Works") as set out in the Schedule
 to the Conditions of Engagement attached hereto and has
 requested the Consulting Engineers to undertake certain
 duties as set out in the Conditions of Engagement attached
 hereto.
- B. The Consulting Engineers have agreed so to do upon and
 subject to the terms and conditions hereinafter set forth.

NOW THIS MEMORANDUM OF AGREEMENT WITNESSETH and it is hereby agreed
and declared between the parties hereto as follows :-

1. The Client hereby appoints the Consulting Engineers as Consulting
 Engineers in respect of the Works and the Consulting Engineers agree to
 provide professional services subject to and in accordance with the
 terms and Conditions of Engagement hereinafter set forth.
2. This Memorandum of Agreement the said Conditions of Engagement
 and the particular conditions shall together constitute the Agreement
 between the Client and the Consulting Engineers.

IN WITNESS WHEREOF the parties have herunto set their hands and affixed their seals (if any), the day and the year first hereinbefore written.

Signed on behalf of the said Government

.....
Director
Department of Water Affairs

In the presence of :-

Name

Address

.....

Occupation

Signed on behalf of the Consulting Engineers

Name of Partnership

Address

.....

.....
(Partner)

In the presence of :-

Name

Address

.....

Occupation

B. CONDITIONS OF ENGAGEMENT

1. GENERAL

1.01 DEFINITIONS

(a) "Client"

Means the Government of Zambia by whom the Consulting Engineers are employed for the purposes of fulfilling this Agreement.

(b) "Director"

Means the "Engineer" appointed by the "Client" to deal between the Client and the Consulting Engineers on all matters arising out of this Agreement.

(c) "Consulting Engineers"

Means the person or firm named in the Memorandum of Agreement whose Resident Partner(s) or Senior Representative(s) are registered under the

(d) "Project"

Means all the activities requites for the accomplishment of the Works and includes preliminary and final design.

(e) "Works"

Means the construction works referred to in this Agreement and which are the subject of design and, where applicable, supervision by the Consulting Engineers.

(f) "Design" means

(i) Preparing

(a) Preliminary and final design reports, plans, drawings, and calculations, and project identification.

(b) Specifications, schedules, and/or bills of quantities and engineering estimates.

(ii) Advising of appropriate conditions of contract, forms of tender and invitations to tender, as may be necessary to enable the Works to be tendered for or otherwise ordered by the Client.

(g) "Supervision"

Means the duties of the Consulting Engineers in the administration and technical control of the constructions works.

(h) "NORAD"

Means the Norwegian Agency for International Development.

1.02 DURATION OF ENGAGEMENT

The appointment of Consulting Engineers shall commence from the date of this Agreement.

Unless terminated under either of Clauses 1.06 or 3.04 of these Conditions, the Consulting Engineers appointment under this Agreement shall terminate when the Consulting Engineers make and issue the certificate authorizing the final payment for the construction of the Works expressly carried out to meet the contract clauses concerning retention monies whichever is the later, or when informed in writing by the Director, that they will not be required to undertake supervision of the Works. Termination of the Consulting Engineers' appointment under this Agreement shall not prejudice the accrued rights or claims of either party to this Agreement.

1.03 NON ASSIGNMENT

The Consulting Engineers shall not have the right to assign or transfer the benefit and obligations of this Agreement or any part thereof and it shall automatically come to an end on the death of the survivor of them but without prejudice to the accrued rights of either party against the other under this Agreement - provided that it shall be lawful for the Consulting Engineers at any time to take into partnership another Partner or Partners and that he or they or their survivor of them shall thenceforth be deemed to be included in the expression "the Consulting Engineers".

1.04 PROFESSIONAL SERVICES

The Consulting Engineers must allow for the attendance of a senior representative or partner at the Lusaka offices of the Department of Water Affairs whenever necessary during the course of implementing the Project in terms of this Agreement.

1.05 SKILL CARE AND DILIGENCE

The Consulting Engineers shall exercise all reasonable skill, care and diligence in the discharge of the duties agreed to be performed by them, including any such duties as may be sub-contracted.

1.06 DEFAULT

- (a) If at any time during the execution of the Contract :-
- (i) Any unnecessary delay shall occur in carrying out the work, duties and services to be performed or any part thereof through the default of the Consulting Engineers; or
 - (ii) The Consulting Engineers shall not carry out the said work, duties and services to the satisfaction of the Director: or

- (iii) The Consulting Engineer shall fail to comply with any instruction given by the Director;

then the Director may serve notice upon the Consulting Engineers in respect of any of the foregoing defaults requiring them to take remedial action by a specified date.

(b) If the Consulting Engineers :-

- (i) Shall fail to comply with any requirement of such notice to the entire satisfaction of the Director; or
- (ii) Shall comply with the requirements of such notice to the satisfaction of the Director but shall again become liable to be served with a notice under paragraph (a) of this clause; or
- (iii), Shall assign or sub-let the Contract or any part thereof without the permission of writing from the Director; or
- (iv) Shall become bankrupt or insolvent or shall compound with or make any assignments for the benefit of their creditors;

then the Client may at once by notice by registered post, determine the employment of the Consulting Engineers under this Contract.

In case the Client shall exercise the option mentioned in this Clause he shall not be bound to authorise for the Consulting Engineers any more money on account of the Contract until the work duties and services to be performed have been completed and the final statement of accounts has been prepared at which time the Consulting Engineers shall be entitled to receive such sums as are then due after deduction of such sums expended by the Client in completing and upholding the work, duties and services to be performed, and all such other expenses which they have incurred in so doing.

1.07

INDEMNIFICATION

In the event of war hostilities (whether war be declared or not), invasion, acts of foreign enemies, rebellion, revolution, insurrection, or military or usurped power, civil war, riot (other than amongst the Consulting Engineers own employees), or commotion or disorder, or any operation of the forces of nature as reasonable foresight and ability on the part of the Consulting Engineers could have foreseen or reasonably provided against, then NORAD shall compensate the Consulting Engineers for any additional expenses incurred in the implementation of this Agreement.

The Consulting Engineers shall as soon as any such increase of cost shall come to their knowledge forthwith notify the Client thereof in writing.

1.08

OWNERSHIP OF DOCUMENTS AND COPYRIGHT

All documents prepared by the Director in connection with the Works are the property and copyright of the Client, and the Consulting Engineers shall not be entitled, either directly or indirectly, to make use of such documents for the carrying out of any work beyond the Works to which the Agreement relates without the prior approval of the Client.

All documents provided to the Client by the Consulting Engineers, shall become the property of the Client but shall be the copyright of the Consulting Engineers and the Client shall not be entitled either directly or indirectly to make use of such documents for the carrying out of any work beyond the Works to which this Agreement relates, without the prior approval of the Consulting Engineers.

1.09

ARBITRATION

Any dispute or difference arising out of this Agreement shall be referred to the arbitration of a person to be mutually agreed upon or, failing agreement, of some person appointed by the

1.10

JURISDICTION

This Agreement should be governed by and construed in all respect in accordance with the Laws of Zambia.

1.11

COST OF THE WORKS

The "Cost of the Works" or any part thereof shall be deemed to include :-

(a) The cost to the Client of the Works from whatever cause arising except as hereinafter stated, but so as to include:- any payments made to the Contractors in the settlement of claims, and before deduction of liquidated damages or penalties (if any) payable by the Contractors to the Client.

(b) A fair valuation of any labour, materials, manufactured goods, machinery or other facilities provided by the Client, and of the use and waste (including the cost of repairs) of construction plant and equipment belonging to the Client which he shall require to be used in the carrying out of the Works.

(c) Salaries, travelling, out-of-pocket and office expenses of the Consulting Engineers' resident site staff where the Works are carried out by direct labour, and

(d) The market value as though purchased new of any second hand materials, manufactured goods and machinery incorporated in the Works.

The Cost of the Works shall exclude the following :-

- (i) Administration expenses incurred by the Client.
- (ii) Professional fees and out-of-pocket expenses.
- (iii) Salaries, travelling, out-of-pocket expenses of resident site staff of the Consulting Engineers appointed under Clause 5.02 when the Works are carried out by Contract.
- (iv) Interest on capital during construction, and the cost of raising monies for carrying out the construction of the Works.
- (v) Cost of land, wayleaves, and other compensation.

2. OBLIGATIONS OF THE CONSULTING ENGINEERS ON DESIGN

2.01 DESIGN STANDARDS

(a) The Consulting Engineers shall, as soon as their investigations enable them, critically examine the current edition of the "Standards", issued by the Director, in order to establish the most suitable basis for the design of the Works.

(b) On completion of this examination the Consulting Engineers shall report to the Director their recommendations upon those standards most suitable for the Project giving full reasons. The Director will then instruct the Consulting Engineers as to what modifications to the Standards he requires to be adopted for the design of the water supplies.

2.02 PRELIMINARY DESIGN

The Consulting Engineers shall investigate the areas to be supplied with water and all the various water resources and shall prepare and submit such preliminary design reports, maps, drawings, estimates and other engineering documents as to enable the Director to decide upon the particular design to be adopted, phasing to be applied and any special arrangements to be made. These documents shall include but not be limited to :-

(a) A Preliminary Design Report describing broadly, the particular needs and problems of the area, the proposals for dealing with these and the justification for the proposals for and any other aspects considered to be relevant to the preliminary design. It shall include :-

- (i) All preliminary design data in sufficient detail to enable the Director to check the main elements of the preliminary design which shall include but not be limited to analyses of population, economics living patterns, future development, water resources, water demand, and which shall be in conformity with the Standards as modified by the instructions referred to in Clause 2.01 (b).

Any variation from these shall be otherwise described and justified and shall require the approval of the Director.

- (ii) Comparisons between alternative design schemes where more than one is feasible.
- (iii) Advice to the Client as to the need for special investigations such as for sub-soil conditions.
- (iv) Results of the analysis of water samples
- (v) Advice to the Client as to the need for special surveys to provide essential data for the proper design of the Works.
- (vi) General arrangements and layouts of all major structures especially any of unusual type.
- (b) Suitable topographical maps of the area of water supply to a scale of not less than 1:50,000 (greater where the area is complex.) Where such maps are not obtainable by other means, aerial photographing mapping or preliminary field surveys should be undertaken, subject to the approval of the Director. The proposed location of the main supply elements including the pipeline routes shall be indicated on the maps.
- (c) Preliminary estimate of costs
- (d) Preliminary lists of materials in conformity with the current "Materials Standard" or as otherwise agreed with the Director. During the course of the Preliminary Design preparation the Director may require the Consulting Engineers to discuss aspects of the Preliminary Design including the submission of part of the required documentation before the date for submission of the Preliminary Design. These discussions and partial submissions which shall be included under the normal fee are described in the Schedule to these conditions.

2.03

FINAL DESIGN

The Consulting Engineers after receiving the approval of the Director to the Preliminary Design, including any special instructions, shall proceed with the preparation of the Final Design documents to be prepared and submitted shall include but not be limited to:-

- (a) Final Drawings in negative form on approved permanent transparent materials. These drawings shall include plans and longitudinal sections of pipelines to a horizontal scale of not less than 1:10,000, site and other detailed drawings to agreed scales as necessary to describe fully the Works and enable them to be constructed. The drawings shall be fully dimensioned in metric units and shall be produced in the "A1" metric format. The drawings as appropriate shall show all plot boundaries plot numbers, way leaves required and land to be acquired for installation, and services of all kinds along the water supply routes.

(b) The Final Design Report briefly summarising the final recommendations, the recommended design, and justifying any amendments to the preliminary design. It shall include information about the local sources of sand, aggregate and all other materials which will be required for the Works, together with details of any problems likely to be encountered during the construction and site administration of the Works.

(c) Hydraulic and other calculations for the Final Design

(d) General and particular specifications for all the various components of the Works.

(e) Final Bill of Quantities for the designed Works which shall be priced as an "Engineers Estimate" by the Consulting Engineers who shall have obtained data to provide the best estimate of the item rates at the expected time of construction. To assist in this operation an "Analysis of Contract Rates" will be compiled annually by the Director and will be supplied on request to the Consulting Engineers when it is available.

(f) Final list of materials, itemised as instructed by Director.

(g) The Final Design shall also include:-

(i) The execution of detailed surveys and the production of plans therefrom essential to the precise siting of such installations as intakes the various elements of treatment works, pumping stations and pipe routes.

(ii) The establishment of a sufficient number of adequate reference points so as to enable the vertical and horizontal location of all elements of the water supply for purposes of construction of the Works. The type, general siting and frequency of location or reference points shall be agreed in advance with the Director. These points shall be clearly identified on the relevant drawings.

(iii) The establishment of ground markers on the corners of all land to be acquired prior to the visit to the site of the Government Valuer or his deputed agent.

2.04 DOCUMENTATION

A. Preliminary Design Stage

The Consulting Engineers shall submit under covering letters to the Director, the documents required in the following numbers:-

(i) 7 bound complete copies of the Preliminary Design Report, Estimate and List of Materials described in 2.02 in 'A4' metric format.

- (ii) 2 complete sets of maps as described in 2.02 (b) and 2 complete sets of the general arrangements of all structures, Clause 2.02 (a)(vi). One set of these will be retained by the Director, for record purposes and the other will be returned to the Consulting Engineers with comments and the signature of the Director, which will constitute his approval in principle to the preliminary design drawings.

B.

Final Design Stage

- (i) The complete set of the Final Design drawing negatives as described in Clause 2.03 (a) shall be submitted to the Director, for his approval and signature before being issued for Tendering, Construction or Record purposes as relevant. The negatives of the drawings will be deposited with the Director.
- (ii) The Consulting Engineers shall submit to the Director, the following :-
 - (a) 7 bound complete copies of the Final Design Report as described in Clause 2.03 (b).
 - (b) 2 bound full size copies of the Final Design Drawings.
 - (c) 2 bound copies of draft Tender Documents.
 - (d) 25 bound copies of the Final Design Drawings, photo-reduced to Standard Metric Size 'A3' for tendering purposes.
 - (e) 25 bound complete sets of actual Tender Documents.
 - (f) 20 loose sets of Bills of Quantities, as Clause 2.03 (a).
 - (g) 3 sets of the Hydraulic Calculations, as Clause 2.03 (c).

C.

Construction Stage

Subsequent to the Tender Opening and the appointment of the Approved Tenderer, the Consulting Engineers shall provide to the Director the following :-

- (a) 6 complete sets of Tender Documents and complete with the prices and other details of Tender of the Approved Tenderer.
- (b) 4 complete sets of the full scale Construction Drawings for onward transmission to the Approved Tenderer.

2.05 ALTERATIONS TO AND MODIFICATIONS OF DESIGN AND
ADDITIONAL SERVICES

Wherever in the opinion of the Consulting Engineers and agreed by the Director, surveys, investigations or designs need to be altered, modified or varied in nature from those required by Clauses 2.02 and 2.03, or additional services are ordered by the Director, then the Consulting Engineers shall carry out such necessary alterations and the additional services, and shall be reimbursed for any additional work in accordance with Clause 4.05.

2.06 LIAISON WITH AUTHORITIES

- (a) The Consulting Engineers must liaise with the District Commissioner or the Commissioner of Lands and the land owners (local authorities in the case of Trust Lands) and occupants to obtain permission where possible to enter upon land for survey purposes prior to such entry.
- (b) The Consulting Engineers must keep accurate records of the crops, trees, buildings and other properties damaged in any way during all survey operations and they must report immediately to the District Officer and the District Agricultural Officer all cases of damage caused so that compensation can be correctly assessed.
- (c) The Consulting Engineers shall instruct the District Commissioner and/or the Commissioner of Lands to submit assessments for payment of all compensation to the Director.
- (d) The Consulting Engineers shall liaise with the Client and all other Authorities whose interests may be affected by the design or construction of the Works. A brief record of the salient points arising out of such consultations shall be forwarded to the Director. If any matters arise out of these consultations beyond the jurisdiction of the Consulting Engineers or upon which they consider a satisfactory solution cannot be achieved between them and such Authority, then the Consulting Engineers shall immediately inform the Director, who will negotiate with the Authorities concerned and subsequently instruct the Consulting Engineers.
- (e) The Consulting Engineers shall point out to the District Commissioner and the Commissioner of Lands or their representatives, the areas required for the buildings, structures, and the necessary land reserves for the water supply and the routes of the pipelines so that compensation and wayleave can be assessed. To this end the Consulting Engineers will indicate the boundaries as detailed in Clauses 2.03 (a) and (g) and in addition will provide the District Commissioner or Commissioner of Lands with six copies of the plans showing the location of the areas to be acquired, the property boundaries, the plot numbers and the areas to be excised from each plot.

Such drawings shall show wherever possible the location and area of any permanent improvements, such as building, plantation, etc. to be acquired. One copy of such plans shall be sent to the Director.

2.07 DESIGN STAFF

The Consulting Engineers will be responsible for the provision of properly qualified and experienced design staff at all stages of Design.

3. OBLIGATION OF THE CLIENT ON DESIGN

3.01 DESIGN STANDARDS

The Director shall indicate the proposed design standards for the Work which shall be in accordance with the "Standards" and modified standards as described in 2.01 or as laid down in the Schedule to these conditions or elsewhere in this Agreement.

3.02 INFORMATION TO BE SUPPLIED TO THE CONSULTING ENGINEERS

(a) The Client shall supply free of charge all pertinent data and information and give such assistance as shall reasonably be required for the carrying out by the Consulting Engineers of their duties under this Agreement saving that such assistance shall not be extended to the provision of any supplies or services.

(b) In particular the Director will supply to the Consulting Engineers upon commencement of the Works detailed in the Schedule to these conditions a 1:50,000 scale Key Plan showing any suggested pipe-routes and know major structures, and the appropriate areas to be considered for water supplies.

(c) The following documents will be supplied where available on request to the Consulting Engineers by the Director:-

- (i) Design Criteria.
- (ii) Material Standards.
- (iii) Analyses of Contract Rates.

3.03 APPROVAL OF DESIGNS

The Director shall approve or instruct the Consulting Engineers to modify their preliminary and final design within 60 days of the prescribed or actual dates of submission to him, whichever is the later, for the relevant design stages. Approvals to designs which have been modified to the satisfaction of the Director shall be given not more than 30 days after the agreed or actual dates of submission to him whichever is the later.

3.04 POSTPONEMENT OR ABANDONMENT OF THE DESIGN WORK

In the event of the whole or any part of the Design works being postponed or abandoned, then the payment to be made to the Consulting Engineers for services performed shall be calculated in accordance with clauses 4.01 and 4.02 inclusive of these Conditions increased by one quarter, or from the full value of the Design works as set out in clause 4.01 and 4.02 inclusive of these conditions, whichever is the lesser, and in accordance with such other clauses as may be applicable having regard to the services performed prior to the Design works being postponed or abandoned. If, within two years, the postponed Design works or any part thereof shall again proceed, then any relevant payment made under this clause shall rank as defined in Clauses 4.01 and 4.02 inclusive of these Conditions. Should additional services by the Consulting Engineers be required in connection with resumption of postponed Design works, the Consulting Engineers shall be entitled to charge for such additional services on a time basis calculated in accordance with the scale set out in clause 4.01 of these Conditions. In the event of the design works or any part thereof being postponed for a period longer than two years, such Design works or part thereof shall be considered to have been abandoned.

4. REMUNERATION OF CONSULTING ENGINEERS

4.01 SCALE OF FEES

(a) The fee shall be on the basis of a lump-sum, in accordance with the appropriate line as given by NORAD

4.02 REMUNERATION OF CONSULTING ENGINEERS FOR DESIGN WORK

(a) The remuneration of the Consulting Engineers for the performance of their duties as set out in Section 2 of these Conditions shall be a proportion of the total fee calculated in accordance with Clause 4.01 above together with out-of-pocket expenses involved in the design and the preparation of contract documents. Compensation costs will be met direct by NORAD.

(b) The fee for preliminary design shall be 30% of the total fee.

(c) The fee for Final Design, but excluding the production of Tender documents shall be 30% of the total fee.

(d) The fee for the production of the actual Tender documents and loose Bills of Quantities shall be 10% of the total fee.

(e) The Design fee shall include all direct and indirect costs of providing the design services detailed in this Agreement including but not limited to:

- (i) The salary and fringe benefits of the staff engaged on the work both on site and in the Consulting Engineers' offices, including air passages, leave, appointment, travelling and subsistence expenses etc.
 - (ii) The Consulting Engineer's Head Office and other overheads attributable to the work.
 - (iii) All travelling, transport, hotel subsistence and communications expenses incurred in Zambia.
- (f) Out of pocket reimbursable expenses shall be estimated for by the Consulting Engineers at the outset of design. These expenses shall not be incurred by the Consulting Engineers without the prior approval of the Director to the general level of these expenditures. Out of pocket reimbursable expenses shall include for:-
- (i) Soil testing in excess of that normally required.
 - (ii) The cost of all power drilling and/or blasting for site investigations.
 - (iii) The cost of new aerial photography and mapping of the area but excluding the cost of existing photography and mapping
 - (iv) The cost of field survey work on main pipeline routes during the design stage.
 - (v) The cost of beaconing and referencing to establish the pipeline route and other installations and services, and for land compensation.
 - (vi) Water testing and analysis.
 - (vii) Printing reproduction and purchase of all documents, drawings, maps and records.
 - (viii) Advertising for tenders.

4.03

PAYMENT OF CONSULTING ENGINEERS FOR DESIGN WORK

- (a) Payment to the Consulting Engineers of the Design fee will be made by NORAD in accordance with Clause 4.02 (b), (c) and (d) of these Conditions upon completion of the various Design stages to the satisfaction of the Director, or as otherwise mutually agreed.
- (b) Payment for out-of-pocket expenses on Design will generally be made at three monthly intervals upon production to the Director, of adequate evidence audited where necessary, to support the claims.
- (c) All payments for Design will be made to the Consulting Engineers within 28 days of the submission of their accounts to the Director, in accordance with Clause 4.02.

4.04 REMUNERATION OF CONSULTING ENGINEERS FOR ALTERATIONS
TO MODIFICATIONS OF DESIGN AND ADDITIONAL SERVICES

(a) If after completion of or during the execution of the Design duties set out in these Conditions, any design whether completed or in progress or other document prepared in whole or in part by the Consulting Engineers shall require to be modified or revised by reason of instructions given by the Director, to the Consulting Engineers or by reason of circumstances which could not reasonably have been foreseen, such modification or revision and any consequential reproduction of documents shall be the subject of additional payment computed on a time basis as set out below in Clause 4.04 (b) or such other basis as may be agreed, together with any appropriate out-of-pocket reimbursement.

(b) Remuneration for Additional Services required by the Director, shall be in accordance with the Scale of Charges shown below in this Clause 4.04 (b), or as may be otherwise agreed, together with specialists' fees and out-of-pocket expenses in connection therewith and any appropriate reimbursements. The scale of charges on a time basis shall be agreed upon between the Consulting Engineers and NORAD.

Time spent by Clerical Staff (unless previously agreed) shall not be chargeable.

Time spent by partners and technical staff in travelling shall be chargeable.

4.05 PAYMENT TO CONSULTING ENGINEERS FOR ALTERATION AND
MODIFICATIONS OF DESIGN AND ADDITIONAL SERVICES

(a) Fee payment for such work as described in Clause 4.04 and out-of-pocket expenses incurred in the performance of such work will be paid for in full upon their completion to the satisfaction of the Director, including the delivery of any relevant documents to the Director.

(b) All payments for alterations and modifications of Design and Additional Services will be made to the Consulting Engineers within 28 days of submission of their accounts to the Director, in accordance with Clause 4.04.

5. OBLIGATIONS OF CONSULTING ENGINEERS ON SUPERVISION

5.01 GENERAL

It might appear that the Consulting Engineers will be requested by the Director to supervise the Works designed under this Agreement in accordance with the Supervision terms laid down herein. The Client cannot however commit himself to offering the supervision work to the Consulting Engineers at the time of signing the Agreement.

5.02 SITE STAFF

If the Consulting Engineers are requested to supervise the Construction of the Works they will be responsible for the provision of properly qualified and experienced resident staff. The Consulting Engineers must agree with the Director, the numbers and qualifications of the individuals selected for employment on the site, their rates of remuneration and conditions of service, both at the outset and at all times during the execution of their supervisory duties.

5.03 DUTIES OF CONSULTING ENGINEERS AND RESIDENT SITE STAFF

The Consulting Engineers shall be responsible to the Director, under the Agreement for:-

- (a) Advising the Client on tenders, tenderers, prices and estimates for carrying out the Works
- (b) Advising the Client on the appointment of the resident site staff and making available such staff if so required.
- (c) Issuing instructions to contractors including all working drawing, tabulations, and other documents necessary to the contractors to enable them to execute the works.
- (d) Exercising Supervision-in-Chief on all matters concerning the Contract and the execution of the Works.
- (e) Detailed supervision and administration of the construction work.
- (f) Preparing such detailed design work as may be necessary for the issuing of proper instructions to the Contractor.
- (g) Examining Contractor's proposals and details.
- (h) Measurement of the Work.
- (i) Preparing and approving Certificates for payment to the Contractors.
- (j) Preparation of Reports, maintenance of Records and preparations and handing-over of as-built Drawings to the Director.
- (k) Assisting in settling disputes or differences which may arise between the Client and the Contractor, including advising the Director up to the stage of going to arbitration.
- (l) Supervision, administration and discipline of the Consulting Engineer's resident site staff and for efficient performance of their duties.
- (m) Liaison with all relevant authorities to ensure the orderly progress of the work and to assist in the upkeep of good public relations.

(n) Advising the Director, of any faults in design, specifications, costing, selection of materials, design standards, and construction methods if these become apparent during construction and making recommendations to the Director to overcome such difficulties.

(o) Assisting the Client in co-ordinating deliveries of material supplied by the Client, keeping an up-to-date record of material received on site and advising the Client on the necessity for the inspection and testing of materials and plant supplied.

(p) Inspecting the Works as requested by the Director, in case of defects during the "Maintenance Period", instructing the Contractor on remedial works and supervising the proper execution of such works.

6. OBLIGATION OF CLIENT ON SUPERVISION

6.01 SITE TRANSPORT

(a) If the Consulting Engineers are requested to provide their own transport, the payment rate for mileage and maximum mileage allowable will be subject to the approval of the Director.

(b) If the Client provides transport without drivers, the driver of any vehicle so provided shall be deemed to be at all times and for all purposes employed by and/or under the control of the Consulting Engineers and not the Client. No vehicle so provided shall be driven except by a licensed driver in respect of whose driving of that vehicle there is in force a valid comprehensive policy of insurance, and the cost of this insurance is reimbursable to the Consulting Engineers under Clause 6.02 (c) (ii). The Client shall be indemnified by the Consulting Engineers against all claims for loss, damages and injuries arising out of or in consequence of the driving of any vehicle so provided and against all claims, demands, proceedings, damages, costs, charges and expenses in respect thereof and in relation thereto.

6.02 REMUNERATION OF CONSULTING ENGINEERS FOR SUPERVISION WORK

(a) Payment for the services set out in Section 5 of these conditions shall be the sum of the following:-

(i) A Supervision fee of 30% of the total fees as agreed upon by NORAD

(ii) The salaries of the technical/professional staff, at levels to be agreed in advance with the Director and NORAD whilst engaged on the site of the Works (but including local leave not exceeding 1½ days exclusive of Sundays and Public Holidays per month spent on the site), plus an allowance of 35 per cent of such salaries in addition to such salaries.

- (iii) Specified out-of-pocket expenses involved in the site supervision of the contract.
- (b) Payments under (a) (i) and (a) (ii) for supervision fees, salaries and percentage on salaries shall include all direct and indirect costs of providing the services mentioned therein including but not limited to the costs of:-
 - (i) All professional services and the cost of Consulting Engineers' Head Office, site office and other overheads attributable to the work.
 - (ii) Salaries and all fringe benefits of the staff engaged on site supervision.
 - (iii) Non specified out-of-pocket expenses which exclude those specified in Clause 6.02 (c) below.
- (c) Payments under (a) (iii) for specified out-of-pocket expenses shall include for the following :-
 - (i) Cost of housing staff if this is not covered by the Construction Contract.
 - (ii) Cost of the Consulting Engineers site transport in accordance with Clause 6.01 (a) and (b) as are relevant.
 - (iii) Additional services required by the Client in respect of litigation or arbitration in accordance with Clause 4.04 (b) hereof together with specialists' fees and out-of-pocket expenses in connection therewith, or as otherwise agreed between the Director, and the Consulting Engineers.
- (d) In cases where the Design was prepared by an agency other than the Consulting Engineers carrying out the Supervision, the detailed design work in Clause 5.03 (f) above shall be paid for as Additional Services in accordance with Clause 4.04 (b) hereof or as otherwise mutually agreed.

6.03

PAYMENT TO CONSULTING ENGINEERS FOR SUPERVISION WORK

- (a) Payment to the Consulting Engineers of the fee due for Supervision laid down in Clause 6.02 (b) (i) will generally be made in three monthly instalments. The total fee due at any date will bear the same proportion to the cost of the Works certified for payment to that date, as the total supervision bears to the cost of the Works.
- (b) The specified out-of-pocket expenses, salaries of site staff and percentage of salaries as laid down in Clauses 6.02 (a) (ii) and (iii) hereto will generally be made in instalments for each monthly period upon production of evidence by the Consulting Engineers to the Director, that such specified out-of-pocket expenses and salaries have been met by the Consulting Engineers.
- (c) All payments will be made to the Consulting Engineers within 28 days of the submission of their accounts to the Director, in accordance with this Clause.

C. SCHEDULE TO THE CONDITIONS OF ENGAGEMENT

7.01 STATEMENT OF INTENT

The Government of Zambia intends to investigate, design and construct water supply projects for the following townships in Western Province:

- a) Lukulu
- b) Kalabo
- c) Kaoma
- d) Mongu
- e) Namushabende
- f) Senanga
- g) Sesheke

In addition 10 small earth-fillings dams will be constructed by intensive labour and 700 well-points by construction teams.

7.02 ASSESSMENT OF PRELIMINARY STUDIES, STANDARD AND CRITERIA

A description of each project has been carried out. The reports also indicating the likely scope of works will be made available to the Consulting Engineers. It should be noted, however, that the report should be used only as a guide and not necessarily as the final plan for the projects. Any aspects which the Consulting Engineers consider should be revised, shall be brought to the attention of the Director during the Preliminary Design Stage. In particular, the Consulting Engineers shall re-assess population and demand calculations liaising with the Department of Urban and Rural Physical Planning, and the limits of supply where population patterns economical aspects on water sources dictate. In addition to the standards mentioned in Clause 2.01 relevant parts of reports shall be applied.

7.03 LUKULU WATER SUPPLY PROJECT

7.03.1 LOCATIONAL DESCRIPTION OF THE WORKS AND LIMITS OF SUPPLY

The water supply project is intended to serve the urban centre of Lukulu with a number of communal water point in and adjacent to the town. The Consultant is to make special proposals for the actual limits of supply based upon an investigation of demand and economics. The Director will be informed of all such proposals as they are considered, to prevent the works from becoming over extended.

7.03.2 WATER QUALITY AND SOURCE

Although a limited amount of test pumping and sampling for chemical analyses has already been carried out on the existing wells the Consulting Engineers shall carry out further tests to establish the maximum yield of the wells and to show whether treatment is required. If required, further hydrogeological investigations have to be carried out.

7.04 KALABO WATER SUPPLY PROJECT

7.04.1 LOCATIONAL DESCRIPTION OF THE WORKS AND LIMITS OF SUPPLY

Water supply project is intended to serve the urban centre and immediate surroundings of Kalabo. The Consulting Engineers shall determine the optimum supply area taking into consideration the settlements near township.

7.04.2 EXISTING SUPPLIES

There is one existing township supply and one Secondary School supply in the area to be served. The Consulting Engineers shall make recommendations if and as to which parts of the existing supplies should be incorporated in the new supply.

They shall also make enquiries into whether the present owner of the Secondary School Supply is willing to be taken over, assess the value of its assets and recommend a reasonable basis for any recommended take over.

7.05 KAOMA WATER SUPPLY PROJECT

7.05.1 LOCATIONAL DESCRIPTION OF THE WORKS AND LIMITS OF SUPPLY

The water supply project is generally intended to serve the Urban area of Kaoma but the Consulting Engineers will investigate the feasibility of providing a bulk supply to the secondary school in addition to define the detailed limits for Kaoma township itself and the surrounding rural area.

7.05.2 WATER QUALITY AND SOURCES

The Consulting Engineers shall investigate the quality of water and the capacity of the existing dam source West of Kaoma, as well as the existing infiltration arrangement along the river.

7.05.3 EXISTING WORKS

The Consulting Engineers will assess the adequacy of the existing treatment, distribution and storage system of Koama.

7.06 MONGU WATER SUPPLY PROJECT

7.06.1 LOCATIONAL DESCRIPTION OF THE WORKS AND LIMITS OF SUPPLY AND AUGMENTATION

The water supply project is an extension and augmentation of the existing supply which serves Mongu Town.

7.06.2 WATER QUALITY AND SOURCES

The Consulting Engineers shall investigate the quality of water and the yield of the existing water supply sources (Kambule spring, the well point ring on the east side of the Blue Gums recreation area and the boreholes). Sampling for chemical analysis has to be carried out. Based on chemical analysis and tests, the Consulting Engineers have to recommend methods of treatment

7.06.3 EXISTING WORKS

The Consulting Engineers will assess the adequacy of the existing treatment, distribution and storage system for Mongu including the Secondary School and other institutions. They shall also make enquiries into the present owner or the Secondary School Supply now under construction to see if he is willing to be taken over, assess the value of its assets and recommend a reasonable basis for any recommended take over.

7.07 NAMUSHAKENDE WATER SUPPLY PROJECT

7.07.1 LOCATIONAL DESCRIPTION OF THE WORKS AND LIMITS OF SUPPLY

The Water Supply project is intended to serve the urban centre and the immediate surroundings. The Consulting Engineers shall determine the optimum supply area.

7.07.2 WATER QUALITY AND SOURCE

The existing source is a brick lined channel from a lag on. The water in the lagoon is reported to be of excellent quality in its natural state. Sampling for chemical analysis has to be carried out. Based on chemical analysis and tests, the Consulting Engineers have to recommend measures of treatment.

7.07.3 EXISTING SUPPLY

The Consulting Engineers will assess the adequacy of the existing supply.

7.08 SENANGA WATER SUPPLY PROJECT

7.08.1 LOCATIONAL DESCRIPTION OF THE WORKS AND LIMITS OF SUPPLY

The water project is intended to serve the urban centre of Senanga and the immediate surroundings. The Consultant is to make specific proposal for the actual limits of supply based upon an investigation of demand and economics. The Director will be informed of all such proposals as they are considered to prevent the works from becoming over extended.

7.08.2 WATER QUALITY AND SOURCE

The Consulting Engineers shall assess the quality of raw water that will be abstracted from the Zambesi River, both during low-level and flood periods.

Based on chemical analysis and tests the Consulting Engineers have to recommend methods of treatment including natural treatments through the river sandbed.

7.08.3 EXISTING WORKS

The Consulting Engineers will assess the adequacy of the existing pumping station and intake, treatment, distribution and storage system. A borehole supply is proposed for the Secondary School.

An economic comparison between a separate school supply and a town supply including the Secondary School will be carried out by the Consulting Engineers.

7.09 SESHEKE WATER SUPPLY PROJECT

7.09.1 LOCATIONAL DESCRIPTION OF THE WORKS AND LIMITS OF SUPPLY

The water project is intended to serve the urban centre of Sesheke and the immediate surroundings. The Consultant is to make specific proposals for the actual limits of supply based upon an investigation of demand and economics. The Director will be informed of all such proposals as they are considered to prevent the works from becoming over extended.

7.09.2 WATER QUALITY AND SOURCE

The Consulting Engineers shall assess the quality of raw water that will be abstracted from the Zambesi River, both during low-lever and flood periods.

Based on chemical analysis and tests the Consulting Engineers have to recommend methods of treatment including natural treatments through the river sandbed.

7.09.3 EXISTING WORKS

The Consulting Engineers will assess the adequacy of the existing pumping station and intake, treatment, distribution and storage system. A borehole supply is proposed for the Secondary School.

An economic comparison between a separate school supply and a town supply including the Secondary School will be carried out by the Consulting Engineers.

7.10 EARTH-FILLING DAMS

7.10.1 LOCATION OF DAMS

The Areas to be considered for water conservation are in Kaoma and Mulobezi Districts some of the damsites are already selected for implementation.

The final selection shall be made by the Director after liaison with the DDC/PDC and the Consulting Engineers.

7.10.2 SOURCES

The Consulting Engineers will investigate the ground conditions, the hydrology, and the feasibility of the proposed dams. A priority list for implementation will be put forward to the Director (clause 7.10.1).

The Consulting Engineers have to propose measures to prevent the spread of bilharzia.

7.10.3 DESIGN

The Consulting Engineers shall undertake the design of ten dams at selected sites. The height of the earth-filling dams vary from 3m. to 7m. which is considered the practical range for direct labour construction.

7.11 DESIGN COMPLETION DATES

For the separate projects the Preliminary and Final Designs shall be submitted to the Director not later than:-

	<u>Preliminary Design</u>	<u>Final Design</u>
a) Lukulu
b) Kalabo
c) Kaoma
d) Mongu
e) Namushakende
f) Senanga
g) Sesheke
h) Dams

7.12 PRELIMINARY AND FINAL DESIGN REPORTS

(Clause 2.04 A(1) and 2.04 B(11)(a)).

The Consulting Engineers shall submit to the Director seven bound copies of each report as specified in the above clauses. All calculations such as hydraulic, structural and for soil mechanics shall be submitted together with the reports.

7.13 PERIODICAL REPORTS DURING DESIGN

At least at monthly intervals, the Consulting Engineers shall contact the Director's Office to discuss the progress that has been made with the design and so that agreement may be reached on major points within the design before reports are finalised.

7.14 OPERATORS MANUAL AND COMMISSIONING INSTRUCTIONS

If the project involves construction of treatment works, the Consulting Engineers shall produce and submit to the Director, three copies of an 'Operators Manual', for each treatment works. These manuals shall give the operators easily understood instructions for running the treatment works. Detail commissioning instructions will be drawn up by the Consulting Engineers who will also assist the Provincial Water Engineer in the ultimate commissioning of the new works.

7.15 ENGINEERS ESTIMATE

a) Preliminary Design

The Consulting Engineers shall prepare an estimate to an accuracy of $\pm 15\%$

b) Final Design

The Consulting Engineers shall prepare an estimate to an accuracy of $\pm 7\frac{1}{2}\%$.

In each case the estimate shall be prepared at present day prices at the time of estimation and shall be submitted with an estimate of the probable annual percentage increases in the cost of the completed project.

7.16 OWNERSHIP OF DOCUMENTS AND COPYRIGHT

(Clause 1.08)

The Client shall be entitled to make use of maps produced for this project even for other purposes.

7.17 OBLIGATION OF CONSULTING ENGINEERS ON SUPERVISION

(Clause 5.01)

It is probable that the Director will carry out the construction of some or all of the water supply projects by direct labour methods in which case the Consulting Engineers may be required to supervise the works. A modified form of tender documents comprising drawings, bill of quantities, and brief specifications will be required in such instances. The fee payable for preparing these documents will be agreed upon between the Consulting Engineers and NORAD.

(Clause 5.03)

On projects carried out by direct labour methods the following sub-clauses will apply :- 5.03 (b), (e), (h), (j), (l), (m), (n), (o), and (p). In addition the Consulting Engineers shall be responsible to the Director for issuing instructions including but not limited to all working drawings, tabulations, and other documents necessary for the proper execution of the works.

If the Director so requires the Consulting Engineers will supervise the works or any project item of the works designed under this Agreement if the project is carried out by Civil Engineering Contract in accordance with Clauses 5.02 and 5.03, and payment to the Consultants for supervision will be in accordance with Clause 6.02.

The Client cannot however commit himself to offering the supervision work to the Consulting Engineers at the time of signing this Agreement.

7.18 SOIL INVESTIGATIONS

(Clause 4.02 (f) (i))

The design fee shall include for normal soil investigations for major structures to establish rock levels and to classify overlying layers of soil. Based upon the results the Consulting Engineers shall make recommendations on any further investigations necessary, e.g. to establish allowable bearing pressures and to ensure stability under various conditions. Extra investigations will be paid for as an agreed reimbursable cost regarding rate and quantity.

7.19 LIAISON WITH AUTHORITIES

(Clause 2.06)

In addition to all work in Clauses 2.06 (a) - 2.06 (d), the Consulting Engineers shall liaise with all Authorities responsible for planning future development within the areas to be served in order to assess the probable water consumption of any such development. The results of such discussions shall be included in the Preliminary Design Report. The Consulting Engineers shall carry out all work in Clause 2.06 (e) before completing the Final Design.

7.20 TIMETABLE

The Consulting Engineers shall within 30 days from signing this Agreement prepare a time-table showing estimated periods of time for the various portions of the design and documentation. This time-table shall be amended when required by the Director and after negotiations agreed between the Consulting Engineers and the Director

7.21 REPORTS DURING CONSTRUCTION

Progress reports on the works during construction will be submitted to the Director at monthly intervals. Such reports should include.

- (i) details of all work carried out during the month as indicated on a bar chart, and compared with the original programme,
- (ii) staff,
- (iii) photographs of work done, and
- (iv) any special points of interest requiring mention.

Minutes of all site meetings held at least every month will also be submitted to the Director.