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APPENDIX A

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

MINISTRY OF LOCAL GOVERNMENT, RURAL DEVELOPMENT AND COOPERATIVES

RURAL IRRIGATION WORKS STUDY
FINAL REPORT

APPENDIX – A
GENERAL SPECIFICATIONS

ENGINEERING CONSULTANTS, INC.
ENGLEWOOD, COLORADO, U.S.A.

PLANNERS, ENGINEERS AND CONSULTANTS LIMITED
DACCA, BANGLADESH

FEBRUARY 1980

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INSTRUCTIONS TO TENDERERS

1. Invitation

The Ministry of Local Government, Rural Development & Co-operatives, Government of the People's Republic of Bangladesh, hereinafter referred to as the Employer, invites approved firms and joint ventures to submit tenders for the construction of .
Only firms and joint ventures invited by the Employer are authorized to submit tenders for the construction of the Works described in these Contract Documents.

Tenders shall be prepared in an original and one copy in English, on the forms included in these Tender Documents. The original and one copy shall be sealed in one envelope marked in capital letters in the lower left hand corner:

and must be addressed and delivered as follows:

on or before 1100 hours, Bangladesh Time, at which place and time tenders will be publicly opened.

2. Availability of Contract Documents

Three complete sets of the Contract Documents will be furnished free of charge to each of the firms and joint ventures invited to tender by the Employer. Additional copies of the Contract Documents may be obtained by those firms and joint ventures at the following address:

Requests by prospective tenderers for additional sets of the Contract Documents shall be accompanied by a check or money order, payable to the Ministry of Local Government, Rural Development & Co-operatives, in the amount of for each additional set of the Contract Documents requested.

Persons and firms other than prospective tenderers may obtain complete sets of the Contract Documents upon payment of for each set of the Contract Documents requested.

3. Preparation of Tender

All tenders shall be prepared in English and submitted in accordance with the following requirements:

a. One copy of the tender shall be marked "Original". In case of discrepancies between the original and the copy, the original shall govern.

The original and one copy of the tender shall be made on the forms included in and made a part of these Contract Documents, which shall be returned in its entirety with all blanks properly filled in, and manually signed in ink.

If erasures or other changes appear, each such erasure or change must be initialed by the person signing the tender. Modifications of tenders will be considered only by letter signed by the same person who signed the tender and only if received by the Employer prior to the time fixed for the receipt of tenders.

b. Tenders shall be submitted on all items of the Bill of Quantities and no tender will be considered for only a part of the Bill of Quantities. Prices shall be expressed in figures. In case of discrepancy between the unit price and the extension thereof, the unit price shall govern.

c. The tender must be signed by one duly authorized to do so. Tenders submitted by corporations must bear the seal of the corporation and be attested by its Secretary. Tenders submitted by joint ventures of two or more firms must be accompanied by the document of formation of the joint venture duly registered and authenticated before an official

of the firms' home country deputized to witness sworn statements, in which is defined precisely the general conditions under which it will function, its period of duration, the persons authorized to represent and obligate it, the participation of the several firms forming the joint venture, and any other information which will permit a full appraisal of its functioning.

d. Both the original and the copy of the tender shall contain all information, data, and other material, except tender security, to be furnished by the Tenderer. Complete information, data and other material must be submitted with the tender and no information received from the Tenderer after the opening of the tenders will be considered in the evaluation of tenders. No tender will be accepted after the date and hour specified for delivery of tenders to the Employer.

e. The Employer assumes no obligation or responsibility whatsoever to compensate or indemnify Tenderers for any expense or loss which they may incur in the preparation of the Tender, nor does the Employer guarantee that an award will be made under these Contract Documents.

4. Basis on Which Tenders Requested

Tenders submitted shall be on the basis of firm prices in Bangladesh at the time of tendering for the articles and services called for in the tender, and subject to all the conditions set forth in the Contract Documents. Tenders submitted on any other basis will not be considered. A tender which is qualified by the Tenderer by the insertion or attachment of unsolicited terms or conditions need not be considered and can be cause for rejection.

Prices quoted in the Bill of Quantities shall be in Bangladesh Takas. The Contractor will be paid in Bangladesh Takas in accordance with the General Conditions.

5. Tender Security

To be considered, the original, but not the copies, of the tender shall be accompanied by a tender security in the amount of not less than five percent (5%) of the Total Tender Price as computed in the Bill of Quantities.

The tender security may be in the form of a Bid Bond prepared in the form appended herein providing a surety or sureties acceptable to the Employer to be jointly and severally bound with the Tenderer for the performance of his Tender, or in the form of an irrevocable bank draft, made payable to the Ministry of Local Government, Rural Development & Co-operatives, Government of the People's Republic of Bangladesh, and drawn on the Bank of Bangladesh. The tender security shall be valid for sixty (60) calendar days following the date of opening of tenders.

In case the successful Tenderer fails for any reason to execute the Contract to furnish an acceptable Performance Security and furnish evidence of working capital, the Tender Security shall be forfeited to the Employer as liquidated damages and not by way of penalty, as the exact damage caused to the Employer by such failure is difficult if not impossible to determine accurately.

The tender security of the successful Tenderer will be returned without interest upon execution of the Contract after the performance security furnished by the Contractor has been accepted by the Employer. The tender securities of the second and third lowest complying tenderers will be returned without interest within seven (7) calendar days following execution of the Contract. The tender securities of the other tenderers will be returned without interest within thirty (30) calendar days following the date of tender opening.

A tender which is not accompanied by a satisfactory tender security will be rejected.

6. Delivery of Tenders

Tenders shall be delivered on or before the hour and date set for the opening of tenders. For every tender delivered, a receipt will be issued indicating the hour and date of delivery and the name of the Tenderer. Delivery of tenders by registered mail shall be at the Tenderer's risk, and the hour and date of receipt of the tender will be taken as that certified by the Employer. Tenders will only be considered if received prior to the time set for the opening of tenders. Tenders received otherwise will be returned unopened.

7. Withdrawal of Tenders

A Tenderer will be allowed to withdraw his tender prior to the time set for the opening of tenders if he

communicates his purpose in writing to the Employer and his tender shall be returned to him unopened. No tender can be withdrawn for any reason whatsoever after the opening of tenders has commenced.

8. Tenderer's Responsibility

The Tenderer shall be responsible for having taken steps to carefully examine all of the Contract Documents and also to have fully informed himself as to all conditions, local and otherwise, affecting the carrying out of the Contract Work, and to have formulated an estimate of the facilities available and needed. Failure to do so will be at the Tenderer's risk.

It shall be the sole responsibility of Tenderers to determine and to satisfy themselves by such means as they consider necessary or desirable as to all matters pertaining to this Contract, including the location and nature and condition of the terrain; geologic conditions at the site; transportation and communication facilities; the requirements and availability of labor, water, electric power and roads; the location and extent of aggregate sources, earth and other natural materials for use in the Contract Work; and all other factors that may affect the cost, duration, and execution of the Contract Work. The Tenderer, by the act of submitting a tender, acknowledges that he has inspected the Site and determined the general characteristics of the Contract Work and the conditions indicated above.

The Employer will not assume any responsibility regarding information, interpretations, or conclusions obtained by the Tenderer, or regarding information, interpretations or deductions the Tenderer may obtain or arrive at from the data furnished by the Employer. No verbal agreement or conversation with any officer, employee or agent of the Government or the Consultant, either before or after the execution of the Contract, shall affect or modify any of the terms or obligations contained in the Contract.

9. Law

By submitting a tender, the Tenderer acknowledges that he has become familiar with all laws, acts and regulations of Bangladesh that in any manner may affect, or apply, to the operations and activities of Contractor under the Contract, or in connection therewith. The Contractor shall be the employer of the personnel which he will utilize for the performance of the Contract and he shall be obligated to comply with the labor laws of Bangladesh.

10. Data to be Submitted With Tender

Tenders shall contain the following documents:

a. An organization chart, and complete qualifications and experience data sheets for the supervisory personnel the Tenderer proposes to employ for the execution of the Contract. Alternate key personnel of equal competence may be substituted later subject to Government approval.

b. A construction schedule which will show in detail the proposed plan of operation and construction of each main item in the Bill of Quantities from start to completion of the Contract Work. The schedules shall be in a bar graph form with months shown as the least unit of time and each main item on a separate horizontal line. The schedule shall also show expected quarterly accomplishment and financial requirements based on the Bill of Quantities.

c. A list of equipment proposed to be used for the performance of the Contract Work. The list shall set forth separately the construction plant or equipment owned by the Tenderer and that which the Tenderer intends to purchase or provide from other sources thereof. The list shall indicate new and used equipment and the value thereof.

d. A description of the housing, utilities and other facilities comprising the Contractor's camp in sufficient detail to indicate the adequacy and type of construction proposed by the Tenderer.

e. Schedule of proposed subcontractors with complete description and data on materials, labor, equipment and services to be subcontracted.

f. Tenderer's declaration certifying that he has fully informed himself of all conditions, local and otherwise, affecting the carrying out of the Contract Work and that his tender has been prepared in strict accordance with the terms of these Contract Documents.

11. Tenderer's Competence

The Employer reserves the right to examine more fully the competence and responsibility of a Tenderer at any time

before the award of Contract by further verification of the Tenderer's qualifications, or by any other means; and to reject any tender when the facts as to business and technical organization, or financial resources, or construction experience, have been misrepresented and in the Employer's opinion would justify rejection.

12. Interpretation of Contract Documents

If a prospective Tenderer is in doubt as to the true meaning of any part of the Contract Documents, the Tenderer may submit a written request for an interpretation to the Employer allowing sufficient time for a reply to reach him before submission of his tender. Any substantive interpretation given will be issued by the Employer in the form of an addendum furnished to all prospective tenderers.

The Employer may also issue addenda to the Contract Documents prior to the date of opening of tenders for clarification or modification of the Contract Documents. Receipt of all addenda shall be acknowledged by each prospective tenderer prior to submittal of tenders and receipt of and compliance to shall be indicated in the tender. Oral interpretation of the Contract Documents will not be binding.

13. Pre-Tendering Conference

A pre-tendering conference will be held at the at 0900 hours, Bangladesh Time, on , 19 to make final clarification to contractors. Attendance by contractors is desirable but not mandatory. An addendum will be issued covering the subjects of clarification.

14. Comparison of Tenders

In evaluating tenders, the Employer will not be bound to award a contract to a tenderer submitting a tender with the lowest cost, but will take into consideration the Tenderer's experience, organization, plant facilities, financial standing, and other relevant considerations.

15. Opening of Tenders and Award of Contract

Tenders will be opened in the presence of the Tenderers who may desire to attend such opening by the Employer

at the place and time specified.

Promptly after the opening of tenders, the Employer, assisted by the Consultants, will undertake a detailed study and appraisal of the tenders submitted. The Employer will make award to the Tenderer whose tender is the most advantageous to the Government. The Employer reserves the right to reject any and all tenders received.

Within ten (10) calendar days after the date of receipt of notice of award, the successful Tenderer will be required to have in an authorized representative to execute the Contract with the Employer to furnish the performance Security, to furnish evidence of working capital and to appoint the agent or agents upon whom process may be served in accordance with the General Conditions.

16. Alternative Tenders

Tenderers shall tender on the Works as shown on and described in these Contract Documents. Alternative tenders on a different scheme will not be accepted.

TENDER

NOTE: Tenderers shall fill in all blank spaces in the Tender and Bill of Quantities:

TO: Ministry of Local Government
Rural Development & Co-operatives
Government of the People's
Republic of Bangladesh

Gentlemen:

1. The undersigned Tenderer, having examined the Contract Documents and Addenda Numbers thereto, for and having examined the Site of the above Works, or having caused the Site to be visited on our behalf by a competent and reliable agent, and having satisfied ourselves as to all conditions under which the above named Works must be performed, hereby proposes to construct the above named Works in accordance with the Contract Documents, including the Addenda indicated above, for the Total Tender Price entered in the Bill of Quantities or such other sum as may be ascertained in accordance with the said Contract Documents and the rates and prices set forth in the Bill of Quantities; and should this Tender be accepted by you:

a. to send a representative having our power of attorney to within 10 calendar days following your notification of said acceptance for the purpose of entering into and executing a Contract Agreement in the form set out in the Contract Documents with such alterations or additions thereto as you may require to adapt such Agreement to the circumstances of this Tender; and

b. to commence the Works within 30 days following receipt of the Engineers order to proceed, and to complete the Works comprised in the Contract on or before the date specified below.

2. This Tender is made by the Tenderer without any connection, knowledge, comparison of figures, or arrangements with any other person or persons making a tender for the same work and is in all respects fair and without collusion or fraud.

3. The Tenderer agrees that, if this Tender is accepted, the Tenderer will execute any additional volume or quantity of work that may be required, over and above the quantities set forth in the Bill of Quantities, in strict conformity in all respects with the requirements of the Contract Documents.

4. The Tenderer agrees that deductions from the volumes or quantities as set forth in the Bill of Quantities, if any, shall be made in strict conformity in all respects with the requirements of the Contract Documents.

5. The Tenderer agrees to abide by this Tender for the period of 60 calendar days following the date set for opening of tenders and may be accepted by you at any time before the expiration of such period.

6. The Tenderer agrees that the official act of awarding a Contract, based on this Tender, by the Ministry of Local Government, Rural Development & Co-operatives, Government of the People's Republic of Bangladesh shall constitute and be an acceptance of this Tender without communication or any notice.

7. The Tenderer agrees that if this Tender is accepted, the Tenderer shall forthwith furnish approved sureties for the proper fulfilment of the Contract as required in the General Conditions, and shall execute a contract and a Performance Bond, each in duplicate, and in the form shown in the Tender Documents within 10 calendar days after being notified to do so.

8. The Tenderer hereby proposes _____

_____

(Name of Bonding Company)

which is willing to become bound with the Tenderer in the amount of _____ for the due performance and fulfilment of the Contract, and all matters or things contained therein or in these Tender Documents.

9. The Tenderer understands that the Employer is not bound to accept the lowest or any tender the Employer may receive, and that the Employer will not defray any expenses incurred by us in tendering.

10. The Tenderer agrees that the Bill of Quantities and all appendices to the Tender attached hereto form part of this Tender.

Tenderer's Signature _____

_____

_____

in the capacity of _____
duly authorized to sign Tenders for and on behalf of

_____

_____

Witness _____
Dated at _____ this _____
day of _____, 19

NOTE: If tender is submitted by or on behalf of any corporation, it must be signed in the name of such corporation by some duly authorized officer or agent thereof who shall also subscribe his own name and office.

PREAMBLE TO BILL OF QUANTITIES

1. The Bill of Quantities is to be read in conjunction with the other component parts of the Contract Documents.

2. The rates and prices entered by the Tenderer in the Bill of Quantities, except insofar as it is otherwise provided under the Contract, shall be deemed to cover all obligations set out in the Contract, and all matters or things necessary for the proper completion and maintenance of the Works, and shall be fixed and binding upon the Contractor.

3. Each item in the Bill of Quantities shall be priced by the Tenderer. If the Tenderer omits to price any item in the Bill of Quantities, the cost of those items shall be deemed to be covered by other items in the Bill of Quantities.

4. The quantities set out in the Bill of Quantities are provisional and cover the approximate scope of the work which the Contractor may be required to perform. The actual quantities will be determined by measurement of the work completed by the Contractor.

BILL OF QUANTITIES

Item No.	Work and/or Material	Quantity	Unit	Unit Price (Taka)	Amount (Taka)
1.	Clearing and Grubbing	___	L.S.	___	___
2.	Dismantling	___	L.S.	___	___
3.	Care and handling of water	___	L.S.	___	___
4.	Excavation:				
	a. For canals and drains	___	cu.yd.	___	___
	b. For structures	___	cu.yd.	___	___
5.	Compacting embankments	___	cu.yd.	___	___
6.	Compacting backfill	___	cu.yd.	___	___

Item No.	Work and/or Material	Quantity	Unit	Unit Price (Taka)	Amount (Taka)
7.	Constructing brick masonry:				
	a. With 1:6 mortar	___	100 cu.ft.	___	___
	b. With 1:3 mortar	___	100 cu.ft.	___	___
8.	Constructing brick lining:				
	a. With 1:6 mortar	___	100 cu.ft.	___	___
	b. With 1:3 mortar	___	100 cu.ft.	___	___
9.	Plastering brick work				
	a. With 1:3 mortar	___	100 sq.ft.	___	___
10.	Furnishing and placing steel reinforcing bars	___	112 lb.	___	___
11.	Concrete:				
	a. Class A	___	100 cu.ft.	___	___
	b. Class B	___	100 cu.ft.	___	___
	c. Class C	___	100 cu.ft.	___	___
12.	Furnishing and laying non-reinforced concrete pipe:				
	a. 12-inch diameter	___	lin.ft.	___	___
	b. 15-inch diameter	___	lin.ft.	___	___
	c. 18-inch diameter	___	lin.ft.	___	___
	d. 24-inch diameter	___	lin.ft.	___	___
13.	Furnishing and laying reinforced concrete pipe:				
	a. 12-inch diameter	___	lin.ft.	___	___
	b. 15-inch diameter	___	lin.ft.	___	___
	c. 18-inch diameter	___	lin.ft.	___	___
	d. 24-inch diameter	___	lin.ft.	___	___
14.	Furnishing and installing vertical lift gates	___	each	___	___
15.	Furnishing and installing timber flap gates	___	each	___	___
16.	Furnishing and installing wooden stoplogs	___	L.S.	___	___
17.	Constructing site building	___	sq.ft.	___	___
		Total Tender Price			_____

APPENDICES TO TENDER

A. SPECIAL STIPULATIONS

For ease of reference, certain information and data applicable to the Contract, which is the subject of this Tender, are set forth herein and shall not be changed by the Tenderer. Where the information or data has not been given, but rather a space has been provided therefor, the required information or data shall be entered by the Tenderer.

Clause	Item	Applicable Data
10.1	Amount of Performance Bond	10 percent of the Contract Price
14.1	Submittal of Construction Program	Within 30 days of receipt of Notice to proceed
23.2	Minimum Amount of Third Party Insurance for any single accident	
43.1	Commencement of Works	Within 30 days of receipt of Notice to proceed
45.1	Date of Completion of Works	_____
48.1	Amount of Liquidated Damages Per Day	_____
50.1	Period of Maintenance	30 Days
53.3	Adjustment of unit prices will not be made to any items of work except the following:	

Item No.	Work and/or Material

61.2	Percentage of Retention	10 Percent

61.2 Limit of Retention Money _____

61.2 Minimum Amount of Interim Certificates _____

61.3 Payment of Retention:

(1) One-half upon the issue of a Certificate of completion

(2) One-half upon expiration of the Period of Maintenance provided all work shall have been executed.

61.4 Time for payment of certificate after receipt by Employer 30 Days

APPENDIX B TO TENDER

MODIFICATIONS TO CONTRACT DOCUMENTS

The following paragraphs are deemed to be additional provisions to the Contract Documents, notwithstanding any such statement to the contrary in the Contract Documents, any modification of the Contract Documents set forth herein shall supersede and take precedence over any other provision of the Contract Documents.

APPENDIX C TO TENDER

DESCRIPTION OF CONTRACT WORK

FORM OF BID BOND

By this BOND, we _____
_____
(hereinafter called the "Principal) as Principal and the
_____
of _____ a Corporation duly organized under the laws of the State of _____ _____(hereinafter called the "Surety"), are held and firmly bound into the Government of the People's Republic of Bangladesh as represented by the Ministry of Local Government, Rural Development & Co-operatives (hereinafter called the "Employer") in the sum of _____
_____
for the payment of which sum well and truly to be made, the said Principal and the Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for the construction of _____
_____.

NOW, THEREFORE, if the Employer shall accept the bid of the Principal and the Principal shall enter into a contract with the Employer in accordance with the terms of such bid, and give such bonds as specified in the Tender Documents with good and sufficient surety for the faithful performance of such contract, or in the event of the failure of the principal to enter such contract and give such bonds, then the Principal shall pay to the Employer the difference not to exceed the penalty thereof between the amount specified in the said bid and such larger amount for which the Employer may in good faith contract with another party to perform the work covered by the said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

_____dated of _____
day of _____, 19____.

Signed and delivered by the _____
_____
(Principal)
for and on behalf of _____
_____

in the presence of _____

_____

Signed and delivered by the _____

_____

(Surety)

for and on behalf of _____

_____

in the presence of _____

_____

FORM OF CONTRACT

This Contract (hereinafter, together with all Appendices attached hereto and forming an integral part hereof, called the "Contract") dated _____

_____

_____

between the Government of the People's Republic of Bangladesh as represented by the Ministry of Local Government, Rural Development & Co-operatives (hereinafter called the "Employer") _____

_____

_____

_____

_____

a corporation duly organized and existing under and by virtue of the laws of _____

_____

_____

(hereinafter referred to as the "Contractor"), for _____

_____.

NOW THEREFORE, it is hereby agreed by and between the parties hereto as follows:

I. The Contractor Agrees:

1. That in this Contract words and expressions shall have the same meanings as are respectively assigned to them in the General Conditions hereinafter referred to.

2. To construct, complete, and maintain the Works, namely, _____, in conformity in all respects with the provisions of the Contract Documents set forth in the next sub-clause 3, which are included in, attached to and form a part of this Contract, and which have been signed in duplicate for identification by both parties.

3. That the following documents shall be deemed to form and be read and construed as part of this Contract namely:

(a) Instructions to Tenderers
(b) Tender
(c) Preamble to Bill of Quantities

(d) Bill of Quantities
(e) Performance Bond
(f) General Conditions
(g) Special Conditions
(h) Technical Specifications
(i) All drawings and documents referred to in the Specifications.
(j) Addendum
(k) The letter of intent dated _____, 19___ from the Employer.

4. That the terms, conditions and requirements of the Contract Documents shall prevail except those which are expressly modified or altered by this Contract.

5. That the said Contract Documents are intended to cover and provide for first class completed works in all respects; and everything necessary to carry out this intent, which may be reasonably implied from the Contract Documents, shall be done by the Contractor, even if not particularly referred to in the Contract Documents.

6. That the Contractor has examined the site of the Works and access thereto and has satisfied himself as to the working conditions, the nature and kinds of work to be done, the special risks associated therewith, and to any and all matters which may be necessary in order to form a proper conception of the conditions under which the works will be performed.

II. <u>The Employer Agrees</u>:

1. To provide the Contractor with access to, and use of, its land and premises to whatever extent may be necessary for the continuous and unrestricted prosecution of the Contractor's operation.

2. To pay the Contractor in consideration of the construction, completion, and maintenance of the Works the Contract Price at the times and in the manner prescribed by the Contract Documents.

III. <u>It is Mutually Agreed</u>:

1. That the Total Tender Price as computed in the Bill of Quantities is _____.

2. (Herein insert particulars of any modifications or alterations of the Contract Documents).

3. (Herein insert any other matter of mutual agreement).

4. That the Works as hereinbefore set forth shall be performed and completed, to the approval of the Employer.

5. That the date from which this Contract is to be in force is to be the _____ day of _____, 19____.

6. That this Contract shall extend to, be binding upon, and ensure to the benefits of the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, the parties hereto have caused this Contract to be signed in their respective names and delivered to the principal office of the Employer as of the day and year first hereinabove written.

(Contractor)	(Employer)
By: _____	By: _____
Authorized Representative	Authorized Representative

FORM OF PERFORMANCE BOND

BY THIS BOND, we, _____

_____
(Name of Contractor)
whose registered office is at _____

_____
(hereinafter called "Principal"), as Principal, and the

_____
(Name of Bonding Company)
(hereinafter called "Surety"), are jointly and severally held and firmly bound unto the Government of the People's Republic of Bangladesh, as represented by the Ministry of Local Government, Rural Development & Co-operatives (hereinafter called the "Employer") in the penal sum of _____ _____, lawful money of the Government of the People's Republic of Bangladesh for the payment whereof we the Principal and the Surety bind ourselves and our successors and assigns and each of us jointly and severally, firmly by these presents.

Dated this _____day of_____, 19__.

WHEREAS the Principal has, by means of a written Contract dated the _____day of_____, 19___ entered into a Contract with the Employer for the construction of _____ which Contract is made a part hereof and a copy is attached hereto.

AND WHEREAS, the Surety has agreed to execute these presents to secure the due performance on the part of the said Principal of the said Contract as in the said Contract Documents set forth or as the same may be changed, altered or varied as hereinafter provided.

NOW the condition of this bond is such that if the Principal, its successors or assigns shall henceforth and at all times faithfully perform and observe the said Contract as in the said Contract Documents set forth or as the same may be changed, altered or varied as hereinafter provided and shall fully indemnify and save harmless the Employer from all loss, damage and cost which the Employer may suffer by reason of or incidentally to the failure so to do and shall fully reimburse and repay the

Employer for all outlay and expense which the Employer may incur in making good any such default, then this obligation shall be null and void, otherwise it shall remain in full force and effect.

Provided always, and it is hereby agreed and declared, that the Employer acting directly with the Principal shall have the right to change, alter and vary the terms of the said Contract, and that the Employer may in its discretion at any time or times take and receive from the said Principal any security whatsoever and grant any extension of time thereon or on any liability of the Principal to the Employer.

Provided further, and it is hereby agreed and declared, that the Principal and Surety, their successors and assigns, or any of them, shall not be discharged or released from any liability under the said Bond, nor such liability be in any way affected by any such changes, alterations, or variations, taking or receiving of security, or extension of time as aforesaid, or by any dealing or transaction or forbearance which may take place between the Principal and the Employer, and the Employer shall not be required to give the Surety notice of any such or of any default of the Principal such notice being hereby waived but upon request from the Surety, the Employer shall furnish any information which it may have at the time of such request.

SIGNED AND DELIVERED by

_____
(Principal)

for and on behalf of

_____

in the presence of

_____

SIGNED AND DELIVERED by the

_____
(Surety)

for and on behalf of

_____

in the presence of

_____

GENERAL CONDITIONS

Definitions and Interpretation

1.1 Definitions

(1) In the Contract, as hereinafter defined, the following words and expressions shall have the meanings hereby assigned to them except where the context otherwise requires:

(a) "Government" means the Government of the People's Republic of Bangladesh.

(b) "Employer" means the Government of the People's Republic of Bangladesh, as represented by the Ministry of Local Government, Rural Development & Co-operatives.

(c) "Engineer" means the Engineer designated to perform the duties in Clause 2.1 hereof.

(d) "Engineer's Representative" means any resident engineer or assistant of the Engineer appointed from time to time by the Employer or the Engineer to perform the duties set forth in Clause 2.1 hereof whose authority shall be notified in writing to the Contractor by the Engineer.

(e) "Consultant" means the Consulting Engineer appointed by the Employer and notified in writing to the Contractor.

(f) "Tenderer" means any party whose tender has been accepted by the Employer and includes the Contractor's personal representatives, successors and permitted assigns.

(g) "Contractor" means the party whose tender has been accepted by the Employer and includes the Contractor's personal representatives, successors and permitted assigns.

(h) "Subcontractor" means any party or parties having a direct contract with the Contractor for the performance of any part or parts of the Works to be performed under the Contract.

(i) "Other Contractor" means any party or parties having a direct contract with the Employer for work outside the scope of this Contract and includes any subcontractor of this other contractor.

(j) "Provisional sum" means an amount of money provisionally set up by the Employer for payment in a work item or items in the Bill of Quantities at the time of tendering.

(k) "Works" shall include both Permanent Works and Temporary Works.

(l) "Contract" means the agreement between the Employer and the Contractor and all appendices and schedules thereto.

(m) "Contract Price" means the sum named in the Tender subject to such additions thereto or deductions therefrom as may be made under the provisions hereinafter contained.

(n) "Plant" means all functional machinery, apparatus, articles and things of all kinds required to be installed or supplied under the Contract.

(o) "Materials" means all component items used in the construction of the Works.

(p) "Temporary Works" means all temporary works of every kind required in or about the execution, completion or maintenance of the Works.

(q) "Permanent Works" means the permanent works to be executed and maintained in accordance with the Contract.

(r) "Drawings" means the drawings referred to in the Technical Specifications and any modification of such drawings approved by the Engineer and such other drawings as may from time to time be furnished or approved by the Engineer.

(s) "Site" means the lands and other places on, under, in or through which the works are to be executed or carried out and any other lands or places provided by the Employer for the purposes of the Contract together with such other places as may be specifically designated in the Contract as forming part of the Site.

(t) "Approved" means approved in writing by the Engineer and "approval" means approval in writing.

(u) "Month" means Gregorian calendar month.

(v) "Day" means calendar day, every day shown on the Gregorian calendar.

(w) "Writing" means any manuscript, typewritten or printed statement under signature by authorized persons.

(2) Words importing the singular only also include the plural and vice versa where the context requires.

(3) The headings in these General Conditions shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or of the Contract.

(4) The word "cost" shall be deemed to include overhead costs whether on or off the Site.

Duties and Power

2.1 Engineer and Engineer's Representative

The duties of the Engineer and Engineer's Representative are to watch and supervise the Works and to test and examine any materials to be used or workmanship employed for the execution of or in connection with the Works.

They shall have no authority to relieve the Contractor of any of his duties or obligations under the Contract nor, except as expressly provided hereunder or elsewhere in the Contract, to order any work involving delay or any extra payment by the Employer nor to make any variation of or in the Works.

The Engineer may from time to time in writing delegate to the Engineer's Representative any of the powers and authorities vested in the Engineer and shall furnish to the Contractor a copy of all such written delegations of powers and authorities. Any written instruction or approval given by the Engineer's Representative to the Contractor within the terms of such delegation (but not otherwise) shall bind the Contractor and the Engineer as though it had been given by the Engineer.

Provided always as follows:

(a) Failure of the Engineer's Representative to disapprove any work or materials before completion of that

work shall not prejudice the power of the Engineer thereafter to disapprove such work or materials and to order the pulling down, removal or breaking up thereof.

(b) If the Contractor shall be dissatisfied by reason of any decision of the Engineer's Representative he shall be entitled to refer the matter to the Engineer who shall hereupon confirm, reverse or vary such decision.

The Engineer shall have authority to stop the progress of the work whenever, in his opinion, such stoppage may be necessary to ensure the proper execution of the Works. In an emergency affecting or liable to affect the safety of life or property, the Engineer shall have authority to stop the work and order such changes therein, or in the methods, materials, equipment and apparatus used by the Contractor and to order such work additional to the Contract or otherwise as may, in his opinion, be necessary.

2.2 Consultant

The duties of the Consultant are to assist the Employer inthe preparation of detailed design drawings which shall be issued to the Contractor by the Engineer. The Consultant shall also assist in supervising the Contractor in executing the Works, and to advise the Engineer on any necessary improvements, instruction procedures, or design alterations. He shall have no authority to give direct instructions on the commmencement or stoppage or revision of the Works to the Contractor. In case any disputes or differencesof any kind whatsoever shall arise between the Employer or the Engineer and the Contractor, the opinion of the Consultant shall be requested in writing from either the Employer or the Engineer and/or the Contractor.

Assignment and Subletting

3.1 Assignment

The Contractor shall not assign the Contract or any part thereof or any benefit or interest therein or thereunder (otherwise than by a charge in favor of the Contractor's Bankers of any monies due to or to become due under this Contract) without prior written consent of the Employer.

4.1 Subletting

Except where otherwise provided by the Contract, the Contractor shall not sublet any part of the Works without the prior written consent of the Engineer, which shall not

be unreasonably withheld, and such consent if given shall not relieve the Contractor from any liability or obligation under the Contract and he shall be responsible for the acts, defaults, and neglects of any subcontractor, his agents, servants or workmen as fully as if they were the acts, defaults, or neglects of the Contractor, his agents, servants or workmen. Provided always that the provision of labor on a piecework basis shall not be deemed to be a subletting under this Clause.

Nothing contained in this Contract shall constitute any contractual relations or commitments between any subcontractor and the Engineer or Employer.

Extent of Contract

5.1 Extent of Contract

The Contract comprises the construction, completion, and maintenance of the Works within the Contract time and, except insofar as the Contract otherwise provides, the provision of all labor, materials, plant, temporary works and everything, whether of a temporary or permanent nature, required in and for such construction, completion, and maintenance so far as the necessity for providing the same is specified in or can reasonably be inferred from the Contract.

The Contractor shall apply to the Engineer for any explanation which he may require with reference to the meaning and intent of any part of the Contract and shall be held responsible for any errors or losses he may make in consequence of failure to obtain such explanation.

Contract Documents

6.1 Language

The language in which the Contract Documents shall be drawn up shall be English. The Contract shall in all respects be read and construed and shall operate in conformity with the laws of the Government of the People's Republic of Bangladesh.

6.2 Documents Mutually Explanatory

The several documents forming the Contract are to be taken as mutually explanatory of one another and in case of ambiguities or discrepancies the same shall be explained and adjusted by the Engineer after consultation with the Consultant. The Engineer shall thereupon issue to the

Contractor instructions directing in what manner the work is to be carried out. Provided always that, if in the opinion of the Engineer, compliance with any such instructions shall result in any expense or saving which by reason of any such ambiguity or discrepancy the Contractor did not and had reason not to anticipate, the Engineer shall assess such expense or saving and the Contract Price shall be increased or decreased accordingly.

7.1 Drawings

The drawings shall remain in the sole custody of the Engineer but six copies thereof shall be furnished to the Contractor through the Engineer free of cost. The Contractor can obtain at his own expense any further copies required by him through the Engineer. At the completion of the Contract the Contractor shall return to the Engineer all drawings provided under the Contract.

The Contractor shall give adequate notice in writing to the Engineer or the Engineer's Representative of any further drawing or specification that may be required for the execution of the Works or otherwise under the Contract.

8.1 Further Drawings and Instructions

The Drawings made a part of the Contract Documents are intended for the purpose of indicating the type, extent and quantity of work to be performed and are for tendering purposes only. For construction, the Engineer will supply to the Contractor revised specification drawings, supplemental drawings, and construction drawings. The Contractor shall give adequate notice in writing to the Engineer or the Engineer's Representative of the need for such drawings before commencing any part of the Works or structures or before placing orders for any materials or equipment to be used in the construction or incorporated in the Works and shall commence the work or place orders for materials and equipment only upon written approval of the Engineer. The undertaking of the work or purchase of equipment and materials without receipt of such drawings or approval of the Engineer shall be at the risk of the Contractor.

8.2 Claims for Extra Cost

If the Contractor claims that Construction Drawings or any instructions issued by the Engineer during the term of the Contract involve extra cost or should other

special circumstances of any kind whatsoever occur such as to fairly entitle the Contractor to extra cost under this Contract, the Engineer shall determine the amount of such extra cost; provided, that the Engineer is not bound to take into account any claim for any extra cost unless Contractor has within twenty-eight (28) calendar days after such work has been commenced or after the circumstances leading to such claim have arisen, delivered to the Engineer a notice giving full and detailed particulars of any claim for extra cost in order that it may be investigated at that time. Failure to provide such notice shall constitute a waiver by the Contractor of any claim. On receipt of full and detailed particulars, the Employer shall examine the facts and shall grant the Contractor extra cost when, in the Employer's opinion, the findings of fact justify any extra cost.

General Obligations

9.1 Letter of Intent

Following the opening and assessment of the Tenders, the Employer will issue by registered post or by otherwise depositing at the registered office of the successful Tenderer a letter of intent to enter into a contract with the successful Tenderer for the execution of the work in accordance with the Contract Documents and such exceptions to the said documents which are acceptable to the Employer. Upon acceptance of such letter of intent by the Tenderer's Representative, and if within ten (10) days the Employer does not receive any refusal from the successful Tenderer, the Contract shall be deemed to have been fully and sufficiently made and the Employer and successful Tenderer shall become bound by all the terms and conditions of the Contract providing the provision in Clause 9.2 herein.

9.2 Agreement

The Contractor shall, when called upon to do so, enter into and execute an agreement (to be prepared at the cost of the Employer) in the Form of Contract annexed with such modifications as may be necessary.

10.1 Performance Bond

Within ten (10) days after receipt of notification of acceptance of his tender (Letter of Intent), the successful Tenderer shall furnish a Performance Bond or

form of surety in an amount equal to ten (10) percent of the Contract Price. The Performance Bond or surety shall be made in the Form of Performance Bond and executed with such Bonding Company who is willing to become bound with the Tenderer. The Performance Bond shall secure faithful execution of the Work according to the Contract including the maintenance thereof, and shall cover the period from the date of signing the Contract until the end of the period of maintenance as set forth in the Tender; however, the amount during the period of maintenance shall be reduced to that equal to three (3) percent of the said Contract Price.

11.1 Inspection of Site

The Contractor shall inspect and examine at his own expense the Site and its surroundings and shall satisfy himself before submitting his Tender as to the nature of the ground and subsoil (so far as is practicable), the form and nature of the Site, and nature of the work and materials necessary for the completion of the Works, and the means of access to the Site and accommodation he may require, and in general shall himself obtain all necessary information (subject as above mentioned) as to risks, contingencies and other circumstances which may influence or affect his Tender.

Failure to acquaint himself fully with all available information concerning conditions affecting the Work would not relieve the Contractor of responsibility for estimating the difficulties and cost of satisfactorily performing the Work.

12.1 Sufficiency of Tender

The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his Tender for the Works and of the rates and prices stated in the priced Bill of Quantities, which prices shall (except insofar as it is hereinafter otherwise provided) cover all his obligations under the Contract and all matters and things necessary for the proper completion of the Works.

12.2 Adverse Physical Conditions and Artificial Obstructions

If however, during the execution of the Works unfavorable physical conditions (other than weather conditions or conditions due to weather conditions) or artificial obstructions are encountered, the Contractor shall forthwith give written notice thereof to the Engineer and if (in either

case) such conditions could not in the opinion of the Engineer have been reasonably foreseen by an experienced contractor then the Engineer shall certify and the Employer shall pay the additional expense of such conditions including the proper and reasonable expense:

(a) of complying with any instruction which the Engineer may issue to the Contractor in connection therewith; and

(b) of any proper reasonable measure approved by the Engineer which the Contractor may take in the absence of specific instructions from the Engineer,

as a result of such conditions or obstructions being encountered.

13.1 Work to be to Satisfaction of the Engineer

Save insofar as it is legally or physically impossible, the Contractor shall execute, complete, and maintain the Work in strict accordance with the Contract to the satisfaction of the Engineer, and shall comply with and adhere strictly to the Engineer's instructions and directions on any matter (whether mentioned in the Contract or not) touching on or concerning the Works. The Contractor shall take instructions and directions only from the Engineer or (subject to the limitation referred to in Clause 2.1 hereof) from the Engineer's Representative.

13.2 Correspondence

Unless otherwise required under the terms of the Contract, all correspondence on matters arising out of the Contract shall be addressed by the Contractor to the Engineer, and copies always forwarded to the Employer and the Consultant. The Engineer will reply directly to the Contractor.

13.3 Contractor's Records

The Contractor shall at all times keep complete and accurate records in accordance with sound engineering practice, and to the satisfaction of the Engineer. All records relating to the work shall be available to the Engineer at all times.

14.1 Program to be Furnished by the Contractor

Within thirty (30) days of receiving Letter of Intent in accordance with Clause 9.1, the Contractor shall submit

to the Engineer for his approval a program showing the order of procedure and method in which he proposes to carry out and complete the Works by the date specified in the Contract.

Upon acceptance by the Engineer of the Contractor's construction program, it shall be referred to as the Approved Construction Program and shall become a part of the Contract. The Work and each portion of the work shall be performed in accordance with the Approved Construction Program.

The submission to, and approval by the Engineer of such program or the furnishing of such particulars shall not relieve the Contractor of any of his duties or responsibilities under the Contract.

14.2 Drawings to be Furnished by the Contractor

When requested to do so by the Engineer, or stated in the Contract Documents, the Contractor shall submit drawings of temporary and permanent works to be constructed by or supplied and installed by the Contractor or his subcontractors.

The drawings shall be of uniform size, except for brochures and typical drawings.

The Contractor shall check thoroughly all drawings provided by his subcontractors including measurements, size of members, materials and details to satisfy himself that they conform to the intent of the Engineer's specifications and drawings. Drawings found to be inaccurate or otherwise in error are to be returned to the subcontractors for correction before submitting them to the Engineer.

All drawings submitted to the Engineer for approval shall bear the Contractor's stamp and date of submission. The Engineer's approval of drawings, schedule and calculations submitted by the Contractor shall not relieve the Contractor from the responsibility for errors or omissions they may contain. The Contractor shall verify all dimensions at the site prior to commencing the work. Where errors or omissions are discovered later, they shall be made good by the Contractor at the Contractor's expense.

On completion of the work, the Contractor shall furnish the Employer with drawings of the work as completed in sufficient detail to enable the Employer to maintain, dismantle, re-assemble and adjust all parts of the work.

15.1 Contractor's Superintendence and Contractor's Representative

The Contractor shall give or provide all necessary superintendence during the execution of the Works and as long thereafter as the Engineer may consider necessary. The Contractor or a competent and authorized agent or representative of the Contractor approved in writing by the Engineer (which approval may at any time be withdrawn) is to be constantly on the Works and shall give his whole time in superintendence to the same. Such authorized agent or representative shall be a fully qualified engineer with proven experience in executing projects of a similar nature and magnitude to the Works comprised in this Contract and shall receive on behalf of the Contractor directions and instructions from the Engineer or (subject to the limitations of Clause 2.1 hereof) the Engineer's Representative.

Once the Contractor's representative has been appointed, he shall not be removed from the project without the written consent of the Engineer.

16.1 Contractor's Employees

The Contractor's staff approved by the Employer shall be employed full time on the Work and shall not be removed except at the request of, or with the written consent of the Engineer. The staff leaving Contractor's employment shall be replaced immediately by competent substitutes approved by the Engineer.

The Contractor shall provide and employ on the Site in connection with the execution and maintenance of the Works:

(a) only such technical assistants as are skilled and experienced in their respective callings and such sub-agents, foremen and leading hands as are competent to give proper supervision to the work they are required to supervise; and

(b) such skilled, semi-skilled and unskilled labor as is necessary for the proper and timely execution and maintenance of the Works.

The Contractor shall keep himself fully informed of all Government laws, all local laws, ordinances, safety codes, regulations and all orders and decrees of bodies or

tribunals having any jurisdiction or authority, which in any manner affects those engaged or employed on the work, or which in any way affects the conduct of the work. He shall at all times observe and comply with all such laws, ordinances, safety codes, regulations, orders and decrees and shall protect and indemnify the Employer and its representatives against any claim or liability arising from or based on the violation of any such law, ordinance, safety code, regulation, order or decree, whether by himself or his employees.

The Contractor shall have reasonable regard for local festivals, customs and religious holidays which may occur during the progress of the work in his planning of operations and other activities connected with the Work.

The Engineer shall be at liberty to object to and require the Contractor to remove forthwith from the Works any person employed by the Contractor in or about the execution or maintenance of the Works who, in the opinion of the Engineer, misconducts himself or is incompetent or negligent in the proper performance of his duties or whose employment is otherwise considered by the Engineer to be undesirable and such person shall not be again employed upon the Works without the written permission of the Engineer. Any person so removed from the Works shall be replaced without delay by a competent substitute approved by the Engineer.

17.1 Setting-out

The Contractor shall be responsible for the true and proper setting-out of the Works in relation to original points, lines and levels of reference given by the Engineer in writing and for the correctness of the position, levels, dimensions, and alignment of all parts of the Works and for the provision of all necessary instruments, appliances, and labor in connection therewith. If at any time during the progress of the Works any error shall appear or arise in the position, levels, dimension, or alignment of any part of the Works, the Contractor, on being required so to do by the Engineer, shall at his own expense rectify such error to the satisfaction of the Engineer. The checking of any setting-out or of any line or level by the Engineer or the Engineer's Representative shall not in any way relieve the Contractor of his responsibility for the correctness thereof and the Contractor shall carefully protect and preserve all benchmarks, sight rails, pegs and other things used in setting-out the Works.

The Contractor shall provide all labor and instruments, stakes and other things necessary, and shall cooperate and provide all facilities required by the Engineer, to enable them to check the setting-out performed by the Contractor.

18.1 Boreholes and Exploratory Excavation

If at any time during the execution of the Works the Engineer shall require the Contractor to make boreholes or to carry out exploratory excavation, such requirements shall be ordered in writing and shall be deemed to be an addition ordered under the provisions of Clause 53.4 hereof unless a provisional sum in respect of such anticipated work shall have been included in the Bill of Quantities.

19.1 Watching and Lighting

The Contractor shall in connection with the Works provide and maintain at his own cost all lights, guards, fencing, and watching when and where necessary or required by the Engineer or Engineer's Representative or by any duly constituted authority for the protection of the Works or for the safety and convenience of the public or others.

20.1 Care of Works

From the commencement to the completion of the Works, the Contractor shall take full responsibility for the care thereof and of all Temporary Works and in case any damage, loss, or injury shall happen to the Works or to any part thereof or to any Temporary Works from any cause whatsoever (save and except the excepted risks as defined in Clause 20.2), shall at his own cost repair and make good the same so that at completion the Works shall be in good order and condition and in conformity in every respect with the requirement of the Contract and the Engineer's instructions. In the event of any such damage, loss, or injury happening from any of the excepted risks, the Contractor shall, if and to the extent required by the Engineer and subject always to the provisions of Clause 66.1 hereof, repair and make good the same as aforesaid at the cost of the Employer. The Contractor shall also be liable for any damage to the Works occasioned by him in the course of any operations carried out by him for the purpose of complying with his obligations under Clause 50.2 hereof.

20.2 Excepted Risks

The "excepted risks" are war, hostilities (whether war be declared or not), invasion, act of foreign enemies,

rebellion, revolution, insurrection or military or usurped power, civil war or (otherwise than among the Contractor's own employees) riot, commotion, or disorder, or use or occupation by the Employer of any portion of the Works in respect of which a Certificate of Completion has been issued, or a cause solely due to the Engineer's and the Consultant's design of the Works or any such operation of the force of nature as beyond his reasonable foresight and ability the Contractor could not foresee or reasonably provide against (all of which are herein collectively referred to as "the excepted risks").

21.1 Insurance of Works, etc.

Without limiting his obligation and responsibilities under Clause 20.1 and 20.2 hereof, the Contractor shall insure in the joint names of the Employer and the Contractor against all loss or damage from whatever cause arising (other than the excepted risks) for which he is responsible under the terms of the Contract and in such a manner that the Employer and the Contractor are covered during the period of construction of the Works and the period of maintenance for loss or damage arising from a cause occurring prior to the commencement of the period of maintenance and for any loss or damage occasioned by the Contractor in the course of any operations carried out by him for the purpose of complying with his obligation under Clause 50.2 hereof:

(a) The Works and the Temporary Works to the full value of such Works executed from time to time.

(b) The Materials, Plant, and other things brought on to the Site by the Contractor to the full value of such Materials, Plant and other things.

Such insurance shall be payable in a currency freely usable to replace or repair such goods.

Such insurance shall be effected with an insurer and in terms approved by the Employer (which approval shall not be unreasonably withheld) and the Contractor shall whenever required produce to the Engineer the policy or policies of insurance and the receipts for payment of the current premiums. Provided always that without limiting his obligations and responsibilities as aforesaid nothing in this clause contained shall render the Contractor liable to insure against the necessity for the repair or reconstruction of any work constructed with materials or workmanship not in accordance with the requirements of the Contract.

22.1 Damage to Persons and Property

The Contractor shall take every practicable precaution not to damage or injure any adjoining or other properties or any person. He shall (except if and so far as the Specification provides otherwise) indemnify and keep indemnified the Employer against all claims for injuries or damage to any person or any property whatsoever which arise out of or in consequence of the construction of the Works and against all claims, demands, proceedings, damages, compensation, costs, charges, and expenses whatsoever in respect of or in relation thereto. Provided always that nothing herein contained shall be deemed to render the Contractor liable for or in respect of or to indemnify the Employer against any compensation or damages for or with respect to:

(a) the permanent use or occupation of land by the Work or any part thereof (save in respect of damage to timber or crops);

(b) the right of the Employer to construct the Work or any part thereof on, over, under, in or through any land;

(c) interference whether temporary or permanent with any right of light, airway or water or other easement or quasieasement which is the unavoidable result of the construction of the Works in accordance with the Contract; and

(d) injuries or damage to persons or property resulting from any act or neglect committed during the currency of the Contract by the Employer, his agents or servants or for or in respect of any claims, demands, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto.

22.2 Indemnity by Employer

The Employer will save harmless and indemnify the Contractor from and against all claims, demands, proceedings, damages, costs, charges, and expenses in respect of the matters referred to in Clause 22.1 hereof.

23.1 Third Party Insurance

Before commencing the execution of the Works the Contractor (but without limiting his obligations and responsibilities under Clause 22.1 hereof) shall on his own

expense insure against any damage, loss, or injury which may occur to any property (including that of the Employer) or to any person (including any employee of the Employer) by or arising out of the execution of the Works or Temporary Works or in the carrying out of the Contract otherwise than due to the matters referred to in Clause 22.1 hereof.

23.2 Minimum Amount of Third Party Insurance

Such insurance shall be effected with an insurer and in terms approved by the Employer (which approval shall not be unreasonably withheld) according to the established regulations and procedures, for at least the amount stated in the Tender for any one claim or series of claims arising out of the same occurrence with no limit on the total indemnity and the Contractor shall whenever required produce to the Engineer the policy or policies of insurance and the receipts for payment of the current premiums.

24.1 Accident or Injury to Workmen

The Employer shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or any subcontractor save and except an accident or injury resulting from any act or default of the Employer, his agents or servants, and the Contractor shall indemnify and keep indemnified the Employer against all such damages and compensation (save and except as aforesaid) and against all claims, demands, proceedings, costs, charges and expenses whatsoever in respect hereof or in relation thereto.

24.2 Insurance Against Accident, etc., to Workmen

The Contractor shall on his own expense insure against such liability with an insurer approved by the Employer (which approval shall not be unreasonably withheld) according to the established regulations and procedures and shall continue such insurance during the whole of the time that any persons are employed by him on the Works and shall when required produce to the Engineer such policy of insurance and the receipt for payment of the current premium. Provided always that in respect of any persons employed by a subcontractor, the Contractor's obligation to insure as aforesaid under this Clause shall be satisfied if the subcontractor shall have insured against the liability in respect of such persons in such manner that the Employer

is indemnified under the policy but the Contractor shall require such subcontractor to produce to the Engineer when required such policy of insurance and the receipt for payment of the current premium.

25.1 Remedy on Contractor's Failure to Insure

If the Contractor shall fail to effect and keep in force the insurance referred to in Clauses 21.1, 23.1, 24.1, and 24.2 hereof or any other insurance which he may be required to effect under the terms of the Contract, then and in any such case the Employer may, without prejudice to any other rights for remedies he may have, effect and keep in force any such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the Employer as aforesaid from any monies due or which may become due to the Contractor or recover the same as a debt due from the Contractor.

26.1 Giving of Notices and Payment of Fees

The Contractor shall give all notices and pay all fees required to be given or paid by any National or State Statute, Ordinance, or other Law, or any regulation, or by-law of any local or other statutory authority in relation to the execution of the Works and by the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Works or any Temporary Works. The Contractor shall conform in all respects with the provisions of any such Statute, Ordinance, or Law as aforesaid and the regulations or by-laws of any local or other statutory authority which may be applicable to the Works or to any Temporary Works, and with such rules and regulations of public bodies and companies as aforesaid, and shall keep the Employer indemnified against all penalties and liability of every kind for breach of any such Statute, Ordinance or Law, regulation or by-law. The Employer (except if and so far as the Contract provides otherwise) will repay or allow to the Contractor all such sums as the Engineer shall certify to have been properly payable and paid by the Contractor in respect of such fees.

27.1 Fossils, etc.

All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the Site of the Works shall be deemed to be the absolute property of the Employer and the Contractor shall take reasonable

precautions to prevent his workmen or any other persons from removing or damaging any such article or thing and shall immediately upon discovery thereof and before removal acquaint the Engineer's Representative of such discovery and carry out at the expense of the Employer the Engineer's Representative's orders as to the disposal of the same.

28.1 Valuable Minerals

All valuable minerals found upon the Site or recovered by reason of the execution of this Contract shall be and shall remain the property of the Employer, and the Contractor and his employees shall deliver all such valuable minerals to the Engineer.

29.1 Patent Rights and Royalties

The Contractor shall save harmless and indemnify the Employer from and against all claims and proceedings for or on account of infringement of any patent rights, design, trademark or name or other protected rights in respect of any Plant, machine, work, or materials used for or in connection with the Works or Temporary Works or any of them and from and against all claims, demands, proceedings, damages, costs, charges, and expenses whatsoever in respect thereof or in relation thereto. Except where otherwise specified the Contractor shall pay all tonnage and other royalties, rent and other payments or compensation (if any) for getting stone, sand, gravel, clay or other materials required for the Works or Temporary Works or any of them.

The Employer on his part warrants that any design or instructions furnished or given by him will not be such as will cause the Contractor to infringe any letters, patent, registered design, trademark, or copyright in the performance of the Contract.

30.1 Interference with Traffic and Adjoining Properties

All operations necessary for the execution of the Works and for the construction of any Temporary Works shall, so far as compliance with the requirements of the Contract permits, be carried on so as not to interfere unnecessarily or improperly with the convenience of the public, or the access to, use and occupation of public or private roads, waterways, and footpaths to or of properties whether in the possession of the Employer or of any other person. Contractor shall save harmless and indemnify

the Employer in respect of all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising out of or in relation to any such matters insofar as the Contractor is responsible for.

31.1 Loading Limits on Roads and Bridges

The Contractor shall use every reasonable means to ensure that all loading limits and other restrictions on any roads and bridges are observed in the event of it being necessary to move any extraordinary load of machinery, plant or pre-constructed unit or part of the Work. The Contractor before moving such extraordinary load shall obtain all necessary permits and approvals from any authorities and comply with all other lawful requirements and the Contractor shall indemnify the Employer against any liability arising by reason of damage to any road or bridge during the execution of the Works.

32.1 Settlement of Extraordinary Traffic Claims

If during the carrying out of the Works or at any time thereafter the Contractor shall receive any claim arising out of the execution of the Works in respect of damage or injury to highways or bridges, he shall immediately report the same to the Engineer and thereafter the Employer shall negotiate the settlement of and pay all sums due in respect of such claim and shall indemnify the Contractor in respect thereof and in respect of all claims, demands, proceedings, damages, costs, charges, and expenses in relation thereto. Provided always that if and so far as any claims or part thereof shall, in the opinion of the Engineer, be due to any failure on the part of the Contractor to observe and perform his obligations under Clauses 30.1 and 31.1, then the amount certified by the Engineer to be due to such failure shall be paid by the Contractor to the Employer.

33.1 Opportunities for Other Contractors

The Contractor shall in accordance with the requirements of the Engineer afford all reasonable opportunities for carrying out their work to any other contractors employed by the Employer and their workmen and to the workmen of the Employer and of any other duly constituted authorities who may be employed in the execution on or near the Site of any work not included in the Contract or of any ancillary to the Works.

34.1 Supply of Plant, Materials and Labor

Except where otherwise specified, the Contractor shall at his own expense supply and provide all the Plant, Temporary Works, materials, both for temporary and for permanent works, labor (including the supervision thereof) transport to or from the Site and in and about the Works and other things of every kind required for the construction, completion and maintenance of the Works.

All materials and equipment supplied under the Contract shall be free of liens.

The Contractor's equipment may, subject to the approval of the Engineer, be either new or fully reconditioned.

If any material or article brought onto the Site by the Contractor is unsuitable or inefficient, in the opinion of the Engineer, such material or article shall be immediately removed from the Site by the Contractor upon the Engineer's written instruction, and if not promptly so removed, the Engineer may cause the same to be removed at the Contractor's risk and expense.

Should the Engineer be of the opinion and so state in writing to the Contractor that the force of men, or the quantity of Contractor's equipment or tools supplied for the performance of the Work is insufficient, or that the character of the said equipment or tools is unsuitable, or that the maintenance of the Contractor's equipment or tools is inadequate, or that the methods employed are not such as to assure that the Work will be completed within the time specified in the Contract, the Contractor shall forthwith increase the number of men employed upon the Work, make the required additions and improvements to his Contractor's equipment and tools, and conform to the methods of procedure, maintenance and use of such Contractor's equipment and tools as are directed by the Engineer.

35.1 Clearance of Site

The Contractor shall at all times keep the Site affected by the operations free from obstruction except that which is the unavoidable result of the construction of the Works in accordance with the Contract and shall indemnify the Employer from any claim whatsoever arising from any obstruction, except as aforesaid, caused by the operations of the Contractor. The Contractor shall,

whenever directed by the Engineer, clear away and remove from the Site any redundant Plant, surplus materials, rubbish and Temporary Works no longer required and leave the part of the Site affected clean and tidy to the satisfaction of the Engineer, otherwise the Engineer may cause such redundant Plant, surplus materials, rubbish and Temporary Works no longer required to be removed at the Contractor's risk and expense. On completion of the Works, the Contractor shall clear away and remove from the Site all Plant, surplus materials, rubbish and Temporary Works of every kind and leave the whole of the Site and Works clean and in a workmanlike condition to the satisfaction of the Engineer in accordance with the requirements of the Engineer.

Labor

36.1 Engagement of Labor

The Contractor shall make his own arrangements for the engagement of all labor, local or otherwise, and save insofar as the Contract otherwise provides for the transport, housing, feeding and payment thereof.

The Contractor shall use local labor out of the affected region as far as it is available and suitable for the various functions.

36.2 Rates of Wages and Hours and Conditions of Labor

The Contractor shall pay rate of wages of labor according to the general level of wages in the region as observed by the Engineer. The Contractor shall effectively control all labor engaged in pursuance of the Contract in a human manner and in compliance with the requirements of Government labor regulations.

36.3 Water Supply

The Contractor shall provide on the Site to the satisfaction of the Engineer an adequate supply of drinking and other water for the use of the Contractor's staff and workpeople.

36.4 Alcoholic Liquor and Drugs

The Contractor shall not otherwise than in accordance with the existing Statutes, Ordinances and Government Regulations or Orders import, sell, give, barter or

otherwise dispose of any alcoholic liquor or drugs or permit or suffer any such importation, sale, gift, barter or disposal by his subcontractors, agents or employees.

36.5 Arms and Ammunition

The Contractor shall not give, barter, or otherwise dispose of to any person or persons any arms or ammunition of any kind or permit or suffer the same as aforesaid.

36.6 Festivals and Religious Customs

The Contractor shall in all dealings with labor in his employ have due regard to all recognized festivals, days of rest and religious or other customs.

36.7 Epidemic

In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders, and requirements as may be made by the Government or the local medical or sanitary authorities for the purpose of dealing with and overcoming the same.

36.8 Disorderly Conduct, etc.

The Contractor shall at all times take all reasonable precautions to prevent any unlawful riotous or disorderly conduct by or among his employees and for the preservation of peace and protection of persons and property in the neighborhood of the Works against the same.

36.9 Observance by Subcontractor

The Contractor shall be responsible for observance by his subcontractor of the foregoing provisions.

36.10 Foreign Technical Experts

Should the Contractor employ foreign technical experts as his assistants for carrying out the Contract, the cost for such foreign technical experts' services shall be included in the prices entered in the Bill of Quantities of the tender, which services shall be obtained from eligible countries. The Contractor shall submit to the Employer appropriate evidence showing that the foreign technical experts are located in, and nationals of, one of the countries listed in Clause 71.1 hereof.

37.1 Returns of Labor, etc.

The Contractor shall deliver to the Engineer a return in detail and in such form and at such intervals as the Engineer may prescribe showing the supervisory staff, the numbers of the several classes of labor from time to time employed by the Contractor on the Site.

Materials and Workmanship

38.1 Quality of Material and Workmanship and Tests

All materials and workmanship shall be of the respective kinds described in the Contract and in accordance with the Engineer's instructions and shall be subject from time to time to such inspections and tests as the Engineer may direct at the place of manufacture or fabrication or on the Site or at all or any of such places. The Contractor shall provide such assistance, instruments, machines, labor and materials as are normally required for examining, measuring, and testing any work and the quality, weight, or quantity of any material used and shall supply samples of materials before incorporation in the Works for testing as may be selected and required by the Engineer.

38.2 Cost of Samples

All samples shall be supplied by the Contractor at his own cost if the supply thereof is clearly intended by or provided for in the Specification or Bill of Quantities but, if not, then at the cost of the Employer.

38.3 Cost of Tests

The cost of making any test shall be borne by the Contractor if such test is clearly intended by or provided for in the Specification or Bill of Quantities and (in the cases only of a test under load or of a test to ascertain whether the design of any finished or partially finished work is appropriate for the purposes which it was intended to fulfil) is particularized in the Specification or Bill of Quantities in sufficient detail to enable the Contractor to price or allow for the same in his Tender.

38.4 Cost of Test Not Provided for, etc.

If any test is ordered by the Engineer which is either:

(a) not so intended by or provided for;

(b) (in the cases above-mentioned) is not so particularized; or

(c) though so intended or provided for, is ordered by the Engineer to be carried out by an independent person at any place other than the Site or the place of manufacture or fabrication of the materials tested,

then the cost of such test shall be borne by the Contractor if the test shows the workmanship or materials not to be in accordance with the provisions of the Contract or the Engineer's instructions but otherwise by the Employer.

39.1 Access to Site

The Engineer and any person authorized by the Engineer shall at all times have access to the Works and to the Site and to all workshops and places where work is being prepared or whence materials manufactured, articles, and machinery are being obtained for the Works and the Contractor shall afford every facility for and every assistance in or in obtaining the right to such access.

40.1 Examination of Work Before Covering Up

No work shall be covered up or put out of view without the approval of the Engineer and the Contractor shall afford full opportunity for the Engineer to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereon.

The Contractor shall give due notice to the Engineer whenever any such work or foundations is or are ready or about to be ready for examination and the Engineer shall without unreasonable delay, unless he considers it necessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such work or of examining such foundations.

40.2 Uncovering and Making Openings

The Contractor shall uncover any part or parts of the Works or make openings in or through the same as the Engineer may from time to time direct and shall reinstate and make good such part or parts to the satisfaction of the Engineer. If any such part or parts have been covered up or put out of view after compliance with the requirements

of Clause 40.1 and are found to be executed in accordance with the Contract, the expenses of uncovering, making openings in or through, reinstating and making good the same shall be borne by the Employer but in any other case all such expenses shall be borne by the Contractor and shall be recoverable from him by the Employer or from any monies due or which may become due to the Contractor.

41.1 Faulty or Defective Works

If, in the opinion of the Engineer, the work or any portion thereof fails to comply with the requirements of the Contract, or if the final tests prove or indicate the existence of any fault or defect in the work, or any part thereof, the Engineer shall give the Contractor notice herein provided together with particulars of such failure, fault, or defect and the Contractor shall, at the Contractor's expense, forthwith re-execute or replace the defective or faulty work or alter the same to make it comply with the requirements of the Contract. Thereafter, completely new tests shall, if required by the Engineer or requested by the Contractor, be carried out.

41.2 Default of Contractor in Compliance

In case of default on the part of the Contractor in carrying out such order, the Employer shall be entitled to employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be borne by the Contractor and shall be recoverable from him by the Employer or may be deducted by the Employer from any monies due or which may become due to the Contractor.

42.1 Suspension of Work

The Contractor shall on the written order of the Engineer suspend the progress of the Works or any part thereof for such time or times and in such manner as the Engineer may consider necessary and shall during such suspension properly protect and secure the work so far as is necessary in the opinion of the Engineer. The extra cost directly related to such suspension incurred by the Contractor in giving effect to the Engineer's instructions under this Clause shall be borne and paid by the Employer unless such suspension is:

(a) otherwise provided for in the Contract;

(b) necessary for the proper execution of the Works

or by reason of weather conditions affecting the safety or quality of the Works or a part thereof or by some default on the part of the Contractor; or

(c) necessary for the safety of the Works or any part thereof or the workmen.

Provided that the Contractor shall not be entitled to recover any such extra cost unless he gives notice to the Engineer in writing of his intention to claim within twenty-eight (28) days of the Engineer's order. The Engineer shall settle and determine the extra payment to be made to the Contractor in respect of such claim as the Engineer shall consider fair and reasonable.

42.2 Suspension Lasting More Than Ninety (90) Days

If on the written order of the Engineer (in this Clause referred to as a "Suspension Order") the progress of the Works or any part thereof shall be suspended for a period or consecutive periods amounting in all to ninety (90) days or if the Engineer having previously issued a Suspension Order for a period which has lasted less than ninety (90) days shall within less than ninety (90) days from the expiration of that period of suspension (except in cases mentioned in Clause 42.1 (a), (b) and (c) issue a further Suspension Order either in respect of the whole of the Works or (where the previous Suspension Order has affected only a part) affecting or including that part, then and in any such case the Contractor may serve a written notice on the Engineer requiring permission within twenty-eight (28) days from the receipt thereof to proceed with the Works, or that part thereof in regard to which progress is suspended and, if such permission is not granted within that time, the Contractor by a further written notice so served may, but is not bound to, elect to treat the suspension where it affects only part of the Works as an omission of such part under Clauses 52.1 and 52.2 hereof, or, where it affects the whole Works, as an abandonment of the Contract by the Employer.

Commencement Time and Delays

43.1 Commencement of Works

The Contractor shall commence the Works on Site within the period named in the Appendix to the Tender after the receipt by him of a Notice to Proceed from the

Engineer and shall proceed with the same with due expedition and without delay, except as may be expressly sanctioned or ordered by the Engineer, or be wholly beyond the Contractor's control.

44.1 Possession of Site

Save insofar as the Contractor may prescribe the extent of portions of the Site of which the Contractor is to be given possession from time to time and the order in which such portions shall be made available to him and subject to any requirement in the Contract as to the order in which the Works shall be executed, the Employer will as from the date of Letter of Intent give to the Contractor possession of so much of the Site as may be required to enable the Contractor to commence and proceed with the construction of the Works in accordance with the program referred to in Clause 14.1 hereof and otherwise in accordance with such reasonable proposals of the Contractor as he shall by notice in writing to the Engineer make and will from time to time as the Works proceed give to the Contractor possession of such further portions of Site as may be required to enable the Contractor to proceed with the Construction of the Works with due dispatch in accordance with the said program or proposals (as the case may be). If the Contractor suffers delay or incurs expense from failure on the part of the Employer to give possession in accordance with the terms of this Clause, the Engineer shall grant an extension of time for the completion of any individual Stage of the Works affected and certify such sum as he considers fair to cover the expense incurred which sum will be paid by the Employer.

Possession of the Site or any part thereof shall not be deemed to confer exclusive possession but only such limited possession as will enable the Contractor to perform the Works comprised in and comply with the provisions of the Contract. Notwithstanding such possession, the Employer or any person authorized by him may enter upon and make use of any portion of the Site for any purpose whatsoever. The Contractor shall also permit the execution of work thereon by other contractors, departments or workmen, and shall afford them every facility for the execution of their several works simultaneously with his own and as far as practicable having regard to their respective contracts, all shall have equal rights to the use of all roads, grounds and accessways.

Occupancy of the Site or of premises is permitted solely for the purpose of executing and carrying out the Works comprised in the Contract, and shall confer or imply no tenancy on the part of the Contractor.

44.2 Rights-of-Way, etc.

The Contractor shall bear all expenses and charges for special or temporary rights-of-way required by him in connection with access to the Site. The Contractor shall also provide at his own cost any additional accommodation outside the Site required by him for the purposes of the Works.

45.1 Date of Completion

Subject to any requirement in the Contract as to completion of any portion of the Works before completion of the whole, the whole of the Works shall be completed on or before the date specified in the Tender or such extended time as may be allowed under Clause 46.1 hereof.

46.1 Extension of Time

Should the amount of extra or additional work of any kind or other special circumstances of any kind whatsoever which may occur be such as fairly to entitle the Contractor to an extension of time for the completion of the Works, the Engineer shall determine the amount of such extension. Provided that the Engineer is not bound to take into account any extra or additional work or other special circumstances unless the Contractor has, within twenty-eight (28) days after such work has been commenced or such circumstances have arisen, delivered to the Engineer full and detailed particulars of any claim to extension of time to which he may consider himself entitled, in order that such claim may be investigated at the time for the determination of the amount of such extension of time which shall not be reasonably withheld by the Engineer.

The Contractor shall cover in his prices for working in shifts and overtime as are necessary to complete the Works by Completion Date.

Except in an emergency the Contractor shall notify the Engineer seven (7) days in advance of his intention to commence any new day shift or night shift on the Works and three (3) days in advance of his intention to alter any day or nightwork schedule.

47.1 Rate of Progress

The whole of the materials, plant, and labor to be provided by the Contractor under this Contract and the mode, manner, and speed of execution and maintenance of the Works are to be of a kind and conducted in a manner to the satisfaction of the Engineer. Should the rate of progress of the Works or part thereof be at any time, in the opinion of the Engineer, too slow to ensure the completion of the Works by the prescribed date of or extended time for completion, the Engineer shall so notify the Contractor in writing and the Contractor shall hereupon take such steps as the Contractor may think necessary and the Engineer may approve to expedite progress so as to complete the Works by the prescribed date of or extended time for completion.

If the work is not being carried on by day and by night and the Contractor decides to work by night as well as by day, then the Contractor shall not be entitled to any additional payment for so doing. All work at night shall be carried out without unreasonable disturbance. The Contractor shall indemnify the Employer from and against any liability for damages on account of disturbance created while or in carrying out the work and from and against all claims, demands, proceedings, damages, costs, charges, and expenses whatsoever in regard or in relation to such liability.

48.1 Liquidated Damages for Delay

If the Contractor shall fail to complete the Works by the date prescribed in the Tender or extended time, then the Contractor shall pay to the Employer the sum stated in the Tender as liquidated damages for such default and not as a penalty for every day which shall elapse between the date prescribed in the Tender or extended time as the case may be and the date of completion of the Works. The Employer may without prejudice to any other method of recovery deduct the amount of such damages from any monies in his hands due or which may become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works or from any other of his obligations and liabilities under the Contract.

48.2 Reduction of Liquidated Damages

If before the completion of the whole of the Works, a certain part of the Works has been certified by the

Engineer as completed pursuant to Clause 49 hereof and occupied or used by the Employer, the liquidated damages for delay shall, for any period of delay after such certification, be reduced in the proportion which the value of the part so certified bears to the value of the whole of the Works.

49.1 Certificate of Completion of Works

As soon as, in the opinion of the Engineer, the Works shall have been substantially completed and shall have satisfactorily passed any final test that may be prescribed by the Contract, the Engineer shall issue a Certificate of Completion in respect of the Works and the Period of Maintenance of the Works shall commence from the date of such certificate. Provided that the Engineer may give such a certificate with respect to a certain part of the Works before the completion of the whole of the Works and shall upon the written application of the Contractor give such certificate with respect to that particular part of the Works which has been both completed to the satisfaction of the Engineer and occupied or used by the Employer and when such certificate is given in respect of that particular part of the Works, such part shall be considered as completed and the Period of Maintenance of such part shall commence from the date of such certificate. Provided always that such certificate given in accordance with the foregoing provisions of that part of the Works occupied and used as aforesaid shall not be deemed to certify completion of any ground or surfaces requiring reinstatement unless such certificate shall expressly so state.

Maintenance and Defects

50.1 Definitions of "Period of Maintenance"

In these Conditions the expression "Period of Maintenance" shall mean the period of maintenance named in the Tender calculated from the date of completion of the Works certified by the Engineer in accordance with Clause 49.1 hereof.

50.2 Execution of Work of Repair, etc.

The Contractor shall execute all such work of repair, amendment, reconstruction, rectification and making good of defects, imperfections, shrinkages, or other faults as may be required of the Contractor in writing by the Engineer during the Period of Maintenance or as a result of an inspection made by or on behalf of the Engineer prior to the expiration of the Period of Maintenance.

50.3 Cost of Execution of Work of Repair, etc.

All such work shall be carried out by the Contractor at his own expense if the necessity thereof shall, in the opinion of the Engineer, be due to the use of materials or workmanship not in accordance with the Contract or to neglect or failure on the part of the Contractor to comply with any obligations expressed or implied on the Contractor's part under the Contract. If, in the opinion of the Engineer, such necessity shall be due to any other cause, the value of such work shall be ascertained and paid for as if it were additional work.

50.4 Remedy on Contractor's Failure to Carry Out Work Required

If the Contractor shall fail to do any such work as aforesaid required by the Engineer, the Engineer shall be entitled to carry out such work by his own workmen or by other Contractors and if such work is work which the Contractor should have carried out at the Contractor's own cost, shall be entitled to recover from the Contractor the cost thereof or may deduct the same from any monies due or that become due to the Contractor.

51.1 Contractor to Search

The Contractor shall, if required by the Engineer in writing, search for the cause of any defect, imperfection, or fault under the directions of the Engineer. Unless such defect, imperfection, or fault shall be one for which the Contractor is liable under the Contract, the cost of the work carried out by the Contractor in searching as aforesaid shall be borne by the Engineer. But if such defect, imperfection or default shall be one for which the Contractor is liable as aforesaid, the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case repair, rectify, and make good such defect, imperfection, or default at his own expense in accordance with the provisions of Clauses 50.2, 50.3, and 50.4 hereof.

Alterations, Additions and Omissions

52.1 Variations

The Engineer shall make any variation of the form, quality, or quantity of the Works or any part thereof

that may in his opinion be necessary and for that purpose or if for any other reason it shall in his opinion be desirable, shall have power to order the Contractor to do and the Contractor shall do any of the following:

(a) increase or decrease the quantity of any work included in the Contract;

(b) omit any such work;

(c) change the character or quality or kind of any such work;

(d) change the levels, lines, positions, and dimensions of any part of the Works; and

(e) execute additional work of any kind necessary for the completion of the Works,

and no such variation shall in any way vitiate or invalidate the Contract but the value (if any) of all such variations shall be taken into account in ascertaining the amount of the Contract Price.

52.2 Orders for Variations to be in Writing

No such variation shall be made by the Contractor without an order in writing of the Engineer. Provided that no order in writing shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an order given under this Clause but is the result of the quantities exceeding or being less than those stated in the Bill of Quantities;andprovided further that if the Contractor shall confirm in writing to the Engineer any verbal order of the Engineer and such confirmation shall not be contradicted in writing by the Engineer it shall be deemed to be an order in writing by the Engineer before carrying out the Work.

53.1 Valuation of Variations

The Engineer shall determine the amount (if any) which in his opinion should be added to or deducted from the sum named in the Tender Documents in respect of any extra or additional work done or work omitted by his order. All such work shall be valued at the rates set out in the Contract if, in the opinion of the Engineer, the same shall be applicable. If the Contract shall not contain any rates applicable to the extra or additional work, then reasonable prices shall be fixed by the Engineer in accordance with Clause 53.4.

53.2 Claim for Variation of Prices

No increase of the Contract Price or variation of rate or price shall be made unless, as soon after the date of the order as is practicable and in the case of extra or additional work before the commencement of the work or as soon thereafter as is practicable, notice shall have been given in writing:

(a) by the Contractor to the Engineer of his intention to claim extra payment or a varied rate; or

(b) by the Engineer to the Contractor of his intention to vary a rate or price as the case may be.

53.3 Adjustment of Unit Prices

The quantities stated in the Bill of Quantities are estimated quantities for comparison of tenders, and, except as hereinafter provided in this Clause, no claim shall be made against the Government for excess or deficiency therein. Payment at the tender prices in the Bill of Quantities will be in full for all Contract Work and for the completed Works and shall include the costs of all materials, supplies, transportation, labor, tools, machinery and all expenditures as are necessary and incident to satisfactory compliance with the Contract, unless otherwise specifically provided. Subclause (b) below does not apply to any uncompleted items in the event of termination of this Contract as provided in Clause 64.1 hereof.

If the actual quantities are more than 125 percent or less than 85 percent of the estimated quantities in the Bill of Quantities, then an adjustment to the unit prices in the Bill of Quantities will be made as stipulated below:

(a) For overruns, the adjustment shall be limited to the number of units by which the actual quantity exceeds 125 percent of the estimated quantity. Payment for such excess units of quantities shall be made on the same basis as extra work as provided in Clause 53.4.

(b) For underruns, the adjustment shall be limited to the difference between the number of units of the

actual quantity and 85 percent of the estimated quantity. The adjustment in payment for such underrun units of quantities shall be made at fifteen percent (15%) of the unit prices to compensate the Contractor for overhead and loss of profit.

No price adjustments will be made to lump sum items of work and to the unit prices of other items of work unless expressly stated in the Tender.

53.4 Extra Work

The Government may, at any time by written order and without notice to the Sureties, direct the Contractor to perform Extra Work if such Extra Work is within the general scope of this Contract. No Extra Work shall be undertaken unless the pursuance of such written order by the Engineer, and no claim for payment shall be valid unless the Extra Work was so ordered. The Contractor shall promptly proceed with the Extra Work as directed by the Engineer and the amounts to be paid the Contractor for any such Extra Work shall be determined by one or more of the following methods:

a. By applicable unit prices contained in the Contractor's Tender for like work.

b. By a supplemental Bill of Quantities and schedule of prices proposed by the Contractor and approved by the Government.

c. By a reasonable lump sum proposal from the Contractor acceptable to the Government.

d. By a cost-plus-percentage basis. The Contractor shall be reimbursed for all actual necessary costs, as determined by the Engineer, in doing the Extra Work which shall include the following:

(1) The Contractor's direct labor costs,
(2) All materials incorporated into the Extra Work,
(3) All supplies, fuel, lubricants, power and other incidentals,
(4) An allowance for use of the Contractor's construction equipment, which shall be the product of the hourly use rate and the

actual number of operating hours, or fraction thereof, that the equipment is used in the performance of the Extra Work regardless of the number of hours used per day. The hourly use rate shall be the latest rental rates published by the Government for similar equipment under similar conditions, except if the published rates are not reasonable or applicable to any category of Extra Work, the hourly use rate shall be such other rate as shall in the opinion of the Engineer be fair and reasonable,

(5) An amount equal to fifteen percent of the sum of Items 1, 2, 3 and 4 above to cover the Contractor's indirect overhead costs, and

(6) An amount equal to five percent of all costs including indirect overhead as Contractor's profit.

If the Contractor and the Government are unable to agree on any of the methods for payment to the Contractor specified in sub-clauses a, b, and c above, then such Extra Work shall be done on a cost-plus-percentage basis as described in sub-clause d above.

The cost of the Extra Work done shall be submitted at intervals to be determined by the Engineer in a satisfactory form and which shall be approved or adjusted at once by the Engineer. Requests for payment by the Contractor for any Extra Work shall be accompanied by a statement, with the above approved supporting forms, giving a detailed accounting and record of the amount for which he claims payment. Said requests for payment shall be included with the Contractor's monthly statement for progress payments.

53.5 Claims

The Contractor shall send to the Engineer once in each quarterly period an account of all claims for any additional expense to which the Contractor may consider himself entitled and of all extra or additional work ordered by the Engineer which he has executed during the preceeding quarterly period. Provided always that the Engineer shall be entitled to authorize payment to be made for any such work notwithstanding the Contractor's failure to comply with this condition of the Contractor as at the earliest practicable opportunity notified the Engineer that he intends to make a claim for such work.

Plant, Temporary Works and Materials

54.1 Plant for Exclusive Use

All plant, Temporary Works and materials provided by the Contractor shall when brought on to the Site be deemed to be exclusively intended for the construction and completion of the Works and the Contractor shall not remove the whole or any part thereof (save for the purpose of moving it from one part of the Site to another) without the consent in writing of the Engineer which shall not be unreasonably withheld.

54.2 Removal of Plant, etc.

Upon completion of the Works, the Contractor shall remove from the Site all the said Plant and Temporary Works remaining thereon and any unused materials provided by the Contractor.

54.3 Employer Not Liable for Damage To Plant

The Employer shall not at any time be liable for the loss of or injury to any of the said Plant, Temporary Works or materials save as mentioned in Clauses 20.2 and 66.1 hereof.

54.4 Taxation, Customs, Duties, Permits and Licenses

(1) Taxation
All taxes shall be paid by the Contractor unless exempted in accordance with the prevailing laws, rules and regulations of the Government.

(2) Customs and Duties
The Contractor shall pay all customs and import duties as imposed under the laws and regulations of the Government with respect to any equipment and materials imported for purposes of the project.

(3) Permits and Licenses
The Contractor shall procure all permits and licenses, pay all charges, duties, fees and taxes necessary for such documents and give the necessary notices incidental to the due and lawful prosecution of the work under the laws of Government.

54.5 Newly Purchased Plant

In any case where the Contractor purchases Plant for the execution of the Works, the Contractor will as far as practicable be limited to the sources of supply and origin as specified in Clause 71.1 hereof.

55.1 Approval of Materials

The operation of Clauses 54.1, 54.2, 54.3, 54.4 and 54.5 hereof shall not be deemed to imply any approval by the Engineer of the materials or other matters referred to therein nor shall it prevent the rejection of any such materials at any time by the Engineer.

Measurement

56.1 Quantities

The quantities set out in the Bill of Quantities are the estimated quantities of the work but they are not to be taken as the actual and correct quantities of the Works to be executed by the Contractor in fulfillment of his obligations under the Contract.

57.1 Work to be Measured

The Engineer shall, except as otherwise stated, ascertain and determine by measurement the value in accordance with the Contract. He shall when he requires any part or parts of the Works to be measured, give notice to the Contractor who shall forthwith attend or send a qualified agent to assist the Engineer or the Engineer's Representative in making such measurement and shall furnish all particulars required by either of them. Should the Contractor not attend or neglect or omit to send such agent, then the measurement made by the Engineer or approved by him shall be taken to be the correct measurement of the Work.

58.1 Method of Measurement

Unless otherwise provided in the Specification, all measurements shall be according to the actual dimensions notwithstanding any general or local custom to the contrary and, except where otherwise specified in the Contract, no payment shall be allowed for any work which shall exceed the quantities required under the Contract.

Provisional Sums

59.1 Definition of Provisional Sum

"Provisional Sum" means a sum included in the Contract and so designated in the Bill of Quantities for the execution of work or the supply of goods, materials, or services, or for contingencies, which sum may be used, in whole or in part, or not at all, at the direction and discretion of the Engineer. The Contract Price shall include only such amounts in respect of the work, supply or services to which such Provisional Sums relate as the Engineer shall approve or determine in accordance with this Clause.

59.2 Use of Provisional Sum Items

In respect of every Provisional Sum, the Engineer shall have power to order:

(a) Work to be executed, including goods, materials or services to be supplied by the Contractor. The Contract Price shall include the value of such work executed or such goods, materials or services supplied determined in accordance with Clause 53.1 hereof.

(b) Work to be executed or goods, materials or services to be supplied by a nominated subcontractor as hereinafter defined. The sum to be paid to the Contractor therefor shall be determined and paid in accordance with Clause 60.2 hereof.

(c) Goods and materials to be purchased by the Contractor. The sum to be paid to the Contractor therefor shall be determined and paid in accordance with Clause 60.2 hereof.

59.3 Production of Vouchers

The Contractor shall, when required by the Engineer, produce all quotations, invoices, vouchers and accounts or receipts in connection with expenditure in respect of Provisional Sums.

59.4 Cash Discount

Insofar as any sum is paid by the Contractor to a nominated subcontractor (as hereinafter defined) by direction of the Engineer under Clause 59.2 before the

Contractor shall have received payment of that sum from the Employer there shall, for the purpose of adjusting the Contract Price under Clause 59.2 hereof, be added to the actual sum paid by the Contractor as aforesaid 2-1/2 percent of the amount of such actual payment and the benefit of any cash discount allowed in respect thereof shall be passed to the Employer.

59.5 Assignment of Subcontractor's Obligations

In the event of a nominated subcontractor (as hereinafter defined) having undertaken towards the Contractor in respect of the work executed or the goods or materials supplied by such nominated subcontractor any continuing obligation extending for a period exceeding that of the Period of Maintenance under this Contract, the Contractor shall before after the expiration of the Period of Maintenance assign to the Employer at the Employer's request and cost the benefit of such obligation for the unexpired duration thereof.

60.1 Nominated Subcontractor

All specialists, merchants, tradesmen and others executing any work or supplying any goods for which provisional sums are included in the Bill of Quantities who may have been or be nominated or selected or approved by the Employer or the Engineer and all persons to whom by virtue of the provisions of the Bill of Quantities or Specifications the Contractor is required to sub-let any work shall in the execution of such work or the supply of such goods be deemed to be subcontractors employed by the Contractor and are herein referred to as "nominated subcontractors". Provided always that the Contractor shall not be required by the Employer or the Engineer or be deemed to be under any obligation to employ any nominated subcontractor who shall decline to quote to the Contractor, or to enter into a subcontract with the Contractor containing provisions:

(a) That in respect of the work or goods the subject of the subcontract the subcontractor will undertake towards the Contractor the like obligations and liabilities as are imposed upon the Contractor towards the Employer by the terms of the Contract and will save harmless and indemnify the Contractor from and against the same and from all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising out of or in connection therewith or arising out of or in connection with any failure to perform such obligations or to fulfill such liabilities, and

(b) That the subcontractor will save harmless and indemnify the Contractor from and against any negligence by the Subcontractor, his agents, workmen, and servants and from and against any misuse by him or them of any Constructional Plant or Temporary Works provided by the Contractor for the purposes of the Contract and from all claims as aforesaid.

60.2 Payments to Nominated Subcontractors

Before issuing under Clause 61.1 hereof any certificate which includes any payment in respect of work done or goods supplied by any nominated subcontractor, the Engineer shall be entitled to demand from the Contractor reasonable proof that all payments included in previous certificates in respect of the work or goods of such nominated subcontractor have been paid or discharged by the Contractor in default whereof unless the Contractor shall:

(a) inform the Engineer in writing that he has reasonable cause for withholding or refusing to make such payment; and

(b) produce to the Engineer reasonable proof that he has so informed such nominated subcontractor in writing,

the Employer shall be entitled to pay to such nominated subcontractor direct upon the certificate of the Engineer all payments which the Contractor has failed to make to such nominated subcontractor and to deduct by way of set-off the amount so paid by the Employer from any sums due or which become due from the Employer to the Contractor.

Provided always that where the Engineer has certified and the Employer has paid direct as aforesaid the Engineer shall, in issuing any further certificate in favor of the Contractor, deduct from the amount thereof the amount so paid direct as aforesaid but shall not withhold or delay the issue of the certificate itself when due to be issued under the terms of the Contract.

Statements, Certificates and Payments

61.1 Statements

The Contractor shall submit to the Engineer after the end of each month eight copies, each signed by the Contractor, of a Statement in such form as the Engineer

may from time to time prescribe showing the amounts to which the Contractor may consider himself to be entitled up to the end of the month in respect of:

(a) the permanent work executed;

(b) any materials for permanent work delivered by the Contractor on the Site but not incorporated in such work;

(c) any Temporary Works for which separate items are provided in the Bill of Quantities; and

(d) payments on account of Lump Sum items in the Bill of Quantities not included under head (a), (b), or (c); and

(e) reimbursements under Clause 54.4.

61.2 Monthly Payment

The Engineer shall after examining each statement certify the amount of payment to the Contractor which he shall consider reasonable and proper in respect thereof subject first to the retention (except in case of payment of reimbursements made under Clause 54.4 hereof) of the Percentage of Retention stated in the Tender until the amount so retained reaches the limit of Retention Money stated in the Tender; and second to the deduction of any sums which may have become due and payable by the Contractor to the Employer. Provided that the Engineer shall not (unless he considers it desirable for the purpose of securing payment by the Contractor to a nominated subcontractor) certify any payment under this sub-clause if the net amount thereof after all retentions and deductions would be less than the Minimum Amount of Interim Certificates stated in the Tender.

61.3 Payment of Retention Money

Upon the issue of the Certificate of Completion with respect to the Works, one half of the Retention Money or upon the issue of a Certificate of Completion with respect to a part of the Works, only such proportion thereof as the Engineer shall determine having regard to the relative value of such part of the Works, shall become due and payable to the Contractor.

Upon the expiration of the Period of Maintenance for the Works, the other half of the Retention Money or upon

the expiration of a Period of Maintenance relating to a part of the Works only such proportion thereof as the Engineer shall determine having regard to the relative value of such part of the Works shall become due and payable to the Contractor. Provided that if at such time there shall remain to be executed by the Contractor any work ordered pursuant to Clause 50.2 hereof in respect of the whole or any part of the Works, the Employer shall be entitled to withhold payment until completion of such work or such half of the Retention Money or such proportion thereof as the case may be as shall, in the opinion of the Engineer, represent the cost of the work remaining to be executed.

61.4 Time for Payment

The amount due to the Contractor under any certificate issued by the Engineer pursuant to this Clause or to any other term of the Contract shall be paid by the Employer to the Contractor within 30 days after such certificate has been delivered to the Employer and in the event of the failure of the Employer to make payment within such time the Employer shall pay to the Contractor interest at the rate of 10 percent per annum upon all sums unpaid from the date upon which the same should have been paid.

61.5 Correction and Withholding of Certificates

The Engineer may by any certificate make any correction or modification in any previous certificate and shall have power to withhold any certificate if the Works or any part thereof are not being carried out to his satisfaction.

61.6 Currency of Account

The currency of account shall be the Bangladesh Taka.

61.7 Payments to Contractor

All payments to the Contractor by the Employer shall be made in the currencies and at the rates and prices stated in the Tender as applicable to such payment.

61.8 Payments to Employer

All payments to the Employer by the Contractor including payments made by way of deduction or set off shall be made in the currencies and at the rates and prices stated in the Tender as applicable to such payment.

61.9 Payment of Lump Sum

For each item in the Bill of Quantities for which payment is to be made in a lump sum the Contractor shall within thirty days of award of contract submit to the Engineer a payment schedule which allocates the lump sum amount tendered or fixed by the Government to the major divisions of work to be performed under the item. Said payment schedules shall be subject to the approval by the Engineer. Payment of lump sums for completion of work under the applicable items in the Bill of Quantities will be pro-rated in accordance with the approved payment schedules provided; however, no payment for work performed under any such lump sum items will be made until a payment schedule has been approved. Payment schedules shall also indicate where applicable the amounts allocated to each individual structure.

62.1 Approval Only by Maintenance Certificate

No certificate other than the Maintenance Certificate (which shall be the certificate of final completion) referred to in Clause 63.1 hereof shall be deemed to constitute approval of any work or other matter in respect of which it is issued or shall be taken as an admission of the due performance of the Contract or any part thereof or of the accuracy of any claim or demand made by the Contractor or of additional or varied work having been ordered by the Engineer nor shall any other certificate conclude or prejudice any of the powers of the Employer.

63.1 Maintenance Certificate

The Contract shall not be considered as completed until a Maintenance Certificate shall have been signed by the Employer and delivered to the Contractor stating that the Works have been completed and maintained to his satisfaction. The Maintenance Certificate shall be given by the Employer upon the expiration of the Period of Maintenance or as soon thereafter as any works ordered during such period pursuant to Clause 50.2 hereof shall have been completed to the satisfaction of the Engineer and full effect shall be given to this Clause and Clause 50.1 notwithstanding any previous entry on the Works or the taking possession, working or using thereof or any part thereof by the Employer.

63.2 Cessation of Employer's Liability

The employer shall not be liable to the Contractor for any matter or thing arising out of or in connection with the Contract or the execution of Works unless the

Contractor shall have made in a claim in writing in respect thereof before the giving of the Maintenance Certificate under this Clause.

63.3 Unfulfilled Obligations

Notwithstanding the issue of the Maintenance Certificate, the Contractor and (subject to Clause 63.2) the Employer shall remain liable for the fulfilment of any obligation incurred under the provisions of the Contract prior to the issue of the Maintenance Certificate which remains unperformed at the time such certificate is issued and for the purpose of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force between the parties hereto.

Remedies and Powers

64.1 Forfeiture

If the Contractor shall become bankrupt or have a receiving order made against him or shall present his petition in bankruptcy or shall make an arrangement with or assignment in favor of his creditors or shall agree to carry out the Contract under a committee of inspection of his creditors or (being a corporation) shall go into liquidation (other than a voluntary liquidation for the purpose of amalgamation or reconstruction) or if the Contractor shall assign the Contract without the consent in writing of the Employer first obtained or shall have an execution levied on his goods or if the Engineer shall certify in writing to the Employer that in his opinion the Contractor:

(a) has abandoned the Contract; or

(b) without reasonable excuse has failed to commence the Works or has suspended the progress of the Works for twenty-eight (28) days after receiving from the Engineer written notice to proceed; or

(c) has failed to proceed with the Works with due diligence; or

(d) has failed to remove materials from the Site or to pull down and replace work for twenty-eight (28) days after receiving from the Engineer written notice that the said materials or work had been condemned and rejected by the Engineer under these conditions; or

(e) is not executing the Works in accordance with the Contract or is persistently or flagrantly neglecting to carry out his obligations under the Contract; or

(f) has to the detriment of good workmanship or in defiance of the Engineer's instructions to the contrary sub-let any part of the contract; or

(g) has engaged in any unlawful act whereby he has been convicted of bribery and/or corruption under a court having jurisdiction for the Contract, then the Employer may, after giving 14 days' notice in writing to the Contractor, enter upon the Site and the Works and expel the Contractor therefrom without thereby voiding the Contract or releasing the Contractor from any of his obligations or liabilities under the Contract or affecting the rights and powers conferred on the Employer or the Engineer by the Contract, and may himself complete the Works. The Employer or such other contractor may use for such completion so much of the Plant, Temporary Works and materials on the Site as he or they may think proper and the Employer may at any time sell any of the said Plant, Temporary Works and unused materials and apply the proceeds of sale in or towards the satisfaction of any sums due or which may become due to him from the Contractor under the Contract.

64.2 Valuation at Date of Forfeiture

The Engineer shall as soon as may be practicable after any such entry and expulsion by the Employer, fix and determine exparte, or by or after reference to the parties or after such investigation or enquiries as he may think fit to make or institute and shall certify what amount (if any) had at the time of such entry and expulsion been reasonably earned by or would reasonably accrue to the Contractor in respect of work then actually done by him under the Contract and the value of any unused or partially used materials, any Plant and any Temporary Works upon the Site.

64.3 Payment after Forfeiture

If the Employer shall enter and expel the Contractor under this Clause, he shall not be liable to pay to the Contractor any money on account of the Contract until the expiration of the Period of Maintenance and thereafter

until the costs of completion and maintenance, damage for delay in completion (if any) and all other expenses incurred by the Employer have been ascertained and the amount thereof certified by the Engineer. The Contractor shall then be entitled to receive only such sum or sums (if any) as the Engineer may certify would have been due to him upon due completion by him after deducting the said amount. But if such amount shall exceed the sum which would have been payable to the Contractor on due completion by him then the Contractor shall upon demand pay to the Employer the amount of such excess and it shall be deemed a debt due by the Contractor to the Employer and shall be recoverable accordingly. Any amount payable under this Clause by the Contractor to the Employer shall be increased or by the Engineer to the Contractor shall be decreased as the case may be to the extent of the liquidated damages if any.

65.1 Urgent Repairs

If by reason of any accident or failure or other event occurring to or in connection with the Works or any part thereof either during the execution of the Works or during the Period of Maintenance any remedial or other work or repair shall in the opinion of the Engineer be urgently necessary for security and the Contractor is unable or unwilling at once to do such work or repair, the Employer may employ and pay other persons to carry out such work or repair as the Engineer may consider necessary. If the work or repair so done by the Employer is work which in the opinion of the Engineer the Contractor was liable to do at his own expense under the Contract, all costs and charges properly incurred by the Employer in so doing shall on demand be paid by the Contractor to the Employer or may be deducted by the Employer from any monies due to the Contractor. Provided always that the Engineer shall as soon after the occurrence of any such emergency as may be reasonably practicable notify the Contractor thereof in writing.

Special Risks

66.1 Special Risks

Notwithstanding anything in the Contract contained:

(1) The Contractor shall be under no liability whatsoever whether by way of indemnity or otherwise for or in respect of destruction of or damage to the Works, save

to work condemned under the provision of Clause 41.1 hereof, prior to the occurrence of any special risk hereinafter mentioned, or Temporary Works or to property whether of the Employer or third parties, or for or in respect of injury or loss of life which is the consequence of any special risk as hereinafter defined. The Employer shall indemnify and save harmless the Contractor against and from the same and against and from all claims, proceedings, damages, costs, charges and expenses whatsoever arising thereout or in connection therewith.

(2) If the Works or any materials on or near or in transit to the Site, or any other property of the Contractor used or intended to be used for the purposes of the Works, shall sustain destruction or damage by reason of any of the said special risks the Contractor shall be entitled to payment for:

(a) any permanent work and for any materials so destroyed or damaged, and, so far as may be required by the Engineer, or as may be necessary for the completion of the Works, on the basis of cost plus such profits as the Engineer may certify to be reasonable;

(b) replacing or making good any such destruction or damage to the Works; or

(c) replacing or making good such materials or other property of the Contractor used or intended to be used for the purposes of the Works.

(3) Destruction, damage, injury, or loss of life caused by the explosion or impact whenever and wherever occurring of any mine, bomb, shell, grenade, or other projectile, missile, or explosive of war, shall be deemed to be a consequence of the said special risks.

(4) The Employer shall repay to the Contractor any increased cost of or incidental to the execution of the Works, other than such as may be attributable to the cost of reconstructing work condemned under the provisions of Clause 41.1 hereof prior to the occurrence of any special risk, which is howsoever attributable to or consequent on or the result of or in any way whatsoever connected with the said special risks, subject however, to the provision in this clause hereinafter contained in regard to outbreak of war, but the Contractor shall as soon as any such increase of cost shall come to his knowledge forthwith notify the Engineer thereof in writing.

(5) The special risks are war, hostilities (whether war be declared or not), invasion, act of foreign enemies, nuclear and pressurewaves, or insofar as it relates to the country in which the Works are being or are to be executed or maintained, rebellion, revolution, insurrection, military or usurped power, civil war, or unless solely restricted to the employees of the Contractor or of his subcontractors and arising from the conduct of the Works, riot, commotion or disorder.

(6) If, during the currency of the Contract, there shall be an outbreak of war, whether war is declared or not, in any part of the world which, whether financially or otherwise, materially affects the execution of the Works, the Contractor shall, unless and until the Contract is terminated under the provisions in this clause, continue to use his best endeavors to complete the execution of the Works provided always that the Employer shall be entitled at any time after such outbreak of war to terminate this Contract by giving notice in writing to the Contractor and, upon such notice being given, this Contract shall, except as to the rights of the parties under this clause and to the operation of Clause 68 hereof, terminate but without prejudice to the rights of either party in respect of any antecedent breach thereof.

(7) If the Contract shall be terminated under the provisions of the last preceding sub-clause, the Contractor shall, with all reasonable dispatch, remove from the Site all Plant and shall give similar facilities to his subcontractors to do so.

(8) If the Contract shall be terminated as aforesaid, the Contractor shall be paid by the Employer, insofar as such amounts or items shall not have already been covered by payments on account made to the Contractor, for all work executed prior to the date of termination at the rates and prices provided in the Contract and in addition:

(a) The amount payable in respect of any preliminary items so far as the work or service comprised therein has been carried out or performed and a proper proportion as certified by the Engineer of any such items, the work or service comprised in which has been partially carried out or performed.

(b) The cost of materials or goods reasonably ordered for the Works or Temporary Works which shall have been delivered to the Contractor or of which

the Contractor is legally liable to accept delivery, such materials or goods becoming the property of the Employer upon such payment being made to him.

(c) A sum to be certified by the Engineer being the amount of any expenditure reasonably incurred by the Contractor in the expectation of completing the whole of the Works insofar as such expenditure shall not have been covered by the payments in this sub-clause before mentioned.

(d) Any additional sum payable under the provisions of sub-clauses (1), (2) and (4) of this clause.

(e) The reasonable cost of removal under constructional plant sub-clause (7) of this clause and, if required by the Contractor, return thereof to the Contractor's main plant yard in his country or registration or to any other destination, at no greater cost.

(f) The reasonable cost of repatriation of all the Contractor's staff and workmen employed on or in connection with the Works at the time of such termination.

Provided always that against any payments due from the Employer under this sub-clause, the Employer shall be entitled to be credited with any outstanding balances due from the Contractor for any sum previously paid by the Employer to the Contractor in respect of the execution of the Works.

Frustration

67.1 Payment in Event of Frustration

If a war, or other circumstances outside the control of both parties, arises after the Contract is made so that either party is prevented from fulfilling his contractual obligations, or under the law governing the Contract, the parties are released from further performance, then the sum payable by the Employer to the Contractor in respect of the work executed shall be the same as that which would have been payable under Clause 66.1 hereof if the Contract had been terminated under the provisions of Clause 66.1 hereof.

Settlement of Disputes

68.1 Settlement of Disputes by Arbitration

Any disputes or differences arising out of this Contract which cannot be settled or adjusted by mutual agreement, or the settlement of which is not otherwise provided for in the Contract, shall be settled and finally determined by arbitration in the following manner:

Each of the parties concerned shall appoint an arbitrator. If the two arbitrators so appointed cannot agree upon a decision and award within fourteen (14) days of the date of their appointment, they shall select a third arbitrator. If either of the parties fail to appoint its arbitrator within fourteen days after receipt of notice of the appointment by the other of its arbitrator, or if the arbitrators fail to appoint a third, then the President of the International Chamber of Commerce, 38 Cours Albertler, Paris, France shall have the power, on the request of either party, to make the appointments which had not been made as provided above. The arbitration shall be conducted in accordance with the rules of conciliation and arbitration of the International Chamber of Commerce and shall be held as promptly as possible. The decision of the majority of arbitrators shall be final and binding upon the parties hereto and the expense of the arbitration shall be paid as the arbitrators determine.

During the period of arbitration, the performance of the Contract shall be carried on without interruption and in accordance with the terms of the Contract, except as to work for which the Employer may specifically authorize delay pending arbitration.

Notices

69.1 Service of Notices on Contractor

Any notice to be given to the Contractor under the terms of the Contract shall be served by sending the same by post to or leaving the same at the Contractor's principal place of business (or in the event of the Contractor being a Company to or at its registered office).

69.2 Service of Notices on Employer

Any notice to be given to the Employer under the terms of the Contract shall be served by sending the same

by post to or leaving the same at the following address:

Original to:

Default of Employer

70.1 Default of Employer

(1) In the event of the Employer:

(a) Failing to pay to the Contractor the amount due under any certificate of the Engineer within the time after the same shall have become due under the terms of the Contract; or

(b) Interfering with or obstructing the issue of any such certificate without any justified cause:

the Contractor shall be entitled without prejudice to any other rights or remedies to terminate the employment of the Contractor under the Contract by giving three (3) months notice in writing to the Employer.

(2) Upon the termination of the notice period, if the payment still remains due, the Contractor shall (notwithstanding the provisions of Clause 54.1 hereof) with all reasonable dispatch remove from the Site all Constructional Plant brought by him thereon.

(3) In the event of such termination the Employer shall be under the same obligations to the Contractor in

regard to payment as if the Contract had been terminated under the provisions of Clause 66.1 hereof but in addition to the payments specified in Clause 66.1 (8) the Employer shall pay to the Contractor the amount of any loss or damage to the Contractor arising out of or in connection with or by consequence of such termination.

(4) Nothing contained in this Clause shall prejudice the right of the Contractor to exercise, either in lieu of or in addition to, the rights and remedies to which the Contractor may be entitled to in any other clause.

Eligible Source Countries

71.1 Eligible Source Countries

The origin and source of all plant, materials and other goods to be purchased by the Contractor for execution of or incorporation in the Works shall be limited to the following countries:

SPECIAL CONDITIONS

SC-1 Work to be Done

The Contractor shall furnish and perform all the Contract Work, as required by these Contract Documents, for the construction of the Works.

SC-2 Location

The location of the work is shown on the drawings.

SC-3 Description of Work

The work under these Contract Documents is described in an Appendix to the Tender.

SC-4 Work by Others

The Employer reserves the right to perform any work, outside of this Contract, either with its own forces or by other contractor's forces. Whenever such work is contiguous to the Works, the respective rights of the various interests involved shall be established by the Engineer, to secure the completion of the various portions of the project in general harmony.

The Contractor shall afford the Employer and such other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly coordinate his Contract Work with theirs. The Contractor shall, without charge, permit the Employer and such other contractors to use the roads, bridges, lighting installations and other facilities constructed by the Contractor for the Works as are available without entailing any materials increase in cost to the Contractor for maintenance or operation of such facilities; Provided, that such usage shall in no way interfere with the Contract Work of the Contractor.

SC-5 Materials and Equipment Furnished by the Contractor

a. General

The Contractor shall furnish all materials and equipment necessary for incorporation in the Works unless specifically stated otherwise in these Contract Documents.

All such materials and equipment shall be new and of good quality, shall meet all the requirements of these Contract Documents, and shall be subject to approval by the Engineer.

All loading, transporting from the point of origin to the Site, unloading, handling, storage at the Site and installation of all such materials and equipment shall be the responsibility of the Contractor.

All materials and equipment which are to be imported shall be packaged for ocean shipment in humid tropical climate in such a manner as to protect the materials from damage in transit and storage at the Site. The Contractor shall be responsible for damages incurred due to improper packaging.

All costs to the Contractor to meet the requirements of this Paragraph shall be included in the bid prices for the various items in the Bill of Quantities.

In the event any equivalent materials and equipment are of less value to the Employer or involve less cost to the Contractor than the materials and equipment specified, an adjustment shall be made in favor of the Employer. Said adjustment shall be made by the Engineer at the time any such equivalent materials and equipment are approved by the Engineer, and it will be handled by deduction from the monthly progress payments due to the Contractor. No payments in excess of bid prices in the Bill of Quantities will be made because of any equivalent materials or equipment substituted by the Contractor.

Prior to final acceptance of the Works the Contractor shall deliver to the Employer any spare parts, supplies or special tools which are included with all such materials and equipment furnished by the Contractor.

b. Approval

Before proceding with any purchase, production or manufacture, the Contractor shall submit necessary information for approval by the Engineer on all of the above materials and equipment which the Contractor proposes to furnish. Such submittals shall be timely and failure to do so, or purchase of any such materials or equipment prior to approval, will be at the Contractor's risk.

The above information shall consist of, wherever applicable, drawings, materials and equipment specifications,

data, installation, operating and maintenance instructions, and illustrative catalogs, and where applicable shall include the following:

(1) Outline Drawings

Outline drawings of the equipment, together with weights, external forces, anchoring details, and sufficient overall dimensions, to facilitate preparation of final designs of the structure into which the equipment is to be incorporated.

(2) Specifications and Detail Drawings

Design computations when requested, detailed specifications, general assembly and erection drawings of the equipment and sufficient sub-assembly drawings to demonstrate fully that all parts will conform with the provisions and intent of the Contract Documents and with the requirements for their installations, operation, and maintenance.

Approval by the Engineer shall in no way relieve the Contractor of the responsibility for furnishing materials and the equipment meeting all the requirements of this Contract, or of the responsibility for the correctness of the Contractor's drawings or other information.

c. Inspection

All such materials and equipment shall be subject to inspection by the Engineer. The Engineer may inspect materials and equipment during its manufacture or fabrication and prior to its preparation for shipment; inspect its packing when ready for shipment; and witness any and all tests. Inspection may be at any one or more of the following locations: (1) the place of production or manufacture; (2) the shipping point; or (3) the Site, as determined by the Engineer. To allow sufficient time for inspection, the Contractor shall submit to the Engineer, at the time of issuance copies in triplicate of purchase orders, including drawings and other pertinent information, covering materials and equipment on which inspection will be made as advised by the Engineer, or shall submit other evidence in the event such purchase orders are issued verbally or by letter.

The inspection of materials and equipment or the waiving of the inspection thereof shall in no way relieve

the Contractor of the responsibility for furnishing materials and equipment meeting all the requirements of this Contract.

SC-6 Construction Equipment and Tools

All construction equipment and tools to be used for the Contract Work shall be furnished by the Contractor. No separate payment will be made for the costs of construction equipment and tools and such cost shall be included in the bid prices for various items in the Bill of Quantities.

SC-7 Standards and Specifications

All materials and equipment to be incorporated in the Works and the fabrication of same shall conform to applicable standards and specifications or to equivalent applicable standards and specifications established and approved in the country of manufacture of the equipment. The materials and equipment shall be in compliance with the latest editions or revisions of the standards and specifications in effect on the date 30 days prior to the date of the bid opening, including any amendments or supplements. In the event of conflicting requirements between a referenced specification, standard, or code, and these specifications, these specifications shall govern.

References to standards and specifications or to materials and equipment of a particular manufacturer shall be considered as followed by the words "or equivalent." The Contractor may propose equivalent standards, specifications, materials or equipment which shall conform in every respect to that specified.

If the Contractor proposes equivalent standards and specifications, or equivalent materials and equipment, the Contractor shall state the exact nature of the change, and shall submit complete standards and specifications, and information and data on the materials and equipment for the approval of the Engineer.

Such submittals shall be timely and failure to do so, or purchase of any proposed equivalent materials and equipment prior to approval by the Engineer, will be at the Contractor's risk.

Where reference is made to a standard or a specification for the furnishing of materials or equipment, such as the American Society for Testing and Materials, the

reference will be specified by the abbreviation for the standard or specification followed by the appropriate letter and/or designation, such as ASTM: C76. The following is a list of the standards and specifications referred to in these Contract Documents and includes the abbreviation for the standard or specification as well as the addresses where copies of the standards and specifications may be obtained:

Abbreviation	Name of Standard or Specification and Address
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, Pennsylvania 19103, U.S.A.
AISC	American Institute of Steel Construction, Inc 1221 Avenue of the Americas New York, New York 10020, U.S.A.
AWS	American Welding Society, Inc. 2501 NW Seventh Street Miami, Florida 33125, U.S.A.

The cost of submitting data and information for approval of equivalent standards and specifications or equivalent materials and equipment, including the cost of any additional data, testing and inspection required by the Engineer, shall be included in the prices bid in the Bill of Quantities for other items of work.

SC-8 Verification by the Government

The Government shall be entitled at its discretion to conduct audits as it may deem necessary for its own investigation in connection with:

(1) Extra work on a cost-plus-percentage basis.
(2) Revisions to tender prices by reason of an increase in the cost of materials and minimum daily wage rate.
(3) Cost incurred in the event of take-over or termination of Contract.
(4) Any other costs that the Contractor may claim from the Government which are not specifically covered by the terms of this Contract.

The Contractor shall keep accurate up-to-date accounting books and records of the above items.

SC-9 Water Supply

The Contractor shall, at his own expense, be responsible for providing a safe and adequate supply of drinking

and domestic water, and an adequate supply for his construction purposes. Whenever there is a possibility of contamination of the water supply for drinking and domestic purposes, chlorination or some other approved method of sterilization shall be carried out.

SC-10 Rights-of-Way

The Government will provide all rights-of-way, free of charge to the Contractor at the time and which, in the opinion of the Engineer, are required for carrying out the Contract Work.

SC-11 Communication Facilities

The Contractor shall arrange for, provide and maintain at his own expense, communication facilities at the Site as may be required for his own purposes.

SC-12 Original Cross-Sections at Site

At least fifteen (15) calendar days before the start of Contract Work at the Site, the Contractor shall notify the Engineer in writing of his intent to perform work which will result in changing the ground surface elevations or contours in the location of structures, for access or for his own convenience. Before the Contractor begins the above-described work, the Contractor shall cross-section the areas in the location of the various structures, as directed by the Engineer, and the cross-sections obtained at that time and approved by the Engineer will be used in computing the quantity of excavation removed from the various structures. Unless otherwise directed, all original cross-sections will be checked by the Engineer.

SC-13 Protection of Real Estate Crossed by Right-of-Way

The Contractor shall limit the movement of his crews and equipment on right-of-way, including access routes approved by the Engineer, so as to minimize damage to crops and property, and shall endeavor to avoid marring the lands. Before final acceptance of the Works, ruts and scars shall be obliterated and the land shall be restored as nearly as practicable to its original condition.

The Contractor shall be responsible directly to the Engineer for any excessive or unnecessary damage to

crops or lands resulting from his operations, whether on right-of-way, on lands adjacent thereto, or on approved access roads, and deductions will be made from payment due the Contractor to cover the amount of such excess or unnecessary damage, as determined by the Engineer.

No payment will be made to the Contractor for the performance of any work described in this paragraph and the cost thereof shall be included in the bid prices for the various items of work in the Bill of Quantities.

SC-14 Removal of Camp and Clean-up

Clean-Up. Upon completion of the Contract Work, and prior to final acceptance by the Government, the Contractor shall remove from his campsite and other areas where he operated all buildings, rubbish, unused materials, storage tanks, and all other construction above ground surfaces; fill and dress all holes and cavities made for his convenience; and leave all areas in good order and condition, all as required by the Engineer; Provided, that should the Contractor refuse or fail to perform this work called for within a period of thirty (30) calendar days after so notified, the buildings and other improvements shall become the property of the Employer; and Provided, further, that any and all clean-up which the Contractor failed to do may be undertaken by the Employer at the expense of the Contractor.

The cost of removal of Contractor's camp and other construction facilities and clean-up shall be included in the bid prices for the various items in the Bill of Quantities.

TECHNICAL SPECIFICATIONS

SECTION I

CLEARING AND GRUBBING

101. Clearing

All areas within the right-of-way which require clearing, as determined by the Engineer, shall be cleared of all trees, brush, rubbish and other objectionable matter and such materials shall be removed from the Site of the work or otherwise disposed of as approved by the Engineer. In general, only such trees that will interfere with the construction required under these specifications shall be removed and trees along the right-of-way shall be left in place to the greatest extent practicable, as determined by the Engineer. No tree or shrub outside the designated areas shall be cut and all trees and shrubs to remain in place shall be protected from damage. All merchantable timber from clearing operations shall become the property of the Government, shall be cut by the Contractor into lengths suitable for transportation, and shall be piled in locations convenient for removal by the Government. All other combustible material from clearing operations shall be burned or removed from the Site of the work or otherwise disposed of as directed by the Engineer.

All materials to be burned shall be piled neatly and when in a suitable condition shall be burned completely. Piling for burning shall be done in such a manner and in such locations as to cause the least fire risk. All burning shall be so thorough that the cleared materials will be reduced to ashes. The Contractor shall at all times take special precautions to prevent fire from spreading and shall have available at all times, suitable equipment and supplies for use in preventing and fighting fires.

Fences, walls, buildings, ruins and similar items which interfere with the construction of the Works shall also be cleared from the right-of-way and suitably disposed of as directed by the Engineer.

All clearing operations shall be performed well in advance of other construction operations. Any damage to

the Works and public or private property caused by the Contractor's operations in clearing and grubbing shall be repaired or replaced at the expense of the Contractor.

102. Grubbing

Grubbing shall consist of removing all tree stumps, roots, vegetable matter and other objectionable matter from areas to be occupied by the permanent works. Grubbing of areas to be occupied by spoil banks and waste materials will not be required. The material removed in grubbing operations shall be disposed of in spoil banks adjoining the canal or in other approved waste banks designated by the Engineer.

103. Payment

Under a unit-price contract, separate payment for clearing and grubbing will be made at the lump-sum amount tendered therefor in the Bill of Quantities.

Under a lump-sum contract, no separate payment for clearing and grubbing will be made and all costs therefor shall be included in the Tender Price.

SECTION II

DISMANTLING

201. Scope of Work

The Contractor shall furnish all labor, equipment and materials to perform the dismantling of structures as shown on the drawings. The structures to be completely or partially dismantled are specified on the drawings.

Dismantling shall include the following: demolition of structures to be completely removed; carefully dismantling structures which are to be partially dismantled; protecting structures to be dismantled from damage during the entire construction period; disposing of waste materials, as directed by the Engineer; and related work to dismantling the structures in accordance with the drawings. All materials and equipment removed in dismantling operations which are not required for the permanent Works shall be wasted as directed by the Engineer.

All dismantling operations shall be performed well in advance of other construction operations. Any damage to the Works and public or private property caused by the Contractor's operations in dismantling shall be repaired or replaced at the expense of the Contractor.

202. Payment

Under a unit-price contract, separate payment for dismantling will be made at the lump-sum amount tendered therefor in the Bill of Quantities.

Under a lump-sum contract, no separate payment for dismantling will be made and all costs therefor shall be included in the Tender Price.

SECTION III

CARE AND HANDLING OF WATER

301. Scope of Work

The Contractor shall furnish all labor, equipment and materials and operate all necessary pumping and other equipment for:

(1) Maintaining flow in all canals, channels, drainage ditches and water-courses located within or crossing the right-of-way during the entire construction period;

(2) Protecting the temporary and permanent Works from damage by rains, surface runoff, floods and other events;

(3) Unwatering foundations and care of water to maintain all excavations free of water, as required for proper construction of the Works.

After having served their purpose, all cofferdams or other temporary protective works, unless otherwise directed, shall be removed or leveled to give a sightly appearance and so as not to interfere in any way with the operation of the Project. Materials for construction of cofferdams may be obtained at no cost to the Contractor from required excavation, or other sources approved by the Engineer.

The Contractor shall be responsible for, and shall repair at his expense, any damage to the foundations and structures, or any other part of the work caused by the Contractor's construction operations; by flow conditions caused by the Contractor's diversion and protective structures; by flood flows; and by the failure of any part of the Contractor's diversion and protective works.

302. Plan

Prior to beginning any work on care and handling of water, the Contractor shall submit for approval a detailed plan showing his proposed method for care and handling water.

303. Maintaining Flow

The Contractor shall not interrupt nor interfere with the normal flow of any irrigation canal, channel or water-course for any reason or purpose, without the written approval of the Engineer.

The Contractor shall perform all operations necessary to maintain flow in existing and relocated irrigation canals and channels and in any other channels served by the construction of the Works. If temporary diversion channels or structures are constructed, the Contractor shall maintain flow in the temporary channels and structures during construction of the permanent structures, and after flow has been diverted into the permanent channels and structures the Contractor shall maintain flow in the permanent channels and structures during the remainder of the construction period. Any damage to existing temporary or permanent channels or structures, or to any part of the Works caused by improper operation of the diversion works and structures for maintaining flow in channels shall be repaired at the expense of the Contractor.

304. Protection of Canal and Structures

The Contractor shall protect the Works from damage as a result of rains; surface runoff; floods; flow in, and overflow of natural waterways, irrigation channels and rivers; flow into and through permanent Works; infiltration of subsoil water; failure of protective works; or similar events which may occur in the area; or upland of the Site during the entire construction period. The Contractor shall plan and schedule his operations to minimize the danger of such damage. Any damage to the Works, or delay to his operations resulting from such events, whether due to his failure to adequately take such dangers into consideration or not, shall be corrected by the Contractor and will not constitute a basis for claims for additional payment or extension of time. The canal, structures and other works shall be protected by construction of bunds, cofferdams, channels, temporary plugs, and such other protective works as the Contractor considers necessary. The protective works provided by the Contractor may incorporate existing natural waterways, but shall not reduce present effectiveness of such waterways and channels or, in the event of one of the occurrences described above, shall not cause damage either above or below the Site to an extent greater than would have occurred prior to the Contractor's operations.

305. Unwatering Foundations

The Contractor shall furnish, install, maintain and operate all necessary pumping and other equipment for unwatering the various parts of the Works, and for maintaining the foundations free from water, as required for

construction of each part of the Works. The Contractor's method of removal of water from the foundations will be subject to the approval of the Engineer. Where excavation for structure foundations extends below the water table, the portion below the water table shall be dewatered in advance of excavation. The dewatering shall be accomplished in a manner that will prevent loss of fines from the foundation, will maintain stability of excavated slopes in the bottom of the excavation, will result in all construction operations being performed free from standing water, and will result in all foundations being sufficiently dry for proper bonding of the backfill materials with the foundations, and proper compaction of the materials placed. The Contractor will be required to control any seepage along the bottom of the foundations, and elsewhere, to prevent the accumulation of standing water.

306. Payment

Under a unit-price contract, separate payment for care and handling of water will be made at the lump-sum amount tendered therefor in the Bill of Quantities.

Under a lump-sum contract, no separate payment for care and handling of water will be made and all costs therefor shall be included in the Tender price.

SECTION IV

EXCAVATION AND EARTHWORK

401. Excavation - General

All excavation and earthwork required for the Contract Work shall be made in accordance with paragraphs 401 to 410, inclusive.

All excavation shall be made to the lines, grades and dimensions shown on the drawings, unless directed otherwise by the Engineer. In the event it becomes necessary or desirable to vary the depths, slopes or the dimensions of the excavation previously established and if the Engineer determines that the Contractor's costs of performing the work will be increased by such charges, an equitable adjustment will be made for any such necessary increases in cost in accordance with applicable provisions of the Contract Documents.

All excavation shall be performed in the dry, except as approved by the Engineer. No additional payment for excavation will be made because of any of the materials being wet.

Any and all excess excavation for the convenience of the Contractor, or over-excavation performed by the Contractor for any purpose or reason, except as may be ordered in writing by the Engineer, and whether or not due to the fault of the Contractor, shall be at the expense of the Contractor. Where required to complete the work, all such excess excavation and over-excavation shall be refilled with materials furnished and placed at the expense of and by the Contractor.

402. Use of Excavated Materials

The Contractor shall use all suitable materials, as determined by the Engineer, from required excavations in the temporary and permanent construction required under these specifications. Suitable materials may be placed in the final locations direct from the excavation, or may be placed in temporary stockpiles and later placed in the final location, as approved by the Engineer. Excavated materials which are unsuitable for use in permanent construction, as determined by the Engineer, shall be wasted. As far as practicable, all materials designated for use in

compacted embankments shall be brought to the proper water content by sprinkling, or other suitable means before and during excavation.

Where sufficient quantities of suitable materials are not available from required excavations to construct the embankments, fills, backfill and other required earthwork construction, suitable materials shall be obtained by overexcavation below the bed level of the canal, or from borrow areas approved by the Engineer.

403. Excavation for Foundations and Structures

Except as otherwise provided in these specifications, or prescribed by the Engineer, excavations shall be made to slopes of one-to-one and to lateral dimensions 12 inches outside of the foundation.

The bottom and side slopes of excavation upon or against which concrete is to be placed shall be finished accurately to the dimensions shown on the drawings and the surfaces so prepared shall be moistened with water and tamped or rolled with suitable tools or equipment for the purpose of thoroughly compacting them to form firm foundations upon or against which to place the structure. If at any point in excavation, the natural foundation materials are disturbed during the excavation process, or otherwise, it shall be consolidated in a manner satisfactory to the Engineer, or where directed by the Engineer, it shall be removed and replaced with selected material compacted to the satisfaction of the Engineer.

If material unsuitable for foundations is encountered in excavation, as determined by the Engineer, the Contractor shall remove all such unsuitable material and refill the excavation with select materials thoroughly compacted by tamping or rolling in layers not more than 4 inches in thickness, and an equitable adjustment in the contract price will be made in accordance with the Contract Documents.

404. Slides

Materials which will not stand on the slopes shown on the drawings, or established by the Engineer, and materials which are a part of slides extending beyond the initially established lines of excavation, but which move into excavated areas, shall be removed by the Contractor in an approved manner as directed by the Engineer, and the slopes shall be completed to the lines and grades

finally established by the Engineer. The Contractor may be required to excavate potential slide areas beyond the limits of the originally staked excavation where, in the judgement of the Engineer, such excavation is necessary to prevent damage to the work. The removal of slides and excavation of potential slide areas will be only at the direction and approval of the Engineer.

405. Filling Channels

Portions of irrigation and drainage channels, if any, located within the designated right-of-way which are not required as part of the permanent works shall be filled with waste or surplus material, and the areas leveled and graded. The fill material shall be placed directly from excavation, and will not require rehandling; however, to facilitate his operation, the Contractor may stockpile such material and later fill the designated channels from stockpiles. Compaction of the fill material will not be required; however, the Contractor shall route his equipment so as to take advantage of compaction resulting from the equipment travel. The fill shall be mounded above the channel to a height sufficient to compensate for settlement, as determined by the Engineer. The areas adjacent to the channels shall be leveled and graded, as required, to provide a neat appearance for the completed Works.

406. Disposal of Excavated Materials

Excavated materials that are unsuitable for or are in excess of construction requirements shall be wasted. The disposal of all excavated materials that are to be wasted shall be subject to the approval of the Engineer.

Waste materials shall be placed in spoil banks adjacent to the canal; in irrigation channels and watercourses which are located within the right-of-way, and are directed to be filled; and in other waste areas designated by the Engineer. Spoil banks adjacent to the canal embankments shall be continuous, except for openings at structures and gaps at suitable intervals for disposal of drainage from canal roads, as shown on the drawings or directed by the Engineer. All spoil banks shall be leveled and trimmed to reasonably regular lines and sloped to drain.

Waste material not placed in spoil banks shall be placed in waste piles located within the right-of-way, as shown on the drawings or directed by the Engineer. Waste piles shall be located where they will not interfere

harmfully with the natural flow of permanent drainage channels or interfere with the operation of any canals, and where they will neither detract from the appearance of the completed project, nor interfere with the accessibility of the structures for the operation. Waste piles shall be leveled and trimmed to reasonable regular lines.

The Contractor will not be required to haul waste materials more than 300 feet airline distance without additional payment.

The cost of transporting excavated materials from excavations to disposal areas, and of disposing of all excavated materials that are wasted, as provided in this paragraph, shall be included in the cost of excavation.

407. Preparation of Embankment Surfaces

After the required stripping has been completed, the ground surface under all embankments to be compacted shall be scarified or plowed thoroughly to a depth of not less than 6 inches, shall be moistened if required, and compacted as specified herein.

408. Construction of Embankments

The Contractor shall construct all embankments required under these specifications to the lines and grades shown on the drawings, or established by the Engineer, including but not limited to, embankments which form the canal banks and canal roads; spoil banks for disposal of excess material; embankments for relocated or reconstructed roadways, irrigation and drainage channels, watercourses and bunds; and all other embankments shown on the drawings, or as directed by the Engineer.

Embankments shall be built in approximately horizontal layers carried across the entire width of the embankment to the required slopes. Embankments shall not be widened with loose material dumped from the top. Embankments may be built by mechanical excavating and hauling equipment, by excavating machinery depositing the materials directly from the excavation, or by other approved methods. Embankments built by mechanical excavating and hauling equipment shall be kept as close to level as practicable, and the travel of equipment over the embankments during construction shall be routed so as to distribute the compacting effect of the equipment to the best practicable advantage. Embankments built by excavating machinery depositing the material directly from the excavation, except for embankments to be compacted, shall be made in horizontal layers having a thickness of approximately the depth of the material as deposited by the excavating machine, except that for embankments forming canal roads,

the maximum thickness of horizontal layers shall be 24 inches.

Wet material from canal excavation, unless otherwise determined by the Engineer to be unsuitable, will be required to be utilized in embankments, and an excess moisture content shall not be cause for rejection. The Contractor shall plan his embankment placing operations to include adequate delays, stockpiling and placing later, mixing with dry material, or other procedure or combination of procedures, as may be required to permit the material to be placed in the specified embankments at a proper moisture content.

409. Compaction of Embankments

Embankments designated on the drawings or by the Engineer as compacted, shall be compacted to the lines, grades and slopes shown on the drawings, or established by the Engineer. The Contractor's operations in the excavation of material designated for use in compacted embankments shall be such as will result in an acceptable gradation of materials, when placed. The portions of the embankment designated on the drawings as compacted embankment shall be constructed of the finer and most suitable material, to provide the impermeability and stability when compacted.

Prior to and during placement operations, the material shall have the optimum practicable moisture content required for the purpose of compaction, as determined by the Engineer, and the moisture content shall be uniform throughout each layer. As determined by the Engineer, the material shall be brought to the proper moisture content at the site of excavation. If the moisture content is less than optimum for compaction, the compaction operations shall not proceed, except with the specific approval of the Engineer, and the moisture shall be supplemented by sprinkling and reworking the material at the site of compaction. If the moisture content is greater than optimum for compaction, the compaction operations shall be delayed until such time as the material has dried to the optimum moisture content, or the material shall be dried by reworking, mixing with dry materials, or other approved means.

The material to be compacted shall be deposited in horizontal layers not more than 8 inches thick before being compacted, and the distribution of materials shall

be such that the compacted material will be homogenous and free from lenses, pockets, streaks or other imperfections. The excavating and placing operations shall be such that the materials, when compacted, will be placed sufficiently to secure the best practicable degree of compaction, impermeability and stability.

When the material has been conditioned and placed as specified, it shall be compacted with compaction rollers of adequate weight and size, mechanical tampers or hand tampers.

The material in compacted embankments shall be compacted until the dry density of the compacted material is not less than 90 percent of the laboratory maximum dry density as determined by ASTM: D698, Method A for the materials being compacted. The Engineer will take samples of the material being compacted, and will perform the tests required to determine that the compaction is meeting the requirements of these specifications. The Contractor shall aid the Engineer in obtaining representative samples for testing.

410. Backfill

a. General

Fill below and about structures, and excavation refill designated as backfill, shall be placed as shown on the drawings and as directed. The material designated as pervious backfill shall be a free-drainage mixture of sand, gravel or broken rock wastes. The material designated as impervious backfill shall be relatively watertight when compacted. All backfill materials shall be subject to approval by the Engineer. Backfill materials shall be reasonably well-graded and free from organic matter, as obtained from required excavations or borrow pits. The materials shall be placed in approximately horizontal layers not more than 8 inches in thickness before compacting. Care shall be taken to avoid damage to any structure in or adjacent to the backfill. During or immediately prior to placement, the material shall be wetted uniformly, as required, to bring the moisture to as near optimum as necessary to obtain the required compaction.

b. Compacting Backfill

All backfill shall be compacted unless directed otherwise. The materials to be compacted shall be composed of

materials as described in subparagraph a., except that the maximum size of material in impervious backfill shall be 4 inches, and in pervious backfill shall be 8 inches. The distribution of the materials shall be such that the compacted material will be homogeneous and free from lenses, pockets or streaks. Prior to and during compaction operations, the backfill materials shall have the proper moisture content for compaction. Each layer shall be compacted by machanical or hand tampers or other approved methods.

Each layer of material in impervious backfill shall be compacted until the dry density of the compacted material is not less than 90 percent of the laboratory maximum dry density as determined by ASTM: D698, Method A for the materials being compacted.

Each layer of material in pervious backfill shall be compacted until the relative density of the compacted material is not less than 70 percent as determined by ASTM: D2049 for the materials being compacted.

411. Payment

a. Unit-Price Contract:

Payment under a unit-price contract will be as follows:

1. Separate payment for excavation will be at the applicable unit prices tendered therefor in the Bill of Quantities, which unit prices shall include the entire costs of performing the required excavation; transporting and disposing of waste and surplus materials; transporting and placing of suitable materials in embankments and backfill; transporting and placing suitable materials in temporary stockpiles for later use, if required; rehandling of material in temporary stockpiles and placing the material in points of final use, if required; and all appurtenant work not paid for under items of work in the Bill of Quantities.

2. Separate payment for compacting embankments will be made at the unit price tendered therefor in the Bill of Quantities.

3. Separate payment for compacting backfill will be made at the unit price tendered in the Bill of Quantities.

4. No payment will be made for excavation performed in previously placed embankment and backfill.

b. Lump-sum Contract

Under a lump-sum Contract, no separate payment for excavation and earthwork will be made and all costs therefor shall be included in the Tender price.

SECTION V

BRICK WORK

501. Scope of Work

The Contractor shall furnish all labor, equipment and materials to construct the brick masonry and brick lining shown on the drawings in accordance with these specifications.

Brick masonry shall consist of bricks laid with mortar joints to the lines, grades and dimensions of the structures shown on the drawings.

Brick lining shall consist of bricks laid with mortar joints to the lines, grades and dimensions of the brick lining shown on the drawings.

Brick arches shall be constructed as shown on the drawings and for purposes of these specifications shall be constructed and paid for under brick masonry.

502. Material

a. Bricks

All brick work shall be constructed with burnt clay bricks. The bricks shall be new, of first class quality and have the following properties:

(1) Uniform shape and size of 9½" x 4½" x 2-3/4". The bricks shall have a crushing strength when tested flatwise of not less than 1,800 pounds per square inch.

(2) Uniform color of deep red and uniform degree of burn.

(3) Give a metallic sound when struck against one another.

(4) Water absorbance not more than one-sixth of their dry weight and shall show no signs of efflorescence or subsequent drying.

(5) Uniform homogeneity of clay which may be checked by breaking a brick.

(6) Will not break when dropped from a height of 4'-0" on top of another brick or a hard surface.

(7) Each shipment of bricks shall be checked for compliance with these specifications. If more than 5 percent of the bricks selected randomly from a shipment are found to be defective in one or more properties the Engineer may reject the entire shipment.

b. Cement

Cement used in mortar for brickwork shall be portland cement and comply with the requirements of these specifications in Section VI.

c. Sand

Sand used in mortar for brickwork shall be of Sylhet sand and shall be thoroughly screened and cleaned of all foreign matter before use. The sand shall be well graded with particle sizes ranging from fine to maximum size of 3/32 inches. The sum of the percentages of all deleterious substances shall not exceed 5 percent, by weight. Sand producing a color darker than the standard in the colorimetic test for organic impurities, as determined by ASTM: C40, may be rejected.

d. Water

Water used in mortar and for soaking bricks or washing sand shall be clean and pure enough for drinking.

503. Mortar

Mortar for brickwork shall consist of cement, sand and sufficient water to produce a workable mixture. The proportions of cement and sand shall be as specified on the drawings. A proportion of 1:3 shall mean one part cement to three parts sand.

All mortar shall be used within thirty minutes after mixing. Mortar which has taken its initial set shall not be used or remixed with fresh mortar but shall be discarded. Water shall not be added to mortar after the mortar has been placed on the brickwork.

504. Placing

Brickwork shall be constructed on concrete foundations or when shown on the drawings on firm earth foundations and only on foundations approved by the Engineer.

Prior to constructing any brickwork on earth foundations, the surfaces of the foundation shall be moistened with water and tamped or rolled with suitable tools and equipment for the purpose of thoroughly compacting them to form firm foundations upon or against which to construct the brickwork.

Bricks shall not be placed during rain sufficiently heavy or prolonged to wash the mortar from the bricks. Mortar already spread which becomes diluted by rain shall be removed and replaced before continuing the work. Workmen shall not be allowed on the brickwork before it is fully set.

All bricks to be used in brickwork with mortar joints shall be completely soaked in water for a minimum period of 8 hours before they are used. The bricks shall be used within 20 minutes of taking out of water. All bricks shall be free from water adhering to their surface when they are placed in the brickwork.

505. Workmanship

All bricks shall be skillfully laid with level courses, uniform joints, square corners, plumb verticals, true surfaces and in English bond except when otherwise shown on the drawings or directed by the Engineer.

Only full bricks shall be used in the brickwork unless absolutely necessary for breaking joints or maintaining bond.

Brick masonry shall be laid where possible from one face only and each brick shall be set with both horizontal and vertical joints filled with mortar and the bricks shall be bedded in by firmly taping with the handle of the trowel.

Each course shall break the joints with the course below. All horizontal joints shall be parallel and all vertical joints in alternate courses shall be directly over one another. In thick walls or foundations, not only the face joints but the joints inside also shall break course.

The thickness of mortar in any joint shall not be less than 1/4-inch and not more than 3/8-inch and the height of four courses as laid shall not exceed more than one inch the height of four dry bricks stacked one upon the other.

Every course shall be well grouted before the next is laid to ensure there are no hollow joints. All mortar joints shall be checked and any hollow or defective joints shall be racked and filled with mortar immediately.

All walls shall be carried up regularly and no part shall be more than 3 feet higher than another unless otherwise approved. Walls left at different levels shall be racked-back. When the entire work cannot be carried out in even courses, the break shall be made at regular steps each of a length of at least 1½ times its height.

The surface of each course shall be thoroughly cleaned from all dirt before another course is laid on top of it. If the mortar in any course has begun to set, the joints shall be racked out to a depth of one inch before any subsequent course is laid.

The joints of brickwork which is to be plastered shall be raked to a depth of 3/8" while the mortar is still unset and the face washed down before closing the days work. Where plastering is not required, the joints shall extend slightly beyond the face and then struck off flush with the trowel as the work proceeds, except all joints which will be exposed upon completion of the work shall be finished using concave pointing.

The face of all masonry shall be kept clear and free from streaks of mortar. Whenever such streaks are found they shall be washed out immediately and not allowed to harden.

Winding or curved walls and ornamental work shall be built in strict accordance with templates made up from the Drawings.

Walls and partitions butting against concrete shall be tied thereto with approved bonding ties as directed by the Engineer in every fourth course of brick or at one foot centres.

The scaffolding shall be subject to Engineer's approval and shall be so constructed that the pole going into the masonry is at a place which can be filled with a header brick.

The brickwork shall be protected during construction from effects of sun and rain by suitable covering.

All anchors and similar work required to be embedded in brick masonry shall be installed as the construction progresses.

506. Curing and Finishing

Curing of brickwork shall commence immediately after the mortar in the joints has taken its initial set. Curing shall consist of keeping the brickwork continuously moist with water for a period of not less than 7 days. The use of mud and dirt for curing brickwork will not be permitted.

All brick masonry that will be exposed upon completion of the work shall be washed down and cleaned of all stains after completion of the specified curing.

507. Plastering

The drawings specify the areas of brickwork to be plastered. Plastering shall consist of applying cement mortar to brickwork in a single coat to the thickness specified on the drawings, and shall commence immediately after curing of the brickwork has been completed. Surfaces to be plastered shall be cleaned and prepared by the Contractor as required to result in a good bond between the brickwork and plaster. Plaster shall be applied only to clean rough surfaces of brickwork and shall be thoroughly smoothed.

Joints of brickwork shall be raked during construction as specified in Paragraph 505. Plaster shall consist of a cement mortar as specified in paragraph 503.

Where required, plaster surfaces shall be screeded, and after screeding, shall be finished off with a flat wooden float to a smooth finish. Excessive floating, rubbing or polishing of the surface with a steel trowel shall be avoided. At construction joints and at other locations where edges of plaster appear, the plaster edges shall be cut straight, either vertically or horizontally, and not left ragged.

Curing of plaster shall commence immediately after the plaster has taken its initial set. Curing shall consist of keeping the plaster continuously moist with water for a period of not less than 7 days. The use of mud and dirt in curing plaster will not be permitted.

508. Payment

a. Unit-Price Contract

Payment under a unit-price contract will be as follows:

1. Separate payment for constructing brick masonry

and brick lining will be made at the applicable unit prices tendered therefor in the Bill of Quantities, which unit prices shall include the entire costs of: furnishing all labor, equipment and materials, including bricks, cement and sand; performing all work to provide firm foundations for brickwork to be constructed on earth foundations; laying bricks, curing brickwork and cleaning brickwork; and all appurtenant work to construct brick masonry and brick lining in accordance with the drawings and these specifications.

2. Separate payment for plastering brickwork will be made at the applicable unit price tendered therefor in the Bill of Quantities, which price shall include the entire cost of: furnishing all labor, equipment and materials, including sand cement; applying plaster to the specified thickness; curing the plaster; and all appurtenant work for plastering brickwork in accordance with the drawings and these specifications.

b. Lump-sum Contract

Under a lump-sum contract, no separate payment for constructing brick masonry, constructing brick lining and plastering brickwork will be made and all costs therefor shall be included in the Tender price.

SECTION VI

CEMENT

601. Cement

a. General

Cement for concrete and mortar shall be furnished by the Contractor in packages. The Contractor shall inform the Engineer within 30 days after date of Notice to Proceed concerning the mill or mills from which the cement is to be shipped, and also furnish information as to location, shipping point or points, purchase order number, contract number, or other designation that will indentify the cement shipment of the Contractor.

b. Portland Cement

All cement shall be Portland cement and conform to ASTM: C150 for Type I cement.

c. Test Requirements

Cement will be sampled and tested at the mills by the Engineer, when deemed necessary, to assure the cement meets the requirements of these specifications.

Cement will be tested by the Engineer at the jobsite, when necessary. Cement not meeting test requirements will be rejected, and shall be promptly removed from the Site of work. Rejected cement shall be replaced with acceptable cement, and the Contractor shall be entitled to no adjustments in price or completion time by reason of any delays occasioned thereby. Cement which has been in storage at the project site over two (2) months shall not be used until retest proves it to be satisfactory. Sacked cement shall have the date of packaging stamped thereon. Any cement that has an age in excess of four (4) months from the date of shipment from the place of manufacture shall not be used in the work.

The inspection and testing of cement at the mills and at the site, or the waiving thereof, shall not relieve the Contractor of responsibility for furnishing cement meeting the requirements of these specifications.

d. Sacked Cement

Cement shall be delivered in strong, well-made paper packages, each plainly marked with the manufacturer's brand. The weight of all packages shall be uniform.

Packages received in broken or damaged condition shall be rejected, or accepted only as fractional packages. Shipments of sacked cement in which more than five percent (5%) of the sacks weight less than 40.0 kilograms will be cause for rejecting the entire shipment.

e. Storage

Immediately upon receipt at the jobsite, cement shall be stored in dry, weather-tight and properly ventilated structures. All storage facilities shall be subject to the approval of the Engineer, and shall be such as to permit easy access for inspection and identification. Storage shall be provided at the site, or at the point of delivery, for a sufficient quantity of cement to permit prosecution of the work without delay. To prevent undue aging of sacked cement after delivery, the Contractor shall use sacked cement in the chronological order in which it was delivered on the job. Each shipment of sacked cement shall be stored so that it may readily be distinguished from other shipments. Cement shall be free from lumps, and shall be otherwise undamaged when used in concrete. Empty paper sacks shall be disposed of as approved by the Engineer.

602. Cost

No separate payment will be made of cement used in concrete, brick masonry, brick lining, mortar, plastering, pointing and other work under these specifications. The cost of all cement required in the work under these specifications shall be included in the prices tendered in the Bill of Quantities for the items of work in which the cement is required.

SECTION VII

STEEL REINFORCING BARS

701. Reinforcement

a. Scope of Work

All steel reinforcing bars required for the work as detailed on the drawings shall be furnished and placed by the Contractor. The Contractor shall transport to the site, store, cut, bend and place all the steel reinforcement bars required for the work.

b. Material

The steel reinforcing bars shall conform to ASTM: A615, Grade 40, or ASTM: A617, Grade 40.

The cleaning, placing, spacing, bending and splicing of reinforcement shall conform to the applicable provisions of the ACI Standard Building Code Requirements for Reinforced Concrete (ACI 318-77), by the American Concrete Institute, unless otherwise shown on the drawings or directed by the Engineer.

The Contractor shall furnish mill text certificates of all reinforcement furnished, which tests shall be made in accordance with the stipulations and requirements in the aforesaid ASTM Standard Specifications. If mill test certificates are not available or satisfactory to the Engineer, the steel reinforcing bars shall be tested for compliance with the specifications by an independent laboratory, approved by the Engineer. All costs of testing steel reinforcing bars shall be at the expense of the Contractor.

c. Workmanship

Workmanship shall be of the highest grade, and in accordance with the latest standard practice of the industry.

Cutting and bending of reinforcement bars may be done in a shop or at the jobsite. All bending shall be in accordance with standard approved practice, and by approved machine methods. Radii for bends and hooks will be specified on the detailed drawings, in accordance with standard design procedures.

Reinforcement bars shall be embedded in the concrete as shown on the drawings, or as directed. Unless otherwise prescribed, the spacing of the reinforcement bars shall be measured from the centerline to the bars. Reinforcement will be inspected for compliance with requirements as to size, shape, length, splicing, position and amount, after it has been placed.

Before the reinforcement is placed, the surfaces of the bars and the surfaces of any metal bar supports shall be cleaned of heavy, flaky rust, loose scale, dirt, grease or other foreign substances which, in the opinion of the Engineer, are objectionable. Heavy, flaky rust that can be removed by firm rubbing with burlap or equivalent treatment is considered objectionable. After being placed, the reinforcement bars shall be maintained in a clean condition until completely embedded in concrete.

Reinforcement bars shall be accurately placed and secured in position so as to avoid displacement during the placing of the concrete. Special care shall be exercised to prevent any disturbance of the embedded reinforcement during the "setting" of the concrete. Metal chairs, metal hangers, metal spacers or other approved supports may be used by the Contractor for supporting reinforcement bars.

702. Payment

a. Unit-Price Contract

Payment under a unit-price contract will be as follows:

1. Separate payment for furnishing and placing steel reinforcing bars will be made at the applicable unit price tendered therefor in the Bill of Quantities, which price shall include the entire cost of: furnishing, loading, transporting to the site, unloading, handling, storing and placing of steel reinforcing bars; cutting, bending, cleaning, securing and maintaining in correct position all steel reinforcing bars; all waste material from cutting, bending and placing operations; making wire ties, providing supports and making joints approved by the Engineer; and all appurtenant work for furnishing and placing steel reinforcing bars in accordance with the drawings and these specifications.

2. The weight of the steel reinforcing bars will be based on the theoretical unit weight,

taken from published standard tables, of the steel reinforcing bars furnished and placed.

3. Steel reinforcing bars in laps indicated on the drawings or authorized by the Engineer will be included for payment.

4. Additional steel reinforcing bars which are authorized for convenience of the contractor and such items as support wires, clips, chairs and other devices for securing the steel reinforcing bars will not be included for payment.

b. Lump-sum Contract

Under a lump-sum contract, no separate payment for furnishing and placing steel reinforcing bars will be made and all costs therefor shall be included in the Tender Price.

SECTION VIII

CONCRETE

801. Scope of Work

The items of the Bill of Quantities for concrete consist of furnishing and placing plain and reinforced concrete in accordance with the drawings and these specifications. The Work shall include the furnishing of all labor, equipment and materials and the performing of all operations necessary for the forming, mixing, placing, finishing and curing of all concrete shown on the drawings and required by these specifications.

802. General

Concrete shall be constructed to the lines, grades and dimensions shown on the drawings. The class of concrete in the various parts of the work shall be as shown on the drawings. Concrete shall not be placed in any part of the work until that part has been inspected and approved as ready for concreting. The completed concrete shall be free from all defects which will impair its strength, impermeability, durability and appearance.

803. Composition

Concrete shall be composed of cement, sand, khoa and water all well mixed and brought to the proper consistency. Admixtures may be added if approved by the Engineer. The addition of water to compensate for stiffening of the concrete before placing will not be permitted.

The slump of all concrete, as determined by ASTM: C143, shall not exceed 3 inches.

804. Materials

a. Cement

Cement shall be Portland cement and comply with the requirements of Section VI.

b. Sand

Sand used in concrete shall be Sylhet sand and shall be thoroughly screened and cleaned of all foreign matter before use. The sand shall be well graded with

particle sizes ranging from fine sand to a maximum size of 1/4 inch. The sum of the percentages of all deleterious substances shall not exceed 5 percent, by weight. Sand producing a color darker than the standard in the colorimetric test for organic impurities, as determined by ASTM: C 4D, may be rejected.

c. Khoa

Khoa consists of broken bricks and shall constitute the coarse aggregate in the concrete. Bricks used to produce khoa shall be of first class quality and comply with the requirements of Section V. Over burnt bricks and bricks with pores shall not be used in producing khoa. The bricks shall be broken at the site and into sizes ranging from a minimum of 1/4 inch to a maximum of about one inch. Khoa shall not contain any chips less than 1/4 inch in size and shall be free of mud, dirt and other deleterious matter. If required by the Engineer, khoa shall be washed with water so as to produce a clean and well-graded khoa.

d. Water

Water used in concrete and in washing sand and khoa, if required, shall be clean and pure enough for drinking.

805. Class of Concrete

The class of concrete in the various parts of the work shall be in accordance with the following:

Class of Concrete	Quantity of Materials By Volume		
	Cement	Sand	Khoa
A	1	2	4
B	1	3	6
C	1	4	8

806. Batching and Mixing

Adequate facilities shall be provided for accurate measurement of materials and thorough mixing after all ingredients are in the mixer. All operations and procedures in combining concrete materials shall be uniform and consistent for each batch unless otherwise approved by the Engineer.

807. Conveying

Concrete shall be conveyed from mixer to forms as rapidly as practicable by methods which will prevent segregation or loss of ingredients. There shall be no vertical drop of concrete greater than 4 feet except where suitable equipment is provided to prevent segregation and where specifically authorized.

808. Form Design

The Contractor shall construct forms to conform to the various shapes, lines, grades and dimensions of the concrete as shown on the drawings. The form material to be used and the design of the forms shall be subject to the approval of the Engineer; however, such approval will not relieve the Contractor of responsibility for adequacy of the forms. Forms shall be removed when approved by the Engineer.

809. Preparation for Placing

No concrete shall be placed until all formwork, reinforcement and preparation of surfaces have been approved by the Engineer. Concrete shall not be placed in water or subject to the action of flowing water until after the concrete has sufficiently hardened.

Immediately before placing concrete, all surfaces upon or against which the concrete is to be placed shall be free from standing water, mud, debris or loose material. The surfaces of absorptive materials against or upon which concrete is to be placed shall be moistened thoroughly so that moisture will not be drawn from the freshly placed concrete.

The surfaces of all joints in concrete construction shall be prepared as directed by the Engineer prior to placement of fresh concrete.

810. Placing

No concrete shall be placed until the Engineer has given approval of the subgrade, forms and reinforcing steel in place. Concrete shall not be placed except in the presence of the Engineer and the Contractor shall give reasonable notice of his intention regarding concreting operations.

Retempering of concrete will not be permitted. Any concrete which has become so stiff that proper placing

cannot be assured shall be wasted. Concrete shall not be placed during rains and placement shall not be interrupted unless approved by the Engineer.

Each layer of concrete shall be consolidated to the maximum practicable density so that it is free from pockets of aggregates and closes snugly against all surfaces of forms and embedded materials. Additional layers of concrete shall not be placed until the layers previously placed have been consolidated.

811. Curing

All concrete shall be cured immediately after the concrete has taken its initial set. Curing shall consist of keeping the concrete continuously moist with water for a period of not less than 14 days. The use of mud and dirt for curing concrete will not be permitted. Water for curing shall meet the requirements of Paragraph 804d.

812. Protection

The Contractor shall protect all concrete against injury until final acceptance of the work. Exposed surfaces of all concrete shall be protected from the direct rays of the sun for at least the first three days after placing.

813. Finishing and Repairing

All concrete shall be finished to the class of finish required by the Engineer.

If after removal of forms, any concrete is found to be not formed as shown on the drawings, or is out of alignment or level, or shows a defective surface, it shall be considered as not conforming with the intent of these specifications and shall be removed and replaced by the Contractor at his expense unless the Engineer grants permission to repair the defective areas, in which case the repairing shall be performed in an approved manner and to the satisfaction of the Engineer.

814. Payment

a. Unit-Price Contract

Payment under a unit-price contract will be as follows:

1. Separate payment for concrete of the various

classes will be made at the applicable unit prices tendered therefor in the Bill of Quantities which unit prices shall include the entire cost of: furnishing all materials, including cement, sand, khoa, and water; furnishing all labor, equipment and materials for batching, mixing, conveying, preparation for placing, constructing and removing forms, placing, protecting, curing, finishing and repairing concrete; and performing all operations for constructing concrete in accordance with these specifications.

2. Separate payment for furnishing and placing steel reinforcing bars will be made at the unit price tendered therefor in the Bill of Quantities.

3. No payment will be made for the following: concrete that is required to be wasted; concrete that is not specified on the drawing or by these specifications; concrete that is not in accordance with these specifications; and concrete constructed for the convenience of the Contractor.

b. Lump-Sum Contract

Under a lump-sum contract, no separate payment for concrete will be made and all costs therefor shall be included in the Tender Price.

SECTION IX

CONCRETE PIPE

901. Scope of Work

The items of the Bill of Quantities for furnishing and laying non-reinforced and reinforced concrete pipe consists of furnishing and laying precast concrete pipe in accordance with the drawings and these specifications. The work shall include: furnishing pipe in the required sizes of the specified strengths; furnishing all materials for pipe, pipe bedding, joints and connections to structures; excavating for the pipe bedding and pipe trench; providing a firm foundation for the pipe bedding, pipe and fittings; furnishing and placing the pipe bedding; installing or laying the pipe sections and fittings; making pipe joints and connections to structures; hydrostatic testing; placing and compacting backfill about the pipe; and performing all incidental operations.

902. Material

Precast concrete pipe shall be machine made by the centrifugal process.

Non-reinforced concrete pipe shall conform to the requirements of ASTM: C14 or ASTM: C118 unless otherwise approved by the Engineer or specified herein.

Reinforced concrete pipe shall conform to the requirements of ASTM: C76 or ASTM: C361 unless otherwise approved by the Engineer or specified herein.

The Contractor shall submit to the Engineer for approval, prior to procurement of any pipe or materials therefor, drawings and schedules showing full details of reinforcement, concrete, joints and dimensions for the pipe and fittings. The Contractor shall also submit, when requested by the Engineer, design calculations, and affidavit of compliance that the pipe and fittings comply with the specifications, and supply complete data of all tests.

If approved by the Engineer, the Contractor may substitute for non-reinforced concrete pipe a vitrified clay pipe having equivalent diameter, capacity, strength and water tightness.

If the Contractor proposes to furnish vitrified clay pipe or precast concrete pipe which conforms to equivalent standards and specifications, the Contractor shall state the exact change in the standards and specifications, and shall submit the standards and specifications,

together with all information and data, to the Engineer for approval. Such submittals shall be timely, and failure to do so, or to purchase any proposed pipe or material prior to approval by the Engineer will be at the Contractor's risk of subsequent rejection of the proposed alternative.

Mortar for joints shall have a 1:3 cement to sand proportion and shall be in accordance with Section V of these specifications.

Cement and steel reinforcing bars shall be in accordance with Sections VI and VII, respectively, of these specifications.

903. Pipe Bedding

All concrete pipe shall be bedded in a monolithic crade of Class C concrete, non-reinforced, having a depth of at least 4 inches or one-fourth the inside diameter of the pipe, whichever is greater, below the lowest surface of the pipe or joint, and extending up the sides of the pipe to a height above the invert of the pipe of at least one-fourth the outside diameter of the pipe. The cradle shall have a width at least equal to the outside diameter of the pipe plus 8 inches.

The pipe bedding shall be placed after all pipe joints have been completed and the pipe sections are in proper position on temporary supports of brick. Bedding material shall be uniformly and simultaneously deposited on each side of the pipe to prevent lateral displacement. All concrete bedding shall be vibrated to consolidate the concrete to its maximum practicable density. The entire space beneath the pipe shall be completely filled with concrete without excessive vibration.

904. Joints

Joints may be tongue and groove, bell and spigot, utilize a collar or rubber gasket, or may be formed entirely of concrete and mortar. Joint assemblies shall be so formed and accurately manufactured that when the pipes are drawn together the pipe shall form a continuous watertight conduit with a smooth and uniform interior surface and shall provide for slight movements of any pipe unit in the pipeline due to expansion, contraction, settlement or lateral displacement.

Pipe joints shall be adequate to meet the internal pressure test, and external load crushing test requirements specified for the pipe.

905. Transporting and Handling

The Contractor shall provide suitable conveyance for hauling the pipe to the work. The conveyances used and the method of loading, unloading, handling and distributing the pipe shall be subject to the approval of the Engineer. The pipe shall not be dropped or subjected to any unnecessary jar, impact or other treatment that might crack the shell or damage the ends of the pipe. Any unit that, in the opinion of the Engineer, is damaged beyond repair in hauling, handling, or otherwise, shall be removed from the site and replaced with acceptable units.

906. Shop Testing and Inspection

The manufacturer furnishing pipe under these specifications shall be fully equipped to carry out shop tests to prove the quality of his product. Upon the demand of the Engineer, the manufacturer shall perform such number of tests as the Engineer may deem necessary to establish the quality of the pipe manufactured. Failure of any pipe to meet the test requirements shall be sufficient cause for rejection of all pipe which the test specimen represents. All pipe shall be subject to inspection by the Engineer at the factory and point of delivery. The purpose of the inspections shall be to cull and reject pipes which, independent of physical tests herein specified, fail to meet the requirements of these specifications, and the rejection through inspection may be made on account of any of the following:

(1) Defects that indicate imperfect proportioning, mixing and molding.

(2) Surface defects indicating honeycombed or open texture.

(3) Damaged ends where such damage would prevent the making of a satisfactory joint.

(4) Exposure of the reinforcement, when such exposure indicates that the reinforcement was misplaced.

(5) Pipe damaged during shipment or handling may be rejected even if previously approved.

907. Laying Pipe

The pipe shall be set to the specified line and grade. Bell and spigot pipe shall be laid with the bell upstream.

Unsuitable foundation material which might cause settlement or unequal bearing for the pipe or pipe bedding shall be over-excavated to the depth specified by the Engineer, and the over-excavation backfilled with suitable material and compacted to the specified grade.

Pipe trenches shall be carefully graded and compacted, where required, so as to provide a firm and uniform support for the pipe and pipe bedding. At joints involving bells or collars, excavation at the joint shall be of ample size to prevent the pipe bells or collars from coming in contact with the bedding or subgrade.

Connection of concrete pipe to monolithic concrete portions of a structure shall be made by placing the applicable fitting in position before the surrounding concrete is placed. The ends of the fitting to be embedded shall be wire brushed to remove all laitance and foreign matter prior to placing concrete or mortar for the connection.

As each unit of pipe is laid, it shall be so positioned with respect to the adjacent pipe unit, that the joints shall be centered so as to minimize any offset on the inside of the pipe at the joint. The pipe units shall be fitted together, and the joints shall be drawn together so that the bells and spigots are as nearly fully engaged as practicable. Care shall be exercised to secure true alignment.

All backfill placed about precast concrete pipe shall be placed and compacted carefully and simultaneously on each side of the pipe, to avoid lateral displacement of the pipe and damage to the joints. Where concrete pipe is placed as a culvert for a roadway, the minimum depth of compacted backfill over any pipe section or joint shall be 24 inches. The material used for backfilling shall be selected material obtained from required excavation or approved borrow pits.

All laying and joining operations to provide watertight pipe and pipe joints shall be the responsibility of the Contractor. If adjustment of the position of a length of pipe is required after it has been laid, it shall be removed and rejoined as for a new pipe. After all pipe laying and joining operations are completed, the inside of the pipe shall be cleaned and all debris removed.

908. Testing

All sections and joints of reinforced concrete pipelines shall be tested for strength and watertightness.

Tests shall be made as soon after completion of construction of the pipeline as practicable, but not less than 21 days after the completion of any mortar joint. When approved by the Engineer, each end of the pipeline to be tested shall be closed with a bulkhead. Each bulkhead shall be provided with a standpipe to fill the pipeline with water, permit air to escape, measure the hydrostatic pressure, and determine the leakage. After the pipeline has been filled and the water surface in the standpipes is at the specified elevation for the required hydrostatic pressure, the water surface shall be maintained at that elevation for a period of not less than 24 hours. Thereafter, the leakage from the pipeline being tested shall not exceed, in any 24-hour period, 0.15 gallons per square foot of interior surface area of the pipeline, and no individual leaks will be permitted. Moisture appearing on the surface of the pipe in the form of patches or beads adhering to the surface shall not be considered individual leaks. If the leakage exceeds 75 percent of the maximum permitted, the water surface in the standpipes shall be maintained for a continuous period of 14 days to permit evidence of excessive leakage at any point to become apparent. The Contractor shall make all repairs and/or replacements that are necessary to secure the required watertightness and repeat the test after each repair or replacement is completed. Unless otherwise specified on the drawings, all pipe sections and joints of reinforced concrete pipe shall be tested at a minimum hydrostatic pressure of 20 feet of water measured from the horizontal centerline of the pipe.

Testing of non-reinforced concrete pipe will not be required provided the completed pipeline is reasonably watertight, in the judgement of the Engineer. If the Engineer has reasons to suspect excessive leakage from the pipeline, he shall so notify the Contractor, in which case the Contractor may correct all deficiencies noted by the Engineer or the Contractor may test the non-reinforced concrete pipe to determine the watertightness. Testing of non-reinforced concrete pipe shall be the same as specified for reinforced concrete pipe except the minimum head of water shall be 5 feet and the maximum leakage shall be 0.30 gallons per square foot of interior surface area of the pipeline.

909. Payment

The payment for furnishing and laying non-reinforced concrete pipe and reinforced concrete pipe shall include the entire cost of the following: excavation for the pipe

trench and pipe bedding; furnishing and placing pipe bedding; furnishing, transporting, handling, laying and testing pipe sections; furnishing all materials, including cement, reinforcement and all materials for making joints and correcting defects; furnishing, placing and compacting backfill; and all incidental work and operations for the complete installation of the pipelines in accordance with the drawings and these specifications.

Under a unit-price contract, payment for furnishing and laying non-reinforced concrete pipe and for furnishing and laying reinforced concrete pipe will be made at the applicable unit price tendered therefor in the Bill of Quantities. Measurement for payment will be made of the length of pipe in place, measured along the centerline of the pipe sections. No allowance will be made for lap at joints between pipe sections.

Under a lump-sum contract, no separate payment for furnishing and laying non-reinforced concrete pipe or for furnishing and laying reinforced concrete pipe will be made and all costs therefor shall be included in the Tender Price.

SECTION X

VERTICAL LIFT GATES

1001. Scope of Work

The item of the Bill of Quantities for furnishing and installing vertical lift gates consists of detailing, furnishing, and installing all vertical lift gates and appurtenances required for completion of the Work under these Contract Documents.

The drawings show the number, type and governing dimensions, and are not intended to define the details of the equipment, nor to exclude modifications of such details, if made with the prior approval of the Engineer. The thickness of any member, however, shall not be less than the thicknesses indicated on the drawings.

The vertical lift gates shall be furnished complete with lifting mechanisms, gate frames, embedded parts, supporting beams, anchor belts, and all accessories required for the satisfactory operation of the equipment.

The lifting mechanisms shall be hand-operated, screw-stem type, complete with screw stems, brackets, bevel gears, handwheels or cranks, bases, base plates, support beams, embedded metal and anchor bolts, and all accessories required for the satisfactory operation of the lifting mechanisms.

All mechanical equipment shall be simple and substantial in design, easily erected, inspected, adjusted, painted and dismantled. All fastenings shall be adequate to hold parts in place under all conditions of service. All steel castings, steel forgings, and wrought steel components shall be annealed properly. All torsion loads shall be transmitted by suitable keys, splines or pins. The transmission of loads by press or shrink fits only will not be permitted. Wherever practicable, machinery shall be mounted on common bedplates, or on rigid structural steel supports. Computations of stresses shall take into account all dead and live loads.

All components and accessories required to ensure satisfactory operation and adequacy of the equipment shall be furnished by the Contractor and included in the tender price, whether or not explicitly shown on the drawings or mentioned in the specifications.

1002. Material

The Contractor shall furnish all materials. All materials shall be new, free from defects, and shall be the best available for the purpose for which used considering strength, ductility, durability, suitability for the intended service, and best engineering practice. All materials shall be selected and, if required, specially treated so that they will be satisfactory for use under humid climatic conditions.

Materials to be used in the major parts of the equipment to be furnished under this Contract shall meet the requirements of standards approved by the Engineer.

The Contractor shall furnish three certified copies of reports of all tests required of the manufacturer to show compliance with the applicable standards and specifications.

1003. Workmanship

a. General

Workmanship shall be of first-class commercial quality and in accordance with best shop practices. Like parts shall be interchangeable wherever possible. Machining of fits on renewable parts shall be accurate and to specified dimensions, so that replacements made to drawings size may be readily installed.

So far as practicable, all work shall be laid out to secure proper matching of adjoining unfinished surfaces. Where there is a large discrepancy between adjoining unfinished surfaces, they shall be chipped and ground smooth, or machined to secure proper alignment. Unfinished surfaces shall be true to the lines and dimensions shown on the drawings, and shall be chipped or ground free of all projections and rough spots. Depressions or holes not affecting the strength or usefulness of the parts may be filled in an approved manner.

The Contractor shall exercise special care in the fabrication of all parts affecting the strength, rigidity and watertightness of the gates and seat frames. Welded parts requiring machining shall be completely welded and stress relieved as necessary prior to machining. Pockets and depressions that will hold water shall be provided with effective drain holes.

b. Electric Welding

Members to be joined by welding shall be cut accurately to size, with edges sheared, flame-cut or machined to suit the required type of welding, and to allow through penetration. The surfaces of plates to be welded shall be free from rust, grease, and other foreign matter along the edges prepared for welding. The technique of welding employed, the appearance and quality of the welds made, and the methods used in correcting defective work shall conform to the requirements of the AWS Structural Welding Code D1.1, or equal.

The Government may order non-destructive weld tests to assure proper quality of work. Such tests will be made at the expense of the Government. The Contractor, however, shall provide all necessary cooperation to expedite tests.

All welded joints which will be submerged in water shall be continuous to prevent corrosion within the joint.

All welding operations assigned to the work shall have passed a qualification test for welding operators conforming to Government standards.

c. Structural Work

Unless otherwise specified, design and fabrication of structural parts shall conform to the applicable provisions of the AISC "Specifications for the Design, Fabrication and Erection of Structural Steel in Buildings" of the AISC "Code of Standard Practice for Steel Buildings and Bridges," or equivalent standards.

Before being laid out or worked in any manner, structural plates and shapes shall be straight and free of rust and dirt. If straightening is necessary, it shall be done by methods that will not injure the metal. Sharp kinks or bends in material will be cause for its rejection.

d. Machine Work

All tolerances, allowances and gauges for metal fits shall conform to Government standards for the class of fit as shown on the drawings. Finished contact or bearing surfaces shall be true and exact to secure full contact. All holes for field assembly with bolts shall

be accurately located and drilled for shop assembly. Journal surfaces shall be polished, and all surfaces shall be finished with sufficient smoothness and accuracy to insure proper operation when assembled. Parts entering any machine shall be carefully and accurately machined. All drilled holes for bolts shall be accurately located and drilled from template.

1004. Gate Seat and Frame

Each gate shall be fabricated to the dimensions shown on the drawings and shall be fabricated of structural steel. The gate shall have suitable provision at the top to fasten the lifting stem. The gate and stem, when assembled, shall be capable of resisting without buckling, the full maximum thrust developed by the lifting mechanism during its operation. The gate shall be of rigid construction to minimize deflection and leakage.

Gate seat and frame shall be an integral unit of structural shapes assembled by welding and bolting, to form the waterway opening. The gate frames shall be provided with the required number of anchors for the secure retention of the frames in the concrete. The frames and seats shall be straight and free from kinks or distortions to ensure uniform contact with the bottom and sliding surfaces of the gates.

1005. Lifting Mechanism

The lifting mechanisms shall have adequate capacity to operate the gates against the fully unbalanced water pressure against the gates, corresponding to the maximum water surface upstream, with no water on the downstream side. The sliding friction factor between steel surfaces shall be assumed to be not less than 0.6. Suitable bevel gear and pinion type hoist shall be provided.

The design of the lift mechanism shall be such that the gate can be operated with a maximum of 40 pounds of effort on the wheel or crank. The direction of rotation to open the gate shall be indicated on the lift mechanism.

Suitable stem guides shall be provided to maintain the alignment of the stems, and to prevent buckling of the stem when closing the gate, where required. Stem guides shall be placed on a center-to-center distance that will limit the l/r ratio of the stem to 200 or less. A stem nut shall be provided on each stem to protect the stem from buckling when the gate reaches its maximum closed position.

Stems shall be of carbon steel corresponding to ASTM: A36, or ASTM: A108, Grade 1045, or equivalent.

1006. Shop Assembly, Inspection and Tests

Each gate frame, exclusive of anchor bolts, shall be completely shop assembled for inspection, testing, and to facilitate matchmarking for field erection.

Each gate shall be completely shop assembled, including the seal bars and hoist brackets, along with the gate frames. With the gate leaf assembled in the closed position and held firmly against the frame seats, the sliding surface of the gate leaf shall bear uniformly against the frame seats.

Each lifting mechanism unit shall be completely shop assembled and tested for satisfactory operation in both directions.

1007. Painting

The gates and lifting mechanisms, except for embedded surfaces, machined surfaces, and sliding or bearing surfaces, shall be painted. Surfaces to be painted shall be cleaned by sandblasting to white basemetal, and be dry and free of grease before painting. Exposed machined or bearing surfaces shall be coated with a water resistant, rust preventive compound. Enclosed machined or bearing surfaces shall be coated with water resistant grease. The extension surfaces of the lift assemblies shall be shop painted with a machinery enamel. The gate leaves, non-embedded surfaces of frames and untreated portions of stems shall be given three coats of coal tar epoxy paint to give a minimum dry film total thickness of 20 mils.

1008. Installation

The gate frames, including all anchor bolts and embedded metal, and the gates and lifting mechanisms, including beams, base plates and all accessories, shall be completely installed by the Contractor in accordance with the manufacturer's installation procedures, as approved by the Engineer. Second stage concreting and grouting shall be performed as required. It shall be the Contractor's responsibility to handle, store and install all equipment as required.

Care shall be taken during the mounting of gates to avoid warping the gate frame, and to maintain all tolerances as shown on the approved drawings, or as required by the Engineer. After the entire assembly has been installed,

properly lubricated, adjusted and checked, the gate shall be operated several times through the complete opening and closing cycles, and any adjustments or corrections needed shall be adjusted in its locations to prevent stem buckling when the gate is fully seated.

1009. Installation Tolerances

Adequate care shall be taken to ensure that all installation tolerances, as approved by the Engineer and required for the satisfactory operation of the gates, are maintained. The sliding surfaces shall be in a truly vertical plane, and shall not deviate by more than 2 millimeters. When the seating surfaces rest on the seal seats under pressure, there shall be uniform bearing along their entire length.

The gate sill shall be truly horizontal and flush with concrete surfaces.

1010. Payment

The payment for furnishing and installing vertical lift gates shall include the entire costs of detailing, furnishing, transporting, installing, testing and painting of the vertical lift gates, frames, and lifting mechanisms, including all accessories.

Under a unit-price contract, separate payment for furnishing and installing vertical lift gates will be made at the unit-price tendered therefor in the Bill of Quantities.

Under a lump-sum contract, no separate payment for furnishing and installing vertical lift gates will be made and all costs therefor shall be included in the Tender Price.

SECTION XI

TIMBER FLAP GATE

1101. Scope of Work

The item of the Bill of Quantities for furnishing and installing timber flap gates consists of detailing, furnishing, and installing all timber flap gates required for completion of the work under these Contract Documents.

The drawings show the number, type and governing dimensions, and are not intended to define the details of the equipment, nor to the exclude modifications of such details, if made with the prior approval of the Engineer. The thickness of the members, however, shall not be less than the thickness indicated on the drawings.

The timber flap gates shall be furnished with gate seat, timber plants, link, wood sealing strip, wall seat, anchor bolts, tiebolts, nuts, washers, screws, mooring pin, cotter pins and all accessories as shown on the drawings and as required for a complete installation.

All components and accessories required to ensure satisfactory operation and adequacy of the equipment shall be furnished by the Contractor whether or not explicitly shown on the drawings or mentioned in these specifications.

1102. Material

The Contractor shall furnish all materials. All materials shall be new, free from defects, and shall be the best available for the purpose for which used considering strength, ductility, durability and suitability for the intended service, and best engineering practice. All materials shall be selected and, if required, specially treated so that they will be satisfactory for use under humid climatic conditions.

Materials to be used shall meet the requirements of standards approved by the Engineer.

The Contractor shall furnish to the Engineer three certified copies of reports of all tests required of the manufacturer to show compliance with the applicable standards and specifications. The costs of all tests and reports shall be borne by the Contractor.

The timber plants shall be teak, sal, jarul, jam, sundari, or such other wood as approved. The timber shall be well seasoned, dry, straight grained, free from large or loose knots, sap and shakes. The timber plants shall be finished to exact dimension, planed and dressed, and tongue and grove as shown on the drawings.

1103. Workmanship

a. General

Workmanship shall be of first class commercial quality and in accordance with best shop practices. Like parts shall be interchangable where possible. Machining of fits on renewable parts shall be accurate and to specified dimensions, so that replacements made to drawing size may be readily installed.

So far as practicable, all work shall be laid out to secure proper matching of adjoining unfinished surfaces. Where there is a large discrepancy between adjoining unfinished surfaces, they shall be chipped and ground smooth, or machined to secure proper alignment. Unfinished surfaces shall be true to the lines and dimensions shown on the drawings, and shall be chipped or ground free of all projections and rough spots. Depressions or holes not affecting the strength or usefulness of the parts may be filled in an approved manner.

The Contractor shall exercise special care in the fabrication of all parts affecting the strength, rigidity and water-tightness of the gates and seat frames. Welded parts requiring machining shall be completely welded and stressed relieved as necessary prior to machining. Pockets and depressions that will hold water shall be provided with effective drain holes.

b. Electric Welding

Members to be joined by welding shall be cut accurately to size, with edges sheared, flame-cut or machined to suit the required type of welding, and to allow thorough penetration. The surfaces of plates to be welded shall be free from rust, grease, and other foreign material along the edges prepared for welding. The technique of welding employed, the appearance and quality of the weld

made, and the methods used in correcting defective work shall conform to the requirements of the AWS Structural Welding Code D1.1, or equal.

All welding operators assigned to the work shall have passed a qualification test for welding operators conforming to Government standards.

c. Structural Works

Unless otherwise specified, design and fabrication of structural parts shall conform to the applicable provisions of the AISC "Specifications for the Design, Fabrication and Erection of Structural Steel in Building" of the AISC "Code of Standard Practice for Steel Buildings and Bridges," or equivalent Standards.

Before being laid out or worked in any manner, structural plates and shapes shall be straight and free of rust and dirt. If straightening is necessary, it shall be done by methods that will not injure the metal. Sharp kinks or bends in material will be cause for rejection.

1104. Gate and Frame

Each gate shall be fastened together with bolted steel straps as shown on the drawings. Gate seat and frame shall be an integral unit of structural shapes assembled by welding and bolting. The gate frame shall be provided with the required number of anchors. The frames and seat shall be straight and free from kinks or distortions to ensure uniform contact with the gate.

1105. Shop Assembly

Each gate shall be completely shop assembled and tested for satisfactory operation and dismantled only if required for shipment and installation.

1106. Installation

The flap gate, including frame, anchor bolts, embedded parts and all accessories, shall be completely installed by the Contractor as shown on the drawings. Care shall be taken during the installation to avoid warping the frame and to maintain all tolerances as shown on the drawings or required by the Engineer. After the gate has been installed, properly lubricated, adjusted and checked, it

shall be operated several times through the complete opening and closing cycles, and any adjustments or corrections needed shall be carried out at no extra cost to the Government.

1107. Painting

When directed by the Engineer, all metal and wood surfaces shall be painted or coated with materials and by procedures approved by the Engineer. Coal tar or other water proofing material approved by the Engineer shall be applied to all wood surfaces.

1108. Payment

The payment for furnishing and installing timber flap gates shall include the entire cost of detailing, furnishing, transporting, installing, testing and painting the timber flap gates and accessories.

Under a unit-price contract, separate payment for furnishing and installing timber flap gates will be made at the unit price tendered therefor in the Bill of Quantities.

Under a lump-sum contract, no separate payment for furnishing and installing timber flap gates will be made and all costs therefor shall be included in the Tender Price.

SECTION XII

WOODEN STOPLOGS

1201. Scope of Work

The item of the Bill of Quantities for furnishing and installing wooden stoplogs consists of furnishing and installing all wooden stoplogs shown on the drawings and required for completion of the work in accordance with the drawings and these specifications.

The drawings show the number and the dimensions of the wooden stoplogs.

1202. Material

Wooden stoplogs shall be well seasoned, dry, straight-grained, best quality local wood such as Sal, Jarul, Jam and Telsu or as specified by the Engineer. The stoplogs shall be planed and dressed to the specified dimensions and free from all defects such as knots, sap and shakes.

Coal tar or other wood preservative shall be the product of a reputable manufacturer and approved by the Engineer prior to making any arrangements for the procurement of the wood preservative.

Hooks for removing the stoplogs shall be of mild steel.

1203. Workmanship

All stoplogs shall be straight and of uniform widths and depths as shown on the drawings, and when placed one above the other shall be in full contact over the entire area. Any stoplog showing evidence of warping shall not be used in the work.

Four hooks shall be placed on each stoplog at the locations shown on the drawings for the removal of stoplogs.

If directed by the Engineer, the Contractor shall insert the stoplogs in the slots and then remove the stoplogs to demonstrate satisfactory operation. Upon completion of the work, stoplogs shall be placed in storage at the location specified by the Engineer.

1204. Preservative

Stoplogs shall be inspected and approved by the Engineer prior to the application of a wood preservative. When directed, stoplogs shall be given one heavy coat of coal tar or other wood preservative and thereafter shall be protected from damage to the stoplog and its coating. The application of a wood preservative shall be in accordance with the manufacturer's recommendations.

1205. Payment

The payment for furnishing and installing wooden stoplogs shall include the entire cost of the following: furnishing all labor, equipment and materials to supply the stoplogs; furnishing and installing hooks; furnishing and applying wood preservative; and all other work to furnish and install wooden stoplogs in accordance with the drawings and these specifications.

Under a unit-price contract, separate payment for furnishing and installing wooden stoplogs will be made at the lump-sum amount tendered therefor in the Bill of Quantitites.

Under a lump-sum contract, no separate payment for furnishing and installing wooden stoplogs will be made and all costs therefor shall be included in the Tender Price.

SECTION XIII

SITE BUILDING

1301. Scope of Work

The Contractor shall construct a site building if required by the drawings or these specifications.

The site building shall be constructed adjacent to an existing pump house and shall consist of brick masonry walls, brick floor, and inclined roof of corrugated sheet metal.

The work to be done shall include excavation and earthwork, constructing footings, constructing the walls and floor, plastering interior walls, providing one door and 5 windows, and other work required for the complete construction of a site building which will be suitable as living quarters for one maintenance person.

The exterior dimensions of the site building will be approximately 10 feet by 24 feet. The actual size will be as shown on the drawings or as specified by the Engineer.

Lighting, plumbing, interior partitions and furnishings for the site building are not included in the work under these specifications. No interior partitions or columns will be required.

1302. Material

Brickwork and concrete shall conform to the applicable requirements of Section V and VIII, respectively, of these specifications. Other materials shall conform to the requirements specified in this section and if not specified shall be as approved by the Engineer.

The Contractor shall furnish all materials required for construction of the site building and shall submit complete specifications and information of the proposed materials to the Engineer for approval prior to making any arrangements for the construction of the site building.

1303. Construction

The site building shall be constructed in accordance with the drawings and the applicable sections of

these specifications. Details of construction not shown on the drawings or specified in these specifications shall be completed as directed by the Engineer.

1304. Earthwork, Footings and Walls

All walls of the site building shall have adequate footings of Class A concrete. The Contractor shall excavate to such depths as may be required to secure firm foundations on which to place the concrete footings. After completion of the footings and walls, backfill material shall be placed and tamped as required to fill all excavations. The entire area surrounding the site building shall be excavated or graded as required to provide slopes away from the building for adequate drainage.

If required, the Contractor shall place suitable backfill material within the site building for construction of the floor. All backfill material and earth foundations for the floor shall be tamped to provide firm support for the floor.

The interior surface of all walls shall be plastered in accordance with Paragraph 507 when approved by the Engineer so as to result in a smooth interior surface.

1305. Door

The door opening shall be 48 inches by 84 inches. The door shall be of solid construction, approximately 1½ inches in thickness, panelled, and a flush-type door. The door shall be best quality local seasoned wood such as Gamari, Kathal, Bailam and Jam or as specified.

The door frame shall be 3 inches by 6 inches of well seasoned quality local wood such as Sal, Jarul, Telsur, Jack and Jam. The frame shall be rabbeted on one side from ½ inch to 3/4 inch in depth to the full width of the door. Frames shall be fixed in a plumb position during construction of the masonry with not less than three 12" x 1½" x ¼" iron anchors on each vertical side. The portion of the frame which will be in contact with the brickwork shall be coal tarred before being fixed in position.

All tees, screws, tower bolts, 3 hinges, door lock and appurtenances for the complete installation of the door and door frame shall be furnished by the Contractor.

1306. Window

The window openings shall be approximately 36" x 48". Each window shall consist of at least 2 glazed panels. Each glazed panel shall be provided with hinges and fittings or other accessories to permit at least a 50 percent openings of the window for ventilation. Window frames and such may be of wood as specified for the door and door frame or of steel plate construction.

Glass panes shall be not less than 3/16" in thickness and approved by the Engineer.

All accessories for the complete installation of the windows shall be furnished by the Contractor.

1307. Roof

The site building shall have a ceiling height of not less than 8'-0", and the roof shall overhang the exterior walls about 18 inches. The walls of the building shall extend to the roof, and the joint between the walls and roof shall be adequate to exclude water and insects. The roof shall be supported by the walls and, if necessary, such additional wood beams and purlins as may be required. The maximum deflection of the roof at any point shall not exceed one inch when subjected to one load, placed at any location on the roof, of 150 pounds over an area of one square foot. The roof shall be securely anchored to the walls and any interior support members.

The roof shall be of the flat type and adequately sloped for proper drainage. Where practical, the roof of the site building shall be of the same slope and joined with the roof of the pump house. The roof material shall be best quality, 24 gauge, galvanized, corrugated sheet metal. The surface of the roofing shall be clean and bright and free of rust. The roofing shall be laid with laps of 6 inches at the ends and at least three corrugations at the sides. Wind ties with ¼" x 1½" flat bars shall be provided.

All penetrations of the roofing and joints between sections of roofing shall be weather tight.

1308. Floor

The floor shall consist of two courses of bricks laid on a well compacted earth foundation. The first brick course shall consist of brick soling with bricks laid flat on the earth foundation and with all joints

filled with sand. Leveling of the earth foundation prior to placing the brick soling shall be with sand. The second course of bricks shall be laid flat with 1:3 cement sand mortar joints. Vertical joints in the brickwork shall not be directly over a vertical joint in the brick soling.

1309. Painting

The door and frame, windows and sashes, metalwork other than galvanized sheet metal, the interior surfaces of all walls, and similar items of wood or steel shall be painted or otherwise finished as directed by the Engineer.

Plastered walls shall be given a white wash of three coats as approved by the Engineer.

1310. Payment

The payment for constructing site building shall include the entire cost of the following: furnishing all labor, equipment and materials; performing all operations, including excavating, backfilling, grading, constructing brick masonry walls, constructing brick floor, plastering; painting and finishing; providing door and windows and all appurtenances; furnishing and installing roofing; and any other work required for the complete construction of the site building.

Under a unit-price contract, payment for constructing site building will be made at the applicable unit price tendered therefor in the Bill of Quantities. Measurement for payment will be made of the area within the exterior surfaces of the walls, measured at the finished floor elevation.

Under a lump-sum contract, no separate payment for constructing site building will be made and all costs therefor shall be included in the Tender Price.