PROCUREMENT OF SMALL WORKS

Request for Quotations

Procurement of Works:

Renovation works at Maran Propagation Station in St. John

Ref No:

Project: Climate-Resilient Agriculture for Integrated Landscape Management (CRA)

Employer: Government of Grenada

Country: Grenada

Issued on: 29th September 2025

Table of Contents

Request for Quotations

RFQ Ref No.:

RFQ Date: 29th September 2025

Dear: **Suppliers**

Request for Quotation (RFQ)

1. The **Government of Grenada has received** financing from the Global Environment Facility (GEF) in collaboration with the United Nations Development Programme (UNDP) toward the cost of the **Climate Resilient Agriculture for Integrated Landscape Management (CRA) Project** and intends to apply part of the proceeds toward payments under the contract for **Renovation Works at the Maran Propagation Station in St. John.**

2. The **Ministry of Economic Development, Planning, Agriculture and Lands**, **Forestry, Marine Recourses and Cooperatives** now invites quotations from contractors for the Works described in Annex 1: Works Requirements, attached to this RFQ.

Fraud and Corruption

3. Government of Grenada requires compliance with the Public Procurement and Disposal of Public Property Act 2014 ("the Act"), as amended and the Public Procurement & Disposal of Public Property Regulations 2015 ("the Regulations") and its prevailing sanctions policies and procedures.
4. In further pursuance of this policy, Contractors shall permit and shall cause their agents (where declared or not), subcontractors, subconsultants, service providers, suppliers, and personnel, to permit the implementing agency to inspect all accounts, records and other documents relating to the RFQ and Contract performance (in the case of award), and to have them audited by auditors appointed by the Government of Grenada.

Eligible Materials, Equipment and Services

5. The materials, equipment and services to be supplied under the Contract and financed by the agency may have their origin in any country subject to Para. 9. At the Employer's request, Contractors may be required to provide evidence of the origin of materials, equipment and services.

Eligible Contractors

6. In case the Contractor is a joint venture (JV), all members shall be jointly and severally liable for the execution of the entire Contract in accordance with the Contract terms. The JV shall nominate a representative who shall have the authority to conduct all

business for and on behalf of any and all the members of the JV during the Request for Quotations process and, in the event the JV is awarded the Contract, during contract execution.

7. A Contractor may have the nationality of any country, subject to the restrictions pursuant to paras. 8 and 9 hereinafter. A Contractor shall be deemed to have the nationality of a country if the Contractor is constituted, incorporated or registered in, and operates in conformity with, the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed subcontractors or subconsultants for any part of the Contract including Related Services.

8. Firms and individuals may be ineligible if so, indicated in para. 9 below and:

   (a) as a matter of law or official regulations, the Borrower's country prohibits commercial relations with that country, provided that the Government is satisfied that such exclusion does not preclude effective competition for the supply of goods, or the contracting of works or services required.

9. In reference to paras. 5 and 7, for the information of Contractors, at the present time firms, goods and services from the following countries are excluded from this procurement process:

   (a) Under para. 5 and 8 (a): none

10. A Contractor that has been sanctioned by the Government, pursuant to the Government's Debarment procedures, shall be ineligible to submit Quotations or be awarded or otherwise benefit from a Government's contract, financially or otherwise, during such period of time as the Government shall have determined. A list of debarred firms and individuals is available on the Government's external website: www.procurement.gd

11. Contractors that are state-owned enterprises or institutions in the Employer's country may be eligible to compete and be awarded a Contract(s) only if they can establish, in a manner acceptable to the Government, that they:

   (a) are legally and financially autonomous;

   (b) operate under commercial law; and

   (c) are not under supervision of the Employer.

12. A Contractor shall not have a conflict of interest. Any Contractor found to have a conflict of interest shall be disqualified. A Contractor may be considered to have a conflict of interest for the purpose of this Request for Quotations process, if the Contractor:

   (a) directly or indirectly controls, is controlled by or is under common control with another Contractor that submitted a Quotation;

(b) receives or has received any direct or indirect subsidy from another Contractor that submitted a Quotation;

(c) has the same legal representative as another Contractor that submitted a Quotation;

(d) has a relationship with another Contractor that submitted a Quotation, directly or through common third parties, that puts it in a position to influence the Quotation of another Contractor, or influence the decisions of the Employer regarding this Request for Quotations process; or

(e) or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of the Request for Quotations process; or

(f) or any of its affiliates has been hired (or is proposed to be hired) by the Employer or Borrower for implementing the Contract; or

(g) would be providing goods, works, or non-consulting services resulting from, or directly related to consulting services for the preparation or implementation of the project specified in this Request for Quotations, that it provided or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm; or

(h) has a close business or family relationship with a professional staff of the Borrower (or of the project implementing agency, or of a recipient of a part of the loan) who: (i) are directly or indirectly involved in the preparation of the Request for Quotations or specifications and/or the evaluation of Quotations, of the subject Contract; or (ii) would be involved in the implementation or supervision of such Contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Government throughout the Request for Quotations process and execution of the Contract.

Performance Security

13. The successful Contractor shall submit a Performance Security in accordance with the Contract Conditions.

Validity of Quotations

14. The quotations shall be valid until ***90 days (28th December 2025)***

Price

15. The Contractor shall quote its total price in the Contractor's Quotation Form.

Admeasurement contracts

16. The Contractor shall also fill in its rates and prices for all items of the Works described in the attached Bill of Quantities. Items against which no rate or price is entered by the Contractor will not be paid for by the Employer when executed and shall be deemed covered by the rates for other items and prices in the Bill of Quantities.

The rates and prices shall include all duties, taxes, and other levies payable by the Contractor under the Contract, as of the date 7 (seven) days prior to the deadline for submission of quotations.

17. A Contractor expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer's Country and wishing to be paid accordingly, shall indicate a foreign currency of its choice in addition to the local currency in: **Eastern Caribbean Dollars (XCD$)**
18. The currency(ies) of the Quotation and the currency(ies) of payments shall be the same.

Technical proposal

19. The Contractor shall furnish a technical proposal including a statement of work methods, equipment, personnel, schedule and any other relevant information, in sufficient detail to demonstrate the adequacy of its proposal to meet the work's requirements and the completion time.

Clarifications

20. Any clarification request or site visit request regarding this RFQ may be sent in writing to ***Joseph Noel,*** ***joseph.noel@moa.gov.gd*** or **cpu@gov.gd** before **24th October 2025.** The Employer will forward copies of its response to all Contractors including a description of the inquiry but without identifying its source.

Submission of Quotations

21. Quotations shall be submitted in the form attached at Annex 2 along with the priced Bill of Quantities and the Technical Proposal ***in hard copies in a sealed envelope to the address given below or in PDF format via the Central Procurement Unit's e-procurement platform. Use this link to access the e-procurement platform:*** In-Tend Electronic Tendering Site - Home
22. The deadline for submission of Quotations is **31st October 2025, before 3:00 p.m. (Eastern Caribbean Time).** Late submissions will be rejected.
23. The address for submission of Quotations:

Attention: ***Joseph Noel***
Project Focal Point

Address: ***Ministry of Agriculture, Lands and Forestry***
Ministerial Complex
Sir Eric Gairy Botanical Gardens
Tanteen, St. George
Grenada

Opening of Quotations

24. Quotations will be opened by the Employer's representatives immediately after the deadline for the submission of Quotations.

Evaluation of Quotations

25. The quotations will be evaluated to determine substantial responsiveness of the technical proposal.
26. For evaluation and comparison purposes, the currency(ies) of the Quotations shall be converted into a single currency. The currency that shall be used for comparison purposes to convert at the selling exchange rate offered prices expressed in various currencies into a single currency is*:* Eastern Caribbean Dollars. The source of exchange rate shall be: Eastern Caribbean Dollars. The date for the exchange rate shall be **31st October 2025.**
27. For technically compliant quotations, the total evaluated prices, excluding provisional sums and any provision for contingencies but including day works where priced competitively, will be compared to determine the lowest evaluated price/s.

Contract Award

28. The contract will be awarded to the Contractor meeting the eligibility requirements in accordance with the RFQ, offering a technically compliant quotation, guaranteeing completion of the Works by the specified date and offering the lowest evaluated price to the Employer.
29. The Employer shall invite by the quickest means the successful Contractor for any discussion that may be needed to conclude the contract or otherwise for contract signature.
30. The Employer shall communicate by the quickest means with the other Contractors on its contract award decision. An unsuccessful Contractor may request clarifications as to why its quotation was not determined to be successful. The Employer will address this request within a reasonable time.
31. The Employer shall publish a contract award notice on its website with free access, if available, or in a newspaper of national circulation or UNDB online, within 10 (ten) business days after award of contract. The information shall include the name of the successful Contractor, the Contract Price, the Contract duration, summary of its scope and the names of the Contractors and their quoted and evaluated prices.

On behalf of the Employer:

Signature:

Name: Mr. Terrence Victor

Title/Position: Chief Procurement Officer

Attachments:

Annex 1: Works Requirements
Annex 2: Quotation Form
Annex 3: Contract Forms

ANNEX 1: Works Requirements Specifications

Ministry Of Infrastructure, Public Utilities, Civil Aviation & Transportation

REPAIRS TO THE MARAN PROPAGATION STATION
MARAN, ST JOHN
BILL OF QUANTITIES

Ref	Description	Unit	Qty	Rate EC	Value EC
	General				
1	**Trim/Cut and cart away surrounding overhanging trees and branches.**	Sum			
2	**Replace existing roofing material with transluscent plastic material to greenhouse no.2&3 (80'L x 21'W x 12' H)**				
A	Remove and cart away all existing translucent roofing materials, sleeves and ridging	Sum			
B	Install new translucent shade house plastic to the roof of the shade house over existing metal arched tunnel shaped structure	Sum			
3	**Repair existing doors on greenhouse no.2&3 @3. Clean and repair, include for replacement of parts if necessary.**	Sum			
4	**Clean and power washing of the Green house structures No. 2&3 (. Use washer to clean front and back pannels and gutering of dirt and debris.**	Sum			
5	**Repair damaged roof section on greenhouse no.3 (20'feet long). Repair dented/damaged aluminum roof frames and sheeting. Include for replacement if necessary.**	Sy	24		
6	**Repair damaged frame on greenhouse no.3. Repair dented/damaged aluminum frames. Include for replacement if necessary.**	Sum			
7	**Repair sprinkler system and replace defective water sprinklers@4. Note: the existing water**	Sum			

REPAIRS TO THE MARAN PROPAGATION STATION					
Ref	**Description**	**Unit**	**Qty**	**Rate EC**	**Value EC**
8	**Remove and replace all damaged greenhouse shade cloth.**				
A	Greenhouse no.2&3 (80'L x 21'W x 12' H). Replace shade cloth on all sides 10ft high	Lf	405		
B	Greenhouse no.1 @ 2 (100' L x 26'W x 18'H) Replace shade cloth on sides and roof section.	Sf	645		
C	Greenhouse no.4 (80' L x 70'W x 10'H) Replace shade cloth on sides section.	Lf	300		
D	Greenhouse no.5 (140' L x 50'W x 10'H) Replace damaged shade cloth on sides section where necessary.	Lf	100		
9	**Preliminaries. This sum is to include for any necessary items; Taxes, Transportation of materials, NIS, Storage , Electricity, Scaffolding, Disposal of materials, Site supervision etc**	Prov. Sum			
	Page 2		**Total**		

REPAIRS TO THE MARAN PROPAGATION STATION					
Ref	**Description**	**Unit**	**Qty**	**Rate EC**	**Value EC**
	SUMMARY				
	Page #1				
	Page #2				
	O - CONTINGENCIES				
	INCLUDE THE FOLLOWING CONTINGENCIES				
	Provide contingency of 10% to be expended only on the instructions of thr project manager without compensation to the contractor	10%	Sum		
			GRAND TOTAL		

…….. ……..

Contractor Name: **Date:**

…….. ……..

Contractor Signature: **Project Duration:**

ANNEX 2: Quotation Forms

Contractor Quotation Form

From:	**[*Insert Contractor's name; in case of a joint venture, specify the name of the joint venture*]**
Contractor's Representative:	**[*Insert name of Contractor's Representative*]**
Title/Position:	**[*Insert Representative's title or position*]**
Address:	**[*Insert Contractor's address*]**
Email:	**[*Insert Contractor's email address*]**

To:	**Ministry of Agriculture, Lands and Forestry**
Employer's Representative:	**Isaac Bhagwan**
Title/Position:	**Permanent Secretary**
Address:	**Ministerial Complex, Tanteen, St. George**
RFQ Ref No.:	
Date of Quotation:	

Dear **Ministry of Agriculture, Lands and Forestry,**

SUBMISSION OF QUOTATION

1. **Conformity and No Reservations**

   In response to the above named RFQ, we offer to execute the Works as per this Quotation and in conformity with the RFQ, Delivery and Completion Schedules and Technical Specifications. We confirm that we have examined and have no reservations to the RFQ, including the Contract.

2. **Eligibility**

   We meet the eligibility requirements and have no conflict of interest, in accordance with the Request for Quotations.

3. **Suspension and Debarment**

   We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the Government of Grenada.

4. Quotation Price

The total price of our offer is ***[Insert the total price in words and figures, indicating the various amounts and the respective currencies]***

1. **Quotation Validity**

Our Quotation shall be valid until the date specified in the RFQ, and it shall remain binding upon us and may be accepted at any time before it expires.

5. Performance Security

If we are awarded the Contract, we commit to obtain a Performance Security in accordance with the RFQ.

6. Commissions, gratuities, fees

We have paid, or will pay the following commissions, gratuities, or fees with respect to this Quotation.

Name of Recipient	Address	Reason	Amount

7. Not Bound to Accept

We understand that you reserve the right to:

a. accept or reject any Quotation and are not bound to accept the lowest evaluated cost Quotation, or any other Quotation that you may receive, and

b. annul the RFQ process at any time prior to the award of the Contract without incurring any liability to Contractors.

8. Fraud and Corruption

We hereby certify that we have taken steps to ensure that no person acting for us, or on our behalf, engages in any type of Fraud and Corruption.

On behalf of the Contractor:

Name of the person duly authorized to sign the Quotation on behalf of the Contractor**:**

…….

Title of the person signing the Quotation: **……..**

Signature of the person named above**:** ……

Date signed ……...day of ……..., ……..

*The power of attorney shall be attached to the Quotation.

Schedules

Bill of Quantities

Ministry Of Infrastructure, Public Utilities, Civil Aviation & Transportation

REPAIRS TO THE MARAN PROPAGATION STATION

MARAN, ST JOHN

BILL OF QUANTITIES

Ref	Description	Unit	Qty	Rate EC	Value EC
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6	**Repair damaged frame on greenhouse no.3. Repair dented/damaged aluminum frames. Include for replacement if necessary.**	Sum			
7	**Repair sprinkler system and replace defective water sprinklers@4. Note: the existing water pump is functional.**	Sum			
	Page 1		**Sub-Total**		

REPAIRS TO THE MARAN PROPAGATION STATION					
Ref	**Description**	**Unit**	**Qty**	**Rate EC**	**Value EC**
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	SUMMARY Page #1 Page #2 **O - CONTINGENCIES** **INCLUDE THE FOLLOWING CONTINGENCIES** **Provide contingency of 10% to be expended only on the instructions of thr project manager without compensation to the contractor**	10%	Sum		
			GRAND TOTAL		

…….. ……..

Contractor Name: **Date:**

…….. ……..

Contractor Signature: **Project Duration:**

…….. ……..

Phone Number: **Tin Number:**

Technical Specifications

The Contractor shall provide:

- the names and details of the suitably qualified key personnel to perform the Contract
- adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment for the Contract
- information on Site organization
- its method statement on the execution of the works
- mobilization and construction schedule
- A summary of other information, if any, that the Contractor considers relevant

GENERAL

Rates

A. The rates inserted by the contractor shall include for complying with all provisions of this section, unless specifically otherwise stated or measured.

Definitions

B. The term "the Works" shall mean the whole of the works envisaged by the Contractor, including deviations form the working details and in respect of setting out correct lines and levels, vertically, sizes and thickness of member, shall be removed and reconstructed or otherwise rectified to the approval of the Project Manager, and the Contractor shall be responsible for all additional costs incurred; all such remedial work shall be executed without undue delay.

C. Words importing the singular only also include the plural and vice versa.

D. The following abbreviations are used:

BS - British Standard

BSCP - British Standard Code of Practice

SMM - Standard Method of Measurement of Building Works – Fifth Edition (Metric) dated 1968

Standard of Specification

E. The Standard of Specification used in the main in this document is the (BS) British Standard of Specification. Other international standards of specification are also acceptable in use. The Contractor shall ensure that whenever or wherever the standards of specification are used other than the British Standard of specification, they must be comparable to the British Standards of specification in all respect, and shall be subject to approval of the Project Manager.

Defective Work

F. The Project Manager reserves the right to check the work executed by the Contractor and his setting out in such cases and at such times as he may deem fit; there is, however no duty on his part to make such checks and any failure by him to observe errors shall not relieve the Contractor of his responsibilities in these respects.

Materials and Workmanship

A. All materials and workmanship shall comply with the requirements and recommendations of the relevant BS and/or BSCP, where applicable unless otherwise stated.

B. Any reference in these Bills of Quantities to a BS or BSCP shall be deemed to refer to the latest edition as most recently amended at date of tender.

C. Any reference in these Bills of Quantities which is at variance with any provision in a BS or BSCP referred to shall be deemed to take precedence over and to override the same.

D. No materials or workmanship described in the British Standard Code of Practice referred to in these Bills of Quantities shall be employed if at variance with these Bills of Quantities or the Project Manager's drawings, specifications or instructions.

Calculation of Quantities

E. All work unless otherwise has been measured net as fixed in position and the Contractor shall allow in his prices for waste, laps, etc.

F. Throughout these Bills of Quantities, the following abbreviations have been used. However, for convenience some metric abbreviations have also been used.

m3	-	Cubic Metre
m2	-	Square Metre
m	-	Linear Metre
mm	-	Millimetre
cm	-	Centimetre
g	-	Gram
Tonne	-	Metric tonne
Nr.	-	Number
Kg	-	Kilogramme
Hr	-	Hour

G. All weights and measurements mentioned in these Bills of Quantities are those normally used in Trinidad. Unless otherwise described, tons shall be "long" tons of 2,240lbs, and gallons shall be imperial gallons.

H. All goods and materials are to be of the best quality unless otherwise described. All goods not otherwise specified are to be in accordance with the British Standard Institution Specifications where such exist. Where not applicable, goods and materials shall be of the minimum approved standard consistent with the performance required. Where the terms "B.S" is used in the Bills of Quantities, it shall mean the latest British Standard specification current at the date of tender.

I. Description of materials and workmanship given in any one work-section shall apply equally to all work-sections, unless otherwise described.

J. Notwithstanding any of the foregoing the whole of the materials and workmanship shall be subject to the approval of the Project Manager.

Materials or goods supplied at PC Rates

A. Where materials or goods are described as being supplied at PC rates, the Contractor shall allow in his prices for profit and all other costs necessary to complete the works.

Proprietary Products

B. All proprietary products shall be used strictly in accordance with the Manufacturer's instructions unless otherwise described.

DEMOLITIONS AND ALTERATIONS

Location

A The numbers, names or locations of rooms in the Bills of Quantities refer to the premises as they exist and are used at the time of preparation of the Bills of Quantities.

Inconvenience

B Carry out all cutting and pulling down in such a manner as to cause as little inconvenience as possible to adjoining occupants or the public and accept responsibility for any claim which may arise.

C Work undergoing demolition and alteration shall be dampened as necessary and the Contractor shall allow for taking measures to the satisfaction of the Project Manager to minimize dust. The Contractor shall keep all debris well watered during the work to prevent dust arising.

Control and protection

D Provide all requisite temporary shoring, strutting or other supports to walls, floors, roofs, etc., necessary for the controlled demolition, protection and safety of existing structures and all screens and other protection necessary to protect the adjoining occupants and the general public. Alter, adapt and maintain all such temporary work as may be necessary from time to time and clear away on completion.

Shoring and Scaffolding

E Shoring and scaffolding incidental to demolitions and alterations and making good all work disturbed thereby, shall be deemed to be included in the description.

Structure

F Shoring and scaffolding incidental to demolition of individual elements or structures and making good all work disturbed by such shoring and scaffolding shall be deemed to be included in the description.

Levels

G Where demolition is described as to be taken down to ground level and the like and the levels on opposite sides of the structure are different, the description shall be deem to apply to the lower of the levels, unless otherwise indicated.

Definitions

H The term "remove" as used in this section shall mean the demolition of the elements or structure by any means except the use of explosives and shall include grubbing of foundations and concrete beds and the grubbing up and sealing off of drains and services etc.

Plumbing, Engineering and Electrical Installations

A The descriptions of removing structures shall be deemed to include sealing off and making safe the mains to plumbing, Engineering and electrical installation shall be deemed to include disconnecting from the associated gutter work, pipe work, duct work, conduits, cables and the like.

Preparation of old work

B The Contractor's prices for hacking off plaster, wall and floor tiling are to include for preparing the backgrounds to form key for new work. Junctions and joints between new and old work must be properly made and finished in such a manner that they are not recognizable.

Stored Materials

C The items for refixing materials in the works, describe such materials as "stored", and this description shall be deemed to include selecting, cleaning, removing from stored to the appropriate location of the works, and fixing.

Protection

D The works and the existing structure shall be efficiently protected against the elements.

E The work shall be kept well damped to avoid excessive dust and all debris is to be cleared away from time to time and when directed by the Project Manager.

Materials arising from demolition

F Materials arising from demolition shall become the property of the Employer, unless otherwise stated. The Contractor shall remove the demolished materials and remove to a place designated on site by the Project Manager and shall store the material in a manner satisfactory to the Project Manager. Materials arising from the demolition work shall not be reused in the works unless approval in writing has been received by the Project Manager.

New Materials

G All materials other than those arising from the pulling down and described as to be reused, or approved in writing by the Project Manager shall be new materials to match the existing work and to the approval of the Project Manager.

Transfer of Materials

H All materials and things described to be transferred to a new position or handed over to the Project Manager shall be taken out and carefully moved to avoid damage, marked as required for identification purposes and the Contractor's pricing shall include for moving to and setting up temporary stores.

Overhauling doors

I The Contractor's prices for overhauling doors and frames shall be deemed to include re-securing frames, taking off doors, easing, adjusting and re-hanging, cutting out as necessary and making good split or worn sections and panels, and piecing-in where ironmongery have been removed.

Overhauling Ironmongery

A The Contractor's prices for overhauling ironmongery including sliding gear shall be deemed to include for taking down as necessary, thoroughly examining, cleaning, oiling and renewing lock springs where necessary, fitting new parts, escutcheons, striking plates and the like as necessary, providing new keys where missing and polishing bright all parts.

Overhauling sanitary fittings

B The Contractor's prices for overhauling sanitary fittings shall be deemed to include for scouring, re-washering valves, re-fixing chains, renewing defective plugs and pulls, clearing wastes and polishing bright all parts.

Protection and existing materials

C Care shall be taken to protect existing materials intended for re-use, renovations or retention and the Contractor shall make good or replace with new at his own expense, as directed by the Project Manager any such materials which are missing or become damaged.

Avoidance of noise

D The pulling down is to be carried out in such a manner as to cause little inconvenience as possible to adjoining owners or the public, and the Contractor will be held responsible for any claims which may arise from disregard of this Clause. Debris is to be kept well watered during the work to prevent dust arising

E Concrete materials resulting from the breaking up of foot paths, ground floor slabs and the like with the approval of the Project Manager may be used for hardcore filling.

F The Contractor shall give due notice to the electricity and water authorities and shall allow them facilities for removing any fixtures, fittings or services which belong to them. The contractors shall arrange for all electrical fixtures, wiring, sanitary fittings which come within the area to be demolished, to be disconnected and stored for handing over to the Project Manager.

Temporary Screens

G Temporary screens shall be erected at the request of the Project Manager and shall be provided in the positions indicated by him.

H Screens shall be constructed in such in manner as to satisfy the particular requirements of the subsequent measured items and in a manner approved by the Project Manager. In addition, screens described as "dust-proof" shall be faced with a suitable rigid sheet of material so as to provide, in addition to the functions previously stated, a reasonable measure of security.

Pricing

I The Contractor shall be deemed to have visited the site to ascertain the full extent and nature of demolitions and alterations.

J No claim resulting from failure to do so will be entertained.

A Allow in pricing for all incidental work directly associated with the items of demolition and alterations which, at the time of tendering, could reasonably have been foreseen. Prices shall be deemed to include also for making good of all other works disturbed in the execution of the work described in this section with materials and workmanship to match in every respect the surrounding work and properly bonded thereto unless otherwise described.

B Allow for all other consideration arising from the specification.

PROVISIONAL AND PRIME COST SUMS

DEFINITIONS

General Attendance

A General attendance on Nominated Sub-Contractors, Local Authorities and Public Undertakings shall be as defined in the SMM Clause B19-21, that is including "the use of Contractor's temporary roads, pavings and paths, standing scaffolding, standing power operated hoisting plant, the provision of temporary lighting and water supplies, clearing away rubbish, provision of space for the sub-contractor's own offices and for the storage of his plant and materials and the use of messrooms, sanitary accommodation and welfare facilities".

B In addition, general attendance shall be deemed to include arranging with Local Authorities, Public Undertakings, Nominated Sub-Contractors and Nominated Suppliers the time for commencement of their work on the site or manufacture and delivery of their goods and materials, obtaining particulars of holes, mortices, chases, recesses, fixings and the like and supplying them with all dimensions and other information required for the proper execution of the Works.

PRIME COST SUMS

Nominated Sub-Contractors

C The Prime Cost Sums given are for work to which the terms of Contract Condition 35 will apply.

D. Except for loss or damage by causes listed in Clause 20 of the Conditions of Contract the Nominated Sub-Contractor shall be responsible for loss and damage and insurance against such loss or damage to any materials and goods brought onto or delivered to the site for his own use until such materials and goods have been fully, finally and properly incorporated in the Works except also for any loss or damage due to any negligence, omission or default of the Contractor, his servants or agents, or any other Sub-Contractor of the Contractor, or of the Employer or any person for whom the Employer is responsible.

E The Contractor shall make arrangements with the various Nominated Sub-Contractors so that their work proceeds in accordance with the agreed programme and shall furnish to then all necessary dimensions, marks, lines, levels, pegs, etc., for setting out and shall be responsible for the accuracy of same.

F Nominated Sub-Contractors will be responsible for covering up and protecting their work during its execution but immediately upon its completion the Contractor shall assume this responsibility.

Nominated Suppliers

G The P.C. Sums given are for goods and materials to which the terms of Contract Condition 36 apply.

H Notwithstanding the provisions of SMM Clause B.21 (b) the costs required to be paid by the Contractor of conveying goods and materials to the site, of any special packing and the like, are included in the appropriate prime cost sums and particulars are not given on the measured items.

I Fixing of goods and materials shall in addition to the provision of SMM clause B.10.2 be deemed to include for distribution of final point of installation.

PROVISIONAL NET SUMS

A Notwithstanding SMM clause A.8 the Provisional net sums given are exclusive of any profit or cash discounts to the Main Contractor. An item of Profit is therefore included which the Contractor should price accordingly as part of his tender.

Work by Local Authorities and Public Undertakings

B The provisional net sums given are for work to which the terms of Contract Conditions 13 will apply. The term Statutory Undertakers used in the Contract Conditions is to be regarded as synonymous with Public Undertaking used in SMM Clause B.19.

C Where a whole or partial prepayment is required by a Local Authority or Public Undertaking as a prerequisite to commencing the Work the Contractor shall forward such prepayment before the work is begun and shall obtain any appropriate refund after the work has been completed. Since under the terms of Clause 30(2) of the Conditions of Contract interim payments can only be made to the extent that they relate to works done and/or materials on the site, the Contractor must allow in his pricing of general attendance for any expense to which he is put in account of such prepayments.

Test of Materials

D The provisional net sum is for charges for testing materials which will be executed by the Laboratory named by the Project Manager and to which the terms of Contract Condition 35 will apply.

E The terms Contractor's services in connection with these tests is to be read as take test sections of the work when required, store, pack, label, record details and dispatch carriage paid to the testing laboratory.

CONCRETE WORK

General

A Concrete shall be made with cement, fine aggregate, coarse aggregate, and water. No other agent or ingredient shall be added to the concrete without the prior approval of the Project Manager. The Contractor shall ensure that the use of such approved additive will not adversely affect the strength, durability or appearance of the finished concrete works.

Definitions

B The following terms whenever used in the specification shall be taken to have the meanings assigned to them below:-

C "Plain concrete" shall mean concrete used in members made with a structural grade of concrete listed, but not containing steel reinforcement.

D "Structural props" shall mean those components of the strutting to formwork which will be retained in position when the shuttering is removed from concrete faces.

E "Satisfactory" shall mean to the satisfaction of the Project Manager's representatives.

F "Approved" shall mean approved by the Project Manager's representatives.

G "Required" shall mean required by the terms of this specification, or any other contract document.

H "Passed by the Project Manager's representative" shall mean accepted as complying with specification requirements as far as can be judged from visual inspection.

I "Current issue" shall mean latest issued at the date of the tender invitation.

J "Failure to comply with this specification" shall mean failure to comply satisfactorily with all requirements of this specification.

Responsibility

K No approval or acceptance by the Project Manager or his representative shall in any way relieve the Contractor of his responsibility for the quality of materials and the standard of workmanship in the finished works and for the strength, durability and appearance of the finished concrete works.

DESIGN

Reinforced concrete

L The reinforced concrete works have been designed generally in accordance with the recommendations contained in the British Standard Code of Practice for the Structural Use of Concrete B.S. 8110. The reinforced concrete works are to comply with the recommendations of this British Standard unless specifically excluded or modified hereafter.

Plain Concrete

A Plain concrete works shall comply with all the relevant requirements for reinforced concrete.

MATERIALS

General

B All materials in the works shall comply in all respects to the best standard available locally, based on the relevant British Standard, except for any deviations specifically authorized in subsequent clauses of this specification.

C The constituent materials of concrete shall be cement, aggregates and water. No admixtures to this concrete shall be permitted without the prior approval of the Project Manager.

Cement

D Cement shall be ordinary Portland Cement complying with B.S. 12:1991. All cement shall be delivered to site in bulk cement lorries of approved design or in sealed bags.

E Minimum cement content of concrete shall be 350kg/m^3 for all work below ground level and 250kg/m^3 for all work above ground level. Maximum cement content of concrete shall not exceed 550kg/m^3.

F No rebagged cement will be permitted to be brought on to the site. On no account shall a change in the type of source of supply be permitted during the course of construction and every endeavor shall be made to ensure that the colour of the cement is constant throughout the contract except with the permission of the Project Manager.

Aggregates

G Aggregates shall comply with the recommendations of B.S. 882:1992. In special circumstances a deviation from B.S. 882:1992 in respect of grading of aggregate may be accepted, subject to the prior approval of the Project Manager.

H The nominal maximum sizes of coarse aggregate shall be 20mm, except where otherwise directed by the Project Manager.

Water

I Water to be used in the works shall be clean and free from all harmful matter, in suspension or solution, that would have adverse effects on setting, hardening and strength of Portland Cement. A continuous supply of water shall be available during all mixing, placing and curing operations.

Reinforcement

A Mild steel reinforcement shall be hot rolled mild steel with a specified characteristic strength of 250N/mm^2 complying with B.S. 785 or approved equivalent. Hot rolled high yield steel shall have a specified characteristic strength of 410N/mm^2 and comply with B.S. 4449 or approved equivalent. Cold rolled high yield steel shall have specified characteristic strengths of 460N/mm^2 for bars up to and including 16mm diameter and 425N/mm^2 for bars exceeding 16mm in diameter. Cold rolled high yield steel shall comply with B.S. 4461 or approved equivalent. Welded steel fabric shall comply with B.S. 4483 or approved equivalent. Only twisted cold marked high yield reinforcement shall be used as main reinforcement.

Admixtures

B Admixtures for improving the concrete may be permitted but only after the Contractors have satisfied the Project Manager that it will be to his advantage. Use of the admixtures shall be made only on the written permission of the Project Manager and in any case the permission to use the same shall not be construed to mean that extra will be paid.

Concrete Densifier and Chemical Hardener

C Surface hardener to be LIQUI-HARD Concrete Densifier and Chemical Hardener as supplied by INTERCHEM LIMITED of 9th Avenue South, Barataria (Tel.: 868 638 3801) or any equal and approved by Project Manager applied by either manual sprayer, soft bristle broom or mechanical scrubber to the concrete surface as per manufacturer's specification.

Storage

D All cements shall be stored in a weatherproof shed of adequate size having a raised dry floor, or in silos of approved design.

E Aggregates shall be stored on hard paved areas with adequate dividing walls, or in approved container, to prevent mixing of different types of aggregate and be kept clean and free from contamination.

F Cements and aggregates shall be used in the order in which they are received on site and their storage shall be arranged to facilitate this procedure.

G Reinforcement shall be stored in racks clear of the ground.

H Where materials are to be stored on suspended floors or roofs the Contractor shall ensure that such storage will not overload or distort the structural frame.

Rejected

I All materials which have been damaged or are contaminated, or have deteriorated or do not comply with the requirements of this specifications shall be rejected and shall be removed from the site immediately at the Contractor's expense.

TESTS

General

A Before the commencement of the Contract, the Contractor shall submit to the Engineer, for his approval, the name of the Testing Authority he proposes to employ.

B The Contractor shall provide all equipment necessary for carrying out all tests on site specified or described in this specification, and he shall make and provide for all necessary arrangements for the delivery of all samples and test pieces to be tested by the approved Testing Authority.

C The Contractor shall provide for maintaining all testing equipment on site in proper working order to the satisfaction of the Engineer.

D The Contractor shall provide for sending copies of all tests results to the Engineer.

E The Contractor will bear the cost of all tests specifically required in this specification.

F The Contractor will not be paid for any special tests called for by the Engineer in consequence of any failure by the Contractor to comply with this specification.

G The Contractor will be paid, at rates to be agreed, for any other special tests called for by the Engineer unless the tests results show failure by the Engineer to comply with this specification.

H The Contractor shall state his source of cement to be used on the site and verify that these are of the relevant B.S.

I The manufacturer's certificates of test including compressive strength tests, carried out in accordance with B.S. 12 for Portland Cement shall be supplied and kept on site for each consignment of cement delivered to the works. At the commencement of the contract, the Contractor shall deliver a 22.68kg sample of each type of cement he intends to use to the approved Testing Authority.

Aggregates

J Samples of aggregates to be used shall be supplied to the Project Manager and the source identified for approval by the Project Manager.

K All sampling and testing of aggregates shall be carried out in accordance with the relevant recommendations of B.S. 882:1992.

L At the commencement of the contract, the Contractor shall deliver to the Approved Testing Authority for inspection and analysis, 3 separate samples of each type of aggregate to be used in the structural concrete grades. For each type of aggregate the 3 samples shall be taken at the proposed source of supply at intervals of not less than one day. For fine aggregates, the samples shall be 22.68 kg weight each and for coarse aggregates, the samples shall be 45.36 kg weight each.

Aggregates (Cont'd)

A To ensure that no significant variation in the grading of the aggregates occurs during the contract, sieve analyses shall be carried out on site at fortnightly intervals. The results of these analyses shall be recorded on a chart to be kept on the site and to be handed to the Project Manager fortnightly.

B If the grading of any aggregate is changed, the Project Manager shall be notified before any of this aggregate is used in the works.

C The quantity of water contained in the aggregate shall be determined by an approved method at least once a day, when concrete mixing is in progress. The Contractor will be required to show the adjustments to be made to batch weights and added water.

Mixing plant

D Weightbatching plant shall be checked weekly in the presence of the Project Manager's representative. The checking shall be carried out with approved weights provided by the Contractor for this purpose.

E The water gauge of the concrete mixer shall be inspected and tested daily when concreting is in progress.

F If any fault in the mixing plant is detected by these tests or otherwise, the fault shall be rectified to the satisfaction of the Project Manager's representative before further use is made of the equipment.

Concrete tests

G Concrete test cubes shall be made, cured and tested and the results recorded, in accordance with the recommendations of the current issue of B.S. 1881, unless specifically modified in subsequent clauses of the specification.

H The test specimens shall be 150mm cubes made in steel moulds of approved design. The test cubes shall be taken from typical batches of concrete as directed by and in the presence of the Project Manager's representative, without prior notice.

I Subject to the Project Manager's approval tests of works cubes may be carried out on site with a testing machine of approved design, in the presence of the Project Manager's representative. Otherwise the test cubes shall be properly packed, suitably labeled and sent, carriage paid, by the Contractor to the Approved Testing Authority.

J Slump test or compaction factors tests of the mixed concrete shall be carried out at regular intervals and the results recorded and kept on the site.

Exposed concrete finishes

K Where exposed concrete finishes are required, the Contractor shall provide in a suitable position test samples of each type of finish to be used in the works. The Project Manager shall approve the test samples before these finishes are put in hand in the works. No correction or repair to surfaces will be allowed unless instructed in writing by the Project Manager.

Load tests

A Load tests of completed parts of the structure may be called for by the Project Manager at any time.

B The test procedure and the standard of acceptance will be specified by the Project Manager.

C Where the results of such tests indicate that any member or part of the structure does not comply with this specification, that part of the structure shall be classed as defective work.

CONCRETE

Concrete Mixes

D For structural concrete mixes made with Ordinary Portland Cement, the average 28 day works strength shall be not less than specified in the table below.

E The following concrete mixes shall be required:-

Grade	28 Days Works Strength in N/mm^2	Proportions	Fine Aggregate	Coarse Aggregate
Plain Concrete	No strength	1:8	-	37 mm all-in
20	20	1:2:4	100 - 4mm	5mm – 19mm
25	25	1:1 ½:3	100 - 4mm	5mm – 19mm
30	30	1:2:2		

Mix Proportions

F Mix proportions shall be designed by the Contractor for each structural concrete mix listed in the table.

G The concrete mixes shall be designed to have target mean strength which exceeds the required characteristic strength by the following margins:-

Grade 20	10N/mm^2
Grade 25	13N/mm^2
Grade 30	15 N/mm^2

H A reduction in the current margin specified above may be permitted subject to the following conditions:-

(i) The Contractor shall satisfy the Project Manager that the standard of supervision and concrete control to be exercised on site for the duration of the structural works, justifies such a reduction.

(ii) The average strength of the concrete used in the works shall be assessed accordingly to the statistical method, applied to works cube tests results.

Mix Proportions (Cont'd)

(iii) Trial mixes are made from three separate batches of concrete which are prepared and four cube tests obtained from each batch.

The trial mix proportions will be approved provided that:-

(a) The mixes have sufficient workability to allow concrete to be placed and properly compacted by the methods to be used on site.

(b) The average strength of the mix cubes tested at 28 days exceeds the specified characteristic strength by the current margin less 3.5 N/mm^2.

Tests at an earlier age may be permitted provided that satisfactory age-strength relationships have been established by experiment.

A The mixes shall be designed to have sufficient workability to allow concrete to be placed and properly compacted by the methods to be used on site.

B Complete calculations for the mix proportions and the information and assumptions on which they are based, shall be submitted to the Project Manager, for each mix listed in the table, before the cubes for the preliminary strength tests are made.

Preliminary strength

C Preliminary strength cube test shall be carried out to check the calculated proportions for each structural concrete mix.

D Preliminary cubes shall be made for each mix from the three samples of aggregates and samples of cement sent to the approved Testing Authority. From each samples of aggregate 6 cubes shall be made, 3 for test at seven days and 3 for test at 28 days.

E Each set of cubes tested at 28 days shall be accepted as satisfactory if, either all three cubes have a crushing strength greater than the preliminary design strength, or the strength, or the average strength of the three cubes is greater than the preliminary design strength and the difference between the greatest and the least is not more than 20% of that average.

F If for any mix in the table, the test result in one set of three cubes tested at 28 days fall below this requirement, the mix shall be rejected, the proportions revised and the testing procedure repeated.

G For each structural concrete mix, the 28 day preliminary strength shall be calculated as the average of all the cubes tested at 28 days and the 7 day preliminary strength shall be calculated as the average of all the cubes tested at 7 days.

H Results for all preliminary tests shall be sent to the Project Manager as soon as they are available.

Works strength

A Compliance with the specified characteristic strength shall be judged by test made on concrete cubes at 28 day. Tests at an earlier age may be accepted provided that satisfactory age-strength relationships have been established by experiment.

B The minimum rate of sampling shall be for every $20m^3$ or every 20 batches of concrete supplied whichever is the lesser volume. No variation in this sampling rate will be permitted without the prior approval of the Project Manager.

C Four cubes shall be made from each sample for testing at 28 days or at an earlier age approved by the Project Manager.

D The samples where practicable shall be taken at the point of discharge from the mixer or in the case of ready-mixed concrete, at the point of discharge from the delivery vehicle.

E Each set of four cubes tested at 28 days shall be accepted as satisfactory provided that:-

(a) The average strength determined from any group of four consecutive test cubes exceed the specified characteristic strength by not less than 0.5 x the current margin.

(b) Each individual test result is greater than 85% of the specified characteristic strength.

F If at any time the mean strength or the standard deviation fails to satisfy the requirements given above, the Project Manager shall be notified immediately and action shall be taken, as the Engineer shall direct.

G In all cases, an estimate of the corresponding 28 day strength may be obtained from the 7 day cube tests by assuming the ratio of 28 to 7 day strengths to be the same as that obtained from the average strengths of the tests for the trial mixes.

H Results of all works cube tests and test analysis shall be kept on site and copies shall be sent to the Project Manager as soon as the results are available. All records of works cube tests shall indicate clearly which part of the structure each sample of concrete represents.

Works test failure

I If any set of 7-day sub tests results indicate a low 28 day strength to be expected, the Project Manager shall be notified immediately and no props shall be removed from the affected part of the structure until the cause is determined.

J If any set of 28-day cube test results fall below the specified strength, the Engineer shall be notified immediately and the cause of the failure investigated.

K The extent of the area of the structure affected shall be as defined by the Project Manager.

L All the cost of and all charges in consequence of the courses of action the Contractor is directed to follow, shall be borne by the Contractor.

Site Control

A The water-cement ratio determined in the calculation of proportions for each mix shall be accurately maintained. The amount of water in each batch shall be controlled by direct measurement and due allowance shall be made for water content of the aggregate as determined by the daily test.

B A slump of 75mm to 100mm or a compaction factor of 0.92 shall be used as a guide to the workability of the mixed concrete.

C If a change in the grading of any aggregate is unavoidable, the proportions of all structural concrete mixes affected shall be revised to take account of the altered grading.

Ready-mixed Concrete

D Permission must be obtained, and the name of the supplier submitted before the used of ready-mixed concrete. Permission must also be obtained to change the supplier of ready-mixed concrete and also to revert back to site mixed concrete. The concrete must be discharged into the formwork within 1 hour of mixing. All the requirements for site mixed concrete, previously given must be complied with, except for time of discharge. Any ready-mixed concrete that has not been deposited within 1 hour of mixing shall not be used and shall be removed from site. If required to do so, certificates showing batching records of the ready-mixed concrete shall be produced by the contractor. Experienced ready-mix truck drivers only will be allowed to deliver the ready-mixed concrete and they, when told to mix-up by the Contractor's Supervisor, will discharge into the mixer drum the exact amount of water required in accordance with previous clauses of this specification. The amount of water in the mix can only be changed on the authority of the Project Manager.

E Although testing is sometimes performed by the ready-mixed concrete suppliers, the Contractor must carry out his own testing in accordance with the requirements for site-mixed concrete. The concrete cubes shall be tested for strength by an independent authority and the results submitted to the Project Manager without delay.

REINFORCEMENT

General

F Reinforcement bending schedules will be provided listing the cut length, diameter or size, bending dimensions and location of each bar in the works.

G Before the bars are cut to length the Contractor must check:-

(i) That reinforcement schedules are provided for each part of the structure sufficiently in advance of his concreting programme.

(ii) That each schedule includes the correct quantities of reinforcement as detailed on the drawing to which it relates.

(iii) That the grades of reinforcement given in each schedule corresponds to those shown on the relevant drawing.

General (Cont'd)

A The Contractor shall submit test certificates to show that the reinforcement complies with the specification.

B The Project Manager shall be notified of any errors disclosed by these checks.

C The Contractor shall be responsible for all delays and charges arising directly from failure to comply with these requirements.

Bending

D All reinforcement bars shall be accurately shaped in a manner that will not injure the material, to the details shown on the drawings and bending schedules. Bars shall not be bent hot.

E The minimum diameter of former to be used when high tensile bar shall be six times the bar diameter. The bar diameter shall be the diameter of the largest circle that can be inscribed in the cross section of the bar.

Cleaning

F All reinforcement shall be free of all loose mill scale and thoroughly cleaned to remove all loose rust, oil, grease, or other harmful matter, immediately prior to being placed in position in the works.

Placing

G All reinforcement shall be accurately placed, securely fixed and adequately maintained in the positions shown on the drawings.

H The concrete cover to the reinforcement detailed on the drawings shall be maintained by use of approved methods e.g biscuits on fairface work.

I The Contractor shall supply and fix all necessary chairs required to maintain the reinforcement in the correct position. The spacing of chairs and the diameter of bars used in their manufacturer shall

be agreed with the Project Manager. The weight of mild steel used for chairs not included in the reinforcement bending schedule will be paid for at the appropriate rates in the specification.

J All laps of fabric and all intersections of bars shall be securely connected with malleable iron wire of suitable size or by another approved method. The wire is to be arranged with ends bent away from the formwork so that the concrete cover is not reduced by more than the diameter of the wire.

K No metal part of any device used for connecting bars or for maintaining reinforcement in the correct position shall remain permanently within the specified minimum concrete cover to the reinforcement.

L The concrete cover to reinforcement shall be as detailed on the structural drawing.

Welding

A Welding of steel reinforcement is not required for structural purposes. No welding of reinforcement for fixing shall be put in hand without the written permission of the Project Manager.

B Welding of cold worked high tensile steel reinforcement will not be permitted.

Formwork

C Before construction commences the Contractor shall notify the Project Manager of the general method and system of formwork he proposes to use for all the main structural members.

D Formwork and its supporting members shall be sufficiently strong to carry the works and all incidental loading. The props and lateral supports shall be sufficiently closely spaced to prevent displacement or visible deflection of the shutters under the weight or hydraulic pressure of the wet concrete. All joints in the formwork and joints between the formwork and previous work shall be sufficiently tight to prevent loss of liquid from the concrete through these joints. The Contractor shall submit calculations for design of the formwork and supports for approval.

E Methods of fixing and locating formwork which result in holes through the concrete when the formwork is removed, shall not be used.

F No metal part of any device for maintaining formwork in the correct location shall remain permanently within the specified concrete cover the main reinforcement.

G The use of concrete retarders or similar preparations to the formwork surfaces shall be subject to the prior approval of the Project Manager.

Mortices, holes, chases in concrete

H Fixing blocks, ends of brackets, bars, bolts, etc., shall be cast in the concrete at the time of placing and all mortices, holes, apertures, chases, grooves, etc., shall be accurately set out in the formwork as the concrete is placed. No part of the concrete works shall be cut away for any such item, or for any other reason, without the Project Manager's permission.

I The Contractor shall obtain from all sub-contractors complete information of their requirements regarding conduits, pipes, fixing blocks or boxes, chases, holes any other items to be cast or formed in the concrete members, subject to the condition that failure of a sub-contractor' to supply such information shall not be allowed to delay the progress of the Contract.

J The Contractor shall ensure that all sub-contractors are informed of his programme for the structural works at the commencement of the Contract. He shall also ensure that sub-contractor's requirements relating to concrete members are approved by the Project Manager before the work is commenced.

K At the commencement of the Contract, the Contractor shall supply all sub-contractors with written copies of the items under this heading of the specification.

Propping

A The vertical propping to all formwork shall be carried down sufficiently far to provide the necessary support without damage, overstress or displacement of any part of the construction.

B Structural props shall be retained in position until new construction is sufficiently strong to support its own weight and any loads to be placed on it during the contract period.

C Structural props for beams and slab shall be positioned to divide the clear span of each member into equal lengths. The number of props provided in each span shall be at least one for clear spans of 6.00m or under and at least two for clear spans over 6.00m and less than 12.00m. For two-way spanning slabs, structural props as specified above shall be provided for each direction of span. For slabs spanning in one direction only, the spacing of props in the direction perpendicular to the span shall not exceed half the span. All members with spans exceeding 12.00m shall be propped to the Project Manager's satisfaction.

Beam and slab formwork

D All formwork to soffits shall be constructed so that it can be removed without disturbing the structural props.

E Unless otherwise detailed on the drawings, the formwork of all floor beams and slabs shall be constructed with an upward camber giving a rise at mid span of 3mm for each 3.00m of span. For roof beams and slabs the formwork shall be cambered to give rise at mid-span of 6mm for each 3.00m of span.

Final preparation

F The internal faces of the formwork may be coated with an approved preparation to prevent adhesion to the concrete to the forms, provided that the use of this preparation will not stain the surface of the finished concrete. None of this preparation shall be allowed to touch the reinforcement.

G Immediately before the concrete is placed in any section of the formwork, the interior of that section shall be completely cleared of all extraneous materials.

H Each section of the formwork to structural members shall be inspected and passed by the Project Manager's representative immediately before the concrete is placed in that section. At least 24 hours notice shall be given when such an inspection is required.

Exposed concrete faces

I Unless otherwise specified all concrete faces to be exposed in the finished works shall be left as struck with a fair face, true to line and level within the specified tolerances for the works.

J After inspection, all superfluous fins and similar projections shall be carefully removed. No render or other applied finish shall be used to obtain a fair face to the concrete.

K All concrete faces to be exposed in the finished works shall be adequately protected against damage and surface staining during the execution of subsequent works.

Exposed concrete faces (Cont'd)

A All finished works which the Project Manager shall judge inferior in any part respect to the standard of the relevant approved sample or which is subjected to subsequent damage or surface staining shall be rejected and treated as defective work.

Formwork to produce a boardmarked finish

B Form of form lining to consist of approved rough textured softwood boards seasoned to a moisture content of not more than 25% and not less than 18%.

C Arrange boards of varying textures and uniform 100mm width alternating the thickness by 10mm to give indentations to the surfaces and a uniform overall pattern. Assemble boards to prevent penetration of grout between them and soak reassembled forms with clean water before erecting and keep damp until concrete is placed.

D Obtain approval for use and type of release agent.

E Do not use cover spacers without approval. Formwork ties to occur in a regular pattern in positions agreed with the Project Manager.

F The finish is to be left as struck. Making good will not normally be permitted.

Formwork to produce a ribbed finish

G Ribbed concrete finish shall be achieved using timber moulds to achieve the profiles shown on the drawings.

H The ribs shall be 50mm deep x 50mm wide (extreme) splayed 6mm form back to front on either face and shall be true, plumb and align exactly on each side of the other.

I The concrete shall be finished fair as described elsewhere.

J Obtain approval for use and type of release agent.

K Formwork ties shall occur in a regular pattern in position agreed with the Project Manager and filled with concrete to match surrounding work. The making good of holes for ties shall be finished 6mm recessed from the general recessed surface of the ribbing.

CONSTRUCTION JOINTS AND EXPANSION JOINTS

Position of construction joints

L The Contractor shall ensure that all construction joints are arranged to minimise the effect of shrinkage of the concrete. Generally the distance between construction joints in walls and slab shall not exceed 9 metres.

M The position of all joints shall be agreed with the Project Manager before the work is commenced.

N Concrete placing shall be carried out continuously between consecutive construction joints.

CONSTRUCTION JOINTS AND EXPANSION JOINTS (cont'd)

Position of construction joints (cont'd)

A Construction joints between different grades of concrete and between concrete mixes using different cements shall be made and positioned as the Project Manager will direct.

Treatment of construction joints

B All construction joints other than horizontal joints shall be formed with proper stop-boards and the stop-boards shall be fixed vertically unless otherwise directed. All joints shall be joggled.

C All construction joints shall be hacked and all laitance and honeycombed concrete removed from the contact face before the adjacent section is poured. Where an adjacent face of the concrete is to be exposed in the finished works, hacking of the contact face shall be terminated 12mm away from the face to be exposed. Air and water jetting immediately after striking stop ends may be used instead of hacking subject to the prior approval of the Project Manager. All loose materials shall be removed from contact face immediately after hacking or jetting has been completed.

D When work is to be resumed at a construction joint, it shall be swept clean and treated with a 2:1 sand/cement slurry or approved bonding agent before starting the new pour. The approved bonding agent shall be Vandex super or equal applied at the rate of 1 kilogramme per square metre.

E At vertical joints the fresh concrete shall be placed directly against the hacked and treated contact face.

Expansion joints

F Expansion joints shall be positioned and formed in accordance with the details shown on the drawings.

G All expansion joints shall be filled with an approved compressible material and joint sealant unless otherwise indicated on the drawings.

Mixing

H Concrete shall be mixed in an approved mechanical batch type concrete mixer. Mixing shall be continued until there is a uniform distribution of the materials in the mixer and the mass is uniform in colour. The mixing time for each batch shall not be less than the minimum period recommended by the mixer manufacturer.

I The volume of mixed materials in each batch shall not exceed the rated capacity of the mixer. Each batch of concrete shall be completely discharged before the mixer drum is re-charged.

J The mixer drum shall be thoroughly washed out whenever mixing ceases.

Transporting

A Concrete shall be transported as rapidly as possible from the mixer to its final position without segregation or loss of any of the ingredient.

B All plant and equipment used for transporting concrete shall be kept clean, all containers used for transporting concrete shall be thoroughly washed out whenever mixing ceases.

C Runs or gangways for concrete transporters and mains runs for foot traffic shall not be supported or allowed to bear on the fixed reinforcement.

Placing

D Concrete shall be placed while still sufficiently plastic for adequate compaction without segregation or loss of any of the ingredients.

E At all times when reinforced concrete is being placed, a competent steel fixer shall be in continuous attendance on the concretors, he shall adjust and correct the position of any reinforcement, which may be displaced.

F The Contractor shall keep on site a complete record of the works showing the time and date when concrete is placed in each part of the works. These records shall be available at all times for inspection by the Project Manager.

Compacting

G Concrete shall be thoroughly compacted during placing and shall be carefully worked around all reinforcement and embedded fixtures and into the sides and corners of the formwork, using a heavy-duty, poker type vibrator with minimum frequency of 12MHE. The Contractor shall have standby vibrators on site during pours.

Curing

H All surfaces of freshly placed structural concrete shall be covered with an approved material and kept constantly wet for 7 days except that for concrete made with rapid hardening cement the minimum curing period shall be 3 days. Degradable clear plastic curing coating may be used with prior written approval by the Project Manager or his representative.

I Soffit and side forms left in position will be regarded as effective in keeping those surfaces wet.

J The Contractor shall notify the Project Manager of the system and method of curing he proposes to use for all structural concrete members before the works are commenced.

STRIKING OF FORMWORK

K The structure shall not be distorted, damaged or overloaded in any way by the removal of the formwork form concrete members.

L The responsibility of the safe removal of any part of the formwork or strutting shall rest with the Contractor.

Record of temperatures

A A maximum and minimum thermometer of approved design shall be kept on site close to the works for measuring atmospheric shade temperature.

Minimum striking times

B The minimum striking times for removing formwork to structural members shall be determined from the table below. The times are given in days, where each day is to be 24 hours duration. Before the formwork is removed from any structural member the Contractor shall ensure that the concrete in that member has attained sufficient strength for striking to proceed.

Location	Minimum Time O.P.C. Concrete
Slab soffits (structural props left in)	4
Beams soffits (structural props left in)	6
Slab structural props	10
Beam structural props	14

CONCRETE IN WATERTIGHT CONSTRUCTION

General

C All work required to be watertight in the finished works will be so indicated on the drawings.

D The Contractor shall include in his rates for any waterproofing additives he proposed to use but the use of such additives shall be subject to the prior approval of the Project Manager.

E Where in the opinion of the Project Manager, damp patches or leakage of water in the finished works are due to incorrect placing or inadequate compaction of the allowance for shrinkage, the affected works shall be made good at the Contractor's expense.

Water-bars

F Where shown on the drawings, water-bars of approved material, make and design shall be incorporated in construction joints in concrete in water tight construction. Water-bars shall be jointed in an approved manner.

G Before commencing the works, the Contractor shall obtain the Project Manager's approval of the methods to be used to support and maintain the water-bars in the correct locations while the concrete is placed.

PRECAST CONCRETE WORK

General

H Except as provided herein, the whole of the specification for Concrete Works shall apply.

Concrete strength requirements

I The required minimum concrete strength or works cubes shall be:-

7 days after placing	14.00 N/mm^2
28 days after placing	30.00 N/mm^2

Concrete proportions

A The concrete mix shall be designed by the supplier, or where the Main Contractor choose to precast, they shall be designed by him.

B The design of the mix shall be based on the method given in U.K. Road Research Note 4, or other approved method. Complete calculations for the mix design and the information on which they are based, such as sieve analysis of the aggregates, the water/cement ratio, workability, etc., shall be submitted to the Project Manager before the preliminary cube test are carried out.

C Preliminary cube tests must be carried out to confirm the mix design calculations.

D The mix must have sufficient workability to enable the concrete to be placed without difficulty.

E When the mix has been decided upon, no variations must be made without the approval of the Engineer.

F The design mix calculations shall be submitted to the Project Manager, together with cube test results, for his approval.

Manufacture of precast units

G The concrete in one precast piece shall be placed in one preparation. The moulds and methods shall be such that the dimensions of the finished work are accurate within the limits of ± 6mm the surfaces and edges clean and true, not winding and free from all defects, with the ends square. The concrete shall be dense and homogeneous of a colour to the Engineer satisfaction. Pressure, vibration, or other effective methods shall be used to consolidate the materials subject to the Project Manager's approval.

H Fixing plugs shall be accurately positioned, as indicated on the detailed drawings.

I The concrete shall be "fairfaced" and free from mould oil staining.

Handling of precast units

J No element shall be removed from the mould until sufficiently matured to ensure that no damage shall be done to it.

K The units shall be delivered to site in such a manner as not to damage then during transport. The Project Manager or his authorised representative shall be at liberty to reject any units which are damaged, or in any way do not comply with this specification. Such units must be removed from the site immediately.

Pricing

A Prices for Concrete Work shall include:-

1. All considerations arising from the specification.

2. Where concrete is cast in earth cuts (i.e. not described as filled into formwork) for any additional concrete over the size stated or shown necessitated by the irregularity of the surfaces retaining the concrete.

3. Cutting, bends, hooks, tying wire, distance blocks and ordinary spacers for reinforcement.

4. All cleaning and oiling of forms and making good of exposed concrete surfaces after removal of formwork, e.g. cutting off projecting fins, filling out small voids and brushing to exposed aggregate.

5. Where formwork is described as "wrought" or "dressed" for producing a fair face finish either by lining the formwork with suitable material and/or filling in voids, etc., and rubbing down to a smooth finish to the Project Manager's approval.

6. Transporting concrete, hoisting or lowering, placing in position, working around reinforcement where necessary and curing.

7. Formwork including all temporary supports and strutting, notches, overlaps and passings at angles, easing, striking and removing.

8. Precast units including hoisting and fixing in position and bedding, jointing and pointing where necessary in cement mortar similar to that used in adjoining work.

BLOCKWORK

Cement and water

A Cement and water shall be as described under "CONCRETE WORK".

Sand

B Sand shall be clean fine plastering sand, free from salt, organic matter, clay, loam, dirt or other deleterious matter.

Plasticiser

C Plasticiser shall be "Rendaplas" or approved equal and used in accordance with the manufacturer's instructions.

Mortar

D Mix mortar for blockwork of cement and sand (1:3) mixed on site in a similar manner to concrete including a plasticiser additive at the rate of 0.142 litres of plasticiser to every bag of cement and use within one hour of mixing. Mortar, which has commenced to set, is not to be knocked up again to re-use.

E Mortar shall be mixed by placing one half of the water and sand in the operating mixer then adding the cement, plasticiser and the remainder of sand and water. After all the ingredients are in the batching mixer, they shall be mechanically mixed for not less than three minutes. Hand mixing shall not be employed unless specifically approved. Mortar should be retempered to maintain high plasticity but shall not be used after 1½ hours from the initial mixing time.

Clay blocks

F Hollow clay blocks shall conform to B.S. 3921: 1985 of first quality good, sound, hard and well burnt, true to shape and size, ribbed and scored for plaster, unless otherwise described.

Concrete blocks

G Concrete blocks shall conform to B.S. 6073 Part 1:1981 of first quality good, sound, hard and well cured and true to shape and size of the types described with surfaces free from laitance and honeycombing. Blocks must be selected free from any fault with whole, even and sharp arrises. Blocks are to be smooth or rough finish as indicated on the drawings and even in feature and colour throughout.

H Load bearing blocks shall have an average crushing strength (average of 5 units) of not less than $7N/mm^2$ measured over the gross area. Concrete masonry units shall be tested in accordance with A.S.T.M. C-140. The Contractor shall allow for testing 5 random units, prior to commencement of the job. The units shall be selected in the presence of the manufacturer's representative and the Project Manager's representative.

Concrete Blocks (cont'd)

A No dimensions shall differ by more than 3mm from the specified standard dimension. "Standard Dimensions" refer to the manufacturer's designated dimensions and are not to be confused with "nominal dimensions" of modular size units which are equal to the standard dimensions plus 10mm thickness of one standard mortar joint.

B Minimum face-shell thickness and web thickness shall be as specified below:-

Nominal Unit Width	Minimum face shell	Web thickness
150mm	25mm	25mm
200mm	31mm	25mm
250mm	35mm	28mm
300mm	38mm	28mm

C Measurement shall be the average of 5 units taken at the thinnest point.

Laying blocks

D At the time of laying, all masonry units shall be free of excessive dirt and dust. Proper masonry units shall be used to provide a minimum of cutting. Where cutting is necessary, cuts shall be neat and true. Where masonry is to be bonded to a concrete beam or footing, the concrete surfaces shall be clean with laitance removed. Unless shown otherwise, blocks are to be laid in uniform courses with regular bond.

E Units shall be laid to preserve the unobstructed vertical continuity of the cells to be filled. Such cells shall be not less than 50mm x 75mm clear.

F Grouted cells are to be kept clear of all overhands, mortar droppings and other material. Cleanout holes shall be provided for each pour by leaving out every other unit in the bottom course of this section being poured. These cleanouts shall be sealed after inspection.

G Mortar joints shall be straight, clean and uniform in thickness and shall be tooled as shown on the plans. Joints shall be tooled in a manner which compacts the mortar, pressuring the excess mortar out the joint rather than dragging it out. The mortar shall be well bonded to the block at the edges. Tooling shall be done when the mortar is partially set but still sufficiently plastic to bond. Where walls are to receive plaster or water-proofing agent, the joints shall be struck flush. Joints which are not tight at the time of tooling shall be raked out, pointed and then tooled. If it is necessary to move a unit after it has once been set in place, the unit shall be removed from the wall, cleaned and set in fresh mortar. Joints shall be 10mm thick unless specified otherwise and shall have full coverage on face-shells, webs and vertical ends.

H Where reinforcement is used in horizontal mortar joints, the thickness of the joints shall be at least twice the thickness of the diameter of the reinforcement. Alternatively, block cells can be notched twice the rod diameter and fully bedded in mortar.

I When hot, dry weather exists, units shall be wetted with a light fog spray, but not immersed into any vessel. The work shall be carried up course by course and no one portion shall be raised more than four courses at any time. All perpends and quoins shall be kept strictly true and square and carefully levelled through every second course. Build cross walls at the same time with main walls and properly bond together.

Concrete Blocks (cont'd)

A Thoroughly wet clay blocks before laying.

B Tool joints of exposed blockwork which is not plastered for a depth of 20mm before the mortar has set to form an even joint and leave the edges of blocks well defined and sharp.

Grouting

C Where vertical reinforcement is specified or described, the reinforced cells are to be grouted for the full height of wall.

D Grout shall consist of concrete mix 21N/mm^2. Sufficient water shall be added to make a workable mix that will flow into all the parts of the masonry cell without separation or segregation. The slump of the grout should be in the region of 75mm – 100mm. Grout shall be placed before any initial set occurs and in no case more than 1½ hours after water has been first added. Admixtures may be used subject to prior approval by the Engineer.

E Grout shall develop a minimum compressive strength of 21N/mm^2 at 28 days when tested as follows:

F Grout shall be placed in a cell of a hollow concrete block of the type being grouted. The prism of grout so formed shall be separated and tested in compression in the same way as concrete test cubes except that any rough surface may require to be capped. For ease in separating the prism, the cell may be lined with porous paper. A minimum of ten preliminary tests will be required plus at least two tests for each day on which grouting is undertaken.

1. Grout shall not be placed to a height of more than 1 block course at one time and there shall be a minimum interval of 60 minutes between pours. When work is stopped for one hour or longer, the horizontal construction joints shall be formed by stopping all tiers at the same elevation with the grout 38mm below the top. Grout shall be compacted with a suitable pencil vibrator.

2. The final pour where a block wall is constructed to abut a fixed soffit shall be carried out through a chute fixed to the side of the wall so that grout may be poured up to soffit level. The resultant surplus may be removed and cleaned off as soon as the grout has reached an initial set. After grouting, walls shall be hosed down to clean off scum and stains. No grout shall be placed until such time as the masonry mortar has sufficiently hardened to prevent "blow outs".

G Where the top of the grouted wall is exposed, it shall be kept moist for curing purposes for at least three days after pouring

Water-proofing

H Water-proofing of bedding courses to blockwall shall be Vandex Premix or approved equal applied in a continuous solid layer in accordance with the manufacturer's instructions and of sufficient depth to equal that of the blockwork regular course joints.

I Where an alternative waterproofing agent is to be utlised, the Contractor will first seek the written approval of the Project Manager.

Water-proofing (Cont'd)

A The Contractor shall submit details of the alternative procedure he intends to follow and the manufacturer's instructions.

B All surfaces are to be properly prepared, checked and approved by the Project Manager before application of the waterproofing compound.

Reinforcement

C Block walls generally shall have "Brickforce" reinforcement laid in the joints after every third course of blockwork in addition to any rod reinforcement as shown on Project Manager's drawings.

D When a foundation dowel does not line up with a vertical core, it shall not be sloped more than one horizontal in six vertical. Vertical reinforcement shall be held in position at the top and bottom and at intervals not exceeding 192 diameters of reinforcement. Vertical reinforcing steel shall have minimum clearance of 6mm from the masonry and not less than one bar between bars.

E Wire reinforcement shall be completely embedded in mortar. Wire reinforcement shall be lapped a minimum of 225 mm at splices and shall contain at least one cross wire of each piece of reinforcement in the lapped distance.

F Overlapping horizontal wire reinforcement is to be used at all block corners and wall junction together with ties to framing concrete columns and vertical faces.

G Where blockwork and concrete are joined with flush faces to be render finished, the joint is to be covered by stapled galvanised chicken wire or equal with 150mm overlap each side of the joint.

Chases and openings

H No chases and openings whatsoever shall be allowed without written permission from the Project Manager. Should chasing be necessary, they shall not be deeper than one-half the wall's thickness. No horizontal chase or the horizontal projection of a diagonal chase shall exceed 1.20m. Where openings are approved, they shall have lintels of reinforced concrete and such lintels shall have a bearing of 200mm minimum at each end. All such chases to be filled solid with mortar and flushed fair on completion.

I Block opening to receive joinery are to be exact dimensions within a tolerance agreed with the joiner that can be easily absorbed by the rough ground scribed to the opening.

Pricing

J Prices for blockwork shall include:-

1. All consideration arising from the specification.

2. All rough cutting, cutting and pinning up at top of walls, cutting at ends and around openings, cutting and bonding at intersections and building off beams and plates, filling exposed ends with mortar and forming and filling reveals.

3. All labours implied by the use of reinforcement where described as reinforced.

CARPENTRY AND JOINERY

Timber generally

A Timber shall be sound with reasonably straight grain and at least 95% heartwood free from warp waney edges, post hole beetle, splits, fringes, decay, infestation or other deformation and from sign of rot. Worm and beetle and shall not contain large, loose or dead knot, sapwood, shakes or other defects to such an extent or so situated in the piece as to render it insufficient in strength or stiffness for the work to be done.

B Timber, which is in the opinion of the Project Manager inferior in quality or condition or is not suitable for requirements of this work, shall not be used. No piece of exceptionally light wood shall be permitted. Samples of materials shall be submitted to the Project Manager for his approval before the start of the operations.

C Unwrought timber shall be sawn full to the dimensions stated, except that occasional variations in sawing are permitted. No variations in sawing shall be more than 5mm under the stated dimension when this is less than 200mm, or more than 6mm under the stated dimension when this is more than 200mm.

D Timber specified "dressed" on one, or both opposite sides, shall be more than 12mm less than the nominal dimension, unless stated to be "actual dimension". Timber shall be held to be "dressed" by machine unless otherwise stated.

Pitch pine

E Pitch pine shall be best imported quality of mature growth, free from gross defects, air seasoned and having a minimum density of 0.578kg/cubic metre at 25% moisture content.

Plywood

F Plywood shall conform to B.S. 6566:1985 Grade 2 Veneer bonded with "weather and boil proof" synthetic resin adhesive unless otherwise described and shall be protected against infestation by the powder post beetle and like insect pests.

Teak

G Teak shall be prime quality, selected for appearance and left clean for oiling 100% free from sap.

Mahogany

H Mahogany shall be Honduras type local mahogany and of prime quality.

Treated timber

I All timber is to be vacuum/pressure impregnated with "Wolmanised" preservative to a dry salt net retention of 8.009kg of "Wolmanol" per cubic metre of timber. Where timber is cross cut or bored after treatment all surfaces exposed should be liberally treated with "Wolmanol" preservative. All treated timber will be subject to test and shall be accompanied by a supplier's certificate of conformity with this specification.

Exposed faces

A Timber which is to be exposed in the finished work shall be "dressed" unless otherwise described.

Standards

B The following British Standards shall apply insofar as they refer:-

Isometric block hexagon bolts, screws and nuts	BS 4190
Nails	BS 1202
Wood screws	BS 1210
Workmanship and Maintenance	BSCP 112 :Part2
Preservative Treatment for constructional Timber	BSCP 98

Natural finish

C When natural finish or staining, clear polish or varnishing is specified, the timber in adjacent pieces shall be matched or uniform or symmetrical in colour and grain.

Shrinkage

D Arrange, joint and fix all joinery work in such a manner that shrinkage in any part and in any direction shall not impair the strength and appearance of the finished work and shall not cause damage to adjoining materials or structure.

Moisture content

E The moisture content of timber as delivered for the work shall not be more than 15 percent for joiner's work, nor shall this content be allowed to increase whilst work is in progress.

Joints

F The Contractor shall perform all necessary tenoning, grooving, matching, tongueing, housing, rebating and all other works necessary for the correct jointing. He shall provide all metal plates, screws, nails and other fixings that may be ordered by the Project Manager or that may be necessary for the proper execution of the works unless otherwise stated on the drawings.

G All joints are to be type specified or as is most appropriate in the circumstances. The joints shall be designed and secured so that the stresses to which they are subjected may be either resisted or compensated. Loose joints are to be made where provision must be made for shrinkage or other movements acting other than in the direction of the stresses of fixing of loading.

H Glued joints are to be used where provision need not be made for shrinkage or other movement in the connection and here sealed joints are required. All glued joints shall be cross tongued or otherwise reinforced.

I All nails, sprigs, etc. and other joinery works shall be accurately scribed to fit the contours or any irregular surface against which they may be required to form a close butt connection.

Screws

A All screws shall be non-corrosive, pre-drilled and countersunk with dowel filling or matching timber.

Nails

B All nails used shall be galvanised wire nails driven into pre-bored holes not exceeding 4/5 of the nail diameter.

Bolt holes

C Bolt holes shall be large enough to permit easy access for the bolt but may not exceed D+D/16 or 4mm whichever is the larger, where D is the bolt diameter.

Tolerance

D All structural timbers shall be sawn timbers to the section given on the drawings. Permissible tolerance on cross section dimension will be +6mm and –3mm with no allowance for wane.

E Provide reasonable tolerance at all connections between joinery work and the building carcass so that any irregularities, settlement or other movements shall be adequately compensated for .

Fabrication

F Joinery work shall be carried out by competent craftsmen. The Contractor shall check the exact dimensions of masonry openings to ensure that the rough grounds can absorb the tolerances of exact dimensions.

G Free-standing or independent joinery shall be dimensioned from the Project Manager's drawings. Any discrepancies shall be brought to the attention of the Project Manager in writing before fabrication

is commenced. Allowance shall be made for the production of prototype joinery units for testing and written approval by the Project Manager.

H Put in hand all joinery work immediately on commencement of the Works and store in a dry place and put together without wedging up for the inspection and approval of the Project Manager. Care shall be taken in fabrication to avoid excessive wetting or drying of the timber.

I Where joinery works are shown built-in or erected in position before the surrounding or enclosing works of the main building carcass have been carried out, it shall be the responsibility of the Contractor to ensure that the works are set plumb and shall not be damaged or be displaced by subsequent operations.

J Where necessary, the joinery shall be temporarily braced and encased. Provide and secure suitable anchors or other fixings so that these may be "built-in" to the carcass while it is being constructed. The anchorage connections shall be constructed so that they shall permit settlements in the building carcass without stressing or otherwise loading the joinery works. No fixing of temporary strutting into the finished joinery will be allowed.

K Joinery works shall not be fixed in position until after all floors, walls and ceiling surfaces have been formed and constructed, unless otherwise specified.

Fixing

A All fixings, plates, shoes or straps shown on the drawings shall be neatly formed of mild steel plate drilled and welded as necessary. Prior to erection, all mild steel components shall be wire brushed and primed with one coat or red lead zinc chromate primer. All surfaces in contact with the wood shall be painted with a further two coats of bituminous paint.

Shop drawings

B Shop drawings shall be produced for all joinery work for review and approval by the Project Manager.

Ironmongery

C Provide samples of all ironmongery not included in the Ironmongery Schedules for selection by the Project Manager without charge.

D Carefully wrap and protect all ironmongery until completion of the work and replace any which may be defaced or damaged without charge as the Project Manager shall direct. Oil all locks and adjust and leave in perfect working order on completion and properly label all keys and deliver up in accordance with the Project Manager's instructions.

E Fix all ironmongery with screws of the same metal and finish as the fittings themselves. Remove and replace with new ones all screws damaged when driven by the turn screw or from any other cause.

F Remove all ironmongery when painting or carrying out other works likely to damage the fittings and replace on completion.

Pricing

G Prices for Carpentry/Joinery shall include:-

1. All considerations arising from the specification.

2. Pre-finished built-in joinery fittings including all frames, legs, bolts, screws, straps, spacer blocks, etc. ironmongery and decoration.

PLUMBING INSTALLATION

General

A. The works as described in this specification relate to the plumbing installation works

Compliance And Codes

B. Compliance with the Specification

1) Comply in full with the requirements described or implied by the technical specification as well as all relevant drawings issued under the Contract. In this respect, the specification and drawings are complementary and anything called for in the specification and not shown on the drawings or vice versa, must be considered as appearing in both and hence to be supplied and installed as part of the Contract.

2) Comply with the requirements of the local Plumbing Code.

Drawings

C. A list of Drawings accompanying this Specification Document is given at Appendix B.

Scope of Work

D. The intent of these specifications and of the drawings is to cover and include all of the apparatus, appliances, materials and labour necessary for the proper installation of the plumbing works. Any exceptions to this one properly defined elsewhere in this specification. This shall include but shall not be limited to the following: -

1) Supply and install water supply piping inclusive of all fittings to the proposed building.

2) Supply and install soil, waste and vent systems including connecting water lines to the nearest manhole to the sewage collector system.

3) Supply and install sanitary ware.

Locations

E. All locations are approximately correct but are understood to be subject to modifications as may be found necessary in order to meet structural conditions and the requirements of other equipment installations prior to and/or at the same time of installation.

Co-ordination and Method

A. All roughing-in shall be done from measurement of the actual fixtures or from the manufacturers' brochures giving these specific details. Unless stated otherwise, all pipework above ground shall be

concealed within walls, ceiling and plumbing ducts provided and any deviation from this shall be first approved by the Project Manager.

Clean-Outs

B. No clean-out within the building shall be left protruding out of the wall or floor, except where it is concealed behind a sanitary fitting. In all visible locations, clean-out plug shall be recessed and covered by a metal plate. Clean-outs external to the building shall terminate at Grade Level for easy access and properly protected from traffic or otherwise.

Materials Non-Pressure Waste And Soil Pipes

C. Waste and soil pipes up to 100mm diameter internal to the building shall be P.V.C. DWV. (Imperial sizes). P.V.C. pipe shall be installed with all standard P.V.C. fittings using the correct solvent cement for this application.

Cold Water Supply Pipes

D Pipes 25mm to be Grade E PVC. All pipes must withstand test pressure of 150psi on cold water systems.

Venting

E. Venting shall be in accordance with Water and Sewerage Authority regulations and the Isometric Drawing.

Above Ground Support PVC

F. For above ground installation of horizontal runs of PVC pipe, there shall be at least one support hanger located adjacent to the joint. The maximum spacing between hangers shall be 10'-0". For vertical runs of PVC pipe supports shall not be less than every storey height and at the base of the run.

Joints

G. No P.V.C. joints to be made with open flames, heat or sparks. Pipes shall not be flared on site by heat application in order to create a socket joint. A PVC collar shall be used instead.

Fittings

H. All fittings shall be suitable for use with working pressure equal to or better than those applicable to the pipe on which they are installed. For pipes smaller than 3/4" fittings shall be screwed unless otherwise approved. All joints to be leak-proof.

Adapters

I. Adapters shall be used to join pipe of different type, unless solid sleeves are indicated or approved. Adapters shall have ends for the appropriate type of joint to receive the joining pipe.

Valves And Appurtenances

A. Valve working pressure shall be at least equal to that of the pipe on which they are to be installed. Listed below are the general features required for the various types of valves unless otherwise approved.

Handling And Cutting Pipe

B. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe, scratching or marring machined surfaces and abrasion to the pipe coating.

Laying Pipes And Fittings

C. No defective pipe or fitting shall be laid or placed in the piping system and any defective item discovered shall be replaced.

D. Each pipe and fitting shall be cleaned of all debris, dirt, etc., before being laid and shall be kept clean until accepted with the completed work. Pipe fitting shall be laid accurately to the lines and grades indicated as required. Care shall be taken to ensure a good alignment both horizontally and vertically and to give the pipe a firm bearing along its entire length.

Thrust Blocking

E. Joint Restraint devices or thrust blocking must be used for all pressure pipe (including force mains for any change of direction or connection of appliance (e.g. Fire Hydrant). See details given in engineering drawings for information on thrust blocking.

Cutting/Patching Repairing Etc

F. All cutting of walls, partitions, floors etc, required for the installation of work called for under this section will be done by the Plumbing Contractor. Cutting of structural members shall not be done without the approval of the Project Manager.

G. All patching will be done by others.

H. Any cutting or patching required in connection with the installation of this work due to errors on the part of the Plumbing Contractor shall be paid for by him.

I. The Contractor shall guarantee that all work and materials found defective during the maintenance period shall be promptly removed and replaced by him without additional cost to the Owner and that all work so replaced shall be in strict accordance with the drawings and this specification.

J. Where such defects occur, the Plumbing Contractor shall be held responsible for all cost incurred in making the defective work good and all damage to finishes caused by such replacements shall be repaired and left in first class condition by the Plumbing Contractor at his own expense.

Cutting/Patching Repairing Etc.

A. The Plumbing Contractor shall furnish certificates of guarantees from the manufacturer of specialties furnished under this Contract to the effect that they will furnish new parts or apparatus where defects occur due to faulty occur due to faulty manufacture, for the period of one year from date of final acceptance.

Sleeves

B. The Plumbing Contractor shall supply all sleeves for openings, etc as required.

C. Sleeves shall be delivered to the Supervisory Consultant who shall position these as instructed by the Plumbing Contractor. It shall be the Plumbing Contractor's responsibility to ensure that these are accurately placed and fixed prior to casting.

D. The type of sleeve supplied and the nature of their installation for the particular application shall be as described in these specification and the drawings.

Foundations And Plinths

E. The Plumbing Contractor shall supply and position all necessary foundation bolts, and do all final and levelling required by his equipment. Where cork, anti-vibration pads and other such specialties are required below the equipment foundation, they shall be supplied and installed by the Plumbing Contractor.

Licensed Plumber

F. Unless otherwise agreed, a licensed plumber shall be in attendance at all time during execution of the Plumbing works. The onus is on the Plumbing Contractor to seek the approval of the Water and Sewerage Authority, periodic inspections and final connections.

Codes Permits Etc

G. All materials furnished and work done shall comply with the local Plumbing Code. The Plumbing Contractor shall give all necessary notices, file all plans, obtain all permits and pay all fees or other costs in connections with this work. He shall obtain all certificates of inspection which he shall deliver to the Supervisory Consultant who will distribute copies to all concerned.

Temporary Closure

H. When the pipe laying is not actually in progress, the open ends of pipes shall be closed by temporary water tights plugs or by other approved means.

Cleaning

I. Prior to the pressure and leakage tests, pipe shall be thoroughly cleaned of all dirt, dust, oil grease and other foreign materials. These works shall be done with care to avoid damage to inside coating where applied.

Field Testing

A. Except as otherwise directed, all pipe lines shall be tested. Pipe lines laid in excavation or bedded in concrete shall be tested prior to being covered. The cost involved in providing the necessary materials and apparatus including test plugs, nipples, pumps and labour to prepare and perform the tests is to be borne by the contractor.

Soil, Waste Pipes (Above ground)

B. Water Test. Minimum 10ft head
Maximum 15ft head

Soil Pipes (Buried) Sewer Collector

C. Steel Ball. Mirror Test

Vent Pipes

D. Smoke test.

Water Supply Pipes

E. Pressure system to 1.5 times working pressure and hold without loss for 2 hours.

F. All other testing shall conform to the requirements of the Sanitary Authority or other appropriate authority where applicable and shall be to the satisfaction of the Engineer. All approvals of tests to be verified in writing.

Adjustments And Cleaning

G. After all fixtures are completely set and connected, the contractor shall adjust the various supply valves, fixtures, fittings, etc., so that the proper delivery of water is obtained at all fixtures. Before work is finally turned over to the owner, the contractor shall make such additional adjustments as may be found necessary to deliver the job in proper working condition.

H. All this time, all fixtures, escutcheons, fittings and nameplates, pipe covering and finishings in general shall be completely gone over by the Plumbing Contractor and left in a finished and neat condition.

a) Clean all parts of the installation exposed to view.

b) Protect from weather and/or oxidation all part of the installation.

c) Provide means of identification of all parts of the installation.

d) Touch up paint of factory finished equipment.

e) Clean, dust, varnish, polish, touch up etc., all of above for final inspection.

As Installed & Record Drawings

A. The Plumbing Contractor shall keep one copy of all drawings, specifications and approved shop drawings of the work in order, available to the Project Manager and to his representatives. As the work progresses, the Plumbing Contractor shall record changes to the project as built.

B. At the completion of the installation and before the final inspection, the Plumbing Contractor shall liase with the Engineer in ensuring the production of an accurate record of "As Built Drawings".

Maintenance

C. Allow for maintenance of the complete installation to the end of the defects liability period. Maintenance shall include: -

i) Cleaning lubrication and adjustments, etc of the equipment and accessories in accordance with the Manufacturer's recommendations on a regular basis.

ii) Repair and/or replacement of any part or parts of the installation which may malfunction or prove to be defective whether under the manufacturer's guarantee or not. Repairs are to be made with a minimum of downtime for the equipment.

iii) No charge whatsoever arising out of the maintenance will be accepted by the Owner. Duties, transport and all other cost will be to the Contractor's account.

iv) Project Manager 's certification of the maintenance undertaken.

Maintenance Manual

A. Two (2) copies of a Maintenance Manual shall be assembled in plastic covered three-ring binders and delivered to the Project Manager before expiry of the Defects Liability Period.

B. The Manual shall include the following:-

1) Manufacturer's catalogues and shop drawings.

2) All manufacturer's installation and maintenance instructions packed with equipment, electrical and controls wiring diagrams, etc.

3) Lists of spare parts.

4) A copy of these specifications

5) A copy of "As installed & Record Drawings".

6) Manufacturer's test results if such required by equipment specifications.

7) Recommended control settings.

8) Any other information considered useful by the Contractor.

9) System performance, test results and final settings as specified in these specifications.

Tags/Charts/Instructions

C. Provide proper identification of the systems and its components as specified in the elevant technical specifications.

FLOOR, WALL AND CEILING FINISHINGS

General

Cement, sand, water and plasticiser

A Cement and water shall be as described under "CONCRETE WORK".

B Sand and plasticiser shall be as described under "BLOCKWORK".

FLOORS

Brushed concrete finish

C A brushed concrete finish shall be produced by sweeping the surface of concrete with a bass broom so as to leave visible lines in a roughly parallel configuration on the concrete when it has finally hardened.

Granolithic

D Granolithic shall be composed of two parts of cement to five parts of blue limestone chippings, from an approved source, graded from 6mm down with not more than 20% fine material passing a B.Sc. 200 mesh sieve. The blue limestone chippings shall be angular and free from flaking particles.

E Granolithic shall be floated onto ordinary concrete or screeded bed, to a pattern between dividing strips, within twelve hours of the latter being laid, otherwise the concrete or screeded surface shall be hacked, cleaned and watered and afterwards treated with cement slurry before the paving is laid.

F Immediately after spreading and compacting the topping, tamp surface with a wood float to ensure a level surface and trowel to a smooth finish.

G Where paving is described as one-time or applied "brushed", wash and wire-brush surface to expose the aggregate about one and a half hours after laying, the exact timing being related to the setting of the concrete.

H Where paving is described as "non-skid" the surface shall be ground to expose the aggregate and give a smooth even finish.

I Where paving is described as "polished" the surface shall be ground to expose aggregate and give a smooth even finish and sealed polished with an applied wax polish.

J Two-tone granolithic shall consist of panels each wholly of one of the combinations ordinary grey cement/Guanapo gravel and ordinary grey cement/blue limestone chippings or other combinations listed on the drawings and laid to a consistent pattern.

Tiles

A Ceramic tiles for floors shall conform to B.S. 6431:1983.

B Glazed ceramic tiles for walls shall conform to B.S. 6431:1983.

C Tiles shall be set out so as to avoid or minimise unsightly cutting, to establish the position of movement joints and to maintain straight joints.

D Apply a thin bed of an approved adhesive to a consistent thickness on floors and walls to receive tiles. Fix tiles before any surface drying of the adhesive occurs. After the tiles have been firmly fixed apply grouting material mixed to consistency recommended by the manufacturer to as large an area as can be worked before hardening commences. Work well into joints until they are completely filled and when grout has set, remove surplus and tool joints to required profile. At all exposed edges rounded edge tiles shall be used without mitring corner tiles.

E Tiles shall be fixed by competent tilers approved by the Project Manager.

F The Contractor shall allow in his price for constructing a sample panel for wall and floor tiles, each sample of approximately $16ft^2$, for the approval of the Project Manager. Subsequently, the standard of workmanship approved, shall be the standard by which the works shall be executed.

Beds

G Mix for beds shall be in the proportions of one part of cement to three parts of sand.

H Thoroughly brush clean surfaces to receive beds of all foreign matter. Provide an adequate bond between beds and concrete either by using an approved concrete bonding agent or by well hacking, wetting and applying cement grout immediately prior to laying beds.

I Lay beds to thicknesses and with surface finish as described.

J Fill joints or cracks with an approved plastic material and finish flush with surface.

K Prime chalky or dusty surfaces to receive tiles with a primer recommended by the tile manufacturer.

Levels

L Ensure that the levels of floors and paving within any area and between adjoining areas are constant unless specifically described or shown to be otherwise. Make up for any variations in the thickness of floor and paving finishings and irregularities in the surface of the structural base by adjusting the thickness of the screed as necessary.

Protection

M Protect all premoulded floor finishings from walking or other disturbances for five days after laying.

N Wet all in-situ floor finishings and keep damp for at least seven days after laying by thickly covering with hessian or polythene membrane kept moist by frequent sprinkling with water.

Protection (Cont'd)

A Cover all floors up to the completion of the Works with a temporary covering. On completion of the Works, clean off temporary coverings, remove all stains, mortar splashes, etc., from the floors and leave perfect for handing over.

WALLS

Rendering Work and Backings

Rendering

B Mix rendering of cement and sand, in the proportion of one part cement and five parts sand and lay to the thicknesses described with a plasticiser added in strict accordance with the manufacturer's instructions.

C Proportion materials by measure and not by estimation and proper approved measuring boxes must be provided for this purpose. Make up mix on site in a closeboarded wood platform with upstand edges and thrice turn over mix while water is being added through a rose director and use immediately thereafter.

D Where approved mechanical batch mixers are employed, rotate each batch in the drum at least two minutes and use immediately thereafter.

E Thoroughly wash out all platforms and mixers at the cessation of work each day and as necessary during the working hours.

F Mix only quantities which can be used at once and reject rendering which has begun to set before being required.

G Carefully float all work and finish to the stated thicknesses with surfaces perfectly flat to stand the straight edge every way, free from all cracks, blisters, or after effects and leave perfectly clean.

H "Throw" all rendering and plaster on to the wall and give the minimum of "working" to ensure a plumb and even finish. Use only wood floating unless otherwise described.

I Where possible complete each section of walling in one operation, but where this is not possible the existing edge shall be well hacked and wetted before recommencing operations. Throughout the whole of the works order sufficient sand to prevent any variation between the quality and colour of different renderings.

J Allow for preparing and wetting all surfaces prior to commencement of all operations, for any additional thicknesses required in dubbing out and for working round and behind pipes with their connections and fixtures.

Backings

K Mix and apply backing as described under "Beds".

CEILING

Gypsum

A Gypsum sheets shall be manufactured to BS 1230:1970. The fixing system shall be hot dipped zinc coated mild steel sections to BS 292:076 and BS 2989:1975 using the paraclip fixing system.

Storage and handling of materials

B Store materials in dry conditions. If storing on concrete, boards should be supported by timber platforms. Carry boards on edge to prevent breakage.

Workmanship

C Fix main supporting channels at 410 mm centers using wire ties on plugs and screws to backgrounds as is required. Fix intermediate suspension members to main support with approved plasterboard screws. Fix sheets to suspension system with staggered joints. Joints in sheeting shall be taped with jointing tape and filled with jointing compound.

D The entire surface should be sanded and left smooth for decoration.

Pricing

E. Prices of Floor, Wall and Ceiling Finishings shall include:-

1. All considerations arising from the specification.

2. All preparatory work to the surfaces to be treated.

3. Producing material samples and preparing sample panels of finished work as and when directed by the Project Manager.

GLAZING

General

A Glass shall be obtained from an approved manufacturer and shall conform to B.S. 952 Part 1: 1978. All glass shall be delivered in proper containers with maker's name, guarantee, type of glass and thickness or weight of glass attached to the outside of the containers.

Sheet glass

B Sheet glass shall be selected glazing quality of the weights or thicknesses stated.

C Float glass and plate glass shall be of the thickness stated and be perfectly flat and true.

Wired glass

D Wired glass shall be of the thicknesses stated, be polished georgian and be perfectly flat and true.

Putty

E Putty for glazing metal frames shall be that supplied or recommended by the metal windows manufacturer.

Glazing

F All float glass louvre blades shall have ground and polished long edges.

G Cut glass to sizes required as measured on site with a clearance on all sizes to allow for flexible 4 mm spacers and bedding blocks all set plumb, square and level in alignment with other work and glazing. Metal frames to have back putty and peg with neat front putty kept below the sight lines. Timber frames to be set and watertight with approved non-hardening electrometric caulking compound.

H Glazed door glass to be set with spacers as above and secured with wash leather or equal strips to prevent rattling.

Mirrors

I Mirrors shall be of selected quality polished plate silvered mirror glass enameled after cutting, polished edges and drilled for chrome plated dome head mirror screws and plastic washers fixing. All mirrors to have 50 mm diameter curved corner as listed on drawings.

Pricing

J Prices for Glazing shall include for all considerations arising from the specification.

PAINTING AND DECORATING

General

A All materials used, unless otherwise stated, shall be anti-fungus. Wherever available environmental benign water based paints and primers free from toxic solvents and lead-free will be used.

B Supply paints on site in sealed cans and all mixing etc., shall be in accordance with the manufacturer's instructions. No paint is to be thinned.

C Produce vouchers as and when required by the Engineer to prove to his satisfaction that all materials supplied are genuine and as specified herein.

Preparation and application

D Thoroughly dust and clean down all surfaces to be painted, cut out cracks, stop holes and clean steelwork rust in accordance with approved practice.

E Apply paint by brush, roller or spray with the minimum of dilution.

F Strain the prepared paint free from skins and similar impurities immediately before application.

G Allow to dry and well rub down each coat of paint before the next is applied and no two successive coats shall be to the same tint.

H No paint shall be applied to a damp surface and no external painting shall be carried out during wet weather.

I Remove metal furniture and fittings before painting to general surfaces and afterwards re-fix.

J On no account allow employees to empty washings or painting materials into sanitary fittings or drainage systems, so provide a suitable receptacle outside the building to receive same.

Brand names

K The Generic type of paints which will be allowed for use on this project are:

i.	Emulsion paint:	Terpolymer Latex – internally Acrylic Latex – externally
ii.	Oil paint:	Long oil modified Alkyd – internally and externally
iii.	High Gloss Enamel:	Polyurethane Modified Alkyd
iv.	Emulsion Primer:	Terpolymer Latex
v.	Varnish:	Polyurethane single pack

vi. Wood primer: Modified Alkyd

vii. Metal primer: Polyamide Cored Epoxy

Brand names (Cont'd)

Surfaces shall be prepared and paint applied strictly in accordance with the written recommendations of the Manufacturer.

Masonry and hardboard surfaces

A Prepare masonry surfaces for painting by allowing to dry for as long as possible and removing all mortar splashes by rubbing with a pumice or flat stone and thoroughly brushing to remove dust.

B Prime surfaces with one coat of emulsion and allow to dry. Fill all cracks, holes, etc. with patent filler which shall be allowed to set before sanding to a smooth finish before the application of subsequent coats of emulsion paint.

C Surfaces which are selected for a textured finish shall, after preparation as described for general masonry surfaces, be treated with an etching solution in accordance with the manufacturer's recommendation and finished with a single coat of texture emulsion paint.

Woodwork

D Prepare surfaces of woodwork for painting by sanding smooth and cleaning free of dust. Treat knots and resin pockets with one coat of knotting varnish to prevent bleeding and allow to dry. Apply one coat of wood primer and one coat of oil paint after which all cracks, holes, etc., shall be filled with anti-fungus putty, which shall be allowed to set before sanding to a smooth finish before the application of subsequent coats of oil paint.

Metalwork

E Prepare surfaces of metalwork for painting by removing dirt, grease, etc., with an approved solvent and rust and scale by wire-brushing, chipping, etc., allowing to dry.

F Paint metal surfaces with one coat of primer and two coats of oil paint allowing at least one hour drying between coats.

Pricing

G Prices for Painting and Decorating shall include:-

1. All considerations arising from the specification.
2. Varying colours in individual rooms or areas in accordance with the Engineer's colour schemes.
3. Preparing fairly large sample panels of finishing colours as and when directed by the Engineer.

4. All preparatory work to the surfaces to be painted.

5.

ELECTRICAL INSTALLATIONS

1.0 Basic Materials and Methods

1.1 General Provisions

In the absence of any specific indications in the drawings, the provisions of this section shall apply. In case of conflict, the drawing shall take precedence.

1.1.1 Electrical Drawings and Reference Symbols

The drawings are diagrammatic and indicate generally the locations of materials and equipment. These drawings shall be followed as closely as possible. The contractor shall coordinate the work under this section with the architectural, structural, plumbing and air-conditioning and the drawings of other trades for exact dimensions, clearances and roughing-in locations. This contractor shall co-operate with all other trades in order to make minor field adjustments to accommodate the work of others.

The drawings and specifications are complimentary, each to the other, and the work required by either shall be included in the contract as if called for by both.

The electrical symbols used on the legend for this project are standard symbols and all may not appear on the project drawings. However, whenever the symbol occurs on project drawings the items shall be provided and installed.

1.1.2 Authorities and Regulations

The electrical system shall comply with the wiring code of Grenada and any other requirements or guidelines set out by the Government Electrical Inspectorate in the inspection and acceptance of the installation. The following codes and regulations shall be used as reference:

- Requirements for Electrical Installation - IEE Wiring Regulations Sixteenth Edition

For further reference, if necessary, refer to :

- American National Electrical Code

In the event that there is any conflict between the wiring codes, it shall be resolved at the discretion of the Engineer.

1.1.3 Inspection, Testing and Commissioning

No installation shall be deemed completed until inspected, tested and certified by the Government Electrical Inspectorate, with the final approval of the Engineer.

At the time of final inspection, all connections at panels, fixtures, equipment and all splices must be made. All accessories must be fitted and all equipment suitably tagged, labelled or identified.

All major pieces of equipment shall be tested and commissioned by the Manufacturer/Contractor or his representative in the presence of the Engineer. The Contractor shall arrange the date of commissioning. The Engineer shall draw up a program of tests suitable to the Manufacturer/Contractor who will actually perform the tests.

The Engineer shall not be responsible for any operation of equipment prior to testing, commissioning and acceptance.

1.2 Grounding

1.2.1 General

The contractor shall furnish and install a complete grounding system or systems for light and power, computer and communication on the installations specified.

Grounding cables shall be of bare, stranded copper, unless otherwise indicated. Cable sizes shall be indicated on the drawings.

1.2.2 Substation Grounding

Unless otherwise indicated, the grounding at each transformer substation shall include a ground cable buried in the ground at least 150mm below finished grade and circling all the equipment and connected to the ground rods.

Taps from the main ground cables shall be made to the frame of each transformer, to the transformer neutral and to all other equipment requiring grounding as indicated on the drawing and/or required by the power company.

1.2.3 Transformer Grounding

Secondary neutrals of subsidiary transformers shall be grounded through cable connections to the distribution panel from which they receive their power supply, or through a separate grounding cable connected to the main system ground.

1.2.4 Grounding of Miscellaneous Equipment

Permanent and effective ground connections shall be provided for all metal cases of supporting frames of electrical equipment (such as motor starter enclosures, motor frames, transformer cases and lighting panel enclosures) by separate ground wires.

All necessary conduit, conductors, clamps. connectors, etc. for the grounding system shall be furnished, installed and connected by the electrical contractor.

1.2.5 System Grounding

The identified neutral wire of the interior wiring system shall be permanently grounded. The grounded wire shall be connected to the supply side of the main circuit breaker and soldered to an approved ground damp and securely bonded to driven rods. The size of the ground conductors shall be in accordance with the code.

The conductors maybe protected from mechanical injury by rigid steel conduit to which the conductors shall be securely bonded. Conduit system as well as wire armour of cable shall be securely grounded to the above described ground wiring system. The whole shall be connected to driven copper rods.

1.2.6 Ground Rod (Electrode)

Copper Electrodes shall be 2.4m long and buried at a depth of not less than 2.5m.

Where rock bottom is encountered at a depth of less than 1.2m, the electrodes shall be buried in a horizontal trench at least 3m long and at a depth of not less than 0.6m.

Plate electrodes shall present not less than 0.1,9 square meters surface to exterior soil. Electrodes of iron or steel plates shall be at least 6mm thick. Electrodes or non-ferrous metal shall be at least 1.5mm thick.

Each electrode shall be separated at least 4.8m from any other electrodes including those used for signal circuits, radio, lightning rods or any other purpose.

Where separate electrodes are bonded together, the bonding conductors shall be installed so as not to be subject to mechanical damage.

Each complete rod electrode shall be provided with a clamp for connection to the ground cable or cad welded.

1.3 Main Switchboard (LV)

1.3.1 Panel boards - Circuit Breaker

1.3.1.1 General

Furnish and install circuit breaker panelboards as indicated in the panelboard schedule and where shown on the drawings. The panelboard shall be dead-front safety type equipped with moulded case circuit breakers or miniature circuit breakers as required and shall be surface or flush mounted as called for on the plans and schedules.

1.3.1.2 Circuit Breakers

Provide circuit breakers of type, trip rating and interrupting capacity as shown on the schedules. Also, provide the number of spaces for future circuit breakers as shown in the schedule. The circuit breakers

shall be quick-make, quick-break, thermal-magnetic, trip indicating and have common trip on all multipole breakers with internal tie mechanism. Molded case circuit breakers shall be equipped with adjustable thermal trip settings.

1.3.1.3 Bus Assembly

Main busbars on the panelboard shall be calculated on the basis of 1,000 Ampere per square inch of cross sectional area. Busbar connections to the branch circuit breakers shall be the "phase sequence" type. Each panel shall contain a neutral bar and have as many taps as there are branch circuits in the panel. All current carrying parts of the bus assembly shall be plated. Mains rating shall be as shown in the panelboard schedule or the plans. Solid neutral assembly shall be provided when required.

1.3.1.4 Wiring Terminals

Terminals for feeder conductors to the panelboards mains and neutral shall be suitable for the type of conductor specified. Terminal for branch-circuit wiring, both breaker and neutral shall be suitable for the type of conductor specified.

1.3.1.5 Cabinets and Fronts

Panel cabinets shall be manufactured of steel and shall be hot dip galvanized after fabrication. The size of the wiring gutters and gauge of steel shall be in accordance with NEMA standards. Front shall include door and have flush, brushed stainless steel, spring loaded door pulls. All panelboard locks shall be keyed alike. Fronts shall not be removable with door in the locked position. Cabinet and cover shall be painted two coats of shop paint before delivery to the site. The panelboard designation, the supply voltage and main breaker if any, shall be dearly engraved in the front of the cabinet.

1.3.1.6 Directory

On the inside of each cabinet, a 125mm x 200mm type written directory under glass or clear plastic shall be provided. The directory shall have a description of the loads on each branch circuit and the trip size for each branch. The size of the feeder conduit and size of the feeders shall also be on the directory as well as whether the panel is sub-fed from or sub-feeds another panel.

1.3.1.7 Panelboard Installation

Before installing panelboards, check all the architectural drawings for possible conflict of space, and adjust the location of panelboard to prevent such conflict with other items.

When the panelboard is recessed into a wall serving an area with accessible ceiling space, provide and install an empty conduit system for future wiring. A 32mm conduit shah be stubbed into the ceiling space above the panelboard and under the panelboard if such accessible ceiling space exists. The electrical contractor shall be responsible for furnishing all materials for mounting the panelboard.

1.3.2 Cabinets

The contractor shall furnish and install, where shown on the drawings, cabinets to serve the several purposes indicated. Cabinets of the various panelboards shall be of the sizes required.

All cabinet boxes shall be rigidly constructed of sheet metal. Material gauge shall conform to code requirements except that no material lighter than No. 14 gauges shall be used. Comers shall be overlapped or welded. Edges shall be turned over to receive trim. Each cabinet front shall be fastened in place by toggle bogs, or other adjustable fasteners that will allow plumbing. Each door shall be

provided with a substantial flush type tumbler lock catch. All locks shall be keyed alike. Fronts and boxes shall be shop painted with an anti-corrosive prime coat.

1.4 Switching and Protection

1.4.1 Disconnect Switch – General

Furnish and install safety switches as indicated on the drawings or as required. All disconnect switches shall be NEMA General Duty Type and UL listed. The switches shall be Fused Disconnect Switches or non-fused Disconnect Switches as shown or as required.

1.4.2 Switches

Switches shall have a quick-make and quick break operating handle and mechanism which shall be an integral part of the box. Lighting switches shall be to BS 3676 and shall be rocker operated 20A ac type mounted on fire retardant polycarbonate boxes at a height of 1350mm (4ft. 6in) from fixed floor level in the positions shown on the drawings. Two way (and possibly intermediate) switching shall be provided where requisite but certainly for control of stairway lighting points. Switches shall be flush mounted on to moulded boxes.To support ceiling mounted cord operated switches, wood bearers are, if necessary, to be suitably fixed by the Electrical Contractor between joists to take the switch fixing screws. At every lighting switch position the earth continuity conductor of the final circuit shall, in accordance with wiring regulations, be connected to an earthing terminal.

1.4.3 Enclosures

Switches shall be furnished in NEMA 1 general - purpose enclosures with knockouts unless otherwise noted or required. Switched located on the exterior of the building of in "wet' locations shall have NEMA 3R enclosures (WP) or IP 65.

1.4.4 Installation

Disconnect Switches shall be securely mounted in accordance with the NEC. The contractor shall provide all mounting materials. When required, switches shall be provided with fuses as noted. The fuses shall be dual-element on motor circuits.

1.4.5 Manufacturer

Switches shall be Crabtree or approved equal.

1.4.6 Socket Outlet Circuits

Except in detached garages/outbuildings, switched socket outlets shall be rocker operated 13A flush pattern to BS 1363, mounted on 25mm (1 in) deep flush moulded boxes at a height of approximately 400mm (16in) above the floor level or, in kitchens etc. approximately 300mm (12in) above a working surface (measurements to bottom of socket plate).

Sockets in Kitchens shall include neon indicators.
Single and double gang switched sockets shall be flush mounted on to a moulded box.

Where a surface mounting installation is required, switched sockets shall be mounted on to surface boxes for single or double gang units as required.

Socket outlets designed for the supply of washing machines, etc., and mounted at low level behind the appliance shall be unswitched and shall be 1-gang or 2-gang, mounted on the appropriate boxes.

For detached garages/outbuildings, switched socket outlets shall be metal enclosed surface type, 1-gang or 2-gang. They shall be mounted 1350mm (4ft. 6in) above ground level.

1.4.7 Circuit Breakers

Provide and install molded-case circuit breakers of frame type, trip rating and interrupting capacity as shown on the schedule. Each pole of these circuit breakers shall provide inverse time delay and instantaneous circuit protection. The circuit breakers shall be quick-make, quick-break, thermal-magnetic, trip indicating and have common trip on all multiple breakers with internal tie mechanism.

Tripping due to overload or short circuit shall be clearly indicated by the handle automatically assuming a position midway between manual ON and OFF positions. Ail latch surfaces shall be ground and polished.

Interchangeable trip breakers shall have the trip unit sealed to prevent tampering. Amperes ratings shall be dearly visible. Contacts shall be non-welding silver alloy. Circuit breakers shall be listed with UL and conform to the applicable requirements of NEMA.

1.5 Raceways

1.5.1 Conduit Hangars and Supports

Conduit throughout the project shall be securely and rigidly supported to the building structure in a neat and workmanlike manner, and wherever possible, parallel runs of horizontal conduit shall be grouped together on adjustable trapeze hangers. Support spacing shall not be more than 2.4m. Exposed conduit shall be supported by one-hole, malleable iron straps, two-hole straps, suitable beam damps, or split ring conduit hanger with support rod.

Single conduit 32mm and larger run concealed horizontally shall be supported by suitable beam damps or split ring conduit hangers with support rod. Multiple runs of conduit shall be grouped together on trapeze hangers where possible. Vertical runs shall be supported by steel riser damps.

Conduit 25mm and smaller run concealed above a ceiling may be supported directly to the building structure with strap hangers or No.14 gauge galvanized wire provided the support sparing does not exceed 1.2m.

1.5.2 Pull Wires

This contractor shall furnish and install a No. 14 iron pull wire in every empty conduit or trucking installed to facilitate the future installation of wires. Identify each terminus of pull wire with linen tags with complete information as to service and the location of the other terminus of wins.

1.5.3 Conduits

PVC Conduits to BS 6099 may be joined to each other or to accessories by permanent bonding of the two parts, by a weatherproof joint or by threaded joint. Elbows, bends, tees, shall be of the inspection type. Adaptable junction switch or outlet boxes shall be accessible and have removable covers whether on surface or buried. PVC conduit tubing shall be fixed to boxes with sprouts by use of manufacturers approved fittings and the male portion twisted into it to ensure total coverage and a

solid joint. Tubing fixed to boxes without sprouts whether they are of steel PVC composition shall be by use of manufacturers approved PVC tubing adapters having "female socket for plain tube adhesive joint, but with female thread at the other end for receipt of a male screw bushing'. No conduit smaller than 12 mm internal diameter shall be used. All cuts shall be made square and done with a hacksaw. PVC conduit not exceeding 25 mm diameter shall normally be bent cold using the manufacturer's recommended bended spring if available. If unavailable and to bend larger sizes PVC conduit, the conduit shall be heated until it is pliable for bending by inserting in a large sized steel pipe over a burner or blowlamp. A 90° bend shall have a radius of not less than four times the outside diameter of the tube. During installation, all conduits, unfinished runs and terminations in pull boxes, cabinets, etc. shall be capped in an approved manner. There shall be no more than a total of 360° bends or 30m of continuous runs without pull boxes. PVC conduit shall be supported within 1.2 m of each box cabinet or other conduit termination. Conduit sizes referred to in these specifications and on the drawings are all given in outer diameters. An insulated earth continuity conductor shall be drawn into the conduit for all light and power wiring systems. The maximum conduit fill shall be 40% of its cross-sectional area. Only rigid metal conduit or intermediate metal conduit are to be used in all hazardous areas. These conduits must incorporate seals when run between hazardous and unclassified areas. The seal shall be placed within12 inches of the unclassified area.

1.5.4 Surface Raceway

1.5.4.1 General

Surface raceways shall be continuous from outlet to outlet, junction box to approved fittings designed especially for use with moulded raceway. All outlets shall be provided with approved terminal fittings which protect the insulation of the conductors from abrasion unless such protection is afforded by the construction of the boxes or fittings. Raceway shall be of size noted, and shall be installed in an approved and workmanlike manner. Runs shall be parallel or at right angles to walls and partitions. Connections shall be made to other types of raceways in an approved manner with fittings manufactured for the purpose and application.

Where combination raceways, such as telephone and power circuits or signal, lighting and power circuits are installed, each system shall be run in separate compartments clearly identified and maintaining the same relative position throughout the system. The number of conductors installed in any raceway shall not be greater that the number for which the raceway is approved.

1.5.4.2 Riser Penetrations

All conduit and cable tray riser floor penetrations shall be firestopped with a qualified firestopping system of intumescent putty to a rating of 3 hours.

1.6 Boxes and Fittings

1.6.1 Outlet Boxes

All outlet boxes shall be made of moulded polycarbonate by an approved NEMA method. Pressed steel outlet boxes will not be permitted in the construction. All outlet boxes shall be at least 25mm deep, single or ganged of proper code size to accommodate the devices noted. The outlet boxes shall be complete with the approved type of connectors and required accessories such as ears, studs, cable damps and covers.

Outlet boxes must be securely fastened on positions with the exposed edge of the raised device cover flush with the finished surface. Approved factory-made, knockout seals shall be installed where knockouts are not intact.

Outlet boxes for exposed work shall be utility (handy) boxes with utility box covers unless otherwise noted. Attention is called to the fact that the location of the outlets, apparatus, or equipment on the contract drawings is approximate.

1.6.2 Floor Boxes

Outlet boxes for floor receptacles; both telephone and power shall be of the cast metal, threaded-conduit entrance, waterproof type. Three legs shall be welded to the bottom of the box for level adjustment, these legs being set to permit full use of all knockouts. Boxes shall be supplied with adjusting rings, aluminium bases and 12mm diameter and 32mm long standpipe stems for receiving receptacle heads, complete with gasket.

1.6.3 Wall Boxes

Outlet boxes for wall receptacles both telephone and power, shall be mounted 450mm above finished floor (AFF) unless other noted. When the receptacle is mounted on a masonry wall, the bottom of the outlet box shall be in line with the bottom of a masonry unit.

All receptacle outlet boxes shall be equipped with grounding leads, which shall be connected to grounding terminal of the device.

1.6.4 Switch Boxes

Outlet boxes for switches shall be mounted 1.35mm above the finished floor (AFF) unless otherwise noted and shall be located on the strike side of the doors as finally hung, whether so indicated on the plans or not. When the switch is mounted in a masonry wall, the bottom of the outlet box shall be in line with the bottom of a masonry unit.

Where more than two switches are located, the switches shall be mounted in a gang outlet box with gang cover. Dimmer switches shall be individually mounted unless otherwise noted. Switches with pilot lights, switches with overload motor protection, and other special switches that will not conveniently fit under gang wall plates shall be individually mounted.

1.6.5 Ceiling Boxes

All lighting fixture outlet boxes shall be furnished with the necessary accessories to install the fixture. The supports must be such as not to depend on the outlet box supporting the fixture. The supports for the lighting fixture shall be independent of the ceiling system. All ceiling outlet, boxes shall be equipped with raised circular cover plates with edges set flush with surface of finished ceiling.

1.6.6 Junction Boxes

Where indicated on the plans, and where necessary to terminate, tap-off or redirect multiple conduit runs, the electrical contractor shall furnish and install appropriately designed junction boxes. Boxes shall be moulded polycarbonate and shall have full-access screw covers mounted with corrosion-resistant machine screws. Covers shall be for flush or surface installation as noted.

Boxes shall be as required by the I.E.E. for the number of conduits and conductors entering and leaving it. Where intermediate cable supports are necessary because of box dimensions, provide

insulated, removable cross-brackets to support the conductors as required by the I.E.E. and local code. Where indicated on the drawings, junction boxes are to be equipped with steel barriers to separate the feeder circuits. Where feeder splices are to be made, boxes shall be large enough to provide ample workspace. Boxes shall be supported independently of conduits entering them. Brackets, rod hangers, bolts or other approved supporting methods shall be used.

1.6.7 Pull Boxes

All pull boxes shall be constructed of moulded polycarbonate, the dimensions of which shall not be less than NEC requirements and shall be increased if necessary for practical reasons or where required to fit a job condition.
Furnish and install pull boxes where necessary in the raceway system, whether indicated on the drawings or not, to facilitate conductor installation. In general, conduit runs of more than 30m or with more than four 90 bends, shall have a pull box installed at a convenient intermediate location. All such pull boxes shall be indicated on the contractor's shop drawings.

Boxes shall be securely mounted on the building structure with supporting facilities independent of the conduits entering or leaving the boxes. Where boxes are used in connection with exposed conduit, plain covers attached to the box with a suitable number of countersunk flathead machine screws shall be used.

1.6.8 Cable Support Boxes

Vertical cable support boxes made of moulded polycarbonate shall be furnished and installed on the riser conduits whether indicated on the drawings or not. Boxes shall have removable screw covers fastened by corrosion-resistant machine screws, and shall be large enough to accommodate the feeder conduits indicated, and shall provide ample space to install cable supports in the conduits.

Individual two-bolt, clamp type conduit supports shall be provided for each conduit at floor level. Ends of clamps shall extend sufficiently over opening to provide a firm conduit bracing on the floor.

1.7 Wire and Cable

1.7.1 General

The electrical contractor shall provide and install a complete wiring system as shown on the drawings or specification herein. All conductors used in the wiring system shall be soft-drawn copper wire having a conductivity of not less than 98 percent, that of pure copper. Each conductor shall be continuous without weld, splice or joint throughout its length, shall be uniform in cross-section, free from flaws, scales and other imperfections.

The wire shall be delivered to the site in its original unbroken packages, plainly marked or tagged as follows

- Underwriter's Labels
- Size, kind and insulation of the wire
- Name of manufacturing company and the trade name of the wire

Conductors shall be color-coded. Mains, feeder and sub-feeders shall be tagged in all pull, junction and outlet boxes and in the gutter of panels with approved code type wire markers. No wire shall be drawn into a conduit until all work of a nature, which may cause injury, is completed. No lubricant other than powdered soapstone or approved cable pulling compound shall be used to pull conductors. No material, which may be injurious to the wire covering or insulation, shall be used.

1.7.2 Low Voltage Conductors

PVC or XLPE insulated conductors in pvc conduit shall be used or PVC or XLPE armoured cable in the large sizes with 600-volt rating unless otherwise noted. No wire smaller than 1.5 sqmm shall be used except for signal control circuits. All receptacle circuits shall be wired with 2.5 sqmm conductors unless otherwise scheduled or noted. All lighting circuits shall be wired with 2.5 sqmm for circuit runs of less than 100 ft, 4.0 sqmm wire shall be used for longer runs in all cases limiting the voltage drop from panelboard to furthest outlet to within 2½%.

At least 6" of slack wire shall be left in every outlet box whether it is in use of left for future use. All conductors and connections shall be test-free of grounds, shorts and opens before turning the job over to the owner.

1.7.2.1 Conductor Temperatures

Feeders shall be rated at 75 °C
Branch circuits shall be rated at 75 °C.

1.1.2.2 Special Location

Conductors in special locations such as range hoods, lighting fixtures, etc., shag be as required by the NEC, local code or as otherwise noted.

1.7.2.3 Lugs, Taps and Splices

Joints on branch circuits shall occur only where such circuits divide and shall consist of one through circuit to which shall be spliced to branch from the circuit. I No splices shall be made in conductor except at outlet boxes, junction boxes or splices boxes.
All joints or splices for 6.0 sqmm or smaller wire shall be made with UL approved wire nuts or compression type connectors.

All joints or splices for 10.0 sqmm or larger wires shall be made with a mechanical compression connector. After the conductors have been made mechanically and electrically secure, the entire joint or splice shall be covered with switch No. 33 tape or approved equal to make the insulation of the joint or splice equal to the insulation of the conductors. The connector shall be UL approved.

Black heat shrinkable thin-wall tubing as FP-301 supplied by 3M shall be applied to all Xlpe insulated conductor tails exposed to sunlight.

1.7.3 High Voltage Conductors

The term "high voltage" as used here refers to any circuit operating voltage above 600 volts, to phase. Cable shall be armoured, shielded cross-linked polyethylene unless otherwise stated, manufactured in accordance with the latest British, NEMA or equivalent International Standards.

Semi-conductive tapes shall perform the electrostatic shield function or extruded coverings of semi conductive materials combined with metal shielding.

1.8 Lighting

1.8.1 General

Unless specified otherwise, the electrical contractor shall furnish all luminaries and lighting equipment shown on the plans, listed in the Fixture Schedule, and specified herein. He shall furnish all labour and materials required to install the specified equipment in the manner indicated. All luminaries and lighting equipment shall be delivered to the building complete with suspension accessories, canopies, casings, sockets, holders, reflectors, ballasts, diffusing materials, lowers, plaster frames, recessing boxes, etc., all wired and assembled as indicated.

The fittings shall be properly aligned, levelled and free from warps, dents or other defects at the time of acceptance. Hangers, frames, supports, trims, shall be installed in an approved manner. Fittings shall be cleaned and installed complete with lamps or tubes as detailed. At the time of acceptance of the installation all lighting fittings shall be equipped with lamps of correct type and wattage and functioning correctly. Only high power factor fittings are permitted.

1.8.2 Fixture Type

The fixture for each location is indicated by type letter. Refer to fixture schedule on the drawings for each type, manufacturer, catalogue number and type of mounting.

1.8.3 Shop Drawings

Shop drawings for lighting fixtures shall indicate each type together with manufacturer's name and catalogue number, complete photometric data compiled by an independent testing laboratory, and type of lamps) to be installed. No fixtures shall be delivered to the job until approved by the Engineer.

If the electrical contractor submits shop drawings on a fixture for approval other than those specified, he shall also submit a sample fixture when requested by the Engineer. The sample fixture will be returned to the electrical contractor. The decision of the Engineer shall be final.

1.8.4 Fluorescent Ballasts

All fluorescent fixtures shall have a single high power factor greater than 0.9, quiet operating, class A sound-rated, thermally protected class P cool-rated electronic ballast with UL approval operating at a frequency above 20khz. Ballast shall be as manufactured by Philips or approved equal rated at 230v/50Hz with voltage tolerance of +/-10% and total harmonic distortion not exceeding 10%. Ballasts shall operate as a parallel circuit allowing remaining lamps to operate even if one or more lamps fail. The ballasts shall be subject to a 2 year manufacturer's guarantee. Guarantee shall be filed with the Owner.

1.8.5 Fluorescent Lamps

The electrical contractor shall furnish and install T8 lamps in all fixtures as indicated on the drawings or as required. Fluorescent lamps shall be standard daylight 6000K CRI 80.

2.0 TELEPHONE/DATA DISTRIBUTION

The contractor shall supply and install all conduits, boxes and inserts to provide a complete system to receive the cables. Each workstation shall have its own home run using 25mm conduit . All conduits must be blown through and left clear and dry. Pull wires shall be provided for cable installers.

2.1 SCOPE OF WORK

The work described herein and on the drawings shall consist of the complete and entire electrical installation. It includes the supply and installation of all materials, labour, tools, transport, permits,

testing etc necessary for the execution and commissioning of the installation. The work includes but is not necessarily limited to the supply and installation of the following.

a) All lighting fixtures and lamps.

b) All conduits, boxes, switches, receptacles, telephone outlets and all necessary accessories.

c) All panels with circuit breakers associated earthing systems and distribution cables.

ANNEX 3: Contract Forms

Contract Agreement

THIS AGREEMENT made the . . . . . .day of . . . . . , between the ***Government of Grenada, Ministry of Economic Development, Planning, Agriculture and Lands, Forestry, Marine Resources and Cooperatives*** (hereinafter "the Employer"), of the one part, and . . . . . ***[name of the Contractor]***. . . . .(hereinafter "the Contractor"), of the other part:

WHEREAS the Employer invited a Quotation for the execution of Works, **Renovation Works at Maran Propagation Station in St. John**, and has accepted the Quotation by the Contractor for the Works:

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.

   (a) the Letter of Award of Contract

   (b) the Contractor's Quotation

   (c) the Conditions of Contract, including Appendices

   (d) the Specifications

   (e) the Drawings

   (f) Bill of Quantities; and

   (g) any other document listed in the CC as forming part of the Contract.

3. In consideration of the payments to be made by the Employer to the Contractor as specified in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of Grenada on the day, month and year specified above.

Signed by:	Signed by: .....
for and on behalf of the Employer	for and on behalf the Contractor
in the presence of:	in the presence of: .....
Witness, Name, Signature, Address, Date	Witness, Name, Signature, Address, Date

Conditions of Contract

Table of Clauses

Conditions of Contract

A. General

1. Definitions

1.1 The following words and expressions shall have the meanings hereby assigned to them. Boldface type is used to identify defined terms.

(a) The **Accepted Contract Amount** means the amount accepted in the Letter of Award of Contract for the execution and completion of the Works and the remedying of any defects.

(b) The **Activity Schedule** is a schedule of the activities comprising the construction, installation, testing, and commissioning of the Works in a lump-sum contract. It includes a lump-sum price for each activity, which is used for valuations and for assessing the effects of Variations and Compensation Events.

(c) The **Adjudicator** is the person appointed jointly by the Employer and the Contractor to resolve disputes in the first instance, as provided for in **CC 21.**

(d) **Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Contractor's Quotation.

(e) **Compensation Events** are those defined in **CC 40**.

(f) The **Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with **CC 49.1**.

(g) The **Contract** is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in **CC 3.3** below.

(h) The **Contractor** is the party whose Quotation to carry out the Works has been accepted by the Employer.

(i) The **Contractor's Quotation** is the completed quotation document submitted by the Contractor to the Employer.

(j) The **Contract Price** is the Accepted Contract Amount stated in the Letter of Award of Contract and thereafter as adjusted in accordance with the Contract.

(k) **Days** are calendar days; months are calendar months.

(l) **Dayworks** are varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant.

(m) A **Defect** is any part of the Works not completed in accordance with the Contract.

(n) The **Defects Liability Certificate** is the certificate issued by Project Manager upon correction of defects by the Contractor.

(o) The **Defects Liability Period** is the period specified in **CC 2.12** and calculated from the Completion Date.

(p) **Drawings** means the drawings of the Works, as included in the Contract, and any additional and modified drawings issued by (or on behalf of) the Employer in accordance with the Contract, include calculations and other information provided or approved by the Project Manager for the execution of the Contract.

(q) The **Employer** is the party who employs the Contractor to carry out the Works, **as specified in CC 2.1.**

(r) **Equipment** is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

(s) "**In writing"** or "**written"** means hand-written, type-written, printed or electronically made, and resulting in a permanent record.

(t) The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works as specified in **CC 2.1.**

(u) **Materials** are all supplies, including consumables, used by the Contractor for incorporation in the Works.

(v) **Plant** is any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function.

(w) The **Project Manager** is the person named in **CC 2.1** (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract.

(x) The **Site** is the area defined as such in the **CC 2.1.**

(y) **Site Investigation Reports** are those, if any, that were

included in the request for quotations documents and are factual and interpretative reports about the surface and subsurface conditions at the Site.

(z) **Specifications** means the Specifications of the Works included in the Contract and any modification or addition made or approved by the Project Manager.

(aa) The **Start Date** is **given in CC 2.1**. It is the latest date when the Contractor shall commence execution of the Works.

(ab) A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract, which includes work on the Site.

(ac) **Temporary Works** are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works.

(ad) A **Variation** is an instruction given by the Project Manager which varies the Works.

(ae) The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the **CC 2.1.**

(af) "**Contractor's Personnel**" refers to all personnel whom the Contractor utilizes on the Site or other places where the Works are carried out, including the staff, labor and other employees of each Subcontractor.

(ag) **"Key Personnel"** means the positions (if any) of the Contractor's personnel that are included in the contract.

(ah) **"Sexual Exploitation and Abuse" "(SEA)"** means the following:

Sexual Exploitation is defined as any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another;

Sexual Abuse is defined as the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions;

(ai) **"Sexual Harassment" "(SH)"** is defined as unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature by the Contractor's Personnel with other Contractor's or

Employer's Personnel; and

(aj) **"Employer's Personnel"** refers to the Project Manager and all other staff, labor and other employees (if any) of the Project Manager and of the Employer engaged in fulfilling the Employer's obligations under the Contract; and any other personnel identified as Employer's Personnel, by a notice from the Employer or the Project Manager to the Contractor.

2. Contract Specific Information

2.1 General

(a) The **Employer** is: ***Government of Grenada, Ministry of Economic Development, Planning, Agriculture and Lands, Forestry, Marine Resources and Cooperatives***

(b) The **Intended Completion Date** for the whole of the Works shall be: ***[insert date]***

[If different dates are specified for completion of the Works by section ("sectional completion" or milestones), these dates should be listed here]

(c) The **Project Manager** is: ***Joseph Noel, Ministry of Economic Development, Planning, Agriculture and Lands, Forestry, Marine Resources and Cooperatives***

(d) The **Site** is located at ***[insert address of Site]*** and is defined in drawings No. ***[insert numbers]***

(e) The **Start Date** shall be: ***[insert date]*.**

(f) The Works consist of: ***Renovation Works at Maran Propagation Station in St. John***

2.2 Any notice given by one Party to the other pursuant to the Contract shall be in writing to the address hereafter using the quickest available method such as electronic mail with proof of receipt.

Address for notices to the Employer:

Joseph Noel

Project Officer
Ministry of Economic Development, Planning, Agriculture and Lands, Forestry, Marine Resources and Cooperatives
Sir Eric Gairy Botanical Gardens, Ministerial Complex, Tanteen, St. George's Grenada

joseph.noel@moa.gov.gd

Address for notices to the Contractor:

[insert the name of officer authorized to receive notices]

[title/position]

[department/work unit]
[address]

[Electronic mail address]

2.3 In accordance with **CC 3.2**, **Sectional Completions** are: ***[insert nature and dates, if appropriate; otherwise delete]***

2.4 The **language** of the contract is ***English***

2.5 The Contract shall be governed by the **law** of ***Grenada***

2.6 **CC 12**: The minimum **insurance** amounts and deductibles shall be:

(a) for loss or damage to the Works, Plant and Materials: ***[insert amounts].***

(b) For loss or damage to Equipment: ***[insert amounts]***.

(c) for loss or damage to property (except the Works, Plant, Materials, and Equipment) in connection with Contract ***[insert amounts]***.

(d) for personal injury or death: of the Contractor's employees: ***[amount]*** of other people: ***[amount].***

2.7 **CC 13: Site Data** are**:** ***[list Site Data].***

2.8 **CC 18**: **Site Possession Date(s)** shall be: ***[insert location(s) and date(s)]***

2.9 **CC 21: Appointing Authority** of Adjudicator: ***[insert name of Authority].***

2.10 **CC 25.1**: A **Program** for the Works shall be submitted within: ***[insert: number]*** days from the date of the Letter of Award of Contract.

2.11 **CC 25.2**: The period for submission of **progress reports** is:***[insert period].***

2.12 **CC 33**: The **Defects Liability Period** shall be: ***[insert number]*** days from the date of Completion.

2.13 **CC 43**: The **retention** amount shall be ***5%***

2.14 **CC 44.1**: The **liquidated damages** for the whole of the Works shall be: ***[insert percentage]*** of the final Contract Price per day..

2.15 **CC 44.1**: The **maximum amount of liquidated damages** for the whole of the Works is: ***[insert percentage]*** of the final Contract Price.

2.16 **CC 44.3**: the **Bonus** for the whole of the Works is: ***[insert percentage]*** of the final Contract Price per day. The

maximum amount of Bonus for the whole of the Works is *[insert percentage]* of the final Contract Price. ***[If early completion would provide benefits to the* Employer*, this clause should remain; otherwise delete. The Bonus is usually numerically equal to the liquidated damages.]***

CC 45: The **Advance Payment** shall be: ***[insert %]*** of the Accepted Contract Amount and shall be paid to the Contractor no later than *[insert number of days]* after the Contractor submits an acceptable Bank Guarantee**. [CC 46**: The Performance Security amount shall be for an amount of: ***10 %*** of the Accepted Contract Amount.

2.18 **CC 52.1**: The date by which operating and maintenance manuals are required is ***[insert date].*** In accordance with **CC 52.1, t**he date by which "as built" drawings are required is ***[insert date].***

2.19 **CC 52.2**: The amount to be withheld: ***[insert amount]***.

2.20 **CC 54.1**: The percentage to apply to the value of the work not completed is: ***[insert percentage]. [insert percentage, considering the Employer's additional cost for completing the Works]***

3. Interpretation

3.1 In interpreting these CC, words indicating one gender include all genders. Words indicating the singular also include the plural and words indicating the plural also include the singular. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these CC.

3.2 If sectional completion is specified in **CC 2.3**, references in the CC to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).

3.3 The documents forming the Contract shall be interpreted in the following order of priority:

(a) the Contract Agreement,

(b) The Letter of Award of Contract

(c) The Contractor's Quotation,

(d) the Conditions of Contract, including Appendices

(e) the Specifications,

(f) the Drawings,

(g) the Bill of Quantities, and

(h) any other document ***[include other documents if any]*.**

4. Prohibitions

4.1 Throughout the execution of the Contract, the Contractor shall comply with the import of goods and services prohibitions in the Employer's country when

(a) as a matter of law or official regulations, the Borrower's country prohibits commercial relations with that country;

5. Project Manager's Decisions

5.1 Except where otherwise specifically stated, the Project Manager shall decide contractual matters between the Employer and the Contractor in the role representing the Employer.

6. Subcontracting

6.1 The Contractor may subcontract with the approval of the Project Manager but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations.

7. Cooperation

7.1 The Contractor shall cooperate with and allow appropriate opportunities for other contractors, public authorities, utilities, and the Employer, to carry out on or near the Site work, if any, not included in the Contract.

8. Personnel and Equipment

8.1 The Contractor shall employ the Key Personnel and use the Equipment identified in its quotation, to carry out the Works or other personnel and Equipment approved by the Project Manager. The Project Manager shall approve any proposed replacement of Key Personnel and Equipment only if their relevant qualifications or characteristics are substantially equal to or better than those proposed in the quotation.

8.2 The Project Manager may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Key Personnel (if any), who:

(a) persists in any misconduct or lack of care;

(b) carries out duties incompetently or negligently;

(c) fails to comply with any provision of the Contract;

(d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment;

(e) engages in Sexual Harassment, Sexual Exploitation, Sexual Abuse or in any form of sexual activity with individuals under the age of 18 except in case of pre-existing marriage;

(f) based on reasonable evidence, is determined to have engaged in Fraud and Corruption during the execution of the Works; or

(g) has been recruited from the Employer's Personnel.

As appropriate, the Contractor shall then promptly appoint (or cause to be appointed) a suitable replacement with equivalent skills and experience.

8.3 Labor

8.3.1 Engagement of Staff and Labor. The Contractor shall provide and employ on the Site for the execution of the Works such skilled, semi-skilled and unskilled labor as is necessary for the proper and timely execution of the Contract. The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labor with appropriate qualifications and experience from sources within the Country.

8.3.2 Labor Laws. The Contractor shall comply with all the relevant labor laws applicable to the Contractor's Personnel, including laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights:

8.3.3 Facilities for Staff and Labor. ***[if facilities for staff and labor are to be provided by the Contractor, insert this sub-clause; otherwise delete]*** The Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel.

*8.3.4 Supply of Foodstuff*s. ***[if food to its personnel is to be provided by the Contractor, insert this sub-clause; otherwise delete]*** The Contractor shall arrange for the provision of a sufficient supply of suitable food at reasonable prices for the Contractor's Personnel for the purposes of or in connection with the Contract.

8.3.5 Supply of Water. ***[if water to its personnel is to be provided by the Contractor, insert this sub-clause; otherwise delete]*** The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.

8.3.6 Forced *Labor.* The Contractor, including its Subcontractors,

shall not employ or engage forced labor. Forced labor *consists* of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labor, such as indentured labor, bonded labor or similar labor-contracting arrangements.

No persons shall be employed or engaged who have been subject to trafficking. Trafficking in persons is defined as the recruitment, transportation, transfer, harboring or receipt of persons by means of the threat or use of force or other forms of coercion, abduction, fraud, deception, abuse of power, or of a position of vulnerability, or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purposes of exploitation.

8.3.7 Child Labor. The Contractor, including its Subcontractors, shall *not* employ or engage a child under the age of 14 unless the national law specifies a higher age (the minimum age).

The Contractor, including its Subcontractors, shall not employ or engage a child between the minimum age and the age of 18 in a manner that is likely to be hazardous, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.

The Contractor including its Subcontractors, shall only employ or engage children between the minimum age and the age of 18 after an appropriate risk assessment has been conducted by the Contractor with the Project Manager's approval. The Contractor shall be subject to regular monitoring by the Project Manager that includes monitoring of health, working conditions and hours of work.

Work considered hazardous for children is work that, by its nature or the circumstances in which it is carried out, is likely to jeopardize the health, safety, or morals of children. Such work activities prohibited for children include work:

(a) with exposure to physical, psychological or sexual abuse;

(b) underground, underwater, working at heights or in confined spaces;

(c) with dangerous machinery, equipment or tools, or involving handling or

(d) transport of heavy loads;

(e) in unhealthy environments exposing children to

hazardous substances, agents, or processes, or to temperatures, noise or vibration damaging to health; or

(f) under difficult conditions such as work for long hours, during the night or in confinement on the premises of the employer.

8.3.8 Employment Records of Workers. The Contractor shall keep complete and accurate records of the employment of labor at the Site.

8.3.9 Non-*Discrimination and Equal Opportunity.* The Contractor shall not make decisions relating to the employment or treatment of Contractor's Personnel on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment of Contractor's Personnel on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to any aspects of the employment relationship.

8.3.10 *Contractor's Personnel Grievance Mechanism.* The Contractor shall have a proportionate grievance mechanism for Contractor's Personnel.

8.3.11 Awareness of Contractor's Personnel. The Contractor shall provide appropriate awareness to relevant Contractor's Personnel on any applicable environmental and social aspects of the Contract, including on health, safety and prohibition of SEA and SH.

9. Employer's and Contractor's Risks

9.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

10. Employer's Risks

10.1 From the Start Date until the Defects Liability Certificate has been issued, the following are Employer's risks:

(a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to

(i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works or

(ii) negligence, breach of statutory duty, or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor.

(b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the

Employer or in the Employer's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.

10.2 From the Completion Date until the Defects Liability Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is an Employer's risk except loss or damage due to

(a) a Defect which existed on the Completion Date,

(b) an event occurring before the Completion Date, which was not itself an Employer's risk, or

(c) the activities of the Contractor on the Site after the Completion Date.

11. Contractor's Risks

11.1 From the Starting Date until the Defects Liability Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Employer's risks are Contractor's risks.

12. Insurance

12.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles specified in **CC 2.6**, for listed events which are due to the Contractor's risks:

12.2 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

12.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

12.4 Alterations to the terms of an insurance shall not be made without the approval of the Project Manager.

12.5 Both parties shall comply with any conditions of the insurance policies.

13. Site Data

13.1 The Contractor shall be deemed to have examined any Site Data referred to in **CC 2.7**, supplemented by any information

available to the Contractor.

14. Contractor to Construct the Works

14.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.

15. Approval by the Project Manager

15.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, for his approval.

15.2 The Contractor shall be responsible for design of Temporary Works.

15.3 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

15.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.

15.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Project Manager before this use.

16. Health, Safety and Protection of the Environment

16.1 The Contractor shall be responsible for the safety of all activities on the Site, and for taking care of the health and safety of all persons entitled to be on the Site and any other place where the Works are being executed.

16.2 The Contractor shall comply with all applicable health and safety regulations and laws.

16.3 Protection of the environment

(a) The Contractor shall take all necessary measures to: protect the environment (both on and off the Site); and

(b) limit damage and nuisance to people and property resulting from pollution, noise and other results of the Contractor's operations and/ or activities.

In the event of damage to the environment, property and/or nuisance to people, on or off Site as a result of the Contractor's operations, the Contractor shall agree with the Project Manager the appropriate actions and time scale to remedy, as practicable, the damaged environment to its former condition. The Contractor shall implement such remedies at its cost to the satisfaction of the Project Manager.

17. Archaeological and Geological Findings

17.1 All fossils, coins, articles of value or antiquity, structures, groups of structures, and other remains or items of geological, archaeological, paleontological, historical, architectural or

religious interest found on the Site shall be placed under the care and custody of the Employer.

18. Possession of the Site

18.1 If possession of a part is not given by the date stated in **CC 2.8,** the Employer shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event.

19. Access to the Site

19.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

20. Instructions, Inspections and Audits

20.1 The Contractor shall carry out all instructions of the Project Manager which comply with the applicable laws where the Site is located.

20.2 The Contractor shall keep and shall make all reasonable efforts to cause its Subcontractors and subconsultants to keep, accurate and systematic accounts and records in respect of the Works in such form and details as will clearly identify relevant time changes and costs.

21. Appointment of the Adjudicator

21.1 The Employer and the Contractor shall jointly appoint an adjudicator with relevant experience, within 7 (seven) days of contract signature. In case of disagreement between the Employer and the Contractor on the appointment of the Adjudicator within this period, either party will request the Appointing authority stated in **CC 2.9**, to appoint the Adjudicator within 7 (seven) days of receipt of such request.

21.2 Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not functioning in accordance with the provisions of the Contract, a new Adjudicator shall be jointly appointed by the Employer and the Contractor. In case of disagreement between the Employer and the Contractor, within 14 (fourteen) days, the Adjudicator shall be designated by the Appointing Authority stated in **CC 2.9**, at the request of either party, within 7 (seven) days of receipt of such request.

22. Procedure for Disputes

22.1 If the Contractor believes that a decision taken by the Project Manager was either outside the authority given to the Project Manager by the Contract or that the decision was wrongly taken, the decision shall be referred to the Adjudicator within 14 (fourteen) days of the notification of the Project Manager's decision.

22.2 The Adjudicator shall give a decision in writing within 14 (fourteen) days of receipt of a notification of a dispute. The adjudicator's cost (hourly fee and reimbursable expenses) shall be divided equally between the Employer and the Contractor, whatever decision is reached by the Adjudicator.

22.3 Both parties shall attempt to settle the dispute amicably before commencement of arbitration. If the dispute is not settled amicably within 14 (fourteen) days of the Adjudicator's written decision, either party may refer a decision of the Adjudicator to an Arbitrator. If neither party refers the dispute to arbitration within 28 (twenty-eight) days of the Adjudicator's written decision, the Adjudicator's decision shall be final and binding. The arbitration shall be conducted in accordance with the following arbitration procedures.

[CC 22.3(a) shall be retained in the case of a Contract with a foreign Contractor and CC 22.3 (b) shall be retained in the case of a Contract with a national of the Employer's Country.]

(a) Contract with foreign Contractor:

[unless the Employer chooses the commercial arbitration rules of another international arbitral institution, the following sample clause should be inserted:]

All disputes arising out of or in connection with the present contract shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with the said Rules.

(b) Contracts with Contractor national of the Employer's Country:

In the case of a dispute between the Employer and a Contractor who is a national of the Employer's Country, the dispute shall be referred to adjudication or arbitration in accordance with the laws of the Employer's Country.]

23. Fraud and Corruption

23.1 The Employer requires the Contractor to disclose any commissions or fees that may have been paid or are to be paid to agents or any other party with respect to the to the request for quotations or execution of the Contract. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee.

24. Security of the Site

24.1 ***[Insert the following where the Contractor is responsible for the security of the Site]*** The Contractor shall be responsible for the security of the Site, and:

(a) for keeping unauthorized persons off the Site;

(b) authorized persons shall be limited to the Contractor's Personnel, the Employer's Personnel, and to any other personnel identified as authorized personnel (including the Employer's other contractors on the Site), by a notice from the Employer or the Project Manager to the Contractor.

The Contractor shall require the security personnel to act within the applicable Laws.

B. Time Control

25. Program and Progress Reports

25.1 The Contractor shall submit for approval a Program for the Works, within the period stated in **CC 2.10**. The Contractor may revise the Program and submit it to the Project Manager again at any time. A revised Program shall show any effect of Variations and Compensation Events.

25.2 The Contractor shall monitor progress of the Works and submit progress reports to the Project manager at intervals no longer than the period stated in **CC 2.11**.

25.3 In addition to the progress reports stated in **CC 2.11**, the Contractor shall inform the Project Manager immediately of any allegation, incident or accident in the Site, which has or is likely to have a significant adverse effect including, but is not limited to, any incident or accident causing fatality or serious injury; significant adverse effects or damage to private property; or any allegation of SEA and/or SH.

The Contractor shall provide full details of such incidents or accidents to the Project Manager within the timeframe agreed with the Project Manager.

26. Extension of the Completion Date

26.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost.

26.2 If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new

Intended Completion Date.

27. Acceleration

27.1 When the Employer wants the Contractor to finish before the Intended Completion Date, the Project Manager shall obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Employer accepts these proposals, the Intended Completion Date shall be adjusted accordingly and confirmed by both the Employer and the Contractor.

27.2 If the Contractor's priced proposals for an acceleration are accepted by the Employer, they are incorporated in the Contract Price and treated as a Variation.

28. Delays Ordered by the Project Manager

28.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.

29. Management Meetings

29.1 Either the Project Manager or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

30. Early Warning

30.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of the Works.

30.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager.

C. Quality Control

31. Identifying Defects

31.1 The Project Manager shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a Defect and to uncover and test any work that the Project Manager considers may have a Defect.

32. Tests

32.1 If the Project Manager instructs the Contractor to carry out a test not specified in the Specifications to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event.

33. Correction of Defects

33.1 The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability specified in **CC 2.12**. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

33.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager's notice.

34. Uncorrected Defects

34.1 If the Contractor has not corrected a Defect within the time specified in the Project Manager's notice, the Project Manager shall assess the cost of having the Defect corrected, and the Contractor shall pay this amount.

D. Cost Control

35. Contract Price[1]

35.1 The Bill of Quantities shall contain priced items for the Works to be performed by the Contractor. The Bill of Quantities is used to calculate the Contract Price. The Contractor will be paid for the quantity of the work accomplished at the rate in the Bill of Quantities for each item.

36. Changes in the Contract Price[2]

36.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 1 percent of the Accepted Contract Amount, the Project Manager shall adjust the rate to allow for the change. The Project Manager shall not adjust rates from changes in quantities if thereby the Accepted Contract Amount is exceeded by more than 15 percent, except with the prior approval of the Employer.

36.2 If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities.

37. Variations

37.1 All Variations shall be included in updated Programs produced by the Contractor.

37.2 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within 7 (seven) days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.

37.3 If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs.

37.4 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

37.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.

37.6 If the work in the Variation corresponds to an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work above the limit stated in **CC 36.1** or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work. [3]

38. Payment Certificates

38.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously.

38.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor.

38.3 The value of work executed shall be determined by the Project Manager.

38.4 The value of work executed shall comprise the value of the quantities of work in the Bill of Quantities that have been completed.[4]

38.5 The value of work executed shall include the valuation of Variations and Compensation Events.

38.6 The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

39. Payments

39.1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the

Contractor the amounts certified by the Project Manager within 28 (twenty-eight) days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. The interest rate shall be at the prevailing rate of interest for commercial borrowing for each of the currencies in which payments are made.

39.2 Items of the Works for which no rate or price has been entered in shall not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

40. Compensation Events

40.1 The following shall be Compensation Events:

(a) The Employer does not give access to a part of the Site by the Site Possession Date pursuant to **CC 2.8**.

(b) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time.

(c) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.

(d) The Project Manager unreasonably does not approve a subcontract to be let.

(e) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Award of Contract from the information issued to Contractors (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.

(f) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.

(g) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.

(h) The advance payment is delayed.

(i) The effects on the Contractor of any of the Employer's Risks.

(j) The Project Manager unreasonably delays issuing a Certificate of Completion.

40.2 If a Compensation Event would cause additional cost or would

prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

40.3 As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager shall assume that the Contractor shall react competently and promptly to the event.

40.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor's not having given early warning or not having cooperated with the Project Manager.

41. Tax

41.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date of submission of quotations for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor.

42. Price Adjustment

42.1 **Prices shall not be adjusted for any fluctuations in the cost of inputs.**

43. Retention

43.1 The Employer shall retain from each payment due to the Contractor the proportion stated in **CC 2.13** until Completion of the whole of the Works.

43.2 Upon the issue of a Certificate of Completion of the Works by the Project Manager, in accordance with **CC 49.1**, half the total amount retained shall be repaid to the Contractor and half when the Defects Liability Period has passed and the Project Manager has certified that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected. The Contractor may substitute retention money with an "on demand" Bank guarantee.

44. Liquidated Damages and Bonuses

44.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in **CC 2.14** for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount defined in **CC 2.15.** The Employer may deduct

liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.

44.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in **CC 39.1**.

44.3 The Contractor shall be paid a Bonus calculated at the rate per calendar day stated in **CC 2.16** for each day (less any days for which the Contractor is paid for acceleration) that the Completion is earlier than the Intended Completion Date. The Project Manager shall certify that the Works are complete, although they may not be due to be complete

45. Advance Payment

45.1 The Employer shall make advance payment to the Contractor in the amount specified in **CC 2.17,** against provision by the Contractor, if required in **CC 2.17**, of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the advance payment. The Guarantee shall remain effective until the advance payment has been repaid, but the amount of the Guarantee shall be progressively reduced by the amounts repaid by the Contractor.

45.2 The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.

45.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.

46. Performance Security

46.1 The Performance Security, if required in **CC 2.18**, shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount specified in **CC 2.18,** by a bank or surety acceptable to the Employer, and denominated in the types and proportions of

the currencies in which the Contract Price is payable. The Performance Security shall be valid until a date 28 days from the date of issue of the Certificate of Completion in the case of a Bank Guarantee, and until one year from the date of issue of the Certificate of Completion in the case of a Performance Bond.

47. Dayworks

47.1 If applicable, the Dayworks rates in the Contractor's Quotations shall be used only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.

47.2 All work to be paid for as Dayworks shall be recorded by the Contractor on forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within two days of the work being done.

47.3 The Contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms.

48. Cost of Repairs

48.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. Finishing the Contract

49. Completion

49.1 The Contractor shall request the Project Manager to issue a Certificate of Completion of the Works, and the Project Manager shall do so upon deciding that the whole of the Works is completed.

50. Taking Over

50.1 The Employer shall take over the Site and the Works within 7 (seven) days of the Project Manager's issuing a Certificate of Completion.

51. Final Account

51.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 (fifty six) days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 56 (fifty six) days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide

on the amount payable to the Contractor and issue a payment certificate.

52. Operating and Maintenance Manuals

52.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in **CC 2.19**.

52.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in **CC 2.19,** or they do not receive the Project Manager's approval, the Project Manager shall withhold the amount stated in **CC 2.20** from payments due to the Contractor.

53. Termination

53.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

53.2 Fundamental breaches of Contract shall include, but shall not be limited to, the following:

(a) the Contractor stops work for 28 (twenty-eight) days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager;

(b) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 28 (twenty-eight) days;

(c) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

(d) a payment certified by the Project Manager is not paid by the Employer to the Contractor within 84 (eighty-four) days of the date of the Project Manager's certificate;

(e) the Project Manager gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager;

(f) the Contractor does not maintain a Security, which is required;

(g) the Contractor has delayed the completion of the Works for which the maximum amount of liquidated damages can be paid, as specified in **CC 2.15**; or

(h) if the Contractor, in the judgment of the Employer has engaged in Fraud and Corruption, as defined in paragraph 2.2 a of the Appendix A to the CC, in

competing for or in executing the Contract, then the Employer may, after giving 14 (fourteen) days written notice to the Contractor, terminate the Contract and expel him from the Site.

53.3 Notwithstanding the above, the Employer may terminate the Contract for convenience.

53.4 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.

53.5 When either party to the Contract gives notice of a breach of Contract to the Project Manager for a cause other than those listed under **CC 53.2** above, the Project Manager shall decide whether the breach is fundamental or not.

54. Payment upon Termination

54.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate and less the percentage specified in ***CC* 2.21** to apply to the value of the work not completed**.** Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.

54.2 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.

55. Property

55.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor's default.

56. Release from Performance

56.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before

receiving it and for any work carried out afterwards to which a commitment was made.

57. Suspension of Bank Loan or Credit

57.1 In the event that the Agency suspends the Loan or Credit to the Employer, from which part of the payments to the Contractor are being made:

(a) The Employer is obligated to notify the Contractor of such suspension within 7 (seven) days of having received the Agency's suspension notice.

(b) If the Contractor has not received sums due to it within the 28 (twenty-eight) days for payment provided for in **CC 39.1**, the Contractor may immediately issue a 14 (fourteen)-day termination notice.

a. Sample Letter of Award of Contract

[modify as appropriate]

[use letterhead paper of the Employer]

[date]. . . . . .

To: . . . . . ***[name and address of the Contractor]*** . . . . . .

Subject: ***Notification of Award Contract No.:***

This is to notify you that your Quotation dated ***[insert date]*** for execution of the **Renovation Works at Maran Propagation Station in St. John** for the Accepted Contract Amount of ***[insert amount in numbers and words and name of currency]***, as corrected and modified in accordance with the Request for Quotations is hereby accepted by our Agency.

Please find enclosed herewith the Contract. You are requested to sign the contract within ***10 days.***

You are also requested to furnish a Performance Security within [*insert no of days*] in accordance with the Conditions of the Contract, using for that purpose one of the Performance Security Form*s* attached to the Contract.

Authorized Signature: _____
Name and Title of Signatory: _____
Name of Agency: _____

Attachment: Contract

Advance Payment Security

Demand Guarantee

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: *[Insert name and Address of* Employer*]*

Date: *[Insert date of issue]*

ADVANCE PAYMENT GUARANTEE No.: *[Insert guarantee reference number]*

Guarantor: *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that *[insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called "the Applicant") has entered into Contract No. *[insert reference number of the contract]* dated *[insert date]* with the Beneficiary, for the execution of *[insert name of contract and brief description of* Works*]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum *[insert amount in figures]* () *[insert amount in words]* is to be made against an advance payment guarantee.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in figures]* (_____) *[insert amount in words]*[1] upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating either that the Applicant:

(a) has used the advance payment for purposes other than the costs of mobilization in respect of the Works; or

(b) has failed to repay the advance payment in accordance with the Contract conditions, specifying the amount which the Applicant has failed to repay.

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the advance payment referred to above has been credited to the Applicant on its account number *[insert number]* at *[insert name and address of Applicant's bank]*..

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[1] *The Guarantor shall insert an amount representing the amount of the advance payment and denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Employer.*

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Applicant as specified in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that ninety (90) percent of the Accepted Contract Amount, less provisional sums, has been certified for payment, or on the *[insert day]* day of *[insert month]*, 2 *[insert year]*,[2] whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

_____

[signature(s)]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

[2] *Insert the expected completion date as described in CC 49.1. The Employer should note that in the event of an extension of the expected completion date of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."*