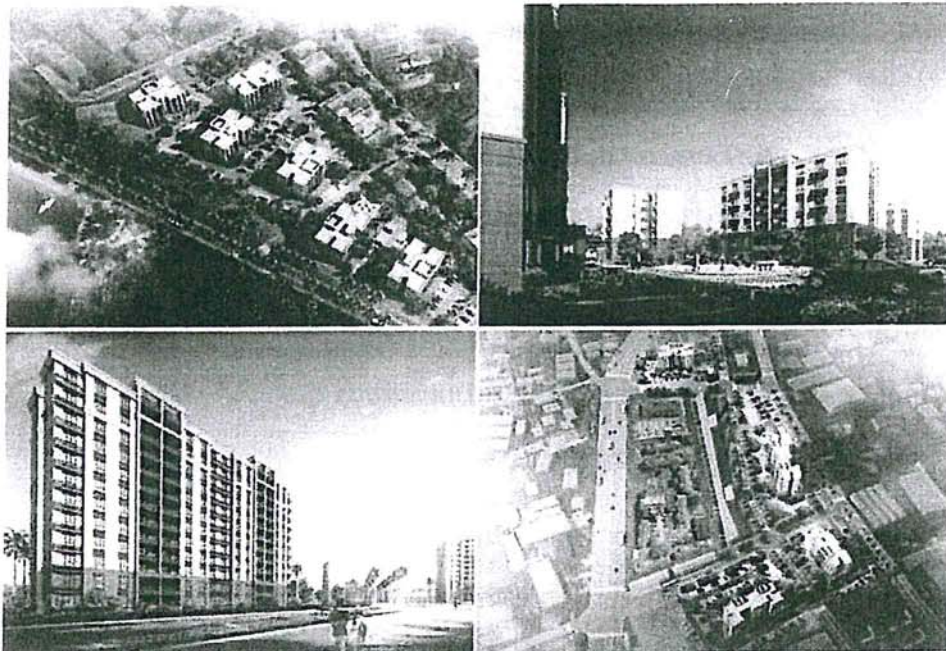


# **5,000 Apartment Units Affordable Housing Project Phase I**

## **Engineering, Procurement and Construction Contract**



**Between**

**Trinidad and Tobago Housing Development Corporation**

**and**

**China Gezhouba Group International Engineering Co., Ltd**

**May 2019**

**VOLUME I**

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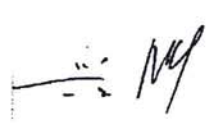


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## VOLUME I

### CONTRACT AGREEMENT

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## TRINIDAD AND TOBAGO

### AGREEMENT

This Agreement is made the 17<sup>th</sup> day of May, 2019

### BY AND BETWEEN:

THE TRINIDAD AND TOBAGO HOUSING DEVELOPMENT CORPORATION, registered under the laws of the Republic of Trinidad and Tobago, having its registered office at of Nos. 44-46 South Quay, in the City of Port of Spain, in the Island of Trinidad, which expression shall where the context so admits include their successors-in-title (hereinafter referred to as "the Employer") of the one part.

### AND

CHINA GEZHOUBA GROUP INTERNATIONAL ENGINEERING CO., LTD, a company incorporated under the laws of the People's Republic of China and having its registered office at Tower F, Ocean International Center, 208 CiyunsiBeili, Chaoyang District, Beijing (100025), P.R.China, which expression shall where the context so admits include their successors-in-title and assigns, (hereinafter referred to as "the Contractor"), on the other part.

### WHEREAS:

- A. The Employer is desirous of bridging the gap between the supply and demand for affordable housing in the Republic of Trinidad and Tobago;
- B. The Contractor has the knowledge, experience and expertise in housing construction and is interested in the design, engineering, procurement and construction of the housing projects in the Republic of Trinidad and Tobago;
- C. A Framework Agreement for the 5,000 Apartment Units Affordable Housing Project has been signed by and between the Employer and the Contractor on July 13, 2018;
- D. The Contractor has submitted the proposal for 5,000 Apartments Units Affordable Housing Projects Phase I, and through negotiations the Employer has accepted the proposal for the execution and completion of these works and remedying of defects therein for the South Quay, Port of Spain and Lady Hailes, San Fernando Sites.



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 Conditions of Contract hereinafter referred to.
2. The following contract documents shall be deemed to form and be read and construed as part of this Agreement:
  - (a) This Agreement
  - (b) Framework Agreement
  - (c) Particular Conditions of Contract
  - (d) Annexes to the Particular Conditions of Contract. (Annexes A to F)
    - Annex A: Contract Data
    - Annex B: Form of Advanced Payment Guarantee
    - Annex C: Form of Retention Money Guarantee
    - Annex D: Form of Interim Payment Certificate
    - Annex E: Form of Payment Guarantee
    - Annex F: Form of Dispute Adjudication Board Agreement
  - (e) The General Conditions of Contract for EPC/ Turnkey Projects, 1<sup>st</sup> Edition 1999
  - (f) The Employers Requirements
  - (g) Contractors EPC Proposal

In the event any ambiguity or conflict between the Contract documents listed above, the priority shall be the order in which the Contract documents are listed herein.
3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to design, finance, execute and complete the Works and remedy any defects therein, in conformity with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor, in consideration of the design, finance, execution and completion of the Works and the remedying of defects therein, the Contract Price at the times and in the manner prescribed in the Contract.

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5. The Contract Price shall be US Dollars 71,739,411.00 (in words: Seventy-One Million, Seven Hundred And Thirty-Nine Thousand, Four Hundred and Eleven US Dollars) plus VAT, subject to the adjustment in accordance with the Contract.
6. The currency of payment shall be in Trinidad and Tobago Dollars based on the selling exchange rate issued by the Central Bank of Trinidad and Tobago on the Contract Base Date.
7. The Employer will use its best efforts to assist the Contractor to obtain foreign exchange sufficient to convert 60% of the Contract Price to US dollars.
8. The payments shall be adjusted in accordance with the Conditions of Contract when the exchange rate of TT dollar to US dollar fluctuation exceeds one percent (1%).
9. This Contract shall come into full force and effect from the data of execution by the parties.

Two handwritten signatures in black ink, one on the left and one on the right, located at the bottom right of the page.



In Witness whereof the parties hereto have caused this Agreement to be executed the day and year first  
before written in accordance with their respective laws.

Signed on behalf of  
Trinidad and Tobago Housing  
Development Corporation

Signed on behalf of  
China Gezhouba Group International  
Engineering Co., Ltd

Name: *NEWMAN K. GEORGE*  
Signature: *Newman K George*  
Date:

Name: *ZHOU Xing*  
Signature: *[Signature]*  
Date:

Witness:  
Name: *KENESHIA LIGHTBOURNE*  
Signature: *[Signature]*

Witness:  
Name: *ZHANG MINGDE*  
Signature: *[Signature]*

## VOLUME I

- **CONTRACT AGREEMENT**

**FRAMEWORK AGREEMENT**

- **PARTICULAR CONDITIONS OF CONTRACT**
- **ANNEXES TO PARTICULAR CONDITIONS OF CONTRACT**
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  - E. *FORM OF PAYMENT GUARANTEE*
  - F. *FORM OF DISPUTE ADJUDICATION BOARD AGREEMENT*
- **GENERAL CONDITIONS OF CONTRACT**

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**Framework Agreement for the  
5,000 Apartment Units Affordable Housing Project**

Between

**The Government of Trinidad and Tobago  
Being Represented By the Trinidad and Tobago  
Housing Development Corporation (HDC)  
A Body Corporate Established Under Act No. 24 Of 2005 Of  
The Laws Of The Republic of Trinidad And Tobago,  
Situated at 44-46 South Quay, Port Of Spain.**

And

**China Gezhouba Group International Engineering Co., Ltd (CGGC)  
A Stated-Owned Company Established Under The Laws of  
The People's Republic of China, Registered at Tower F, Ocean  
International Center, 208 Ciyunsi Beili, Chaoyang District, Beijing**

July 13, 2018

This Framework Agreement is entered into on this 13<sup>th</sup> day of July 2018.

**By and BETWEEN**

The Government of the Republic of Trinidad and Tobago, represented by The Trinidad and Tobago Housing Development Corporation with its office at 44-46 South Quay, Port of Spain (hereinafter referred to as "the HDC").

**AND**

China Gezhouba Group International Engineering Co., Ltd, a Company registered under the laws of the People's Republic of China, having its registered office at Tower F, Ocean International Center, 208 Ciyunsi Beili, Chaoyang District, Beijing (100025), P.R.China (hereinafter referred to as "CGGC").

The HDC and CGGC are jointly referred to as "the Parties" and singularly as "the Party".

**WHEREAS:**

- A. The HDC is desirous of bridging the gap between the supply and demand for affordable housing in the Republic of Trinidad and Tobago;
- B. CGGC, with rich experience and required technical capacity in housing construction, is interested in the design, engineering, procurement and construction of the housing projects in the Republic of Trinidad and Tobago;
- C. The HDC and CGGC are desirous of cooperating for the development of affordable housing in the Republic of Trinidad and Tobago; and,
- D. The Parties now wish to cooperate whereby CGGC shall design, engineer, procure and construct around 5,000 Apartment Units with associated infrastructure as part of the HDC's Affordable Housing programme.

**NOW THEREFORE** the Parties hereto for good consideration agree as follows.

**ARTICLE 1**

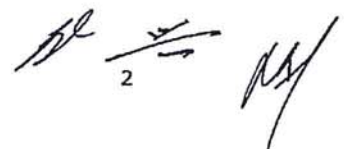
**OBJECTIVE**

The objective of this Framework Agreement is to provide the framework for CGGC to undertake the proposed 5,000 Apartment Unit Affordable Housing Project (hereinafter referred to as "Project") in the mode of Engineering, Procurement and Construction plus Financing (EPC+F).

**ARTICLE 2**

**COOPERATION MODEL**

- 2.1 CGGC shall be responsible for design, engineering, procurement, and construction plus financing of the Project. The HDC shall pay CGGC at latest within 6 months upon completion of each stage.
- 2.2 The HDC shall provide ten percent (10%) of the Contract Price to CGGC, in accordance with the phases agreed to between HDC and CGGC, as advance payment to facilitate the mobilization and design work. During construction of the Project, the HDC shall issue irrevocable Interim Payment Certificate to CGGC for each milestone to be defined by the Parties.
- 2.3 The Contract Price shall be subjected to the Value Added Taxes (VAT) in accordance with the laws of Republic of Trinidad and Tobago. The HDC shall, using its own funds, reimburse to CGGC such VAT paid by CGGC to the tax authorities. The Reimbursement of VAT to CGGC shall only be applied and facilitated within a period of one month after the submission of each Interim Payment Certificate.
- 2.4 The Corporate Taxes paid by CGGC to tax authorities (Board of Inland Revenue) adhering to the laws of Trinidad and Tobago shall be reimbursed by the HDC to CGGC within a period of one month after its submission date.



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- 2.5 The HDC shall obtain a 100% guarantee of the payment due to CGGC on a take or pay basis, with the understanding that HDC will be responsible for the placement, mortgages and sales to potential buyers of the Project apartments. In this way, both the HDC and CGGC shall ensure that other phases of the Project continue to be developed.
- 2.6 The HDC shall be responsible for land acquisition, and shall give the right of access to the site to CGGC before the Commencement Date.
- 2.7 CGGC is committed to its social responsibilities and pledges to use as many local workers and materials as possible for the Project.

### ARTICLE 3

#### SIGNING OF CONTRACT DOCUMENTS

- 3.1 The HDC and CGGC shall commence negotiating the details of cooperation immediately after this Framework Agreement has been signed.
- 3.2 Conditions of Contract for EPC/Turnkey Projects published by Fédération Internationale des Ingénieurs Conseils (FIDIC) shall be adopted as the basis for Contract Documents of the Project. Words and expressions in this Framework Agreement shall have the same meanings as are respectively assigned to them in the Contract Documents.
- 3.3 The Contract Documents for the first stage, including but not limited to the Contract Agreement, the Particular Conditions, the General Conditions, shall be prepared and signed by the Parties within ninety (90) days after signing of this Framework Agreement.

### ARTICLE 4

#### TAX EXEMPTION AND PERMITS

- 4.1 The Contract Price shall exclude Value Added Taxes on imports, Custom and Import Duties, individual income taxes for foreign staff and other related fees and charges and other equivalent charges that may be levied upon CGGC during the performance of the Project in accordance with the laws of Trinidad and Tobago.

CGGC shall be eligible for taxation relief in accordance with the Income Tax act, Chap. 75:01, Order under Section 93(1) of the Trinidad and Tobago Income Tax.

In the event that the exemption is not approved by any authorities, all above-noted taxes, duties, fees and charges paid by CGGC, shall be reimbursed by the HDC through his own fund resources.

- 4.2 The HDC shall, as reasonably possible with the assistance of CGGC, obtain all permits including tax exemption certificates, planning permission, work permits, permits-to-work, and any other permits and approvals required for the Project.

### ARTICLE 5

#### DEVELOPMENT IN STAGES

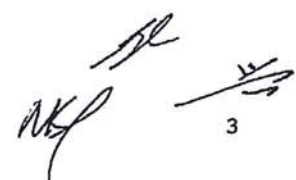
The total 5,000 apartment units shall be developed in three or four stages.

The detail of each stage, including the sites to be developed and number of apartment units to be built, shall be discussed and agreed by the Parties during the negotiations stage of the contract.

### ARTICLE 6

#### PROPERTY MANAGEMENT SERVICE

Upon request by the HDC, CGGC is willing to provide Property Management Service for the Project after its completion, for which a separate contract shall be signed.

  
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#### ARTICLE 7

##### CONFIDENTIALITY AND MATERIAL BREACH

The Parties may exchange information regarding the Project, which shall be considered proprietary and confidential. Each of the Parties hereby agrees to maintain such confidentiality and not to utilize any such information received for any purpose not originally disclosed or intended, except as may be required by law or a court of competent jurisdiction or with the written consent of the other Party. Provided that a material breach by a Party of this provision which results in financial prejudice to the other Party shall bind such Party who is at fault to make good such prejudice and loss.

#### ARTICLE 8

##### GOVERNING LAW

The provisions and implementation of this Framework Agreement shall be interpreted in accordance with the laws of Trinidad and Tobago.

#### ARTICLE 9

##### EXCLUSIVITY

This Agreement shall be on an exclusive basis between the parties. During the term of this Framework Agreement, the Parties shall agree to grant mutual exclusivity to each other to develop the Project and accordingly the Parties shall not conduct any negotiation, discussion and cooperation, or shall not agree with any third party, directly or through their affiliates.

#### ARTICLE 10

##### SETTLEMENT OF DISPUTES

Any disputes arising in connection with the interpretation or other matters pertaining to this Framework Agreement shall be resolved by the Parties through amicable negotiation in the spirit of cooperation as envisaged under this Agreement.

#### ARTICLE 11

##### VALIDITY AND TERMINATION

This Framework Agreement shall enter into force on the date of signature and shall subsist for a period of twenty-four (24) months.


This Framework Agreement may be terminated by the mutual consent of the Parties.

AS WITNESS WHEREOF, the Parties hereto HAVE SIGNED this Framework Agreement in Port of Spain on this 13<sup>th</sup> day of July 2018, in quadruplicate in the English language by the duly authorised representatives of the Parties.



.....  
Managing Director

By and for  
Trinidad and Tobago  
Housing Development Corporation (HDC)



.....  
Executive Vice President

By and for  
China Gezhouba Group International  
Engineering Co., Ltd (CGGC)

## VOLUME I

- **CONTRACT AGREEMENT**
- **FRAMEWORK AGREEMENT**

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## PARTICULAR CONDITIONS OF CONTRACT

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## PARTICULAR CONDITIONS OF CONTRACT

The Conditions of Contract comprise the "General Conditions", which form part of the "Conditions of Contract for EPC Turnkey Projects" First Edition 1999 published by the *Fédération Internationale des Ingénieurs-Conseils (FIDIC)* and the following "Particular Conditions", which include amendments and additions to such General Conditions including the Annexes to the Particular Conditions of Contract.

### CLAUSE 1 – GENERAL PROVISIONS

#### Sub-Clause 1.1.1 – The Contract

1.1.1.4 Replace Sub-Clause 1.1.1.4 in it's entirely with the following:

*"Contractor's EPC Proposal" means the documents and associated annexes entitled Contractor's EPC Proposal compiled and submitted by the Contractor.*

1.1.1.6 Add the following as Sub-Clause 1.1.1.6

*"Project" means the 5,000 Apartment Units Affordable Housing Project Phase I as described in more details in the Contract.*

1.1.1.7 Add the following as Sub-Clause 1.1.1.7

*"Framework Agreement" means the Framework Agreement for the 5,000 Apartment Units Affordable Housing Project signed between the Employer and the Contractor on July 13, 2018.*

1.1.1.8 Add the following as Sub-Clause 1.1.1.8

*"Financing Contract" means the financing contract or other similar agreement to be executed between the Contractor and financing institutions for the financing arrangement of this EPC Contract.*

1.1.1.9 Add the following as Sub-Clause 1.1.1.9

*"Financial Close Date" means the date on which the conditions precedent to the first disbursement under the Financing Contract for the project are satisfied.*

**Sub-Clause 1.1.3 - Dates Test Periods and Completion**

*Sub-Clause 1.1.3.1 shall read: "Base Date" refers to Aug 3, 2018.*

**Sub-Clause 1.1.3.3 - Time for Completion**

*Delete the words, "Particular Conditions" and replace with "ANNEX A, Contract data" in the third line of this Sub-Clause.*

**Sub-Clause 1.1.3.7 - Defects Notification Period**

*Delete the words, "Particular Conditions" and replace with, "ANNEX A: Contract data" in the fourth line of this Sub-Clause.*

**Sub-Clause 1.1.4.7 - Retention Money**

Replace Sub-Clause 1.1.4.7 in it's entirely with the following:

*"Retention Money Guarantee" means the guarantee which the Contractor submits and the Employer returns under Sub-Clause 14.9 [Payment of Retention Money].*

**Sub-Clause 1.3 - Communications**

*Delete the words, "Particular Conditions" in the third line of sub-paragraph (a), and replace with, "ANNEX A: Contract data".*

**Sub-Clause 1.4 - Law and Language**

Delete this Sub-Clause and replace with the following:

*"The Contract shall be governed by the Law of Republic of Trinidad and Tobago. If there are versions of any part of the Contract which are written in more than one language, the ruling language shall be English. The language for communications shall be English."*

**Sub-Clause 1.5 - Priority of Documents**

Delete this Sub-Clause and replace with the following:





The documents forming the Contract are to be taken as mutually explanatory of one another. The priority of the documents shall be kept same as stipulated in Sub-Clause 2 of the Contract Agreement.

#### **Sub-Clause 1.7 - Assignment**

Add at the end of this Sub-Clause the following:

*"(c) The Contractor shall sign Financing Contracts with financing institutions for the financing arrangement of the Contract.*

*The Contractor is entitled to assign the whole or part of the payments to become due based on the Interim Payment Certificates to any financial institution for obtain disbursement for the project during the execution of the project.*

*Prior to any assignment, the contractor shall serve to the Employer a Notice of Assignment in the form accepted by the financing institution. Following receipt of any Notice of Assignment, the Employer shall issue its Acknowledgment of Notice of Assignment, in the form accepted by the financing institution, to the financing institution as assignee and copy to EPC contractor as assigner within seven (7) Days of receiving. Any payment relating to the assignment shall be made into the account specified by the Contractor."*

### **CLAUSE 2 – THE EMPLOYER**

#### **Sub-Clause 2.1 - Right of Access to the Site**

Delete the words, "the Particular Conditions" in the second line of the first paragraph and in the first line of the second paragraph of this Sub-Clause and replace with, "ANNEX A".

Delete the last sentence of the first paragraph, that is:

*"However, the Employer may withhold any such right or possession until the Performance Security has been received."*

At the end of the first paragraph, insert the following:

*The Employer shall provide two hectares of land for each site for Contractor's temporary camps within 5 Km from each site during the execution of the project.*

*The Employer shall execute at its cost all necessary expropriation, requisition or lease, and give possession to the Contractor of all lands necessary for the execution of the Works, including lands for Contractor's temporary camps and temporary division of traffic.*

*The Employer shall resettle at its cost all residents or occupants who inhabit adjacent or within the Site and may impact the execution of the Works.*

## Sub-Clause 2.2 - Permits, Licenses or Approvals

Replace Sub-Clause 2.2 in its entirety as the following:

*The Employer shall, using its best efforts, provide assistance, in obtaining necessary permits, licenses or approvals required by the Laws of the Country:*

- (a) which the Employer is required to obtain under Sub-Clause 1.13 [Compliance with Laws], Sub-Clause 2.1 [Right of Access to the Site] etc.*
- (b) for the delivery of all Goods, material, equipment and spare parts, including acquiring tax exemption, custom clearance, warehouse licenses,*
- (c) for the export of the Contractor's Equipment when it is removed from the Site,*
- (d) for obtaining visas, resident permits, working permits for 400 persons of the Contractor's Personnel, 200 extra shall be granted if necessary to ensure the timely delivery of the project,*
- (e) for obtaining natural Materials and disposal of materials from demolition and excavations and of other surplus material (whether natural or man-made), and*
- (f) for obtaining power, water and other services the Contractor may require for the execution of the Works.*

*The Employer shall provide assistance to the Contractor at the request of the Contract:*

- (a) by obtaining copies of the Laws of the Country which are relevant to the Contract but are not readily available, and*
- (b) for the Contractor's applications for any permits, licenses or approvals which the Contractor is required to obtain under Sub-Clause 1.13[Compliance with Laws].*

## Sub-Clause 2.4 - Employer's Financial Arrangements

Delete this Sub-Clause in its entity and replace with the following:

### 2.4.1 Payment Guarantee

*The Employer shall, within 28 days after signing the Contract Agreement, deliver to the Contractor a Payment Guarantee with the amount covering 100% of the Contract Price. The Payment Guarantee shall be issued by an authority acceptable to the Contractor for ensuring the signing of the Financing Contract, and shall be in the form annexed to the Particular Conditions or in other forms accepted by the Contractor.*

*The Payment Guarantee shall be returned to the Employer at the earliest of the following dates:*

- (a) when the Contractor has been paid the Contract Price in accordance with the Contract;*
- (b) when obligations under the guarantee expire or have been discharged; or*



(c) when the Employer has performed all obligations under the Contract.

#### 2.4.2 Co-operation for financing

The Employer shall provide necessary assistance with the Contractor to prepare the Feasibility Study required by the financing institutions.

The Employer shall at its cost obtain Certificate of Environmental Clearance (CEC) required by any authorities and the financing institutions. The Employer shall obtain the approval of the CEC issued by local authority and shall submit it to the Contractor by the Employer within 7 days after his receiving.

Except as otherwise stated in the Contract, any other documents and necessary co-operation required by the Financing institution for the project regarding the Employer or its Country shall be provided to the Contractor within reasonable time.

#### Sub-Clause 2.6 - Security for the Contractor's Personnel and Property

Insert new Sub-Clause 2.6 Security for the Contractor's Personnel and Property.

Within each Site, the Employer shall at its cost provide sufficient security for Contractor's personnel and property. During execution of the project, at least one patrol car with two armed police shall be arranged for each site 24 hours per day by the local police station under the liaison of the Employer.

### CLAUSE 4 – THE CONTRACTOR

#### Sub-Clause 4.10 - Site Data

Delete the second paragraph of this Sub-Clause.

#### Sub-Clause 4.12 - Unforeseeable Difficulties

Delete this Sub-Clause and replace by the following:

In this Sub-Clause, "physical conditions" means natural physical conditions and man-made and other physical obstructions and pollutants, which the Contractor encounters at the Site when executing the Works, including sub-surface and hydrological conditions.

If the Contractor encounters adverse physical conditions which he considers to have been Unforeseeable, the Contractor shall give notice to the Employer as soon as practicable.

*This notice shall describe the physical conditions, so that they can be inspected by the Employer or the Employer's Representative, and shall set out the reasons why the Contractor considers them to be Unforeseeable. The Contractor shall continue executing the Works, using such proper and reasonable measures as are appropriate for the physical conditions, and shall comply with any instructions which the Employer may give. If an instruction constitutes a Variation, Clause 13 [Variations and Adjustments] shall apply.*

*If and to the extent that the Contractor encounters physical conditions which are Unforeseeable, gives such a notice, and suffers delay and/or incurs Cost due to these conditions, the Contractor shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:*

*(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and*

*(b) payment of any such Cost, which shall be included in the Contract Price.*

*After receiving such notice and inspecting and/or investigating these physical conditions, the Employer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) whether and (if so) to what extent these physical conditions were Unforeseeable, and (ii) the matters described in sub-paragraphs (a) and (b) above related to this extent.*

#### **Sub-Clause 4.15 - Access Route**

Replace Sub-Clause 4.15 in its entirety with the following:

*The Contractor shall use reasonable efforts to prevent any road or bridge from being damaged by the Contractor's traffic or by the Contractor's Personnel.*

*The Contractor shall be responsible for maintenance which may be required for his use of access routes and shall provide signs and directions along access routes.*

*The Employer shall assist the Contractor in obtaining any permission which may be required from the relevant authorities for the use of routes, signs and directions.*

*The Employer shall not be responsible for any claims which may arise from the use or otherwise of any access route. The Employer does not guarantee the suitability or availability of particular access routes. Costs due to non-suitability or non-availability, for the use required by the Contractor, of access routes shall be borne by the Contractor.*



**Sub-Clause 4.19 - Electricity, Water and Gas**

Replace the first paragraph of this Sub-Clause with the following:

*The Employer shall provide assistance for the access of electricity, water and drainage system from the local grid and/or utility to the Site.*

**CLAUSE 5 - DESIGN****Sub-Clause 5.1 - General Design Obligations**

Add the following at the end of this Sub-Clause: *"In case the data concerning the site relied upon by the Contractor in preparing its Proposal are found to be adversely different with the assumptions in its Proposal, the Contractor shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:*

*(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and*

*(b) payment of any additional Cost, which shall be included in the Contract Price.*

**Sub-Clause 5.2 - Contractor's Documents**

Replace "21 days" in the first sentence of fourth paragraph with "14 days".

Insert at the end of the fourth paragraph:

*If no response is provided by the Employer within the Review Period, the Contractor's Documents shall be deemed to have been accepted and the Contractor shall be entitled to proceed on the basis of these documents.*

**CLAUSE 6 – STAFF AND LABOUR****Sub-Clause 6.5 - Working Hours**

Delete this Sub-Clause.



## CLAUSE 7 – PLANT, MATERIALS AND WORKMANSHIP

### Sub-Clause 7.1 - Manner of Execution

At the end of Sub-Clause 7.1, insert:

*CGGC is committed to its social responsibilities and pledges to use as many local workers and materials as possible for the Project.*

## CLAUSE 8 – COMMENCEMENT, DELAYS AND SUSPENSION

### Sub-Clause 8.1 - Commencement of Works

Delete sub-paragraph (b) of this Sub-Clause and replace with:

*(b) "Commencement Date" shall be the 28<sup>th</sup> day after the date on which the Contractor is given the right of access to the Site stated in Sub-Clause 2.1, receives the full advance payment stated in Sub-Clause 14.2, and the Financing Contract is signed, whichever is later.*

### Sub-Clause 8.7 - Delay Damages

Between the words "elapse between" and "the relevant Time for Completion" in line five of the first paragraph of this Sub-Clause, add the words "*six months grace period after*".

## CLAUSE 10 – EMPLOYER'S TAKING OVER

### Sub-Clause 10.1 - Taking Over of the Works and Sections

Add the following before the first paragraph:

*The Employer shall be responsible for the access of electricity, water and sewage system from the local grid and/or utility to the Site for the permanent use by the residents of the housing to be delivered. The necessary approval and the connecting work shall be completed by the Employer within one year after the Commencement Date.*

## Sub-Clause 10.2 - Taking Over of Parts of the Works

Replace Sub-Clause 10.2 in its entirety with the following:

*The Employer may issue a Taking-Over Certificate for any part of the Permanent Works.*

*The Employer shall not use any part of the Works (other than as a temporary measure which is either specified in the Contract or agreed by both Parties) unless and until a Taking-Over Certificate is issued for this part. However, if the Employer does use any part of the Works before the Taking-Over Certificate is issued:*

*(a) the part which is used shall be deemed to have been taken over as from the date on which it is used,*

*(b) the Contractor shall cease to be liable for the care of such part as from this date, when responsibility shall pass to the Employer, and*

*(c) if requested by the Contractor, the Employer shall issue a Taking-Over Certificate for this part.*

*After the Employer has issued a Taking-Over Certificate for a part of the Works, the Contractor shall be given the earliest opportunity to take such steps as may be necessary to carry out any outstanding Tests on Completions if any. The Contractor shall carry out these Tests on Completion as soon as practicable.*

*If the Contractor suffers delay and/or incurs Cost as a result of the Employer taking over and/or using a part of the Works, other than such use as is specified in the Contract or agreed by the Contractor, the Contractor shall (i) give notice to the Employer and (ii) be entitled subject to Sub-Clause 20.1[Contractor's Claims] to extension of time and/or payment of any such Cost plus reasonable profit, which shall be included in the Contract Price. After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.*

## CLAUSE 12 – TESTS AFTER COMPLETION

There are no Tests After Completion and Clause 12 shall not apply.

## CLAUSE 13 – VARIATIONS AND ADJUSTMENTS

### Sub-Clause 13.1 - Right to Vary



At the end of Sub-Clause 13.1, insert:

*The Employer shall be responsible to secure sufficient funding, either from the Provisional Sum or from other resources, before issuing any instruction to vary. The Contractor may request the Employer to provide reasonable evidence that financial arrangements have been made and are being maintained which will enable the Employer to pay the price for each Variation. The Contractor shall not be bound by the Variation unless the evidence is provided by the Employer.*

### **Sub-Clause 13.5 - Provisional Sum**

Replace paragraph (b) of Sub-Clause 13.5 with the followings:

*(b) Plant, Materials, or services to be purchased by the Contractor, nominated subcontractors to be employed by the Contractor, and other works whose price is not included in the Pricing Schedule of the Contractor's Proposal. For these items there shall be added to the Contract Price less the original Provisional Sums:*

*(i) the actual amounts paid (or due to be paid) by the Contractor, and*

*(ii) a sum for financings charges, overhead charges and profit, calculated as 40% of these actual amounts.*

### **Sub-Clause 13.8 - Adjustments for Changes in Costs**

Delete Sub-Clause 13.8 and replace with a new Sub-Clause as follows:

*"The amount of each Interim Payment Certificate to the Contractor, shall be adjusted by the addition or deduction of the amounts determined by the formula prescribed in this Sub-Clause.*

*Such adjustment shall be determined on a monthly basis. The adjustment to be applied to the amounts payable to the Contractor, as valued in accordance with the appropriate Schedule of Payments and applied for Interim Payments through the corresponding Statement shall be determined from the following formula:*

$P_n = a + b L_n/L_0 + c C_n/C_0 + d S_n/S_0 + e D_n/D_0 + f LI_n/LI_0$ , where:

*"P<sub>n</sub>" is the adjustment multiplier to be applied to the estimated contract value of the work carried out in period "n", this period being a month;*



"a" is a fixed coefficient. b, c, d and e are coefficients representing the estimated proportion of typical cost elements as per table below.

Index Code	Index description	Source of index	Weightings
A	Non-adjustable	-	a: 0.05
B	Labor	The index shall be the index number applicable to Average wage index, published by China Economic Monitoring & Analysis Center, National Bureau of Statistics of China.	b: 0.30
C	Cement	The index shall be submitted by the Contractor and approved by the Employer or the Employer's Representative within 21 days after the Commencement Date.	c: 0.20
D	Steel	The index shall be submitted by the Contractor and approved by the Employer or the Employer's Representative within 21 days after the Commencement Date.	d: 0.20
E	Diesel	The index shall be submitted by the Contractor and approved by the Employer or the Employer's Representative within 21 days after the Commencement Date.	e: 0.15
F	6M Libor	www.bbrlibor.com	f: 0.10
Total			1.00

$L_n$ ,  $C_n$ ,  $S_n$ ,  $D_n$  and  $LI_n$  are the current cost indices or reference prices of the cost elements for month "n".  $L_0$ ,  $C_0$ ,  $S_0$ ,  $D_0$  and  $LI_0$  are the base cost indices or reference prices corresponding to the above cost elements on the Base Date.

Until such time as the current cost index is available, the last published index shall be used for the issue of Interim Payment Certificate and when the current cost index is available, the adjustment shall be recalculated accordingly.

If the Contractor fails to complete the Works within the Time for Completion as may be determined under Sub-Clause 8.4 [Extension of Time for Completion], adjustment of prices thereafter shall be made using the cost index applicable on the date of the Time for Completion of the Works.

The coefficients "a" to "f" stated above shall only be adjusted if they have been rendered unreasonable, unbalanced or inapplicable.

#### Sub-Clause 13.9 - Adjustments for Foreign Exchange Rate

Add Sub-Clause 13.9 as follows:

*The payment shall be adjusted in accordance with the Conditions of Contract when the exchange rate of TT dollar to US dollar fluctuation exceeds one (1) percent.*

*The payment of each Interim Payment Certificate shall be adjusted by the addition or deduction of the amounts determined by the formula prescribed in this Sub-Clause for the change of the foreign exchange rate.*

*For each payment of the Interim Payment Certificate, in case the Exchange Rate of TT dollar to US dollar used by the Contractor is more than that issued by the Central Bank of Trinidad and Tobago on the base date, the amount of payment shall be adjusted by the following formula:*

$$IPC_n = IPC_0 \times (E_n/E_0 - 1\%)$$

*For each payment of the Interim Payment Certificate, in case the Exchange Rate of TT dollar to US dollar used by the Contractor is less than that issued by the Central Bank of Trinidad and Tobago on the base date, the amount of payment shall be adjusted by the following formula:*

$$IPC_n = IPC_0 \times (E_n/E_0 + 1\%).$$

*In the above two formulas:*

*IPC<sub>n</sub> represents the amount of each Interim Payment Certificate after adjustment for the Foreign Exchange Rate;*

*IPC<sub>0</sub> represents the original amount of each Interim Payment Certificate;*

*E<sub>n</sub> represents the Exchange Rate of TT dollar to US dollar used by the Contractor of month n;*

*E<sub>0</sub> represents the Selling Exchange Rate of US dollar issued by the Central Bank of Trinidad and Tobago on the Base Date.*

## **CLAUSE 14 – CONTRACT PRICE AND PAYMENT**

### **Sub-Clause 14.1 - The Contract Price**



Replace paragraph (b) in Sub-Clause 14.1 with the followings:

*(b) The Contract Price shall be subjected to the Value Added Taxes (VAT) in accordance with the laws of Republic of Trinidad and Tobago. The Employer shall, using its own funds, reimburse to the Contractor such VAT paid by the Contractor to the tax authorities. The Reimbursement of VAT to the Contractor shall only be applied and facilitated within a period of one month after the submission of each Interim Payment Certificate.*

*(c) The Corporate Taxes paid by the Contractor to tax authorities (Board of Inland Revenue) adhering to the laws of Trinidad and Tobago shall be reimbursed by the Employer to the Contractor within a period of one month after its submission date.*

*(d) The Contract Price shall exclude Value Added Taxes on imports, Custom and Import Duties, individual income taxes for foreign staff and other related fees and charges and other equivalent charges that may be levied upon the Contractor during the performance of the Project in accordance with the laws of Trinidad and Tobago.*

*The Contractor shall be eligible for taxation relief in accordance with the Income Tax act, Chap. 75:01, Order under Section 93(1) of the Trinidad and Tobago Income Tax.*

*In the event that the exemption is not approved by any authorities, all above-noted taxes, duties, fees and charges paid by the Contractor shall be reimbursed by the Employer through his own fund resources.*

*(e) The Employer shall, as reasonably possible with the assistance of the Contractor, obtain all permits including tax exemption certificates, planning permission, work permits, permits-to-work, and any other permits and approvals required for the Project.*

#### **Sub-Clause 14.2 - Advance Payment**

Replace Sub-Clause 14.2 in its entirety with the followings:

*The Employer shall make an advance payment, as an interest-free loan for mobilization and design. The amount of the advance payment shall be 10% of the Contract Price stated in the Contract Agreement. The advance payment shall be paid in one instalment in the currency of Trinidad and Tobago Dollar.*

*The Employer shall pay the full advance payment within 30 days after receiving a guarantee in amounts and currencies equal to the first instalment of the advance payment.*

*The advance payment guarantee shall be issued by a Chinese bank approved by the Employer, and shall be in the form annexed to the Particular Conditions. Unless and until the Employer receives the guarantee, this Sub-Clause shall not apply.*

*The Contractor shall ensure that the guarantee is valid and enforceable until the advance payment has been repaid, but its amount may be progressively reduced by the amount repaid by the Contractor. If the terms of the guarantee specify its expiry date, and the advance payment has not been repaid by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the guarantee until the advance payment has been repaid.*

*The advance payment shall be repaid through proportional deductions in interim payments. Deductions shall be made at the amortization rate of 10% of the amount of each Statement, which shall be applied to the amount otherwise due (excluding the advance payment and deductions and repayments of retention), until such time as the advance payment has been repaid.*

*If the advance payment has not been repaid prior to the issue of the Taking-Over Certificate for the Works or prior to termination under Clause 15 [Termination by Employer], Clause 16 [Suspension and Termination by Contractor] or Clause 19 [Force Majeure] (as the case may be), the whole of the balance then outstanding shall immediately become due and payable by the Contractor to the Employer.*

#### **Sub-Clause 14.3 - Application for Interim Payments**

Delete paragraph (c) of this Sub-Clause, that is:

"(c) any amount to be deducted for retention, calculated by applying the percentage of retention stated in the Particular Conditions to the total of the above amounts, until the amount so retained by the Employer reaches the limit of Retention Money (if any) stated in the Particular Conditions."

#### **Sub-Clause 14.6 - Interim Payments**

Delete this Sub-Clause 14.6 in its entirety and replace with following:

*The Employer shall within 7 days after receiving a Statement and supporting documents, give to the Contractor notice of any items in the Statement with which the Employer disagrees, with supporting particulars. In the event that no notice is given:*

*In respect of the first 6 Statements, the Employer shall within 7 days after receiving each Statement and supporting documents, give to the Contractor a Interim Payment Certificate*



*stating such amounts to be paid within 3 months after the completion date stated in the first Taking-Over Certificate for any Section of the Works.*

*In respect of the Statements, other than the first 6 Statements and the Final Statement, the Employer shall within 7 days after receiving each Statement and supporting documents, give to the Contractor a Interim Payment Certificate stating such amounts to be paid within 6 months after the completion date stated in the Taking-Over Certificate for the Works.*

*The Interim Payment Certificate shall be in the form annexed to the Particular Conditions or in other forms accepted by the Contractor.*

*The payment obligation under each Interim Payment Certificate shall be unconditional and irrevocable. In case of any arbitration or suit arising out of any dispute in connection of this Contract, the payment obligation under this Sub-Clause shall not be prejudiced, suspended or held up. Payment under any arbitration or suit shall be paid in accordance with the settlement agreement of the dispute, if any.*

#### **Sub-Clause 14.7 - Timing of Payments**

Delete this Sub-Clause 14.7 in its entity and replace with following:

*Except as otherwise stated in Sub-Clause 2.5 [Employer's Claims], the Employer shall pay to the Contractor in the following method:*

*(a) The amount which is due in respect of each Statement other than the Final Statement*

*The Employer shall pay to the Contractor the amount which is due in respect of each Statement other than the Final Statement within the period stated in each Interim Payment Certificate as stipulated in Sub-Clause 14.6 [Interim Payments].*

*(b) The amount which is due in respect of the Final Statement*

*The Employer shall pay to the Contractor the final amount due, within 42 days after receiving the Final Statement and written discharge in accordance with Sub-Clause 14.11 [Application for Final Payment] and Sub-Clause 14.12 [Discharge].*

#### **Sub-Clause 14.8 - Delayed Payment**

Add the following at the end of Sub-Clause 14.8 [Delayed Payment]:

*"If the Contractor does not receive the Interim Payment Certificate in accordance with Sub-Clause 14.6 [Interim Payments] or the payment in accordance with Sub-Clause 14.7 [Timing of payments], the Contractor shall be entitled to receive financing charges compounded monthly on the amount unpaid during the period of the delay.*

*These financing charges for payments to be made in TT Dollars shall be calculated at the rate of 4% above the annual discount rate published by the Central Bank of Trinidad and Tobago, and shall be paid in such currency.*

*The Contractor shall be entitled to this payment without formal notice or certification, and without prejudice to any other right or remedy."*

#### **Sub-Clause 14.9 - Payment of Retention Money**

Delete Sub-Clause 14.9 - Payment of Retention Money and replace with this Sub-Clause as follows.

*Within 14 days after receiving the payment of the last Interim Payment Certificate, the Contractor shall submit to the Employer a Retention Money Guarantee provided by a Chinese bank approved by the Employer in a form as attached in the Contract, in amounts equal to 2.5% of the final Contract Price.*

*The Contractor shall ensure that the guarantee is valid and enforceable until the latest of the expiry dates of the Defects Notification Periods.*

*Promptly after the latest of the expiry dates of the Defects Notification Periods, the Retention Money Guarantee shall be returned to the Contractor.*

*However, if any work remains to be executed under Clause 11 [Defects Liability] or Clause 12 [Tests after Completion], the Employer shall be entitled to withhold the Retention Money Guarantee until it has been executed.*

#### **CLAUSE 15 -TERMINATION BY EMPLOYER**

##### **Sub-Clause 15.5 - Employer's Entitlement to Termination**

Insert at the end of Sub-Clause 15.5:

*The Employer shall also pay to the Contractor the amount of any loss or profit or other loss or damage sustained by the Contractor as a result of this termination, whether the*

*Commencement Date has come into force or not in accordance with Sub-Clause 1.6 [Contract Agreement].*

## **CLAUSE 16 –SUSPENSION AND TERMINATION BY CONTRACTOR**

### **Sub-Clause 16.2 - Termination by Contractor**

Replace paragraphs (a) and (b) as following:

(a) the Contractor does not receive the Payment Guarantee within 42 days after the expiry of the time stated in Sub-Clause 2.4.1;

(b) the Contractor does not receive the Interim Payment Certificate within 42 days after the expiry of the time stated in Sub-Clause 14.7 within which Interim Payment Certificate is to be made;

## **CLAUSE 17 – RISK AND RESPONSIBILITY**

### **Sub-Clause 17.3 - Employer's Risks**

Add subparagraph (f) at the end of Sub-Clause 17.3:

*(f) Any operation of the forces of nature or any adverse geologic condition which is unforeseeable or against which an experienced contractor could not reasonably have been expected to have taken adequate preventative precautions.*

## **CLAUSE 18 – INSURANCE**

### **Sub-Clause 18.1 - General Requirements for Insurance**

Delete the words, "*Particular Conditions*" and replace with "*ANNEX A, Contract data*" in the second line of the third paragraph of this Sub-Clause.

Replace the sixth paragraph of Sub-Clause 18.1 as the following:

*The Contractor shall, within 56 days of the Commencement date, submit to the Employer copies of the policies for the insurances described in Sub-Clause 18.2 [Insurance of Works*



and Contractor's Equipment] and Sub-Clause 18.3 [Insurance against Injury to Persons and Damage to Property].

At the end of Sub-Clause 18.1, insert:

*All insurance under the Contract shall be provided by reputable Chinese or local insurance companies.*

### **Sub-Clause 18.3 - Insurance against Injury to Persons and Damage to Property**

Delete the words, "*the Particular Conditions*" and replace with "*ANNEX A, Contract data*" in the second line of the second paragraph of this Sub-Clause.

### **Sub-Clause 18.5 - Insurance for Design**

Insert a new provision as follows:

*"The Contractor shall effect professional indemnity insurance which shall cover the risk of professional negligence or malpractice in the design of the Works. The insurance will provide coverage for all design of Works. The insurance will provide coverage for all design professionals including, but not limited to, architectural, structural and civil engineering and mechanical and electrical engineering design services.*

*This insurance shall be for a limit of USD 5,000,000 (US dollar five million only), with no limit on the number of occurrences. The Contractor shall maintain the professional indemnity insurance in full force and effect for a period of five (5) years from the Commencement Date. The Contractor undertakes to notify the Employer promptly of any difficulty in extending, renewing or reinstating this insurance."*

## **CLAUSE 19 – FORCE MAJEURE**

### **Sub-Clause 19.1 - Definition of Force Majeure**

Add at the end of sub-paragraph (ii) as follows:

*the act of government giving rise to the impossibility of performance of the Contract.*

## **CLAUSE 20 – CLAIMS, DISPUTES AND ARBITRATION**

**Sub-Clause 20.6 - Arbitration**

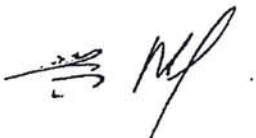
Replace Sub-Clause 20.6 (a)-(c) with the following:

*(a) Any dispute, controversy or claim arising out of or relating to this contract, including the existence, validity, interpretation, performance, breach or termination thereof or any dispute regarding non-contractual obligations arising out of or relating to it shall be referred to and finally resolved by arbitration under the Rules of Arbitration of the International Chamber of Commerce in force when the Notice of Arbitration is submitted.*

*(b) the arbitration award shall be final and binding upon both Parties.*

*(c) the place of arbitration shall be London, England.*

*(d) the arbitration shall be conducted in British English.*

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**ANNEX A**  
**CONTRACT DATA**

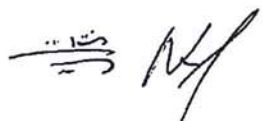
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# ANNEX A

## CONTRACT DATA

Item	Sub-Clause	Data
Employer's name and address	1.1.2.2 & 1.3	Trinidad and Tobago Housing Development Corporation 44-46 South Quay, Port of Spain
Contractor's name and address	1.1.2.3 & 1.3	China Gezhouba Group International Engineering Co., Ltd Tower F, Ocean International Center, No. 208 Ciyunsi Beili, Chaoyang District, Beijing, 100025, P.R. China
Defects Notification Period	1.1.3.7	12 months
Section No. 1	1.1.5.6	Completion of the Works for the first two (2) buildings of the Lady Hailes site such that the apartment units within these buildings are able to be delivered as per the Employer's Requirements.
Section No. 2	1.1.5.6	Completion of the Works for all sites such that the affordable housing under all sites are able to be delivered as per the Employer's Requirements..
Time for access to the Site	2.1	within 14 days after the Contractor receives advance payment
Period for notifying unforeseeable errors, faults and defects in the Employer's Requirements	5.1	90 days
Time for Completion of the Works	8.2	24 months
Time for Completion of Section No.1	8.2	20 months
Time for Completion of Section No.2	8.2	24 months
Delay damages for the Works	8.7 & 14.15(b)	0.02% of the Contract Price per day
Maximum amount of delay damages	8.7	2% of the Contract Price



Limitation of Liability	17.6	30%
Periods for submission of insurance: (a) evidence of insurance (b) relevant policies	18.1	90 days 150 days
Maximum amount of deductibles for insurance of the Employer's risks	18.2(d)	USD 500,000
Minimum amount of third party Insurance	18.3	USD 500,000
The DAB shall be composed of	20.2	A DAB of one Member
Appointment (if not agreed) to be made by	20.3	The President of FIDIC or a person appointed by the President

*Handwritten signature and initials*

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## **ANNEX B**

### **FORM OF ADVANCE PAYMENT GUARANTEE**

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## ANNEX B

### FORM OF ADVANCE PAYMENT GUARANTEE

To: Trinidad and Tobago Housing Development Corporation  
[address]

Project name: 5,000 Apartment Units Affordable Housing Project Phase I

The 5,000 Apartment Units Affordable Housing Project Phase I, located in the  
\_\_\_\_\_ approximately consists of  
\_\_\_\_\_.

The Works are undertaken by the Trinidad and Tobago Housing Development Corporation whose registered offices are located at \_\_\_\_\_ (whom the Contract defines as the Employer).

We have been informed that (Contractor) of (City), (Country) (hereinafter called the 'Principal') is your Contractor under such Contract, and wishes to receive an **Advance Payment**, for which requires him to obtain a guarantee.

At the request of the Principal, we (name of bank).....hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of .....(the 'guaranteed amount', say:.....) upon receipt by us of your demand in writing and your written statement stating:

- (a) that the Principal has failed to repay the Advance Payment in accordance with the conditions of the Contract, and
- (b) the amount which the Principal has failed to repay.

This guarantee shall become effective upon receipt of the advance payment by the Principal. Such guaranteed amount shall be reduced by the amounts of the advance payment repaid to you, as evidenced by your notices issued under Sub-clause 14.6 of the Conditions of the Contract.

Following receipt (from the Principal) of a copy of each purported notice, we shall promptly notify you of the revised guaranteed amount accordingly.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be

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received by us at this office on or before (the date 28 days after the expected expiry of the Time for Completion) .....(the 'expiry date'), when this guarantee shall expire and shall be returned to us.

We have been informed that the Beneficiary may require the Principal to extend this guarantee if the advance payment has not been repaid by the date 28 days prior to such expiry date. We undertake to pay you such guaranteed amount upon receipt by us, within such period of 28 days, of your demand in writing and your written statement that the advance payment has not been repaid and that this guarantee has not been extended.

This guarantee shall be governed by the laws of the People's Republic of China and shall be subject to the Uniform Rules for Demand Guarantees, published as number 758 by the International Chamber of Commerce, except as stated above.

Yours truly,

SIGNATURE AND SEAL

Name of Bank or Financial Institution: \_\_\_\_\_

Address : \_\_\_\_\_

Date : \_\_\_\_\_

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**ANNEX C**

**FORM OF RETENTION MONEY GUARANTEE**

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## FORM OF RETENTION MONEY GUARANTEE

To: Trinidad and Tobago Housing Development Corporation  
[address]

Project name: 5,000 Apartment Units Affordable Housing Project Phase I

The 5,000 Apartment Units Affordable Housing Project Phase I, located in the \_\_\_\_\_ approximately \_\_\_\_\_ consists \_\_\_\_\_ of \_\_\_\_\_

The Works are undertaken by the Trinidad and Tobago Housing Development Corporation whose registered offices are located at \_\_\_\_\_ (whom the Contract defines as the Employer).

We have been informed that (Contractor) of (City), (Country) (hereinafter called the 'Principal') is your Contractor under such Contract, which requires the Contractor to obtain a retention money guarantee.

At the request of the Principal, we .....(name of bank) ..... hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of .....(the 'guaranteed amount', say:.....) upon receipt by us of your demand in writing and your written statement stating:

- (a) that the Principal has failed to carry out his obligation(s) to rectify certain defect(s) for which he is responsible under the Contract, and
- (b) the nature of such defect(s).

At any time, our liability under this guarantee shall not exceed the total amount stipulated under Sub-clause 14.9 of the Conditions of the Contract with a copy being passed to us.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at this office on or before (the date 28 days after the expected expiry of the Defects Notification Period for the Works), .....(the 'expiry date'), when this guarantee shall expire and shall be returned to us.

We have been informed that the Beneficiary may require the Principal to extend this guarantee if the performance certificate under the Contract has not been issued by the date 28 days prior to such expiry date. We undertake to pay you such guaranteed amount upon receipt by us, within such period of 28 days, of your demand in writing and your written

statement that the performance certificate has not been issued, for reasons attributable to the Principal, and that this guarantee has not been extended.

This guarantee shall be governed by the laws of People's Republic of China and shall be subject to the Uniform Rules for Demand Guarantees, published as number 758 by the International Chamber of Commerce, except as stated above.

Yours truly,

SIGNATURE AND SEAL

Name of Bank or Financial Institution: \_\_\_\_\_

Address : \_\_\_\_\_

Date : \_\_\_\_\_

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## **ANNEX D**

### **FORM OF INTERIM PAYMENT CERTIFICATE**



**ANNEX D****FORM OF INTERIM PAYMENT CERTIFICATE**

IPC No.: \_\_\_\_\_

Date: \_\_\_\_\_

To: [Name and address of the Contractor]

With reference to Sub-Clause 14.7.2 of the Particular Conditions of Contract for the 5,000 APARTMENT UNITS AFFORDABLE HOUSING PROJECT PHASE I, entered into between you and *Trinidad and Tobago Housing Development Corporation* ("the Employer") dated \_\_\_\_\_, we hereby confirm to you that the Interim Payment amounting \_\_\_\_\_ (in words: \_\_\_\_\_) under your Statement No. \_\_\_\_\_ is due to the Contractor.

We irrevocably promise to you the above amounts shall be paid to you within \_\_\_\_\_ months after the completion date stated in the Taking-Over Certificate for the Works, provided always that the above amounts shall be paid within 24 months since the issue date of this Interim Payment Certificate.

100% shall be paid in TT dollar.

Words and terms used herein shall have same meanings assigned to them in the Contract.

The Employer hereby caused this Interim Payment Certificate by its duly authorized representative as of the [ ] day of [ ].

Name:

Title:

Signature:



046

**ANNEX E**

**FORM OF PAYMENT GUARANTEE**

*Handwritten signatures*

## ANNEX E

### FORM OF PAYMENT GUARANTEE

To: [Name and address of the Contractor]

With reference to Sub-Clause 2.4.1 of the Particular Conditions of Contract for the 5,000 APARTMENT UNITS AFFORDABLE HOUSING PROJECT PHASE I, entered into between you and *Trinidad and Tobago Housing Development Corporation* ("the Employer") dated \_\_\_\_\_, we, the Employer, irrevocably and unconditionally guarantee to you, as a primary obligation, the due performance of all the Employer's obligations and liabilities under the Contract, including the Employer's compliance with all its terms and conditions according to their true intent and meaning.

Most of all, we, the Employer, irrevocably and unconditionally guarantee to you the full and timely payment of the 100% of the Contract Price in accordance with the Conditions of the Contract, and we will be responsible for the placement, mortgages and sales to potential buyers of the Project apartments. In case there are no sufficient buyers upon completion of each building, we, the Employer shall use its own funds, or purchase the Project apartments by applying mortgages from Trinidad and Tobago Mortgage Finance Company Limited ("TTMF") to ensure that you will be fully paid within the time specified in the Contract.

If the Employer fails to so perform his obligations and liabilities and comply with the Contract, we will indemnify the Contractor against and from all damages, losses and expenses (including legal fees and expenses) which arise from any such failure for which the Employer is liable to the Contractor under the Contract.

This guarantee shall come into full force and effect when the Contract comes into full force and effect. This guarantee shall continue in full force and effect until all the Employer's obligations and liabilities under the Contract have been discharged, when this guarantee shall expire and shall be returned to us, and our liability hereunder shall be discharged absolutely.

This guarantee shall apply and be supplemental to the Contract as amended or varied by the Employer and the Contractor from time to time. Our obligations and liabilities under this guarantee shall not be discharged by any allowance of time or other indulgence whatsoever by the Contractor to the Employer, or by any variation or suspension of the works to be executed under the Contract, or by any

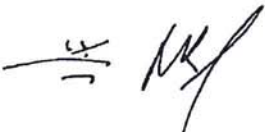


amendments to the Contract or to the constitution of the Contractor or the Employer, or by any other matters, whether with or without our knowledge or consent.

This guarantee shall be governed by the law of the Republic of Trinidad and Tobago as that which governs the Contract, and any dispute under this guarantee shall be finally settled under the same rules as stipulated in Sub-Clause 20.6 of the Particular Conditions of Contract when the Notice of Arbitration is submitted, by one or more arbitrators appointed in accordance with such Rules. We confirm that the benefit of this guarantee may be assigned subject only to the provisions for assignment of the Contract.

Date \_\_\_\_\_

Signature \_\_\_\_\_

Handwritten signature and initials, possibly "11/11" and "N/A", located at the bottom left of the page.

049

## **ANNEX F**

### **FORM OF DISPUTE ADJUDICATION BOARD AGREEMENT**

A handwritten signature in black ink, appearing to be 'NBA' followed by a flourish, located in the bottom right corner of the page.

## ANNEX F

### FORM OF DISPUTE ADJUDICATION BOARD AGREEMENT

[FOR EACH MEMBER OF A THREE-PERSON DAB]

Name and details of Contract .....  
 Name and address of Employer .....  
 Name and address of Contractor .....  
 Name and address of Member .....

Whereas the Employer and the Contractor have entered into the Contract and desire jointly to appoint the Member to act as one of the three persons who are jointly called the 'DAB' [and desire the Member to act as chairman of the DAB] to adjudicate a dispute which has arisen in relation to \_\_\_\_\_

The Employer, Contractor and Member jointly agree as follows:

1. The conditions of this Dispute Adjudication Agreement comprise the 'General Conditions of Dispute Adjudication Agreement', which is appended to the General Conditions of the 'Conditions of Contract for EPC/Turnkey Projects' First Edition 1999 published by the Fédération Internationale des Ingénieurs-Consells (FIDIC), and the following provisions. In these provisions, which include amendments and additions to the General Conditions of Dispute Adjudication Agreement, words and expressions shall have the same meanings as are assigned to them in the General Conditions of Dispute Adjudication Agreement.
2. [ Details of amendments to the General Conditions of Dispute Adjudication Agreement, if any]
3. In accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement, the Member shall be paid a daily fee of equivalent to the ICSID Arbitrator's Daily Fee current at the date of this Agreement.
4. In consideration of these fees and other payments to be made by the Employer and the Contractor in accordance with Clause 6 of the General Conditions of Dispute



Adjudication Agreement, the Member undertakes to serve, as described in this Dispute Adjudication Agreement, as one of the three persons who are jointly to act as the DAB.

5. The Employer and the Contractor jointly and severally undertake to pay the Member, in consideration of the carrying out of these services, in accordance with Clause 6 of the General Conditions of Dispute Adjudication Agreement.
6. This Dispute Adjudication Agreement shall be governed by the law of Federal Republic of Argentina.

SIGNED by:

for and on behalf of the  
Employer in the presence of

for and on behalf of the  
Contractor in the presence of

for and on behalf of the  
Member in the presence of

Witness:

Witness:

Witness:

Name:

Name:

Name:

Address:

Address:

Address:

Date:

Date:

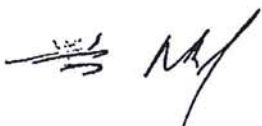
Date:

*MSF* *MSF*

## VOLUME I

- **CONTRACT AGREEMENT**
- **FRAMEWORK AGREEMENT**
- **PARTICULAR CONDITIONS OF CONTRACT**
- **ANNEXES TO PARTICULAR CONDITIONS OF CONTRACT**
  - A. CONTRACT DATA*
  - B. FORM OF ADVANCE PAYMENT GUARANTEE*
  - C. FORM OF RETENTION MONEY GUARANTEE*
  - D. FORM OF INTERIM PAYMENT CERTIFICATE*
  - E. FORM OF PAYMENT GUARANTEE*
  - F. FORM OF DISPUTE ADJUDICATION BOARD AGREEMENT*

**GENERAL CONDITIONS OF CONTRACT**



# GENERAL CONDITIONS OF CONTRACT

The General Conditions of Contract shall be:

Conditions of Contract for EPC/Turnkey Projects

General Conditions

First Edition 1999  
ISBN 2-88432-021-0

Published by:  
Fédération Internationale des Ingénieurs Conseils (FIDIC)

Any Party is expected to purchase his own copy for the execution of the Contract.

*Handwritten signature*



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GENERAL CONDITIONS

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GUIDANCE FOR THE  
PREPARATION OF  
PARTICULAR  
CONDITIONS

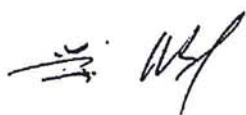
Conditions of Contract  
for **EPC/Turnkey Projects**

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FORMS OF LETTER OF  
TENDER, CONTRACT  
AGREEMENT AND  
DISPUTE  
ADJUDICATION  
AGREEMENT

---

First Edition 1999  
ISBN 2-88432-021-0



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## INTRODUCTORY NOTE TO FIRST EDITION

FIDIC's Red and Yellow Books (i.e. standard forms of contract for works of civil engineering construction and for electrical and mechanical works) have been in widespread use for several decades, and have been recognised - among other things - for their principles of balanced risk sharing between the Employer and the Contractor. These risk sharing principles have been beneficial for both parties, the Employer signing a contract at a lower price and only having further costs when particular unusual risks actually eventuate, and the Contractor avoiding pricing such risks which are not easy to evaluate. The principles of balanced risk sharing are continued in the new "Construction" and "Plant and Design-Build" Books.

During recent years it has been noticed that much of the construction market requires a form of contract where certainty of final price, and often of completion date, are of extreme importance. Employers on such turnkey projects are willing to pay more - sometimes considerably more - for their project if they can be more certain that the agreed final price will not be exceeded. Among such projects can be found many projects financed by private funds, where the lenders require greater certainty about a project's costs to the Employer than is allowed for under the allocation of risks provided for by FIDIC's traditional forms of contracts. Often the construction project (the EPC - Engineer, Procure, Construct - Contract) is only one part of a complicated commercial venture, and financial or other failure of this construction project will jeopardize the whole venture.

For such projects it is necessary for the Contractor to assume responsibility for a wider range of risks than under the traditional Red and Yellow Books. To obtain increased certainty of the final price, the Contractor is often asked to cover such risks as the occurrence of poor or unexpected ground conditions, and that what is set out in the requirements prepared by the Employer actually will result in the desired objective. If the Contractor is to carry such risks, the Employer obviously must give him the time and opportunity to obtain and consider all relevant information before the Contractor is asked to sign on a fixed contract price. The Employer must also realize that asking responsible contractors to price such risks will increase the construction cost and result in some projects not being commercially viable.

Even under such contracts the Employer does carry certain risks such as the risks of war, terrorism and the like and the other risks of Force Majeure, and it is always possible, and sometimes advisable, for the Parties to discuss other risk sharing arrangements before entering into the Contract. In the case of BOT (Build-Operate-Transfer) type projects, which are normally negotiated as a package, the allocation of risk provided for in the turnkey construction Contract negotiated initially between the Sponsors and the EPC Contractor may need to be adjusted in order to take into account the final allocation of all risks between the various contracts forming the total package.

Apart from the more recent and rapid development of privately financed projects demanding contract terms ensuring increased certainty of price, time and performance, it has long been apparent that many employers, particularly in the public sector, in a wide range of countries have demanded similar contract terms, at least for turnkey contracts. They have often irreverently taken the FIDIC Red or Yellow Books and altered the terms so that risks placed on the Employer in the FIDIC Books have been transferred to the Contractor, thus effectively removing FIDIC's traditional principles of balanced risk sharing. This need of many employers has not gone unnoticed, and FIDIC has considered it better for all parties for this need to be openly recognised and regularised. By providing a standard FIDIC form for use in such contracts, the Employer does not have to attempt to alter a standard form intended for another risk arrangement, and the Contractor is fully aware of the increased risks he must bear. Clearly the Contractor will rightly increase his tender price to account for such extra risks.

This form for EPC/Turnkey Projects is thus intended to be suitable, not only for EPC Contracts within a BOT or similar type venture, but also for all the many projects, both large and smaller, particularly E & M (Electrical and Mechanical) and other process plant projects, being carried out around the world by all types of employers, often in a civil law environment, where the government departments or private developers wish to implement their project on a fixed-price turnkey basis and with a strictly two party approach.

Employers using this form must realise that the "Employer's Requirements" which they prepare should describe the principle and basic design of the plant on a functional basis. The Tenderer should then be permitted and required to



verify all relevant information and data and make any necessary investigations. He shall also carry out any necessary design and detailing of the specific equipment and plant he is offering, allowing him to offer solutions best suited to his equipment and experience. Therefore the tendering procedure has to permit discussions between the Tenderer and the Employer about technical matters and commercial conditions. All such matters, when agreed, shall then form part of the signed Contract.

Thereafter the Contractor should be given freedom to carry out the work in his chosen manner, provided the end result meets the performance criteria specified by the Employer. Consequently, the Employer should only exercise limited control over and should in general not interfere with the Contractor's work. Clearly the Employer will wish to know and follow progress of the work and be assured that the time programme is being followed. He will also wish to know that the work quality is as specified, that third parties are not being disturbed, that performance tests are met, and otherwise that the "Employer's Requirements" are being complied with.

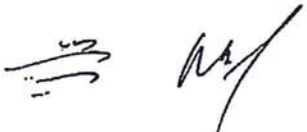
A feature of this type of contract is that the Contractor has to prove the reliability and performance of his plant and equipment. Therefore special attention is given to the "Tests on Completion", which often take place over a considerable time period, and Taking Over shall take place only after successful completion of these tests.

FIDIC recognizes that privately-financed projects are usually subject to more negotiation than publicly-financed ones and that therefore changes are likely to have to be made in any standard form of contract proposed for projects within a BOT or similar type venture. Among other things, such form may need to be adapted to take account of the special, if not unique, characteristics of each project, as well as the requirements of lenders and others providing financing. Nevertheless, such changes do not do away with the need for a standard form.

These Conditions of Contract for EPC/Turnkey Projects are not suitable for use in the following circumstances:

- If there is insufficient time or information for tenderers to scrutinise and check the Employer's Requirements or for them to carry out their designs, risk assessment studies and estimating (taking particular account of Sub-Clauses 4.12 and 5.1).
- If construction will involve substantial work underground or work in other areas which tenderers cannot inspect.
- If the Employer intends to supervise closely or control the Contractor's work, or to review most of the construction drawings.
- If the amount of each interim payment is to be determined by an official or other intermediary.

FIDIC recommends that the Conditions of Contract for Plant and Design-Build be used in the above circumstances for Works designed by (or on behalf of) the Contractor.



## ACKNOWLEDGEMENTS

Fédération Internationale des Ingénieurs-Conseils (FIDIC) extends special thanks to the following members of its Update Task Group: Christopher Wade (Group Leader), SWECO-VBB, Sweden; Peter L Booen (Principal Drafter), GIBB Ltd, UK; Hermann Bayerlein, Fichtner, Germany; Christopher R Seppala (Legal Adviser), White & Case, France; and José F Speziale, IATASA, Argentina.

The preparation was carried out under the general direction of the FIDIC Contracts Committee which comprised John B Bowcock, Consulting Engineer, UK (Chairman); Michael Mortimer-Hawkins, SwedPower, Sweden; and Axel-Volkmar Jaeger, Schmidt Reuter Partner, Germany; together with K B (Tony) Norris as Special Adviser.

Drafts were reviewed by many persons and organisations, including those listed below. Their comments were duly studied by the Update Task Group and, where considered appropriate, have influenced the wording of the clauses. Mushtaq Ahmad, NESPAK, Pakistan; Peter Batty, Post Buckley International, USA; Roeland Bertrams, Clifford Chance, Netherlands; Charles G Borthwick, SwedPower, Sweden; Manfred Breege, Lahmeyer International, Germany; Pablo Bueno, TYPESA, Spain; Nael G Bunni, Consulting Engineer, Ireland; Ian Fraser, Beca Carter Hollings & Ferner, New Zealand; Roy Goode, Oxford University, UK; Dan W Graham, Bristows Cooke & Carpmal, UK; Mark Griffiths, Griffiths & Armour, UK; Geoffrey F Hawker, Consulting Engineer, UK; Hesse & Steinberger, VDMA, Germany; Poul E Hvilsted, Elsamprojekt, Denmark; Lennart Iwar, Lindahl, Sweden; Gordon L Jaynes, Whitman Breed Abbott & Morgan, UK; Tonny Jensen (Chairman of FIDIC Quality Management Committee), COWI, Denmark; Martin Klapper, Hopgood and Ganim, Australia; Philip Loots & Associates, South Africa; Neil McCole, Merz and McLellan, UK; Matthew Needham-Laing, Victoria Russell & Paul J Taylor, Berrymans Lace Mawer, UK; J Gordon Rees, Binnie Black & Veatch, UK; Tim Reynolds, Constant & Constant, UK; David R Wightman & Gerlando Butera, Nabarro Nathanson, UK; the Association of Japanese Consulting Engineers; the Construction Industry Authority of the Philippines; the Dutch Vereniging voor Bouwrecht; the European International Contractors (EIC); ORGANISME de Liaison Industries Metalliques Europeennes (ORGALIME); the International Association of Dredging Contractors; the International Bar Association; the Asian Development Bank; and the World Bank. Acknowledgement of reviewers does not mean that such persons or organizations approve of the wording of all clauses. In particular, EIC and ORGALIME have expressed reservations about some clauses of this EPC Contract.

FIDIC wishes to record its appreciation of the time and effort devoted by all the above.

The ultimate decision on the form and content of the document rests with FIDIC.



## FOREWORD

The Fédération Internationale des Ingénieurs-Conseils (FIDIC) published, in 1999, First Editions of four new standard forms of contract:

**Conditions of Contract for Construction,**

which are recommended for building or engineering works designed by the Employer or by his representative, the Engineer. Under the usual arrangements for this type of contract, the Contractor constructs the works in accordance with a design provided by the Employer. However, the works may include some elements of Contractor-designed civil, mechanical, electrical and/or construction works.

**Conditions of Contract for Plant and Design-Build,**

which are recommended for the provision of electrical and/or mechanical plant, and for the design and execution of building or engineering works. Under the usual arrangements for this type of contract, the Contractor designs and provides, in accordance with the Employer's requirements, plant and/or other works; which may include any combination of civil, mechanical, electrical and/or construction works.

**Conditions of Contract for EPC/Turnkey Projects,**

which may be suitable for the provision on a turnkey basis of a process or power plant, of a factory or similar facility, or of an infrastructure project or other type of development, where (i) a higher degree of certainty of final price and time is required, and (ii) the Contractor takes total responsibility for the design and execution of the project, with little involvement of the Employer. Under the usual arrangements for turnkey projects, the Contractor carries out all the Engineering, Procurement and Construction (EPC): providing a fully-equipped facility, ready for operation (at the "turn of the key").

**Short Form of Contract,**

which is recommended for building or engineering works of relatively small capital value. Depending on the type of work and the circumstances, this form may also be suitable for contracts of greater value, particularly for relatively simple or repetitive work or work of short duration. Under the usual arrangements for this type of contract, the Contractor constructs the works in accordance with a design provided by the Employer or by his representative (if any), but this form may also be suitable for a contract which includes, or wholly comprises, Contractor-designed civil, mechanical, electrical and/or construction works.

The forms are recommended for general use where tenders are invited on an international basis. Modifications may be required in some jurisdictions, particularly if the Conditions are to be used on domestic contracts. FIDIC considers the official and authentic texts to be the versions in the English language.

In the preparation of these Conditions of Contract for EPC/Turnkey Projects, it was recognised that, while there are many sub-clauses which will be generally applicable, there are some sub-clauses which must necessarily vary to take account of the circumstances relevant to the particular contract. The sub-clauses which were considered to be applicable to many (but not all) contracts have been included in the General Conditions, in order to facilitate their incorporation into each contract.

The General Conditions and the Particular Conditions will together comprise the Conditions of Contract governing the rights and obligations of the parties. It will be necessary to prepare the Particular Conditions for each individual contract, and to take account of those sub-clauses in the General Conditions which mention the Particular Conditions.

For this publication, the General Conditions were prepared on the following basis:

- (i) interim payments, in respect of the lump sum Contract Price, will be made as work proceeds, and will typically be based on instalments specified in a schedule;
- (ii) if the wording in the General Conditions necessitates further data which would typically be prescribed by the Employer, then the sub-clause makes reference to this data being contained in the Particular Conditions or in the Employer's Requirements;
- (iii) where a sub-clause in the General Conditions deals with a matter on which different contract terms are likely to be applicable for different contracts, the principles applied in writing the sub-clause were:
  - (a) users would find it more convenient if any provisions which they did not wish to apply could simply be deleted or not invoked, than if additional text had to be written (in the Particular Conditions) because the General Conditions did not cover their requirements; or
  - (b) in other cases, where the application of (a) was thought to be inappropriate, the sub-clause contains the provisions which were considered applicable to most contracts.

For example, Sub-Clause 14.2 [*Advance Payment*] is included for convenience, not because of any FIDIC policy in respect of advance payments. This Sub-Clause becomes inapplicable (even if it is not deleted) if it is disregarded by not specifying the amount of the advance. It should therefore be noted that some of the provisions contained in the General Conditions may not be appropriate for an apparently-typical contract.

Further information on these aspects, example wording for other arrangements, and other explanatory material and a check-list and example wording to assist in the preparation of the Particular Conditions and the other tender documents, are included within this publication as Guidance for the Preparation of the Particular Conditions. Before incorporating any example wording, it must be checked to ensure that it is wholly suitable for the particular circumstances; if not, it must be amended.

Where example wording is amended, and in all cases where other amendments or additions are made, care must be taken to ensure that no ambiguity is created, either with the General Conditions or between the clauses in the Particular Conditions. It is essential that all these drafting tasks, and the entire preparation of the tender documents, are entrusted to personnel with the relevant expertise, including the contractual, technical and procurement aspects.

This publication concludes with example forms for the Letter of Tender, the Contract Agreement, and alternatives for the Dispute Adjudication Agreement. This Dispute Adjudication Agreement provides text for the agreement between the Employer, the Contractor and the person appointed to act either as sole adjudicator or as a member of a three-person dispute adjudication board; and incorporates (by reference) the terms in the Appendix to the General Conditions.

FIDIC intends to publish a guide to the use of its Conditions of Contract for Construction, for Plant and Design-Build, and for EPC/Turnkey Projects.

In order to clarify the sequence of Contract activities, reference may be made to the charts on the next two pages and to the Sub-Clauses listed below (some Sub-Clause numbers are also stated in the charts). The charts are illustrative and must not be taken into consideration in the interpretation of the Conditions of Contract.

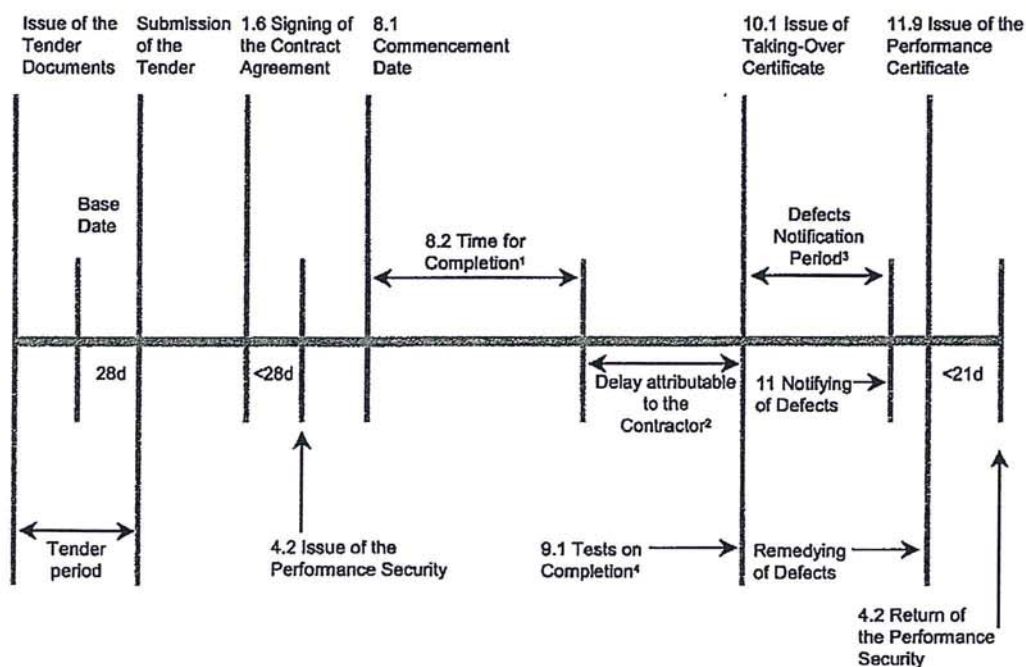
1.1.3.1	&	13.7	Base Date
1.1.3.2	&	8.1	Commencement Date
1.1.6.6	&	4.2	Performance Security
1.1.3.3	&	8.2	Time for Completion (as extended under 8.4)
1.1.3.4	&	9.1	Tests on Completion
1.1.3.5	&	10.1	Taking-Over Certificate



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1.1.3.6	&	12.1	Tests after Completion (if any)
1.1.3.7	&	11.1	Defects Notification Period (as extended under 11.3)
1.1.3.8	&	11.9	Performance Certificate

*Handwritten signatures and initials.*

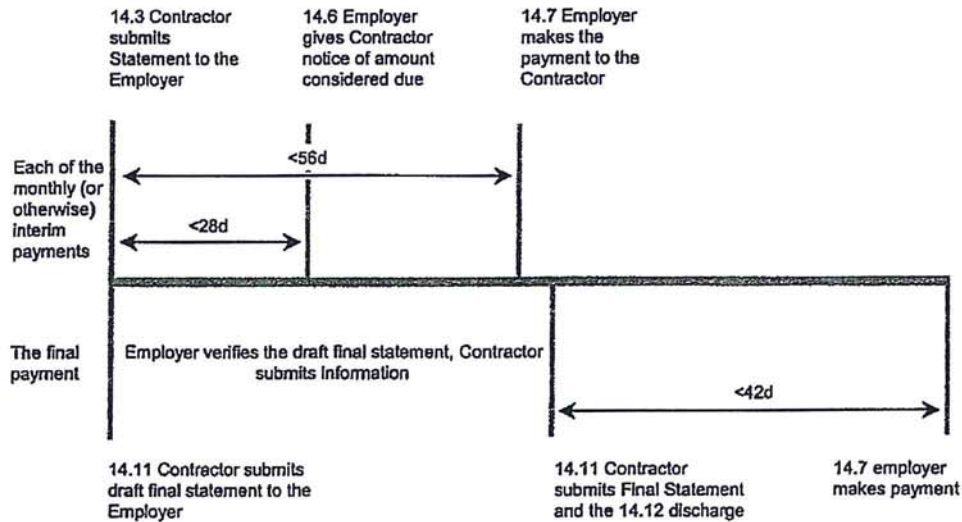


#### Typical sequence of Principal Events during Contracts for EC/Turnkey Projects

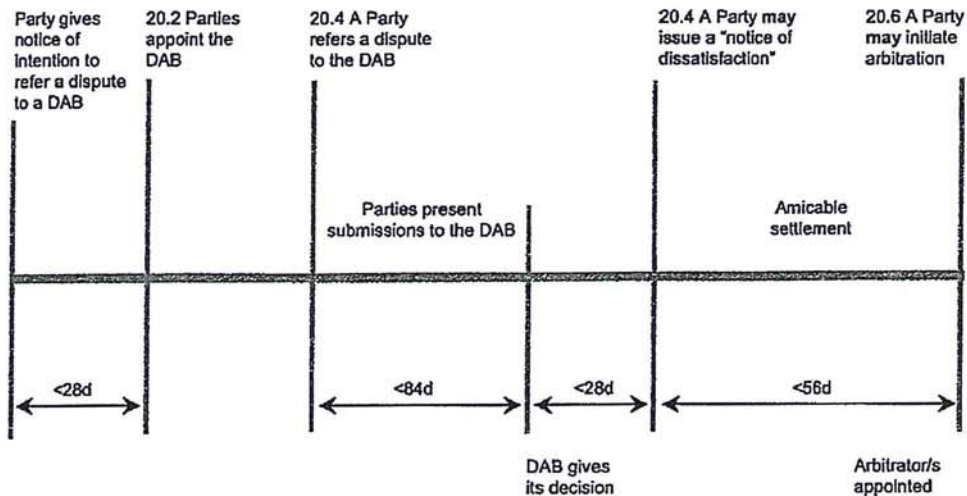
1. The Time for Completion is to be stated (in the Particular Conditions) as a number of days, to which is added any extensions of time under Sub-Clause 8.4.
2. In order to indicate the sequence of events, the above diagram is based upon the example of the Contractor failing to comply with Sub-Clause 8.2.
3. The Defects Notification Period is to be stated (in the Particular Conditions) as a number of days, to which is added any extensions under Sub-Clause 11.3.
4. Depending on the type of Works, Tests after Completion may also be required.

*MS*

*1/1/19*



Typical sequence of Payment Events envisaged in Clause 14



Typical sequence of Dispute Events envisaged in Clause 20

12-  
NK



Conditions of Contract  
for **EPC/Turnkey Projects**

General Conditions

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GENERAL CONDITIONS

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GUIDANCE FOR THE  
PREPARATION OF  
PARTICULAR CONDITIONS

---

FORMS OF LETTER OF  
TENDER, CONTRACT  
AGREEMENT AND  
DISPUTE ADJUDICATION  
AGREEMENT

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## General Conditions

### 1

#### General Provisions

- 1.1 Definitions In the Conditions of Contract ("these Conditions"), which include Particular Conditions and these General Conditions, the following words and expressions shall have the meanings stated. Words indicating persons or parties include corporations and other legal entities, except where the context requires otherwise.
- 1.1.1 The Contract
- 1.1.1.1 "Contract" means the Contract Agreement these Conditions, the Employer's Requirements, the Tender, and the further documents (if any) which are listed in the Contract Agreements.
- 1.1.1.2 "Contract Agreement" means the contract agreement referred to in Sub-Clause 1.6 [Contract Agreement], including any annexed memoranda.
- 1.1.1.3 "Employer's Requirements" means the document entitled employer's requirements, as included in the Contract, and any additions and modifications to such document in accordance with the Contract. Such document specifies the purpose, scope, and/or design and/or other technical criteria, for the Works.
- 1.1.1.4 "Tender" means the Contractor's signed offer for the Works and all other documents which the Contractor submitted therewith (other than these Conditions and the Employer's Requirements, if so submitted), as included in the Contract.
- 1.1.1.5 "Performance Guarantees" and "Schedule of Payments" mean the documents so named (if any), as included in the Contract.
- 1.1.2 Parties and Persons
- 1.1.2.1 "Party" means the Employer or the Contractor, as the context requires.
- 1.1.2.2 "Employer" means the person named as employer in the Contract Agreement and the legal successors in title to this person.
- 1.1.2.3 "Contractor" means the person(s) named as contractor in the Contract Agreement and the legal successors in title to this person(s).
- 1.1.2.4 "Employer's Representative" means the person named by the Employer in the Contract or appointed from time to time by the Employer under Sub-Clause 3.1 [The Employer's Representative], who acts on behalf of the Employer.
- 1.1.2.5 "Contractor's Representative" means the person named by the Contractor in the Contract or appointed from time to time by the Contractor under Sub-Clause 4.3 [Contractor's Representative], who acts on behalf of the Contractor.
- 1.1.2.6 "Employer's Personnel" means the Employer's Representative, the assistants referred to in Sub-Clause 3.2 [Other Employer's Personnel] and all

other staff, labour and other employees of the Employer's Representative, and any other personnel notified to the Contractor, by the Employer or the Employer's Representative, as Employer's Personnel.

1.1.2.7 "Contractor's Personnel" means the Contractor's Representative and all personnel whom the Contractor utilises on Site, who may include the staff, labour and other employees of the Contractor and of each Subcontractor; and any other personnel assisting the Contractor in the execution of the Works.

1.1.2.8 "Subcontractor" means any person named in the Contract as a subcontractor, or any person appointed as a subcontractor, for a part of the Works; and the legal successors in title to each of these persons.

1.1.2.9 "DAB" means the person or three persons so named in the Contract, or other person(s) appointed under Sub-Clause 20.2 [Appointment of the Dispute Adjudication Board] or Sub-Clause 20.3 [Failure to Agree Dispute Adjudication Board].

1.1.2.10 "FIDIC" means the Federation Internationale des Ingenieurs-Conseils, the international federation of consulting engineers.

1.1.3  
Dates, Tests,  
Periods and  
Completion

1.1.3.1 "Base Date" means the date 28 days prior to the latest date for submission of the Tender.

1.1.3.2 "Commencement Date" means the date notified under Sub-Clause 8.1 [Commencement of Works], unless otherwise defined in the Contract Agreement.

1.1.3.3 "Time for Completion" means the time for completing the Works or a Section (as the case may be) under Sub-Clause 8.2 [Time for Completion], as stated in the Particular Conditions (with any extension under Sub-Clause 8.4 [Extension of Time for Completion]), calculated from the Commencement Date.

1.1.3.4 "Tests on Completion" means the tests which are specified in the Contract or agreed by both Parties or instructed as a Variation, and which are carried out under Clause 9 [Tests on Completion] before the Works or a Section (as the case may be) are taken over by the Employer.

1.1.3.5 "Taking-Over Certificate" means a certificate issued under Clause 10 [Employer's Taking Over].

1.1.3.6 "Tests after Completion" means the tests (if any) which are specified in the Contract and which are carried out under Clause 12 [Tests after Completion] after the Works or a Section (as the case may be) are taken over by the Employer.

1.1.3.7 "Defects Notification Period" means the period for notifying defects in the Works or a Section (as the case may be) under Sub-Clause 11.1 [Completion of Outstanding Work and Remedying Defects], as stated in the Particular Conditions (with any extension under Sub-Clause 11.3 [Extension of Defects Notification Period]), calculated from the date on which the Works or Section is completed as certified under Sub-Clause 10.1 [Taking Over of the Works and Sections]. If no such period is stated in the Particular Conditions,



the period shall be one year.

1.1.3.8 "Performance Certificate" means the certificate issued under Sub-Clause 11.9 [Performance Certificate].

1.1.3.9 "day" means a calendar day and "year" means 365 days.

1.1.4  
Money and  
Payments

1.1.4.1 "Contract Price" means the agreed amount stated in the Contract Agreement for the design, execution and completion of the Works and the remedying of any defects, and includes adjustments (if any) in accordance with the Contract.

1.1.4.2 "Cost" means all expenditure reasonably incurred (or to be incurred) by the Contractor, whether on or off the Site, including overhead and similar charges, but does not include profit.

1.1.4.3 "Final Statement" means the statement defined in Sub-Clause 14.11 [Application for Final Payment].

1.1.4.4 "Foreign Currency" means a currency in which part (or all) of the Contract Price is payable, but not the Local Currency.

1.1.4.5 "Local Currency" means the currency of the Country.

1.1.4.6 "Provisional Sum" means a sum (if any) which is specified in the Contract as a provisional sum, for the execution of any part of the Works or for the supply of Plant, Materials or services under Sub-Clause 13.5 [Provisional Sums].

1.1.4.7 "Retention Money" means the accumulated retention moneys which the Employer retains under Sub-Clause 14.3 [Application for Interim Payments] and pays under Sub-Clause 14.9 [Payment of Retention Money].

1.1.4.8 "Statement" means a statement submitted by the Contractor as part of an application for payment under Clause 14 [Contract Price and Payment].

1.1.5  
Works and Goods

1.1.5.1 "Contractor's Equipment" means all apparatus, machinery, vehicles and other things required for the execution and completion of the Works and the remedying of any defects. However, Contractor's Equipment excludes Temporary Works, Employer's Equipment (if any), Plant, Materials and any other things intended to form or forming part of the Permanent Works.

1.1.5.2 "Goods" means Contractor's Equipment, Materials, Plant and Temporary Works, or any of them as appropriate.

1.1.5.3 "Materials" means things of all kinds (other than Plant) intended to form or forming part of the Permanent Works, including the supply-only materials (if any) to be supplied by the Contractor under the Contract.

1.1.5.4 "Permanent Works" means the permanent works to be designed and executed by the Contractor under the Contract.

1.1.5.5 "Plant" means the apparatus, machinery and vehicles intended to form or

forming part of the Permanent Works.

1.1.5.6 "Section" means a part of the Works specified in the Particular Conditions as a Section (if any).

1.1.5.7 "Temporary Works" means all temporary works of every kind (other than Contractor's Equipment) required on Site for the execution and completion of the Permanent Works and the remedying of any defects.

1.1.5.8 "Works" mean the Permanent Works and the Temporary Works, or either of them as appropriate.

#### 1.1.6

##### Other Definitions

1.1.6.1 "Contractor's Documents" means the calculations, computer programs and other software, drawings, manuals, models and other documents of a technical nature supplied by the Contractor under the Contract; as described in Sub-Clause 5.2 [Contractor's Documents].

1.1.6.2 "Country" means the country in which the Site (or most of it) is located, where the Permanent Works are to be executed.

1.1.6.3 "Employer's Equipment" means the apparatus, machinery and vehicles (if any) made available by the Employer for the use of the Contractor in the execution of the Works, as stated in the Employer's Requirements; but does not include Plant which has not been taken over by the Employer.

1.1.6.4 "Force Majeure" is defined in Clause 19 [Force Majeure].

1.1.6.5 "Laws" means all national (or state) legislation, statutes, ordinances and other laws, and regulations and by-laws of any legally constituted public authority.

1.1.6.6 "Performance Security" means the security (or securities, if any) under Sub-Clause 4.2 [Performance Security].

1.1.6.7 "Site" means the places where the Permanent Works are to be executed and to which Plant and Materials are to be delivered, and any other places as may be specified in the Contract as forming part of the Site.

1.1.6.8 "Variation" means any change to the Employer's Requirements or the Works, which is instructed or approved as a variation under Clause 13 [Variations and Adjustments].

#### 1.2

##### Interpretation

In the Contract, except where the context requires otherwise:

- (a) words indicating one gender include all genders;
- (b) words indicating the singular also include the plural and words indicating the plural also include the singular;
- (c) provisions including the word "agree", "agreed" or "agreement" require the agreement to be recorded in writing, and
- (d) "written" or "in writing" means hand-written, type-written, printed or electronically made, and resulting in a permanent record.

The marginal words and other headings shall not be taken into consideration in the interpretation of these Conditions.

### 1.3 Communications

Wherever these Conditions provide for the giving or issuing of approvals, certificates, consents, determinations, notices and requests, these communications shall be:

- (a) in writing and delivered by hand (against receipt), sent by mail or courier, or transmitted using any of the agreed systems of electronic transmission as stated in the Particular Conditions; and
- (b) delivered, sent or transmitted to the address for the recipient's communications as stated in the Contract. However:
  - (i) if the recipient gives notice of another address, communications shall thereafter be delivered accordingly; and
  - (ii) if the recipient has not stated otherwise when requesting an approval or consent, it may be sent to the address from which the request was issued.

Approvals, certificates, consents and determinations shall not be unreasonably withheld or delayed.

### 1.4 Law and Language

The Contract shall be governed by the law of the country (or other jurisdiction) stated in the Particular Conditions.

If there are versions of any part of the Contract which are written in more than one language, the version which is in the ruling language stated in the Particular Conditions shall prevail.

The language for communications shall be that stated in the Particular Conditions. If no language is stated there, the language for communications shall be the language in which the Contract (or most of it) is written.

### 1.5 Priority of Documents

The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of the documents shall be in accordance with the following sequence:

- (a) the Contract Agreement,
- (b) the Particular Conditions,
- (c) these General Conditions,
- (d) the Employer's Requirements,
- (e) the Tender and any other documents forming part of the Contract.

### 1.6 Contract Agreement

The Contract shall come into full force and effect on the date stated in the Contract Agreement. The costs of stamp duties and similar charges (if any) imposed by law in connection with entry into the Contract Agreement shall be borne by the Employer.

### 1.7 Assignment

Neither Party shall assign the whole or any part of the Contract or any benefit or interest in or under the Contract. However, either Party:



1.8  
Care and Supply of  
Documents

- (a) may assign the whole or any part with the prior agreement of the other Party, at the sole discretion of such other Party, and
- (b) may, as security in favour of a bank or financial institution, assign its right to any moneys due, or to become due, under the Contract.

Each of the Contractor's Documents shall be in the custody and care of the Documents Contractor, unless and until taken over by the Employer. Unless otherwise stated in the Contract, the Contractor shall supply to the Employer six copies of each of the Contractor's Documents.

The Contractor shall keep, on the Site, a copy of the Contract, publications named in the Employer's Requirements, the Contractor's Documents, and Variations and other communications given under the Contract. The Employer's Personnel shall have the right of access to all these documents at all reasonable times.

If a Party becomes aware of an error or defect of a technical nature in a document which was prepared for use in executing the Works, the Party shall promptly give notice to the other Party of such error or defect.

1.9  
Confidentiality

Both Parties shall treat the details of the Contract as private and confidential, except to the extent necessary to carry out obligations under it or to comply with applicable Laws. The Contractor shall not publish, permit to be published, or disclose any particulars of the Works in any trade or technical paper or elsewhere without the previous agreement of the Employer.

1.10  
Employer's Use of  
Contractor's Documents

As between the Parties, the Contractor shall retain the copyright and other intellectual Contractor's Documents property rights in the Contractor's Documents and other design documents made by (or on behalf of) the Contractor.

The Contractor shall be deemed (by signing the Contract) to give to the Employer a non-terminable transferable non-exclusive royalty-free licence to copy, use and communicate the Contractor's Documents, including making and using modifications of them. This licence shall:

- (a) apply throughout the actual or intended working life (whichever is longer) of the relevant parts of the Works,
- (b) entitle any person in proper possession of the relevant part of the Works to copy, use and communicate the Contractor's Documents for the purposes of completing, operating, maintaining, altering, adjusting, repairing and demolishing the Works, and
- (c) in the case of Contractor's Documents which are in the form of computer programs and other software, permit their use on any computer on the Site and other places as envisaged by the Contract, including replacements of any computers supplied by the Contractor.

The Contractor's Documents and other design documents made by (or on behalf of) the Contractor shall not, without the Contractor's consent, be used, copied or communicated to a third party by (or on behalf of) the Employer for purposes other than those permitted under this Sub-Clause.

## 1.11

Contractor's Use of  
Employer's Documents

As between the Parties, the Employer shall retain the copyright and other Employer's intellectual property rights in the Employer's Requirements and other documents made by (or on behalf of) the Employer. The Contractor may, at his cost, copy, use, and obtain communication of these documents for the purposes of the Contract.

They shall not, without the Employer's consent, be copied, used or communicated to a third party by the Contractor, except as necessary for the purposes of the Contract.

## 1.12

## Confidential Details

The Contractor shall not be required to disclose, to the Employer, any information which the Contractor described in the Tender as being confidential. The Contractor shall disclose any other information which the Employer may reasonably require in order to verify the Contractor's compliance with the Contract.

## 1.13

## Compliance with Laws

The Contractor shall, in performing the Contract, comply with applicable Laws. Unless otherwise stated in the Particular Conditions:

- (a) the Employer shall have obtained (or shall obtain) the planning, zoning or similar permission for the Permanent Works, and any other permissions described in the Employer's Requirements as having been (or being) obtained by the Employer; and the Employer shall indemnify and hold the Contractor harmless against and from the consequences of any failure to do so; and
- (b) the Contractor shall give all notices, pay all taxes, duties and fees, and obtain all permits, licences and approvals, as required by the Laws in relation to the design, execution and completion of the Works and the remedying of any defects; and the Contractor shall indemnify and hold the Employer harmless against and from the consequences of any failure to do so.

## 1.14

Joint and Several  
Liability

If the Contractor constitutes (under applicable Laws) a joint venture, consortium or other unincorporated grouping of two or more persons:

- (a) these persons shall be deemed to be jointly and severally liable to the Employer for the performance of the Contract;
- (b) these persons shall notify the Employer of their leader who shall have authority to bind the Contractor and each of these persons; and
- (c) the Contractor shall not alter its composition or legal status without the prior consent of the Employer.

## 2

## The Employer

## 2.1

Right of Access to  
the Site

The Employer shall give the Contractor right of access to, and possession of, all the Site parts of the Site within the time (or times) stated in the Particular Conditions. The right and possession may not be exclusive to the Contractor. If, under the Contract, the Employer is required to give (to the Contractor) possession of any foundation, structure, plant or means of access, the Employer shall do so in the time and manner stated in the Employer's Requirements. However, the Employer may withhold any such right or possession until the Performance Security has been received.



If no such time is stated in the Particular Conditions, the Employer shall give the Contractor right of access to, and possession of, the Site with effect from the Commencement Date.

If the Contractor suffers delay and/or incurs Cost as a result of a failure by the Employer to give any such right or possession within such time, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 *[Contractor's Claims]* to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 *[Extension of Time for Completion]*, and
- (b) payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 *[Determinations]* to agree or determine these matters.

However, if and to the extent that the Employer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time, Cost or profit.

## 2.2 Permits, Licences or Approvals

The Employer shall (where he is in a position to do so) provide reasonable assistance to the Contractor at the request of the Contractor:

- (a) by obtaining copies of the Laws of the Country which are relevant to the Contract but are not readily available, and
- (b) for the Contractor's applications for any permits, licences or approvals required by the Laws of the Country:
  - (i) which the Contractor is required to obtain under Sub-Clause 1.13 *[Compliance with Laws]*,
  - (ii) for the delivery of Goods, including clearance through customs, and
  - (iii) for the export of Contractor's Equipment when it is removed from the Site.

## 2.3 Employer's Personnel

The Employer shall be responsible for ensuring that the Employer's Personnel and the Employer's other contractors on the Site:

- (a) co-operate with the Contractor's efforts under Sub-Clause 4.6 *[Co-operation]*, and
- (b) take actions similar to those which the Contractor is required to take under sub-paragraphs (a), (b) and (c) of Sub-Clause 4.8 *[Safety Procedures]* and under Sub-Clause 4.18 *[Protection of the Environment]*.



2.4  
Employer's Financial  
Arrangements

The Employer shall submit, within 28 days after receiving any request from the Contractor, reasonable evidence that financial arrangements have been made and are being maintained which will enable the Employer to pay the Contract Price (as estimated at that time) in accordance with Clause 14 *[Contract Price and Payment]*. If the Employer intends to make any material change to his financial arrangements, the Employer shall give notice to the Contractor with detailed particulars.

2.5  
Employer's Claims

If the Employer considers himself to be entitled to any payment under any Clause of these Conditions or otherwise in connection with the Contract, and/or to any extension of the Defects Notification Period, he shall give notice and particulars to the Contractor. However, notice is not required for payments due under Sub-Clause 4.19 *[Electricity, Water and Gas]*, under Sub-Clause 4.20 *[Employer's Equipment and Free-Issue Material]*, or for other services requested by the Contractor.

The notice shall be given as soon as practicable after the Employer became aware of the event or circumstances giving rise to the claim. A notice relating to any extension of the Defects Notification Period shall be given before the expiry of such period.

The particulars shall specify the Clause or other basis of the claim, and shall include substantiation of the amount and/or extension to which the Employer considers himself to be entitled in connection with the Contract. The Employer shall then proceed in accordance with Sub-Clause 3.5 *[Determinations]* to agree or determine (i) the amount (if any) which the Employer is entitled to be paid by the Contractor, and/or (ii) the extension (if any) of the Defects Notification Period in accordance with Sub-Clause 11.3 *[Extension of Defects Notification Period]*.

The Employer may deduct this amount from any moneys due, or to become due, to the Contractor. The Employer shall only be entitled to set off against or make any deduction from an amount due to the Contractor, or to otherwise claim against the Contractor, in accordance with this Sub-Clause or with sub-paragraph (a) and/or (b) of Sub-Clause 14.6 *[Interim Payments]*.

### 3

#### The Employer's Administration

3.1  
The Employer's  
Representative

The Employer may appoint an Employer's Representative to act on his behalf under the Contract. In this event, he shall give notice to the Contractor of the name, address, duties and authority of the Employer's Representative.

The Employer's Representative shall carry out the duties assigned to him, and shall exercise the authority delegated to him, by the Employer. Unless and until the Employer notifies the Contractor otherwise, the Employer's Representative shall be deemed to have the full authority of the Employer under the Contract, except in respect of Clause 15 *[Termination by Employer]*.

If the Employer wishes to replace any person appointed as Employer's Representative, the Employer shall give the Contractor not less than 14 days' notice of the replacement's name, address, duties and authority, and of the date of appointment.

### 3.2 Other Employer's Personnel

The Employer or the Employer's Representative may from time to time assign duties and delegate authority to assistants, and may also revoke such assignment or delegation. These assistants may include a resident engineer, and/or independent inspectors appointed to inspect and/or test items of Plant and/or Materials. The assignment, delegation or revocation shall not take effect until a copy of it has been received by the Contractor.

Assistants shall be suitably qualified persons, who are competent to carry out these duties and exercise this authority, and who are fluent in the language for communications defined in Sub-Clause 1.4 [*Law and Language*]

### 3.3 Delegated Persons

All these persons, including the Employer's Representative and assistants, to whom duties have been assigned or authority has been delegated, shall only be authorised to issue instructions to the Contractor to the extent defined by the delegation. Any approval, check, certificate, consent, examination, Inspection, instruction, notice, proposal, request, test, or similar act by a delegated person, in accordance with the delegation, shall have the same effect as though the act had been an act of the Employer. However:

- (a) unless otherwise stated in the delegated person's communication relating to such act, it shall not relieve the Contractor from any responsibility he has under the Contract, including responsibility for errors, omissions, discrepancies and non-compliances;
- (b) any failure to disapprove any work, Plant or Materials shall not constitute approval, and shall therefore not prejudice the right of the Employer to reject the work, Plant or Materials; and
- (c) if the Contractor questions any determination or instruction of a delegated person, the Contractor may refer the matter to the Employer, who shall promptly confirm, reverse or vary the determination or instruction.

### 3.4 Instructions

The Employer may issue to the Contractor instructions which may be necessary for the Contractor to perform his obligations under the Contract. Each instruction shall be given in writing and shall state the obligations to which relates and the Sub-Clause (or other term of the Contract) in which the obligations are specified. If any such instruction constitutes a Variation, Clause 13 [*Variations and Adjustments*] shall apply.

The Contractor shall take instructions from the Employer, or from the Employer's Representative or an assistant to whom the appropriate authority has been delegated under this Clause.

### 3.5 Determinations

Whenever these Conditions provide that the Employer shall proceed in accordance with this Sub-Clause 3.5 to agree or determine any matter, the Employer shall consult with the Contractor in an endeavour to reach agreement. If agreement is not achieved, the Employer shall make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances.

The Employer shall give notice to the Contractor of each agreement or determination, with supporting particulars. Each Party shall give effect to each agreement or determination, unless the Contractor gives notice, to the Employer, of his dissatisfaction with a determination within 14 days of receiving it. Either Party may then refer the dispute to the DAB in accordance with Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*].



## 4

**The Contractor**

## 4.1

**Contractor's General Obligations**

The Contractor shall design, execute and complete the Works in accordance with the Contract, and shall remedy any defects in the Works. When completed, the Works shall be fit for the purposes for which the Works are intended as defined in the Contract.

The Contractor shall provide the Plant and Contractor's Documents specified in the Contract, and all Contractor's Personnel, Goods, consumables and other things and services, whether of a temporary or permanent nature, required in and for this design, execution, completion and remedying of defects.

The Works shall include any work which is necessary to satisfy the Employer's Requirements, or is implied by the Contract, and all works which (although not mentioned in the Contract) are necessary for stability or for the completion, or safe and proper operation, of the Works.

The Contractor shall be responsible for the adequacy, stability and safety of all Site operations, of all methods of construction and of all the Works.

The Contractor shall, whenever required by the Employer, submit details of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works. No significant alteration to these arrangements and methods shall be made without this having previously been notified to the Employer.

## 4.2

**Performance Security**

The Contractor shall obtain (at his cost) a Performance Security for proper performance, in the amount and currencies stated in the Particular Conditions. If an amount is not stated in the Particular Conditions, this Sub-Clause shall not apply.

The Contractor shall deliver the Performance Security to the Employer within 28 days after both Parties have signed the Contract Agreement. The Performance Security shall be issued by an entity and from within a country (or other jurisdiction) approved by the Employer, and shall be in the form annexed to the Particular Conditions or in another form approved by the Employer.

The Contractor shall ensure that the Performance Security is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects. If the terms of the Performance Security specify its expiry date, and the Contractor has not become entitled to receive the Performance Certificate by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the Performance Security until the Works have been completed and any defects have been remedied.

The Employer shall not make a claim under the Performance Security, except for amounts to which the Employer is entitled under the Contract in the event of:

- (a) failure by the Contractor to extend the validity of the Performance Security as described in the preceding paragraph, in which event the Employer may claim the full amount of the Performance Security,
- (b) failure by the Contractor to pay the Employer an amount due, as either agreed by the Contractor or determined under Sub-Clause 2.5 [Employer's Claims] or Clause 20 [Claims, Disputes and Arbitration], within 42 days after this agreement or determination,



- (c) failure by the Contractor to remedy a default within 42 days after receiving the Employer's notice requiring the default to be remedied, or
- (d) circumstances which entitle the Employer to termination under Sub-Clause 15.2 [*Termination by Employer*], irrespective of whether notice of termination has been given.

The Employer shall indemnify and hold the Contractor harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from a claim under the Performance Security to the extent to which the Employer was not entitled to make the claim.

The Employer shall return the Performance Security to the Contractor within 21 days after the Contractor has become entitled to receive the Performance Certificate.

#### 4.3 Contractor's Representative

The Contractor shall appoint the Contractor's Representative and shall give him all authority necessary to act on the Contractor's behalf under the Contract.

Unless the Contractor's Representative is named in the Contract, the Contractor shall, prior to the Commencement Date, submit to the Employer for consent the name and particulars of the person the Contractor proposes to appoint as Contractor's Representative. If consent is withheld or subsequently revoked, or if the appointed person fails to act as Contractor's Representative, the Contractor shall similarly submit the name and particulars of another suitable person for such appointment.

The Contractor shall not, without the prior consent of the Employer, revoke the appointment of the Contractor's Representative or appoint a replacement.

The Contractor's Representative shall, on behalf of the Contractor, receive instructions under Sub-Clause 3.4 [*Instructions*].

The Contractor's Representative may delegate any powers, functions and authority to any competent person, and may at any time revoke the delegation. Any delegation or revocation shall not take effect until the Employer has received prior notice signed by the Contractor's Representative, naming the person and specifying the powers, functions and authority being delegated or revoked.

The Contractor's Representative and all these persons shall be fluent in the language for communications defined in Sub-Clause 1.4 [*Law and Language*].

#### 4.4 Subcontractors

The Contractor shall not subcontract the whole of the Works.

The Contractor shall be responsible for the acts or defaults of any Subcontractor, his agents or employees, as if they were the acts or defaults of the Contractor. Where specified in the Particular Conditions, the Contractor shall give the Employer not less than 28 days' notice of:

- (a) the intended appointment of the Subcontractor, with detailed particulars which shall include his relevant experience,
- (b) the intended commencement of the Subcontractor's work, and
- (c) the intended commencement of the Subcontractor's work on the Site.

4.5  
Nominated  
Subcontractors

In this Sub-Clause, "nominated Subcontractor" means a Subcontractor whom the Subcontractors Employer, under Clause 13 *[Variations and Adjustments]*, instructs the Contractor to employ as a Subcontractor. The Contractor shall not be under any obligation to employ a nominated Subcontractor against whom the Contractor raises reasonable objection by notice to the Employer as soon as practicable, with supporting particulars.

4.6  
Co-operation

The Contractor shall, as specified in the Contract or as instructed by the Employer, allow appropriate opportunities for carrying out work to:

- (a) the Employer's Personnel,
- (b) any other contractors employed by the Employer, and
- (c) the personnel of any legally constituted public authorities,

who may be employed in the execution on or near the Site of any work not included in the Contract.

Any such instruction shall constitute a Variation if and to the extent that it causes the Contractor to incur Cost in an amount which was not reasonably foreseeable by an experienced contractor by the date for submission of the Tender. Services for these personnel and other contractors may include the use of Contractor's Equipment, Temporary Works or access arrangements which are the responsibility of the Contractor.

The Contractor shall be responsible for his construction activities on the Site, and shall co-ordinate his own activities with those of other contractors to the extent (if any) specified in the Employer's Requirements.

If, under the Contract, the Employer is required to give to the Contractor possession of any foundation, structure, plant or means of access in accordance with Contractor's Documents, the Contractor shall submit such documents to the Employer in the time and manner stated in the Employer's Requirements.

4.7  
Setting Out

The Contractor shall set out the Works in relation to original, points, lines and levels of reference specified in the Contract. The Contractor shall be responsible for the correct positioning of all parts of the Works, and shall rectify any error in the positions, levels, dimensions or alignment of the Works.

4.8  
Safety Procedures

The Contractor shall:

- (a) comply with all applicable safety regulations,
- (b) take care for the safety of all persons entitled to be on the Site,
- (c) use reasonable efforts to keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons,
- (d) provide fencing, lighting, guarding and watching of the Works until completion and taking over under Clause 10 *[Employer's Taking Over]*, and
- (e) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land.



4.9  
Quality Assurance

The Contractor shall institute a quality assurance system to demonstrate compliance with the requirements of the Contract. The system shall be in accordance with the details stated in the Contract. The Employer shall be entitled to audit any aspect of the system.

Details of all procedures and compliance documents shall be submitted to the Employer for information before each design and execution stage is commenced. When any document of a technical nature is issued to the Employer, evidence of the prior approval by the Contractor himself shall be apparent on the document itself.

Compliance with the quality assurance system shall not relieve the Contractor of any of his duties, obligations or responsibilities under the Contract.

4.10  
Site Data

The Employer shall have made available to the Contractor for his information, prior to the Base Date, all relevant data in the Employer's possession on subsurface and hydrological conditions at the Site, including environmental aspects. The Employer shall similarly make available to the Contractor all such data which come into the Employer's possession after the Base Date.

The Contractor shall be responsible for verifying and interpreting all such data. The Employer shall have no responsibility for the accuracy, sufficiency or completeness of such data, except as stated in Sub-Clause 5.1 [General Design Responsibilities].

4.11  
Sufficiency of the  
Contract Price

The Contractor shall be deemed to have satisfied himself as to the correctness and Sufficiency of the sufficiency of the Contract Price.

Unless otherwise stated in the Contract, the Contract Price covers all the Contractor's obligations under the Contract (including those under Provisional Sums, if any) and all things necessary for the proper design, execution and completion of the Works and the remedying of any defects.

4.12  
Unforeseeable  
Difficulties

Except as otherwise stated in the Contract

- (a) the Contractor shall be deemed to have obtained all necessary information as to risks, contingencies and other circumstances which may influence or affect the Works;
- (b) by signing the Contract, the Contractor accepts total responsibility for having foreseen all difficulties and costs of successfully completing the Works; and
- (c) the Contract Price shall not be adjusted to take account of any unforeseen difficulties or costs.

4.13  
Rights of Way and  
Facilities

The Contractor shall bear all costs and charges for special and/or temporary rights-of-way which he may require, including those for access to the Site. The Contractor shall also obtain, at his risk and cost, any additional facilities outside the Site which he may require for the purposes of the Works.

4.14  
Avoidance of  
Interference

The Contractor shall not interfere unnecessarily or improperly with:

- (a) the convenience of the public, or



- (b) the access to and use and occupation of all roads and footpaths, irrespective of whether they are public or in the possession of the Employer or of others.

The Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from any such unnecessary or improper interference.

#### 4.15 Access Route

The Contractor shall be deemed to have been satisfied as to the suitability and availability of access routes to the Site. The Contractor shall use reasonable efforts to prevent any road or bridge from being damaged by the Contractor's traffic or by the Contractor's Personnel. These efforts shall include the proper use of appropriate vehicles and routes.

Except as otherwise stated in these Conditions:

- (a) the Contractor shall (as between the Parties) be responsible for any maintenance which may be required for his use of access routes;
- (b) the Contractor shall provide all necessary signs or directions along access routes, and shall obtain any permission which may be required from the relevant authorities for his use of routes, signs and directions;
- (c) the Employer shall not be responsible for any claims which may arise from the use or otherwise of any access route,
- (d) the Employer does not guarantee the suitability or availability of particular access routes, and
- (e) Costs due to non-suitability or non-availability, for the use required by the Contractor, of access routes shall be borne by the Contractor.

#### 4.16 Transport of Goods

Unless otherwise stated in the Particular Conditions:

- (a) the Contractor shall give the Employer not less than 21 days' notice of the date on which any Plant or a major item of other Goods will be delivered to the Site;
- (b) the Contractor shall be responsible for packing, loading, transporting, receiving, unloading, storing and protecting all Goods and other things required for the Works; and
- (c) the Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from the transport of Goods, and shall negotiate and pay all claims arising from their transport.

#### 4.17 Contractor's Equipment

The Contractor shall be responsible for all Contractor's Equipment. When brought on to the Site, Contractor's Equipment shall be deemed to be exclusively intended for the execution of the Works.

#### 4.18 Protection of the Environment

The Contractor shall take all reasonable steps to protect the environment (both on and off the Site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations.

The Contractor shall ensure that emissions, surface discharges and effluent from the Contractor's activities shall not exceed the values indicated in the Employer's Requirements, and shall not exceed the values prescribed by applicable Laws.

## 4.19

## Electricity, Water and Gas

The Contractor shall, except as stated below, be responsible for the provision of all power, water and other services he may require.

The Contractor shall be entitled to use for the purposes of the Works such supplies of electricity, water, gas and other services as may be available on the Site and of which details and prices are given in the Employer's Requirements. The Contractor shall, at his risk and cost, provide any apparatus necessary for his use of these services and for measuring the quantities consumed.

The quantities consumed and the amounts due (at these prices) for such services shall be agreed or determined in accordance with Sub-Clause 2.5 [Employer's Claims] and Sub-Clause 3.5 [Determinations]. The Contractor shall pay these amounts to the Employer.

## 4.20

## Employer's Equipment and Free-Issue Material

The Employer shall make the Employer's Equipment (if any) available for the use of the Contractor in the execution of the Works in accordance with the details, arrangements and prices stated in the Employer's Requirements. Unless otherwise stated in the Employer's Requirements:

- (a) the Employer shall be responsible for the Employer's Equipment, except that
- (b) the Contractor shall be responsible for each item of Employer's Equipment whilst any of the Contractor's Personnel is operating it, driving it, directing it or in possession or control of it.

The appropriate quantities and the amounts due (at such stated prices) for the use of Employer's Equipment shall be agreed or determined in accordance with Sub-Clause 2.5 [Employer's Claims] and Sub-Clause 3.5 [Determinations]. The Contractor shall pay these amounts to the Employer.

The Employer shall supply, free of charge, the "free-issue materials" (if any) in accordance with the details stated in the Employer's Requirements. The Employer shall, at his risk and cost, provide these materials at the time and place specified in the Contract. The Contractor shall then visually inspect them, and shall promptly give notice to the Employer of any shortage, defect or default in these materials. Unless otherwise agreed by both Parties, the Employer shall immediately rectify the notified shortage, defect or default.

After this visual inspection, the free-issue materials shall come under the care, custody and control of the Contractor. The Contractor's obligations of inspection, care, custody and control shall not relieve the Employer of liability for any shortage, defect or default not apparent from a visual inspection.

## 4.21

## Progress Reports

Unless otherwise stated in the Particular Conditions, monthly progress reports shall be prepared by the Contractor and submitted to the Employer in six copies. The first report shall cover the period up to the end of the first calendar month following the Commencement Date. Reports shall be submitted monthly thereafter, each within 7 days after the last day of the period to which it relates.

Reporting shall continue until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works.

Each report shall include:



- (a) charts and detailed descriptions of progress, including each stage of design, Contractor's Documents, procurement, manufacture, delivery to Site, construction, erection, testing, commissioning and trial operation;
- (b) photographs showing the status of manufacture and of progress on the Site;
- (c) for the manufacture of each main item of Plant and Materials, the name of the manufacturer, manufacture location, percentage progress, and the actual or expected dates of:
  - (i) commencement of manufacture,
  - (ii) Contractor's inspections,
  - (iii) tests, and
  - (iv) shipment and arrival at the Site;
- (d) the details described in Sub-Clause 6.10 [*Records of Contractor's Personnel and Equipment*];
- (e) copies of quality assurance documents, test results and certificates of Materials;
- (f) list of Variations, notices given under Sub-Clause 2.5 [*Employer's Claims*] and notices given under Sub-Clause 20.1;
- (g) safety statistics, including details of any hazardous incidents and activities relating to environmental aspects and public relations; and
- (h) comparisons of actual and planned progress, with details of any events or circumstances which may jeopardize the completion in accordance with the Contract, and the measures being (or to be) adopted to overcome delays.

4.22  
Security of the Site

Unless otherwise stated in the Particular Conditions:

- (a) The Contractor shall be responsible for keeping unauthorised persons off the Site, and
- (b) authorised persons shall be limited to the Contractor's Personnel and the Employer's Personnel; and to any other personnel notified to the Contractor, by (or on behalf of) the Employer, as authorised personnel of the Employer's other contractors on the Site.

4.23  
Contractor's Operations  
on Site

The Contractor shall confine his operations to the Site, and to any additional areas which may be obtained by the Contractor and agreed by the Employer as working areas. The Contractor shall take all necessary precautions to keep Contractor's Equipment and Contractor's Personnel within the Site and these additional areas, and to keep them off adjacent land.

During the execution of the Works, the Contractor shall keep the Site free from all unnecessary obstruction, and shall store or dispose of any Contractor's Equipment or surplus materials. The Contractor shall clear away and remove from the Site any wreckage, rubbish and Temporary Works which are no longer required.

Upon the issue of the Taking-Over Certificate for the Works, the Contractor shall clear away and remove all Contractor's Equipment, surplus material, wreckage, rubbish and Temporary Works. The Contractor shall leave the Site and the Works in a clean and safe condition. However, the Contractor may retain on Site, during the Defects Notification Period, such Goods as are required for the Contractor to fulfil obligations under the Contract.



4.24  
Fossils

All fossils, coins, articles of value or antiquity, and structures and other remains or items of geological or archaeological interest found on the Site shall be placed under the care and authority of the Employer. The Contractor shall take reasonable precautions to prevent Contractor's Personnel or other persons from removing or damaging any of these findings.

The Contractor shall, upon discovery of any such finding, promptly give notice to the Employer, who shall issue instructions for dealing with it. If the Contractor suffers delay and/or incurs Cost from complying with the instructions, the Contractor shall give a further notice to the Employer and shall be entitled subject to Sub-Clause 20.1 *[Contractor's Claims]* to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 *[Extension of Time for Completion]*, and
- (b) payment of any such Cost, which shall be added to the Contract Price.

After receiving this further notice, the Employer shall proceed in accordance with Sub-Clause 3.5 *[Determinations]* to agree or determine these matters.

## 5 Design

5.1  
General Design  
Obligations

The Contractor shall be deemed to have scrutinised, prior to the Base Date, the Obligations the Employer's Requirements (including design criteria and calculations, if any). The Contractor shall be responsible for the design of the Works and for the accuracy of such Employer's Requirements (including design criteria and calculations), except as stated below.

The Employer shall not be responsible for any error, inaccuracy or omission of any kind in the Employer's Requirements as originally included in the Contract and shall not be deemed to have given any representation of accuracy or completeness of any data or information, except as stated below. Any data or information received by the Contractor, from the Employer or otherwise, shall not relieve the Contractor from his responsibility for the design and execution of the Works.

However, the Employer shall be responsible for the correctness of the following portions of the Employer's Requirements and of the following data and information provided by (or on behalf of) the Employer:

- (a) portions, data and information which are stated in the Contract as being immutable or the responsibility of the Employer,
- (b) definitions of intended purposes of the Works or any parts thereof,
- (c) criteria for the testing and performance of the completed Works, and
- (d) portions, data and information which cannot be verified by the Contractor, except as otherwise stated in the Contract.

5.2  
Contractor's Documents

The Contractor's Documents shall comprise the technical documents specified in the Employer's Requirements, documents required to satisfy all regulatory approvals, and the documents described in Sub-Clause 5.6 *[As-Built Documents]* and Sub-Clause 5.7 *[Operation and Maintenance Manuals]*. Unless otherwise stated in the Employer's Requirements, the Contractor's Documents shall be written in the language for communications defined in Sub-Clause 1.4 *[Law and Language]*.

The Contractor shall prepare all Contractor's Documents, and shall also prepare any other documents necessary to instruct the Contractor's Personnel.

If the Employer's Requirements describe the Contractor's Documents which are to be submitted to the Employer for review, they shall be submitted accordingly, together with a notice as described below. In the following provisions of this Sub-Clause, (i) "review period" means the period required by the Employer for review, and (ii) "Contractor's Documents" exclude any documents which are not specified as being required to be submitted for review.

Unless otherwise stated in the Employer's Requirements, each review period shall not exceed 21 days, calculated from the date on which the Employer receives a Contractor's Document and the Contractor's notice. This notice shall state that the Contractor's Document is considered ready, both for review in accordance with this Sub-Clause and for use. The notice shall also state that the Contractor's Document complies with the Contract, or the extent to which it does not comply.

The Employer may, within the review period, give notice to the Contractor that a Contractor's Document fails (to the extent stated) to comply with the Contract. If a Contractor's Document so fails to comply, it shall be rectified, resubmitted and reviewed in accordance with this Sub-Clause, at the Contractor's cost.

For each part of the Works, and except to the extent that the Parties otherwise agree:

- (a) execution of such part of the Works shall not commence prior to the expiry of the review periods for all the Contractor's Documents which are relevant to its design and execution;
- (b) execution of such part of the Works shall be in accordance with these Contractor's Documents, as submitted for review; and
- (c) if the Contractor wishes to modify any design or document which has previously been submitted for review, the Contractor shall immediately give notice to the Employer. Thereafter, the Contractor shall submit revised documents to the Employer in accordance with the above procedure.

#### 5.3 Contractor's Undertaking

The Contractor undertakes that the design, the Contractor's Documents, the execution and the completed Works will be in accordance with:

- (a) the Laws in the Country, and
- (b) the documents forming the Contract, as altered or modified by Variations.

#### 5.4 Technical Standards and Regulations

The design, the Contractor's Documents, the execution and the completed Works shall comply with the Country's technical standards, building, construction and environmental Laws, Laws applicable to the product being produced from the Works, and other standards specified in the Employer's Requirements, applicable to the Works, or defined by the applicable Laws.

All these Laws shall, in respect of the Works and each Section, be those prevailing when the Works or Section are taken over by the Employer under Clause 10 [Employer's Taking Over]. References in the Contract to published standards shall be understood to be references to the edition applicable on the Base Date, unless stated otherwise.



If changed or new applicable standards come into force in the Country after the Base Date, the Contractor shall give notice to the Employer and (if appropriate) submit proposals for compliance. In the event that:

- (a) the Employer determines that compliance is required, and
- (b) the proposals for compliance constitute a variation,

then the Employer shall initiate a Variation in accordance with Clause 13 [*Variations and Adjustments*].

#### 5.5 Training

The Contractor shall carry out the training of Employer's Personnel in the operation and maintenance of the Works to the extent specified in the Employer's Requirements. If the Contract specifies training which is to be carried out before taking-over, the Works shall not be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [*Taking Over of the Works and Sections*] until this training has been completed.

#### 5.6 As-Built Documents

The Contractor shall prepare, and keep up-to-date, a complete set of "as-built" records of the execution of the Works, showing the exact as-built locations, sizes and details of the work as executed. These records shall be kept on the Site and shall be used exclusively for the purposes of this Sub-Clause. Two copies shall be supplied to the Employer prior to the commencement of the Tests on Completion.

In addition, the Contractor shall supply to the Employer as-built drawings of the Works, showing all Works as executed, and submit them to the Employer for review under Sub-Clause 5.2 [*Contractor's Documents*]. The Contractor shall obtain the consent of the Employer as to their size, the referencing system, and other relevant details.

Prior to the issue of any Taking-Over Certificate, the Contractor shall supply to the Employer the specified numbers and types of copies of the relevant as-built drawings, in accordance with the Employer's Requirements. The Works shall not be considered to be completed for the purposes of taking-over under Sub Clause 10.1 [*Taking Over of the Works and Sections*] until the Employer has received these documents.

#### 5.7 Operation and Maintenance Manuals

Prior to commencement of the Tests on Completion, the Contractor shall supply to the Employer provisional operation and maintenance manuals in sufficient detail for the Employer to operate, maintain, dismantle, reassemble, adjust and repair the Plant.

The Works shall not be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [*Taking Over of the Works and Sections*] until the Employer has received final operation and maintenance manuals in such detail, and any other manuals specified in the Employer's Requirements for these purposes.

#### 5.8 Design Error

If errors, omissions, ambiguities, inconsistencies, inadequacies or other defects are found in the Contractor's Documents, they and the Works shall be corrected at the Contractor's cost, notwithstanding any consent or approval, under this Clause.



## 6

## Staff and Labour

- 6.1  
Engagement of Staff and Labour  
Except as otherwise stated in the Employer's Requirements, the Contractor shall and make arrangements for the engagement of all staff and labour, local or otherwise, and for their payment, housing, feeding and transport.
- 6.2  
Rates of Wages and Conditions of Labour  
The Contractor shall pay rates of wages, and observe conditions of labour, which are not lower than those established for the trade or industry where the work is carried out. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.
- 6.3  
Persons in the Service of Others  
The Contractor shall not recruit, or attempt to recruit, staff and labour from amongst the Employer's Personnel.
- 6.4  
Labour Laws  
The Contractor shall comply with all the relevant labour 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.  
  
The Contractor shall require his employees to obey all applicable Laws, including those concerning safety at work.
- 6.5  
Working Hours  
No work shall be carried out on the Site on locally recognised days of rest, or outside normal working hours, unless:  
  
(a) otherwise stated in the Contract,  
(b) the Employer gives consent, or  
(c) the work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Employer.
- 6.6  
Facilities for Staff and Labour  
Except as otherwise stated in the Employer's Requirements, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall also provide facilities for the Employer's Personnel as stated in the Employer's Requirements.  
  
The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the Permanent Works.
- 6.7  
Health and Safety  
The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the Site and at any accommodation for Contractor's and Employer's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.

The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the execution of the Works, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority.

The Contractor shall send, to the Employer, details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Employer may reasonably require.

6.8  
Contractor's  
Superintendence

Throughout the design and execution of the Works, and as long thereafter as is necessary to fulfil the Contractor's obligations, the Contractor shall provide all necessary superintendence to plan, arrange, direct, manage, inspect and test the work.

Superintendence shall be given by a sufficient number of persons having adequate knowledge of the language for communications (defined in Sub-Clause 1.4 [*Law and Language*]) and of the operations to be carried out (including the methods and techniques required, the hazards likely to be encountered and methods of preventing accidents), for the satisfactory and safe execution of the Works.

6.9  
Contractor's Personnel

The Contractor's Personnel shall be appropriately qualified, skilled and experienced in their respective trades or occupations. The Employer may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Contractor's Representative if applicable, who:

- (a) persists in any misconduct or lack of care,
- (b) carries out duties incompetently or negligently,
- (c) fails to conform with any provisions of the Contract, or
- (d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment.

If appropriate, the Contractor shall then appoint (or cause to be appointed) a suitable replacement person.

6.10  
Records of Contractor's  
Personnel and  
Equipment

The Contractor shall submit, to the Employer, details showing the number of each class of Contractor's Personnel and of each type of Contractor's Equipment on the Site. Details shall be submitted each calendar month, in a form approved by the Employer, until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works.

6.11  
Disorderly Conduct

The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst the Contractor's Personnel, and to preserve peace and protection of persons and property on and near the Site.



## 7 Plant, Materials and Workmanship

### 7.1

#### Manner of Execution

The Contractor shall carry out the manufacture of Plant, the production and manufacture of Materials, and all other execution of the Works:

- (a) in the manner (if any) specified in the Contract,
- (b) in a proper workmanlike and careful manner, in accordance with recognised good practice, and
- (c) with properly equipped facilities and non-hazardous Materials, except as otherwise specified in the Contract.

### 7.2

#### Samples

The Contractor shall submit samples to the Employer, for review in accordance with the procedures for Contractor's Documents described in Sub-Clause 5.2 [*Contractor's Documents*], as specified in the Contract and at the Contractor's cost. Each sample shall be labelled as to origin and intended use in the Works.

### 7.3

#### Inspection

The Employer's Personnel shall at all reasonable times:

- (a) have full access to all parts of the Site and to all places from which natural Materials are being obtained, and
- (b) during production, manufacture and construction (at the Site and, to the extent specified in the Contract, elsewhere), be entitled to examine, inspect, measure and test the materials and workmanship, and to check the progress of manufacture of Plant and production and manufacture of Materials.

The Contractor shall give the Employer's Personnel full opportunity to carry out these activities, including providing access, facilities, permissions and safety equipment. No such activity shall relieve the Contractor from any obligation or responsibility.

In respect of the work which Employer's Personnel are entitled to examine, inspect, measure and/or test, the Contractor shall give notice to the Employer whenever any such work is ready and before it is covered up, put out of sight, or packaged for storage or transport. The Employer shall then either carry out the examination, inspection, measurement or testing without unreasonable delay, or promptly give notice to the Contractor that the Employer does not require to do so. If the Contractor fails to give the notice, he shall, if and when required by the Employer, uncover the work and thereafter reinstate and make good, all at the Contractor's cost.

### 7.4

#### Testing

This Sub-Clause shall apply to all tests specified in the Contract, other than the Tests after Completion (if any).

The Contractor shall provide all apparatus, assistance, documents and other information, electricity, equipment, fuel, consumables, instruments, labour, materials, and suitably qualified and experienced staff, as are necessary to carry out the specified tests efficiently. The Contractor shall agree, with the Employer, the time and place for the specified testing of any Plant, Materials and other parts of the Works.



The Employer may, under Clause 13 *[Variations and Adjustments]*, vary the location or details of specified tests, or instruct the Contractor to carry out additional tests. If these varied or additional tests show that the tested Plant, Materials or workmanship is not in accordance with the Contract, the cost of carrying out this Variation shall be borne by the Contractor, notwithstanding other provisions of the Contract.

The Employer shall give the Contractor not less than 24 hours' notice of the Employer's intention to attend the tests. If the Employer does not attend at the time and place agreed, the Contractor may proceed with the tests, unless otherwise instructed by the Employer, and the tests shall then be deemed to have been made in the Employer's presence.

If the Contractor suffers delay and/or incurs Cost from complying with these instructions or as a result of a delay for which the Employer is responsible, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 *[Contractor's Claims]* to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 *[Extension of Time for Completion]*, and
- (b) payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 *[Determinations]* to agree or determine these matters.

The Contractor shall promptly forward to the Employer duly certified reports of the tests. When the specified tests have been passed, the Employer shall, endorse the Contractor's test certificate, or issue a certificate to him, to that effect. If the Employer has not attended the tests, he shall be deemed to have accepted the readings as accurate.

#### 7.5 Rejection

If, as a result of an examination, inspection, measurement or testing, any Plant, Materials, design or workmanship is found to be defective or otherwise not in accordance with the Contract, the Employer may reject the Plant, Materials, design or workmanship by giving notice to the Contractor, with reasons. The Contractor shall then promptly make good the defect and ensure that the rejected item complies with the Contract.

If the Employer requires this Plant, Materials, design or workmanship to be retested, the tests shall be repeated under the same terms and conditions. If the rejection and retesting cause the Employer to incur additional costs, the Contractor shall subject to Sub-Clause 2.5 *[Employer's Claims]* pay these costs to the Employer.

#### 7.6 Remedial Work

Notwithstanding any previous test or certification, the Employer may instruct the Contractor to:

- (a) remove from the Site and replace any Plant or Materials which is not in accordance with the Contract,
- (b) remove and re-execute any other work which is not in accordance with the Contract, and
- (c) execute any work which is urgently required for the safety of the Works, whether because of an accident, unforeseeable event or otherwise.

If the Contractor fails to comply with any such instruction, which complies with Sub-Clause 3.4 *[Instructions]*, the Employer shall be entitled to employ and pay other persons to carry out the work. Except to the extent that the Contractor would have been entitled to payment for the work, the Contractor shall subject to Sub-Clause 2.5 *[Employer's Claims]* pay to the Employer all costs arising from this failure.

**7.7**  
Ownership of Plant and Materials

Each item of Plant and Materials shall, to the extent consistent with the Laws of the Country, become the property of the Employer at whichever is the earlier of the following times, free from liens and other encumbrances:

- (a) when it is delivered to the Site;
- (b) when the Contractor is entitled to payment of the value of the Plant and Materials under Sub-Clause 8.10 *[Payment for Plant and Materials in Event of Suspension]*.

**7.8**  
Royalties

Unless otherwise stated in the Employer's Requirements, the Contractor shall pay all royalties, rents and other payments for:

- (a) natural Materials obtained from outside the Site, and
- (b) the disposal of material from demolitions and excavations and of other surplus material (whether natural or man-made), except to the extent that disposal areas within the Site are specified in the Contract.

## 8

### Commencement, Delays and Suspension

**8.1**  
Commencement of Works

Unless otherwise stated in the Contract Agreement:

- (a) the Employer shall give the Contractor not less than 7 days' notice of the Commencement Date; and
- (b) the Commencement Date shall be within 42 days after the date on which the Contract comes into full force and effect under Sub-Clause 1.6 *[Contract Agreement]*.

The Contractor shall commence the design and execution of the Works as soon as is reasonably practicable after the Commencement Date, and, shall then proceed with the Works with due expedition and without delay.

**8.2**  
Time for Completion

The Contractor shall complete the whole of the Works, and each Section (if any), within the Time for Completion for the Works or Section (as the case may be), including:

- (a) achieving the passing of the Tests on Completion, and
- (b) completing all work which is stated in the Contract as being required for the Works or Section to be considered to be completed for the purposes of taking over under Sub-Clause 10.1 *[Taking Over of the Works and Sections]*.



8.3  
Programme

The Contractor shall submit a time programme to the Employer within 28 days after the Commencement Date. The Contractor shall also submit a revised programme whenever the previous programme is inconsistent with actual progress or with the Contractor's obligations. Unless otherwise stated in the Contract, each programme shall include:

- (a) the order in which the Contractor intends to carry out the Works, including the anticipated timing of each major stage of the Works,
- (b) the periods for reviews under Sub-Clause 5.2 [*Contractor's Documents*],
- (c) the sequence and timing of inspections and tests specified in the Contract, and
- (d) a supporting report which includes:
  - (i) a general description of the methods which the Contractor intends to adopt for the execution of each major stage of the Works, and
  - (ii) the approximate number of each class of Contractor's Personnel and of each type of Contractor's Equipment for each major stage.

Unless the Employer, within 21 days after receiving a programme, gives notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the programme, subject to his other obligations under the Contract. The Employer's Personnel, shall be entitled to rely upon the programme when planning their activities.

The Contractor shall promptly give notice to the Employer of specific probable future events or circumstances which may adversely affect or delay the execution of the Works. In this event, or if the Employer gives notice to the Contractor that a programme fails (to the extent stated) to comply with the Contract or to be consistent with actual progress and the Contractor's stated intentions, the Contractor shall submit a revised programme to the Employer in accordance with this Sub-Clause.

8.4  
Extension of Time for  
Completion

The Contractor shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to an extension of the Time for Completion if and to the extent that completion for the purposes of Sub-Clause 10.1 [*Taking Over of the Works and Sections*] is or will be delayed by any of the following causes:

- (a) a Variation (unless an adjustment to the Time for Completion has been agreed under Sub-Clause 13.3 [*Variation Procedure*]),
- (b) a cause of delay giving an entitlement to extension of time under a Sub-Clause of these Conditions, or
- (c) any delay, impediment or prevention caused by or attributable to the Employer, the Employer's Personnel, or the Employer's other contractors on the Site.

If the Contractor considers himself to be entitled to an extension of the Time for Completion, the Contractor shall give notice to the Employer in accordance with Sub-Clause 20.1 [*Contractor's Claims*]. When determining each extension of time under Sub-Clause 20.1, the Employer shall review previous determinations and may increase, but shall not decrease, the total extension of time.

8.5  
Delays Caused by  
Authorities

If the following conditions apply, namely



- (a) the Contractor has diligently followed the procedures laid down by the relevant legally constituted public authorities in the Country,
- (b) these authorities delay or disrupt the Contractor's work, and
- (c) the delay or disruption was not reasonably foreseeable by an experienced contractor by the date for submission of the Tender,

then this delay or disruption will be considered as a cause of delay under sub-paragraph (b) of Sub-Clause 8.4 *[Extension of Time for Completion]*.

#### 8.6 Rate of Progress

If, at any time:

- (a) actual progress is too slow to complete within the Time for Completion, and/or
- (b) progress has fallen (or will fall) behind the current programme under Sub-Clause 8.3 *[Programme]*,

other than as a result of a cause listed in Sub-Clause 8.4 *[Extension of Time for Completion]*, then the Employer may instruct the Contractor to submit, under Sub-Clause 8.3 *[Programme]*, a revised programme and supporting report describing the revised methods which the Contractor proposes to adopt in order to expedite progress and complete within the Time for Completion.

Unless the Employer notifies otherwise, the Contractor shall adopt these revised methods, which may require increases in the working hours and/or in the numbers of Contractor's Personnel and/or Goods, at the risk and cost of the Contractor. If these revised methods cause the Employer to incur additional costs, the Contractor shall subject to Sub-Clause 2.5 *[Employer's Claims]* pay these costs to the Employer, in addition to delay damages (if any) under Sub-Clause 8.7 below.

#### 8.7 Delay Damages

If the Contractor fails to comply with Sub-Clause 8.2 *[Time for Completion]*, the Contractor shall subject to Sub-Clause 2.5 *[Employer's Claims]* pay delay damages to the Employer for this default. These delay damages shall be the sum stated in the Particular Conditions, which shall be paid for every day which shall elapse between the relevant Time for Completion and the date stated in the Taking-Over Certificate. However, the total amount due under this Sub-Clause shall not exceed the maximum amount of delay damages (if any) stated in the Particular Conditions.

These delay damages shall be the only damages due from the Contractor for such default, other than in the event of termination under Sub-Clause 15.2 *[Termination by Employer]* prior to completion of the Works. These damages shall not relieve the Contractor from his obligation to complete the Works, or, from any other duties, obligations or responsibilities which he may have under the Contract.

#### 8.8 Suspension of Work

The Employer may at any time instruct the Contractor to suspend progress of part or all of the Works. During such suspension, the Contractor shall protect, store and secure such part or the Works against any deterioration, loss or damage.

The Employer may also notify the cause for the suspension. If and to the extent that the cause is notified and is the responsibility of the Contractor, the following Sub-Clauses 8.9, 8.10 and 8.11 shall not apply.

8.9  
Consequences of  
Suspension

If the Contractor suffers delay and/or incurs Cost from complying with the Employer's instructions under Sub-Clause 8.8 [*Suspension of Work*] and/or from resuming the work, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
- (b) payment of any such Cost, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

The Contractor shall not be entitled to an extension of time for, or to payment of the Cost incurred in, making good the consequences of the Contractor's faulty design, workmanship or materials, or of the Contractor's failure to protect, store or secure in accordance with Sub-Clause 8.8 [*Suspension of Work*].

8.10  
Payment for Plant and  
Materials in Event of  
Suspension

The Contractor shall be entitled to payment of the value (as at the date of suspension) of Plant and/or Materials which have not been delivered to Site, if:

- (a) the work on Plant or delivery of Plant and/or Materials, has been suspended for more than 28 days, and
- (b) the Contractor has marked the Plant and/or Materials as the Employer's property in accordance with the Employer's instructions.

8.11  
Prolonged Suspension

If the suspension under Sub-Clause 8.8 [*Suspension of Work*] has continued for more than 84 days, the Contractor may request the Employer's permission to proceed. If the Employer does not give permission within 28 days after being requested to do so, the Contractor may, by giving notice to the Employer, treat the suspension as an omission under Clause 13 [*Variations and Adjustments*] of the affected part of the Works. If the suspension affects the whole of the Works, the Contractor may give notice of termination under Sub-Clause 16.2 [*Termination by Contractor*].

8.12  
Resumption of Work

After the permission or instruction to proceed is given, the Parties shall jointly examine the Works and the Plant and Materials affected by the suspension. The Contractor shall make good any deterioration or defect in or loss of the Works or Plant or Materials, which has occurred during the suspension.

## 9

### Tests on Completion

9.1  
Contractor's Obligations

The Contractor shall carry out the Tests on Completion in accordance with this Clause and Sub-Clause 7.4, [*Testing*] after providing the documents in accordance with Sub-Clause 5.6 [*As-Built Documents*] and Sub-Clause 5.7 [*Operation and Maintenance Manuals*].



The Contractor shall give to the Employer not less than 21 days' notice of the date after which the Contractor will be ready to carry out each of the Tests on Completion. Unless otherwise agreed, Tests on Completion shall be carried out within 14 days after this date, on such day or days as the Employer shall instruct.

Unless otherwise stated in the Particular Conditions, the Tests on Completion shall be carried out in the following sequence:

- (a) pre-commissioning tests, which shall include the appropriate inspections and ("dry" or "cold") functional tests to demonstrate that each item of Plant can safely under-take the next stage, (b);
- (b) commissioning tests, which shall include the specified operational tests to demonstrate that the Works or Section can be operated safely and as specified, under all available operating conditions; and
- (c) trial operation, which shall demonstrate that the Works or Section perform reliably and in accordance with the Contract.

During trial operation, when the Works are operating under stable conditions, the Contractor shall give notice to the Employer that the Works are ready for any other Tests on Completion, including performance tests to demonstrate whether the Works conform with criteria specified in the Employer's Requirements and with the Performance Guarantees.

Trial operation shall not constitute a taking-over under Clause 10 [*Employer's Taking Over*]. Unless otherwise stated in the Particular Conditions, any product produced by the Works during trial operation shall be the property of the Employer.

In considering the results of the Tests on Completion, appropriate allowances shall be made for the effect of any use of the Works by the Employer on the performance or other characteristics of the Works. As soon as the Works, or a Section, have passed each of the Tests on Completion described in sub-paragraph (a), (b) or (c), the Contractor shall submit a certified report of the results of these Tests to the Employer.

## 9.2 Delayed Tests

If the Tests on Completion are being unduly delayed by the Employer, Sub-Clause 7.4 [*Testing*] (fifth paragraph) and/or Sub-Clause 10.3 [*Interference with Tests on Completion*] shall be applicable.

If the Tests on Completion are being unduly delayed by the Contractor, the Employer may by notice require the Contractor to carry out the Tests within 21 days after receiving the notice. The Contractor shall carry out the Tests on such day or days within that period as the Contractor may fix and of which he shall give notice to the Employer.

If the Contractor fails to carry out the Tests on Completion; within the period of 21 days, the Employer's Personnel may proceed with the Tests at the risk and cost of the Contractor. These Tests on Completion shall then be deemed to have been carried out in the presence of the Contractor and the results of the Tests shall be accepted as accurate.

## 9.3 Retesting

If the Works, or a Section, fail to pass the Tests on Completion, Sub-Clause 7.5 [*Rejection*] shall apply, and the Employer or the Contractor may require the failed Tests, and Tests on Completion on any related work, to be repeated under the same terms and conditions.



## 9.4

## Failure to Pass Tests on Completion

If the Works, or a Section, fail to pass the Tests on Completion repeated under Sub-Clause 9.3 [Retesting], the Employer shall be entitled to:

- (a) order further repetition of Tests on Completion under Sub-Clause 9.3;
- (b) if the failure deprives the Employer of substantially the whole benefit of the Works or Section, reject the Works or Section (as the case may be), in which event the Employer shall have the same remedies as are provided in sub-paragraph (c) of Sub-Clause 11.4 [Failure to Remedy Defects]; or
- (c) issue a Taking-Over Certificate.

In the event of sub-paragraph (c), the Contractor shall proceed in accordance with all other obligations under the Contract, and the Contract Price shall be reduced by such amount as shall be appropriate to cover the reduced value to the Employer as a result of this failure. Unless the relevant reduction for this failure is stated (or its method of calculation is defined) in the Contract, the Employer may require the reduction to be (i) agreed by both Parties (in full satisfaction of this failure only) and paid before this Taking-Over Certificate is issued, or (ii) determined and paid under Sub-Clause 2.5 [Employer's Claims] and Sub-Clause 3.5 [Determinations].

## 10

## Employer's Taking Over

## 10.1

## Taking Over of the Works and Sections

Except as stated in Sub-Clause 9.4 [Failure to Pass Tests on Completion], the Works shall be taken over by the Employer when (i) the Works have been completed in accordance with the Contract, including the matters described in Sub-Clause 8.2 [Time for Completion] and except as allowed in sub-paragraph (a) below, and (ii) a Taking-Over Certificate for the Works has been issued, or is deemed to have been issued in accordance with this Sub-Clause.

The Contractor may apply by notice to the Employer for a Taking-Over Certificate not earlier than 14 days before the Works will, in the Contractor's opinion, be complete and ready for taking over. If the Works are divided into Sections, the Contractor may similarly apply for a Taking-Over Certificate for each Section.

The Employer shall, within 28 days after receiving the Contractor's application:

- (a) issue the Taking-Over Certificate to the Contractor, stating the date on which the Works or Section were completed in accordance with the Contract, except for any minor outstanding work and defects which will not substantially affect the use of the Works or Section for their intended purpose (either until or whilst this work is completed and these defects are remedied); or
- (b) reject the application, giving reasons and specifying the work required to be done by the Contractor to enable the Taking-Over Certificate to be issued. The Contractor shall then complete this work before issuing a further notice under this Sub-Clause.

If the Employer fails either to issue the Taking-Over Certificate or to reject the Contractor's application within the period of 28 days, and if the Works or Section (as the case may be) are substantially in accordance with the Contract, the Taking-Over Certificate shall be deemed to have been issued on the last day of that period.

## 10.2

Taking Over of Parts of  
the Works

Parts of the Works (other than Sections) shall not be taken over or used by the Employer, except as may be stated in the Contract or as may be agreed by both Parties.

## 10.3

Interference with Tests  
on Completion

If the Contractor is prevented, for more than 14 days, from carrying out the Tests on Completion by a cause for which the Employer is responsible, the Contractor shall carry out the Tests on Completion as soon as practicable.

If the Contractor suffers delay and/or incurs Cost as a result of this delay in carrying out the Tests on Completion, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
- (b) payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

## 11

## Defects Liability

## 11.1

Completion of  
Outstanding Work and  
Remedying Defects

In order that the Works and Contractor's Documents, and each Section, shall be in the condition required by the Contract (fair wear and tear excepted) by the expiry date of the relevant Defects Notification Period or as soon as practicable thereafter, the Contractor shall:

- (a) complete any work which is outstanding on the date stated in a Taking-Over Certificate, within such reasonable time as is instructed by the Employer, and
- (b) execute all work required to remedy defects or damage, as may be notified by the Employer on or before the expiry date of the Defects Notification Period for the Works or Section (as the case may be).

If a defect appears or damage occurs, the Employer shall notify the Contractor accordingly.

## 11.2

Cost of Remedying  
Defects

All work referred to in sub-paragraph (b) of Sub-Clause 11.1 [*Completion of Outstanding Work and Remedying Defects*] shall be executed at the risk and cost of the Contractor, if and to the extent that the work is attributable to:

- (a) the design of the Works,
- (b) Plant, Materials or workmanship not being in accordance with the Contract,
- (c) improper operation or maintenance which was attributable to matters for which the Contractor is responsible (under Sub-Clauses 5.5 to 5.7 or otherwise), or
- (d) failure by the Contractor to comply with any other obligation.



If and to the extent that such work is attributable to any other cause, the Employer shall give notice to the Contractor accordingly, and Sub-Clause 13.3 [*Variation Procedure*] shall apply.

11.3  
Extension of Defects  
Notification Period

The Employer shall be entitled subject to Sub-Clause 2.5 [*Employer's Claims*] to an extension of the Defects Notification Period for the Works or a Section if and to the extent that the Works, Section or a major item of Plant (as the case may be, and after taking over) cannot be used for the purposes for which they are intended by reason of a defect or damage. However, a Defects Notification Period shall not be extended by more than two years.

If delivery and/or erection of Plant and/or Materials was suspended under Sub-Clause 8.8 [*Suspension of Work*] or Sub-Clause 16.1 [*Contractor's Entitlement to Suspend Work*], the Contractor's obligations under this Clause shall not apply to any defects or damage occurring more than two years after the Defects Notification Period for the Plant and/or Materials would otherwise have expired.

11.4  
Failure to Remedy  
Defects

If the Contractor fails to remedy any defect or damage within a reasonable time, a date may be fixed by (or on behalf of) the Employer, on or by which the defect or damage is to be remedied. The Contractor shall be given reasonable notice of this date.

If the Contractor fails to remedy the defect or damage by this notified date and this remedial work was to be executed at the cost of the Contractor under Sub-Clause 11.2 [*Cost of Remedying Defects*], the Employer may (at his option):

- (a) carry out the work himself or by others, in a reasonable manner and at the Contractor's cost, but the Contractor shall have no responsibility for this work; and the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay to the Employer the costs reasonably incurred by the Employer in remedying the defect or damage;
- (b) agree or determine a reasonable reduction in the Contract Price in accordance with Sub-Clause 3.5 [*Determinations*]; or
- (c) if the defect or damage deprives the Employer of substantially the whole benefit of the Works or any major part of the Works, terminate the Contract as a whole, or in respect of such major part which cannot be put to the intended use. Without prejudice to any other rights, under the Contract or otherwise, the Employer shall then be entitled to recover all sums paid for the Works or for such part (as the case may be), plus financing costs and the cost of dismantling the same, clearing the Site and returning Plant and Materials to the Contractor.

11.5  
Removal of Defective  
Work

If the defect or damage cannot be remedied expeditiously on the Site and the Employer gives consent, the Contractor may remove from the Site for the purposes of repair such items of Plant as are defective or damaged. This consent may require the Contractor to increase the amount of the Performance Security by the full replacement cost of these items, or to provide other appropriate security.



11.6  
Further Tests

If the work of remedying of any defect or damage may affect the performance of the Works, the Employer may require the repetition of any of the tests described in the Contract, including Tests on Completion and/or Tests after Completion. The requirement shall be made by notice within 28 days after the defect or damage is remedied.

These tests shall be carried out in accordance with the terms applicable to the previous tests, except that they shall be carried out at the risk and cost of the Party liable, under Sub-Clause 11.2 [*Cost of Remedying Defects*], for the cost of the remedial work.

11.7  
Right of Access

Until the Performance Certificate has been issued, the Contractor shall have the right of access to all parts of the Works and to records of the operation and performance of the Works, except as may be inconsistent with the Employer's reasonable security restrictions.

11.8  
Contractor to Search

The Contractor shall, if required by the Employer, search for the cause of any defect, under the direction of the Employer. Unless the defect is to be remedied at the cost of the Contractor under Sub-Clause 11.2 [*Cost of Remedying Defects*], the Cost of the search plus reasonable profit shall be agreed or determined in accordance with Sub-Clause 3.5 [*Determinations*] and shall be added to the Contract Price.

11.9  
Performance Certificate

Performance of the Contractor's obligations shall not be considered to have been completed until the Employer has issued the Performance Certificate to the Contractor, stating the date on which the Contractor completed his obligations under the Contract.

The Employer shall issue the Performance Certificate within 28 days after the latest of the expiry dates of the Defects Notification Periods, or as soon thereafter as the Contractor has supplied all the Contractor's Documents and completed and tested all the Works, including remedying any defects. If the Employer fails to issue the Performance Certificate accordingly:

- (a) the Performance Certificate shall be deemed to have been issued on the date 28 days after the date on which it should have been issued, as required by this Sub-Clause, and
- (b) Sub-Clause 11.11 [*Clearance of Site*] and sub-paragraph (a) of Sub-Clause 14.14 [*Cessation of Employer's Liability*] shall be inapplicable.

Only the Performance Certificate shall be deemed to constitute acceptance of the Works.

11.10  
Unfulfilled Obligations

After the Performance Certificate has been issued, each Party shall remain liable for the fulfilment of any obligation which remains unperformed at that time. For the purposes of determining the nature and extent of unperformed obligations, the Contract shall be deemed to remain in force.

11.11  
Clearance of Site

Upon receiving the Performance Certificate, the Contractor shall remove any remaining Contractor's Equipment, surplus material, wreckage, rubbish and Temporary Works from the Site.

If all these items have not been removed within 28 days after the Employer issues the Performance Certificate, the Employer may sell or otherwise dispose of any remaining items. The Employer shall be entitled to be paid the costs incurred in connection with, or attributable to, such sale or disposal and restoring the Site.

Any balance of the moneys from the sale shall be paid to the Contractor. If these moneys are less than the Employer's costs, the Contractor shall pay the outstanding balance to the Employer.

## 12 Tests after Completion

### 12.1

#### Procedure for Tests after Completion

If Tests after Completion are specified in the Contract, this Clause shall apply. Unless otherwise stated in the Particular Conditions:

- (a) The Employer shall provide all electricity, fuel and materials, and make the Employer's Personnel and Plant available;
- (b) the Contractor shall provide any other plant, equipment and suitably qualified and experienced staff, as are necessary to carry out the Tests after Completion efficiently; and
- (c) the Contractor shall carry out the Tests after Completion in the presence of such Employer's and/or Contractor's Personnel as either Party may reasonably request.

The Tests after Completion shall be carried out as soon as is reasonably practicable after the Works or Section have been taken over by the Employer. The Employer shall give to the Contractor 21 days' notice of the date after which the Tests after Completion will be carried out. Unless otherwise agreed, these Tests shall be carried out within 14 days after this date, on the day or days determined by the Employer.

The results of the Tests after Completion shall be compiled and evaluated by the Contractor, who shall prepare a detailed report. Appropriate account shall be taken of the effect of the Employer's prior use of the Works.

### 12.2

#### Delayed Tests

If the Contractor incurs Cost as a result of any unreasonable delay by the Employer to the Tests after Completion, the Contractor shall (i) give notice to the Employer and (ii) be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine this Cost and profit.

If, for reasons not attributable to the Contractor, a Test after Completion on the Works or any Section cannot be completed during the Defects Notification Period (or any other period agreed upon by both Parties), then the Works or Section shall be deemed to have passed this Test after Completion.

### 12.3

#### Retesting

If the Works, or a Section, fail to pass the Tests after Completion:

- (a) sub-paragraph (b) of Sub-Clause 11.1 [*Completion of Outstanding Work and Remedying of Defects*] shall apply, and



- (b) either Party may then require the failed Tests, and the Tests after Completion on any related work, to be repeated under the same terms and conditions.

If and to the extent that this failure and retesting are attributable to any of the matters listed in sub-paragraphs (a) to (d) of Sub-Clause 11.2 [*Cost of Remedying Defects*] and cause the Employer to incur additional costs, the Contractor shall subject to Sub-Clause 2.5 [*Employer's Claims*] pay these costs to the Employer.

12.4  
Failure to Pass Tests  
after Completion

If the following conditions apply, namely:

- (a) the Works or a Section, fail to pass any or all of the Tests after Completion,
- (b) the relevant sum payable as non-performance damages for this failure is stated (or its method of calculation is defined) in the Contract, and
- (c) the Contractor pays this relevant sum to the Employer during the Defects Notification Period,

then the Works or Section shall be deemed to have passed these Tests after Completion.

If the Works, or a Section, fail to pass a Test after Completion and the Contractor proposes to make adjustments or modifications to the Works or such Section, the Contractor may be instructed by (or on behalf of) the Employer that right of access to the Works or Section cannot be given until a time that is convenient to the Employer. The Contractor shall then remain liable to carry out the adjustments or modifications and to satisfy this Test, within a reasonable period of receiving notice by (or on behalf of) the Employer of the time that is convenient to the Employer. However, if the Contractor does not receive this notice during the relevant Defects Notification Period, the Contractor shall be relieved of this obligation and the Works or Section (as the case may be) shall be deemed to have passed this Test after Completion.

If the Contractor incurs additional Cost as a result of any unreasonable delay by the Employer in permitting access to the Works or Plant by the Contractor, either to investigate the causes of a failure to pass a Test after Completion or to carry out any adjustments or modifications, the Contractor shall (i) give notice to the Employer and (ii) be entitled subject to Sub-Clause 20.1 [*Contractor's Claims*] to payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine this Cost and profit.

## 13 Variations and Adjustments

13.1  
Right to Vary

Variations may be initiated by the Employer at any time prior to issuing the Taking-Over Certificate for the Works, either by an instruction or by a request for the Contractor to submit a proposal. A Variation shall not comprise the omission of any work which is to be carried out by others.



The Contractor shall execute and be bound by each Variation, unless the Contractor promptly gives notice to the Employer stating (with supporting particulars) that (i) the Contractor cannot readily obtain the Goods required for the Variation, (ii) it will reduce the safety or suitability of the Works, or (iii) it will have an adverse impact on the achievement of the Performance Guarantees. Upon receiving this notice, the Employer shall cancel, confirm or vary the instruction.

13.2  
Value Engineering

The Contractor may, at any time, submit to the Employer a written proposal which (in the Contractor's opinion) will, if adopted, (1) accelerate completion, (ii) reduce the cost to the Employer of executing, maintaining or operating the Works, (iii) improve the efficiency or value to the Employer of the completed Works, or (iv) otherwise be of benefit to the Employer.

The proposal shall be prepared at the cost of the Contractor and shall include the items listed in Sub-Clause 13.3 [Variation Procedure].

13.3  
Variation Procedure

If the Employer requests a proposal, prior to instructing a Variation, the Contractor shall respond in writing as soon as practicable, either by giving reasons why he cannot comply (if this is the case) or by submitting:

- (a) a description of the proposed design and/or work to be performed and a programme for its execution,
- (b) the Contractor's proposal for any necessary modifications to the programme according to Sub-Clause 8.3 [Programme] and to the Time for Completion, and
- (c) the Contractor's proposal for adjustment to the Contract Price.

The Employer shall, as soon as practicable after receiving such proposal (under Sub-Clause 13.2 [Value Engineering] or otherwise), respond with approval, disapproval or comments. The Contractor shall not delay any work whilst awaiting a response.

Each instruction to execute a Variation, with any requirements for the recording of Costs, shall be issued by the Employer to the Contractor, who shall acknowledge receipt.

Upon instructing or approving a Variation, the Employer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine adjustments to the Contract Price and the Schedule of Payments. These adjustments shall include reasonable profit, and shall take account of the Contractor's submissions under Sub Clause 13.2 [Value Engineering] if applicable.

13.4  
Payment in Applicable  
Currencies

If the Contract provides for payment of the Contract Price in more than one currency, then whenever an adjustment is agreed, approved or determined as stated above, the amount payable in each of the applicable currencies shall be specified. For this purpose, reference shall be made to the actual or expected currency proportions of the Cost of the varied work, and to the proportions of various currencies specified for payment of the Contract Price.

### 13.5 Provisional Sums

Each Provisional Sum shall only be used, in whole or in part, in accordance with the Employer's instructions, and the Contract Price shall be adjusted accordingly. The total sum paid to the Contractor shall include only such amounts, for the work, supplies or services to which the Provisional Sum relates, as the Employer shall have instructed. For each Provisional Sum, the Employer may instruct:

- (a) work to be executed (including Plant, Materials or services to be supplied) by the Contractor and valued under Sub-Clause 13.3 *[Variation Procedure]*; and/or
- (b) Plant, Materials or services to be purchased by the Contractor, for which there shall be added to the Contract Price less the original Provisional Sums:
  - (i) the actual amounts paid (or due to be paid) by the Contractor, and
  - (ii) a sum for overhead charges and profit, calculated as a percentage of these actual amounts by applying the relevant percentage rate (if any) stated in the Contract.

The Contractor shall, when required by the Employer, produce quotations, invoices, vouchers and accounts or receipts in substantiation.

### 13.6 Daywork

For work of a minor or incidental nature, the Employer may instruct that a Variation shall be executed on a daywork basis. The work shall then be valued in accordance with the daywork schedule included in the Contract, and the following procedure shall apply. If a daywork schedule is not included in the Contract, this Sub-Clause shall not apply.

Before ordering Goods for the work, the Contractor shall submit quotations to the Employer. When applying for payment, the Contractor shall submit invoices, vouchers and accounts or receipts for any Goods.

Except for any items for which the daywork schedule specifies that payment is not due, the Contractor shall deliver each day to the Employer accurate statements in duplicate which shall include the following details of the resources used in executing the previous day's work:

- (a) the names, occupations and time of Contractor's Personnel,
- (b) the identification, type and time of Contractor's Equipment and Temporary Works, and
- (c) the quantities and types of Plant and Materials used.

One copy of each statement will, if correct, or when agreed, be signed by the Employer and returned to the Contractor. The Contractor shall then submit priced statements of these resources to the Employer, prior to their inclusion in the next Statement under Sub-Clause 14.3 *[Application for Interim Payments]*.

### 13.7 Adjustments for Changes in Legislation

The Contract Price shall be adjusted to take account of any increase or decrease in Cost resulting from a change in the Laws of the Country (including the introduction of new Laws and the repeal or modification of existing Laws) or in the judicial or official governmental interpretation of such Laws, made after the Base Date, which affect the Contractor in the performance of obligations under the Contract.



If the Contractor suffers (or will suffer) delay and/or incurs (or will incur) additional Cost as a result of these changes in the Laws or in such interpretations, made after the Base Date, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 *[Contractor's Claims]* to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 *[Extension of Time for Completion]*, and
- (b) payment of any such Cost, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 *[Determinations]* to agree or determine these matters.

### 13.8

Adjustments for Changes in Costs

If the Contract Price is to be adjusted for rises or falls in the cost of labour, Goods and other inputs to the Works, the adjustments shall be calculated in accordance with the provisions in the Particular Conditions.

## 14

### Contract Price and Payment

#### 14.1

The Contract Price

Unless otherwise stated in the Particular Conditions:

- (a) payment for the Works shall be made on the basis of the lump sum Contract Price, subject to adjustments in accordance with the Contract; and
- (b) the Contractor shall pay all taxes, duties and fees required to be paid by him under the Contract, and the Contract Price shall not be adjusted for any of these costs, except as stated in Sub-Clause 13.7 *[Adjustments for Changes in Legislation]*.

#### 14.2

Advance Payment

The Employer shall make an advance payment, as an interest-free loan for mobilization and design, when the Contractor submits a guarantee in accordance with this Sub-Clause including the details stated in the Particular Conditions. If the Particular Conditions does not state:

- (a) the amount of the advance payment, then this Sub-Clause shall not apply;
- (b) the number and timing of instalments, then there shall be only one;
- (c) the applicable currencies and proportions, then they shall be those in which the Contract Price is payable; and/or
- (d) the amortisation rate for repayments, then it shall be calculated by dividing the total amount of the advance payment by the Contract Price stated in the Contract Agreement less Provisional Sums.

The Employer shall pay the first instalment after receiving (i) a Statement (under Sub-Clause 14.3 *[Application for Interim Payments]*), (ii) the Performance Security in accordance with Sub-Clause 4.2 *[Performance Security]*, and (iii) a guarantee in amounts and currencies equal to the advance payment. This guarantee shall be issued by an entity and from within a country (or other jurisdiction) approved by the Employer, and shall be in the form annexed to the Particular Conditions or in another form approved by the Employer. Unless and until the Employer receives this guarantee, this Sub-Clause shall not apply.



The Contractor shall ensure that the guarantee is valid and enforceable until the advance payment has been repaid, but its amount may be progressively reduced by the amount repaid by the Contractor. If the terms of the guarantee specify its expiry date, and the advance payment has not been repaid by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the guarantee until the advance payment has been repaid.

The advance payment shall be repaid through proportional deductions in interim payments. Deductions shall be made at the amortization rate stated in the Particular Conditions (or, if not so stated, as stated in sub-paragraph (d) above), which shall be applied to the amount otherwise due (excluding the advance payment and deductions and repayments of retention), until such time as the advance payment has been repaid.

If the advance payment has not been repaid prior to the issue of the Taking-Over Certificate for the Works or prior to termination under Clause 15 *[Termination by Employer]*, Clause 16 *[Suspension and Termination by Contractor]* or Clause 19 *[Force Majeure]* (as the case may be), the whole of the balance then outstanding shall immediately become due and payable by the Contractor to the Employer.

#### 14.3 Application for Interim Payments

The Contractor shall submit a Statement in six copies to the Employer after the end of the period of payment stated in the Contract (if not stated, after the end of each month), in a form approved by the Employer, showing in detail the amounts to which the Contractor considers himself to be entitled, together with supporting documents which shall include the relevant report on progress in accordance with Sub-Clause 4.21 *[Progress Reports]*.

The Statement shall include the following items, as applicable, which shall be expressed in the various currencies in which the Contract Price is payable, in the sequence listed:

- (a) the estimated contract value of the Works executed and the Contractor's Documents produced up to the end of the month (including Variations but excluding items described in sub-paragraphs (b) to (f) below);
- (b) any amounts to be added and deducted for changes in legislation and changes in cost, in accordance with Sub-Clause 13.7 *[Adjustments for Changes in Legislation]* and Sub-Clause 13.8 *[Adjustments for Changes in Cost]*;
- (c) any amount to be deducted for retention, calculated by applying the percentage of retention stated in the Particular Conditions to the total of the above amounts, until the amount so retained by the Employer reaches the limit of Retention Money (if any) stated in the Particular Conditions;
- (d) any amounts to be added and deducted for the advance payment and repayments in accordance with Sub-Clause 14.2 *[Advance Payment]*;
- (e) any other additions or deductions which may have become due under the Contract or otherwise, including those under Clause 20 *[Claims, Disputes and Arbitration]*; and
- (f) the deduction of amounts included in previous Statements.

#### 14.4 Schedule of Payments

If the Contract includes a Schedule of Payments specifying the instalments in which the Contract Price will be paid, then unless otherwise stated in this Schedule:

- (a) the instalments quoted in the Schedule of Payments shall be the estimated contract values for the purposes of sub-paragraph (a) of Sub-Clause 14.3 [Application for Interim Payments], subject to Sub-Clause 14.5 [Plant and Materials intended for the Works]; and
- (b) if these instalments are not defined by reference to the actual progress achieved in executing the Works, and if actual progress is found to be less than that on which the Schedule of Payments was based, then the Employer may proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine revised instalments, which shall take account of the extent to which progress is less than that on which the instalments were previously based.

If the Contract does not include a Schedule of Payments, the Contractor shall submit non-binding estimates of the payments which he expects to become due during each quarterly period. The first estimate shall be submitted within 42 days after the Commencement Date. Revised estimates shall be submitted at quarterly intervals, until the Taking-Over Certificate has been issued for the Works.

14.5  
Plant and Materials  
intended for the Works

If the Contractor is entitled, under the Contract, to an interim payment for Plant and Materials which are not yet on the Site, the Contractor shall nevertheless not be entitled to such payment unless:

- (a) the relevant Plant and Materials are in the Country and have been marked as the Employer's property in accordance with the Employer's instructions; or
- (b) the Contractor has delivered, to the Employer, evidence of insurance and a bank guarantee in a form and issued by an entity approved by the Employer in amounts and currencies equal to such payment. This guarantee may be in a similar form to the form referred to in Sub-Clause 14.2 [Advance Payment] and shall be valid until the Plant and Materials are properly stored on Site and protected against loss, damage or deterioration.

14.6  
Interim Payments

No amount will be paid until the Employer has received and approved the Performance Security. Thereafter, the Employer shall within 28 days after receiving a Statement and supporting documents, give to the Contractor notice of any items in the Statement with which the Employer disagrees, with supporting particulars. Payments due shall not be withheld, except that:

- (a) if any thing supplied or work done by the Contractor is not in accordance with the Contract, the cost of rectification or replacement may be withheld until rectification or replacement has been completed; and/or
- (b) if the Contractor was or is failing to perform any work or obligation in accordance with the Contract, and had been so notified by the Employer, the value of this work or obligation may be withheld until the work or obligation has been performed.

The Employer may, by any payment, make any correction or modification that should properly be made to any amount previously considered due. Payment shall not be deemed to indicate the Employer's acceptance, approval, consent or satisfaction.

14.7  
Timing of Payments

Except as otherwise stated in Sub-Clause 2.5 [Employer's Claims], the Employer shall



pay to the Contractor:

- (a) the first instalment of the advance payment within 42 days after the date on which the Contract came into full force and effect or within 21 days after the Employer receives the documents in accordance with Sub-Clause 4.2 *[Performance Security]* and Sub-Clause 14.2 *[Advance Payment]*, whichever is later;
- (b) the amount which is due in respect of each Statement, other than the Final Statement, within 56 days after receiving the Statement and supporting documents; and
- (c) the final amount due, within 42 days after receiving the Final Statement and written discharge in accordance with Sub-Clause 14.11 *[Application for Final Payment]* and Sub-Clause 14.12 *[Discharge]*.

Payment of the amount due in each currency shall be made into the bank account, nominated by the Contractor, in the payment country (for this currency) specified in the Contract.

#### 14.8 Delayed Payment

If the Contractor does not receive payment in accordance with Sub-Clause 14.7 *[Timing of Payments]*, the Contractor shall be entitled to receive financing charges compounded monthly on the amount unpaid during the period of delay.

Unless otherwise stated in the Particular Conditions, these financing charges shall be calculated at the annual rate of three percentage points above the discount rate of the central bank in the country of the currency of payment, and shall be paid in such currency.

The Contractor shall be entitled to this payment without formal notice, and without prejudice to any other right or remedy.

#### 14.9 Payment of Retention Money

When the Taking-Over Certificate has been issued for the Works, and the Works have passed all specified tests (including the Tests after Completion, if any), the first half of the Retention Money shall be paid to the Contractor. If a Taking-Over Certificate is issued for a Section, the relevant percentage of the first half of the Retention Money shall be paid when the Section passes all tests.

Promptly after the latest of the expiry dates of the Defects Notification Periods, the outstanding balance of the Retention Money shall be paid to the Contractor. If a Taking-Over Certificate was issued for a Section, the relevant percentage of the second half of the Retention Money shall be paid promptly after the expiry date of the Defects Notification Period for the Section.

However, if any work remains to be executed under Clause 11 *[Defects Liability]* or Clause 12 *[Tests after Completion]*, the Employer shall be entitled to withhold the estimated cost of this work until it has been executed.

The relevant percentage for each Section shall be the percentage value of the Section as stated in the Contract. If the percentage value of a Section is not stated in the Contract, no percentage of either half of the Retention Money shall be released under this Sub-Clause in respect of such Section.

#### 14.10 Statement at Completion

Within 84 days after receiving the Taking-Over Certificate for the Works, the Contractor shall submit to the Employer six copies of a Statement at completion with



supporting documents, in accordance with Sub-Clause 14.3 [*Application for Interim Payments*], showing:

- (a) the value of all work done in accordance with the Contract up to the date stated in the Taking-Over Certificate for the Works,
- (b) any further sums which the Contractor considers to be due, and
- (c) an estimate of any other amounts which the Contractor considers will become due to him under the Contract. Estimated amounts shall be shown separately in this Statement at completion.

The Employer shall then give notice to the Contractor in accordance with Sub-Clause 14.6 [*Interim Payments*] and make payment in accordance with Sub-Clause 14.7 [*Timing of Payments*].

14.11  
Application for Final  
Payment

Within 56 days after receiving the Performance Certificate, the Contractor shall submit, to the Employer, six copies of a draft final statement with supporting documents showing in detail in a form approved by the Employer:

- (a) the value of all work done in accordance with the Contract, and
- (b) any further sums which the Contractor considers to be due to him under the Contract or otherwise.

If the Employer disagrees with or cannot verify any part of the draft final statement, the Contractor shall submit such further information as the Employer may reasonably require and shall make such changes in the draft as may be agreed between them. The Contractor shall then prepare and submit to the Employer the final statement as agreed. This agreed statement is referred to in these Conditions as the "Final Statement".

However if, following discussions between the Parties and any changes to the draft final statement which are agreed, it becomes evident that a dispute exists, the Employer shall pay the agreed parts of the draft final statement in accordance with Sub-Clause 14.6 [*Interim Payments*] and Sub-Clause 14.7 [*Timing of Payments*]. Thereafter, if the dispute is finally resolved under Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*] or Sub-Clause 20.5 [*Amicable Settlement*], the Contractor shall then prepare and submit to the Employer a Final Statement.

14.12  
Discharge

When submitting the Final Statement, the Contractor shall submit a written discharge which confirms that the total of the Final Statement represents full and final settlement of all moneys due to the Contractor under or in connection with the Contract. This discharge may state that it becomes effective when the Contractor has received the Performance Security and the out-standing balance of this total, in which event the discharge shall be effective on such date.

14.13  
Final Payment

In accordance with sub-paragraph (c) of Sub-Clause 14.7 [*Timing of Payments*], the Employer shall pay to the Contractor the amount which is finally due, less all amounts previously paid by the Employer and any deductions in accordance with Sub-Clause 2.5 [*Employer's Claims*].

14.14  
Cessation of Employer's  
Liability

The Employer shall not be liable to the Contractor for any matter or thing under or in connection with the Contract or execution of the Works, except to the extent that the Contractor shall have included an amount expressly for it:

- (a) in the Final Statement and also
- (b) (except for matters or things arising after the issue of the Taking-Over Certificate for the Works) in the Statement at completion described in Sub-Clause 14.10 *[Statement at Completion]*.

However, this Sub-Clause shall not limit the Employer's liability under his indemnification obligations, or the Employer's liability in any case of fraud, deliberate default or reckless misconduct by the Employer.

## 14.15

## Currencies of Payment

The Contract Price shall be paid in the currency or currencies named in the Contract Agreement. Unless otherwise stated in the Particular Conditions, if more than one currency is so named, payments shall be made as follows:

- (a) if the Contract Price was expressed in Local Currency only:
  - (i) the proportions or amounts of the Local and Foreign Currencies, and the fixed rates of exchange to be used for calculating the payments, shall be as stated in the Contract Agreement, except as otherwise agreed by both Parties;
  - (ii) payments and deductions under Sub-Clause 13.5 *[Provisional Sums]* and Sub-Clause 13.7 *[Adjustments for Changes in Legislation]* shall be made in the applicable currencies and proportions; and
  - (iii) other payments and deductions under sub-paragraphs (a) to (d) of Sub-Clause 14.3 *[Application for Interim Payments]* shall be made in the currencies and proportions specified in sub-paragraph (a)(i) above;
- (b) payment of the damages specified in the Particular Conditions shall be made in the currencies and proportions specified in the Particular Conditions;
- (c) other payments to the Employer by the Contractor shall be made in the currency in which the sum was expended by the Employer, or in such currency as may be agreed by both Parties;
- (d) if any amount payable by the Contractor to the Employer in a particular currency exceeds the sum payable by the Employer to the Contractor in that currency, the Employer may recover the balance of this amount from the sums otherwise payable to the Contractor in other currencies; and
- (e) if no rates of exchange are stated in the Contract, they shall be those prevailing on the Base Date and determined by the central bank of the Country.

## 15

## Termination by Employer

## 15.1

## Notice to Correct

If the Contractor fails to carry out any obligation under the Contract, the Employer may by notice require the Contractor to make good the failure and to remedy it within a specified reasonable time.



15.2  
Termination by  
Employer

The Employer shall be entitled to terminate the Contract if the Contractor:

- (a) fails to comply with Sub-Clause 4.2 [*Performance Security*] or with a notice under Sub-Clause 15.1 [*Notice to Correct*],
- (b) abandons the Works or otherwise plainly demonstrates the intention not to continue performance of his obligations under the Contract,
- (c) without reasonable excuse fails to proceed with the Works in accordance with Clause 8 [*Commencement, Delays and Suspension*],
- (d) subcontracts the whole of the Works or assigns the Contract without the required agreement,
- (e) becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events, or
- (f) gives or offers to give (directly or indirectly) to any person any bribe, gift, gratuity, commission or other thing of value, as an inducement or reward:
  - (i) for doing or forbearing to do any action in relation to the Contract, or
  - (ii) for showing or forbearing to show favour or disfavour to any person in relation to the Contract,

or if any of the Contractor's Personnel, agents or Subcontractors gives or offers to give (directly or indirectly) to any person any such inducement or reward as is described in this sub-paragraph (f). However, lawful inducements and rewards to Contractor's Personnel shall not entitle termination.

In any of these events or circumstances, the Employer may, upon giving 14 days' notice to the Contractor, terminate the Contract and expel the Contractor from the Site. However, in the case of sub-paragraph (e) or (f), the Employer may by notice terminate the Contract immediately.

The Employer's election to terminate the Contract shall not prejudice any other rights of the Employer, under the Contract or otherwise.

The Contractor shall then leave the Site and deliver any required Goods, all Contractor's Documents, and other design documents made by or for him, to the Employer. However, the Contractor shall use his best efforts to comply immediately with any reasonable instructions included in the notice (i) for the assignment of any subcontract, and (ii) for the protection of life or property or for the safety of the Works.

After termination, the Employer may complete the Works and/or arrange for any other entities to do so. The Employer and these entities may then use any Goods, Contractor's Documents and other design documents made by or on behalf of the Contractor.

The Employer shall then give notice that the Contractor's Equipment and Temporary Works will be released to the Contractor at or near the Site. The Contractor shall promptly arrange their removal, at the risk and cost of the Contractor. However, if by this time the Contractor has failed to make a payment due to the Employer, these items may be sold by the Employer in order to recover this payment. Any balance of the proceeds shall then be paid to the Contractor.



15.3  
Valuation at Date of  
Termination

As soon as practicable after a notice of termination under Sub-Clause 15.2 [*Termination by Employer*] has taken effect, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine the value of the Works, Goods and Contractor's Documents, and any other sums due to the Contractor for work executed in accordance with the Contract.

15.4  
Payment after  
Termination

After a notice of termination under Sub-Clause 15.2 [*Termination by Employer*] has taken effect, the Employer may:

- (a) proceed in accordance with Sub-Clause 2.5 [*Employer's Claims*],
- (b) with-hold further payments to the Contractor until the costs of design, execution, completion and remedying of any defects, damages for delay in completion (if any), and all other costs incurred by the Employer, have been established, and/or
- (c) recover from the Contractor any losses and damages incurred by the Employer and any extra costs of completing the Works, after allowing for any sum due to the Contractor under Sub-Clause 15.3 [*Valuation at Date of Termination*]. After recovering any such losses, damages and extra costs, the Employer shall pay any balance to the Contractor.

15.5  
Employer's Entitlement  
to Termination

The Employer shall be entitled to terminate the Contract, at any time for the to Employer's convenience, by giving notice of such termination to the Contractor. The termination shall take effect 28 days after the later of the dates on which the Contractor receives this notice or the Employer returns the Performance Security. The Employer shall not terminate the Contract under this Sub-Clause in order to execute the Works himself or to arrange for the Works to be executed by another contractor.

After this termination, the Contractor shall proceed in accordance with Sub-Clause 16.3 [*Cessation of Work and Removal of Contractor's Equipment*] and shall be paid in accordance with Sub-Clause 19.6 [*Optional Termination, Payment and Release*].

## 16 Suspension and Termination by Contractor

16.1  
Contractor's Entitlement  
to Suspend Work

If the Employer fails to comply with Sub-Clause 2.4 [*Employer's Financial Arrangements*] or Sub-Clause 14.7 [*Timing of Payments*], the Contractor may, after giving not less than 21 days' notice to the Employer, suspend work (or reduce the rate of work) unless and until the Contractor has received the reasonable evidence or payment, as the case may be and as described in the notice.

The Contractor's action shall not prejudice his entitlements to financing charges under Sub-Clause 14.8 [*Delayed Payment*] and to termination under Sub-Clause 16.2 [*Termination by Contractor*].

If the Contractor subsequently receives such evidence or payment (as described in the relevant Sub-Clause and in the above notice) before giving a notice of termination, the Contractor shall resume normal working as soon as is reasonably practicable.

If the Contractor suffers delay and/or incurs Cost as a result of suspending work (or reducing the rate of work) in accordance with this Sub-Clause, the Contractor shall give notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [*Contractor's*

*Claims*] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [*Extension of Time for Completion*], and
- (b) payment of any such Cost plus reasonable profit, which shall be added to the Contract Price.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine these matters.

16.2  
Termination by  
Contractor

The Contractor shall be entitled to terminate the Contract if:

- (a) the Contractor does not receive the reasonable evidence within 42 days after giving notice under Sub-Clause 16.1 [*Contractor's Entitlement to Suspend Work*] in respect of a failure to comply with Sub-Clause 2.4 [*Employer's Financial Arrangements*],
- (b) the Contractor does not receive the amount due within 42 days after the expiry of the time stated in Sub-Clause 14.7 [*Timing of Payments*] within which payment is to be made (except for deductions in accordance with Sub-Clause 2.5 [*Employer's Claims*]),
- (c) the Employer substantially fails to perform his obligations under the Contract,
- (d) the Employer fails to comply with Sub-Clause 1.7 [*Assignment*],
- (e) a prolonged suspension affects the whole of the Works as described in Sub-Clause 8.11 [*Prolonged Suspension*], or
- (f) the Employer becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events.

In any of these events or circumstances, the Contractor may, upon giving 14 days' notice to the Employer, terminate the Contract. However, in the case of subparagraph (e) or (f), the Contractor may by notice terminate the Contract immediately.

The Contractor's election to terminate the Contract shall not prejudice any other rights of the Contractor, under the Contract or otherwise.

16.3  
Cessation of Work and  
Removal of Contractor's  
Equipment

After a notice of termination under Sub-Clause 15.5 [*Employer's Entitlement to Termination*], Sub-Clause 16.2 [*Termination by Contractor*] or Sub-Clause 19.6 [*Optional Termination, Payment and Release*] has taken effect, the Contractor shall promptly:

- (a) cease all further work, except for such work as may have been instructed by the Employer for the protection of life or property or for the safety of the Works,
- (b) hand over Contractor's Documents, Plant, Materials and other work, for which the Contractor has received payment, and
- (c) remove all other Goods from the Site, except as necessary for safety, and leave the Site.



## 16.4

Payment on Termination After a notice of termination under Sub-Clause 16.2 [*Termination by Contractor*] has taken effect, the Employer shall promptly:

- (a) return the Performance Security to the Contractor,
- (b) pay the Contractor in accordance with Sub-Clause 19.6 [*Optional Termination, Payment and Release*], and
- (c) pay to the Contractor the amount of any loss of profit or other loss or damage sustained by the Contractor as a result of this termination.

## 17

## Risk and Responsibility

## 17.1

## Indemnities

The Contractor shall indemnify and hold harmless the Employer, the Employer's Personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of:

- (a) bodily injury, sickness, disease or death, of any person whatsoever arising out of or in the course of or by reason of the design, execution and completion of the Works and the remedying of any defects, unless attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, or any of their respective agents, and
- (b) damage to or loss of any property, real or personal (other than the Works), to the extent that such damage or loss:
  - (i) arises out of or in the course of or by reason of the design, execution and completion of the Works and the remedying of any defects, and
  - (ii) is not attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, their respective agents, or anyone directly or indirectly employed by any of them.

The Employer shall indemnify and hold harmless the Contractor, the Contractor's Personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of (1) bodily injury, sickness, disease or death, which is attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, or any of their respective agents, and (2) the matters for which liability may be excluded from insurance cover, as described in sub-paragraphs (d)(i), (ii) and (iii) of Sub-Clause 18.3 [*Insurance Against Injury to Persons and Damage to Property*].

## 17.2

## Contractor's Care of the Works

The Contractor shall take full responsibility for the care of the Works and Goods from the Commencement Date until the Taking-Over Certificate is issued (or is deemed to be issued under Sub-Clause 10.1 [*Taking Over of the Works and Sections*]) for the Works, when responsibility for the care of the Works shall pass to the Employer. If a Taking-Over Certificate is issued (or is so deemed to be issued) for any Section of the Works, responsibility for the care of the Section shall then pass to the Employer.

After responsibility has accordingly passed to the Employer, the Contractor shall take responsibility for the care of any work which is outstanding on the date stated in a



Taking-Over Certificate, until this outstanding work has been completed.

If any loss or damage happens to the Works, Goods or Contractor's Documents during the period when the Contractor is responsible for their care, from any cause not listed in Sub-Clause 17.3 [Employer's Risks], the Contractor shall rectify the loss or damage at the Contractor's risk and cost, so that the Works, Goods and Contractor's Documents conform with the Contract.

The Contractor shall be liable for any loss or damage caused by any actions performed by the Contractor after a Taking-Over Certificate has been issued. The Contractor shall also be liable for any loss or damage which occurs after a Taking-Over Certificate has been issued and which arose from a previous event for which the Contractor was liable.

### 17.3 Employer's Risks

The risks referred to in Sub-Clause 17.4 below are:

- (a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,
- (b) rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war, within the Country,
- (c) riot, commotion or disorder within the Country by persons other than the Contractor's Personnel and other employees of the Contractor and Subcontractors,
- (d) munitions of war, explosive materials, ionising radiation or contamination by radio-activity, within the Country, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity, and,
- (e) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds.

### 17.4 Consequences of Employer's Risks

If and to the extent that any of the risks listed in Sub-Clause 17.3 above results in loss or damage to the Works, Goods or Contractor's Documents, the Contractor shall promptly give notice to the Employer and shall rectify this loss or damage to the extent required by the Employer.

If the Contractor suffers delay and/or incurs Cost from rectifying this loss or damage, the Contractor shall give a further notice to the Employer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost, which shall be added to the Contract Price.

After receiving this further notice, the Employer shall proceed in accordance with Sub Clause 3.5 [Determinations] to agree or determine these matters.

### 17.5 Intellectual and Industrial Property Rights

In this Sub-Clause, "infringement" means an infringement (or alleged infringement) of any patent, registered design, copyright, trade mark, trade name, trade secret or other Rights intellectual or industrial property right relating to the Works; and "claim" means a claim (or proceedings pursuing a claim) alleging an infringement.

Whenever a Party does not give notice to the other Party of any claim within 28 days of receiving the claim, the first Party shall be deemed to have waived any right to

indemnity under this Sub-Clause.

The Employer shall indemnify and hold the Contractor harmless against and from any claim alleging an infringement which is or was:

- (a) an unavoidable result of the Contractor's compliance with the Employer's Requirements, or
- (b) a result of any Works being used by the Employer:
  - (i) for a purpose other than that indicated by, or reasonably to be inferred from, the Contract, or
  - (ii) in conjunction with any thing not supplied by the Contractor, unless such use was disclosed to the Contractor prior to the Base Date or is stated in the Contract.

The Contractor shall indemnify and hold the Employer harmless against and from any other claim which arises out of or in relation to (i) the Contractor's design, manufacture, construction or execution of the Works, (ii) the use of Contractor's Equipment, or (iii) the proper use of the Works.

If a Party is entitled to be indemnified under this Sub-Clause, the indemnifying Party may (at its cost) conduct negotiations for the settlement of the claim, and any litigation or arbitration which may arise from it. The other Party shall, at the request and cost of the indemnifying Party, assist in contesting the claim. This other Party (and its Personnel) shall not make any admission which might be prejudicial to the indemnifying Party, unless the indemnifying Party failed to take over the conduct of any negotiations, litigation or arbitration upon being requested to do so by such other Party.

#### 17.6 Limitation of Liability

Neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or for any indirect or consequential loss or damage which may be suffered by the other Party in connection with the Contract, other than under Sub-Clause 16.4 *[Payment on Termination]* and Sub-Clause 17.1 *[Indemnities]*.

The total liability of the Contractor to the Employer, under or in connection with the Contract other than under Sub-Clause 4.19 *[Electricity, Water and Gas]*, Sub-Clause 4.20 *[Employer's Equipment and Free-Issue Material]*, Sub-Clause 17.1 *[Indemnities]* and Sub-Clause 17.5 *[Intellectual and Industrial Property Rights]*, shall not exceed the sum stated in the Particular Conditions or (if a sum is not so stated) the Contract Price stated in the Contract Agreement.

This Sub-Clause shall not limit liability in any case of fraud, deliberate default or reckless misconduct by the defaulting Party.

## 18 Insurance

### 18.1 General Requirements for Insurance

In this Clause, "insuring Party" means, for each type of insurance, the Party responsible for effecting and maintaining the insurance specified in the relevant Sub-Clause.

Wherever the Contractor is the insuring Party, each insurance shall be effected with insurers and in terms approved by the Employer. These terms shall be consistent with any terms agreed by both Parties before they signed the Contract Agreement. This



agreement of terms shall take precedence over the provisions of this Clause.

Wherever the Employer is the insuring Party, each insurance shall be effected with insurers and in terms consistent with the details annexed to the Particular Conditions.

If a policy is required to indemnify joint insured, the cover shall apply separately to each insured as though a separate policy had been issued for each of the joint insured. If a policy indemnifies additional joint insured, namely in addition to the insured specified in this Clause, (i) the Contractor shall act under the policy on behalf of these additional joint insured except that the Employer shall act for Employer's Personnel, (ii) additional joint insured shall not be entitled to receive payments directly from the insurer or to have any other direct dealings with the insurer, and (iii) the insuring Party shall require all additional joint insured to comply with the conditions stipulated in the policy.

Each policy insuring against loss or damage shall provide for payments to be made in the currencies required to rectify the loss or damage. Payments received from insurers shall be used for the rectification of the loss or damage.

The relevant insuring Party shall, within the respective periods stated in the Particular Conditions (calculated from the Commencement Date), submit to the other Party:

- (a) evidence that the insurances described in this Clause have been effected, and
- (b) copies of the policies for the insurances described in Sub-Clause 18.2 [*Insurance of Works and Contractor's Equipment*] and Sub-Clause 18.3 [*Insurance against Injury to Persons and Damage to Property*].

When each premium is paid, the insuring Party shall submit evidence of payment to the other Party.

Each Party shall comply with the conditions stipulated in each of the insurance policies. The insuring Party shall keep the insurers informed of any relevant changes to the execution of the Works and ensure that insurance is maintained in accordance with this Clause.

Neither Party shall make any material alteration to the terms of any insurance without the prior approval of the other Party. If an insurer makes (or attempts to make) any alteration, the Party first notified by the insurer shall promptly give notice to the other Party.

If the insuring Party fails to effect and keep in force any of the insurances it is required to effect and maintain under the Contract, or fails to provide satisfactory evidence and copies of policies in accordance with this Sub-Clause, the other Party may (at its option and without prejudice to any other right or remedy) effect insurance for the relevant coverage and pay the premiums due. The insuring Party shall pay the amount of these premiums to the other Party, and the Contract Price shall be adjusted accordingly.

Nothing in this Clause limits the obligations, liabilities or responsibilities of the Contractor or the Employer, under the other terms of the Contract or otherwise. Any amounts not insured or not recovered from the insurers shall be borne by the Contractor and/or the Employer in accordance with these obligations, liabilities or responsibilities. However, if the insuring Party fails to effect and keep in force an insurance which is available and which it is required to effect and maintain under the Contract, and the other Party neither approves the omission nor effects insurance for the coverage relevant to this default, any moneys which should have been recoverable under this insurance



shall be paid by the insuring Party.

Payments by one Party to the other Party shall be subject to Sub-Clause 2.5 [*Employer's Claims*] or Sub-Clause 20.1 [*Contractor's Claims*], as applicable.

## 18.2

### Insurance for Works and Contractor's Equipment

The insuring Party shall insure the Works, Plant, Materials and Contractor's Documents for not less than the full reinstatement cost including the costs of demolition, removal of debris and professional fees and profit. This insurance shall be effective from the date by which the evidence is to be submitted under sub-paragraph (a) of Sub-Clause 18.1 [*General Requirements for Insurances*], until the date of issue of the Taking-Over Certificate for the Works.

The insuring Party shall maintain this insurance to provide cover until the date of issue of the Performance Certificate, for loss or damage for which the Contractor is liable arising from a cause occurring prior to the issue of the Taking-Over Certificate, and for loss or damage caused by the Contractor or Subcontractors in the course of any other operations (including those under Clause 11 [*Defects Liability*] and Clause 12 [*Tests after Completion*]).

The insuring Party shall insure the Contractor's Equipment for not less than the full replacement value, including delivery to Site. For each item of Contractor's Equipment, the insurance shall be effective while it is being transported to the Site and until it is no longer required as Contractor's Equipment.

Unless otherwise stated in the Particular Conditions, insurances under this Sub-Clause:

- (a) shall be effected and maintained by the Contractor as insuring Party,
- (b) shall be in the joint names of the Parties, who shall be jointly entitled to receive payments from the insurers, payments being held or allocated between the Parties for the sole purpose of rectifying the loss or damage,
- (c) shall cover all loss and damage from any cause not listed in Sub-Clause 17.3 [*Employer's Risks*],
- (d) shall also cover loss or damage from the risks listed in sub-paragraph (c) of Sub-Clause 17.3 [*Employer's Risks*], with deductibles per occurrence of not more than the amount stated in the Particular Conditions (if an amount is not so stated, this sub-paragraph (d) shall not apply), and
- (e) may however exclude loss of, damage to, and reinstatement of:
  - (i) a part of the Works which is in a defective condition due to a defect in its design, materials or workmanship (but cover shall include any other parts which are lost or damaged as a direct result of this defective condition and not as described in sub-paragraph (ii) below),
  - (ii) a part of the Works which is lost or damaged in order to reinstate any other part of the Works if this other part is in a defective condition due to a defect in its design, materials or workmanship,
  - (iii) a part of the Works which has been taken over by the Employer, except to the extent that the Contractor is liable for the loss or damage, and

- (iv) Goods while they are not in the Country, subject to Sub-Clause 14.5 [*Plant and Materials intended for the Works*].

If, more than one year after the Base Date, the cover described in sub-paragraph (d) above ceases to be available at commercially reasonable terms, the Contractor shall (as insuring Party) give notice to the Employer, with supporting particulars. The Employer shall then (i) be entitled subject to Sub-Clause 2.5 [*Employer's Claims*] to payment of an amount equivalent to such commercially reasonable terms as the Contractor should have expected to have paid for such cover, and (ii) be deemed, unless he obtains the cover at commercially reasonable terms, to have approved the omission under Sub-Clause 18.1 [*General Requirements for Insurances*].

### 18.3

#### Insurance against Injury to Persons and Damage to Property

The insuring Party shall insure against each Party's liability for any loss, damage, death or bodily injury which may occur to any physical property (except things insured under Sub-Clause 18.2 [*Insurance for Works and Contractor's Equipment*]) or to any person (except persons insured under Sub-Clause 18.4 [*Insurance for Contractor's Personnel*]), which may arise out of the Contractor's performance of the Contract and occurring before the issue of the Performance Certificate.

This insurance shall be for a limit per occurrence of not less than the amount stated in the Particular Conditions, with no limit on the number of occurrences. If an amount is not stated in the Contract, this Sub-Clause shall not apply.

Unless otherwise stated in the Particular Conditions, the insurances specified in this Sub-Clause:

- (a) shall be effected and maintained by the Contractor as insuring Party,
- (b) shall be in the joint names of the Parties,
- (c) shall be extended to cover liability for all loss and damage to the Employer's property (except things insured under Sub-Clause 18.2) arising out of the Contractor's performance of the Contract, and
- (d) may however exclude liability to the extent that it arises from:
  - (i) the Employer's right to have the Permanent Works executed on, over, under, in or through any land, and to occupy this land for the Permanent Works,
  - (ii) damage which is an unavoidable result of the Contractor's obligations to execute the Works and remedy any defects, and
  - (iii) a cause listed in Sub-Clause 17.3 [*Employer's Risks*], except to the extent that cover is available at commercially reasonable terms.

### 18.4

#### Insurance for Contractor's Personnel

The Contractor shall effect and maintain insurance against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the Contractor or any other of the Contractor's Personnel.

The Employer shall also be indemnified under the policy of insurance, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Employer or of the Employer's Personnel.



The insurance shall be maintained in full force and effect during the whole time that these personnel are assisting in the execution of the Works. For a Subcontractor's employees, the insurance may be effected by the Subcontractor, but the Contractor shall be responsible for compliance with this Clause.

## 19 Force Majeure

### 19.1 Definition of Force Majeure

In this Clause, "Force Majeure" means an exceptional event or circumstance:

- (a) which is beyond a Party's control,
- (b) which such Party could not reasonably have provided against before entering into the Contract,
- (c) which, having arisen, such Party could not reasonably have avoided or overcome, and
- (d) which is not substantially attributable to the other Party.

Force Majeure may include, but is not limited to, exceptional events or circumstances of the kind listed below, so long as conditions (a) to (d) above are satisfied:

- (i) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,
- (ii) rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war,
- (iii) riot, commotion, disorder, strike or lockout by persons other than the Contractor's Personnel and other employees of the Contractor and Sub-contractors,
- (iv) munitions of war, explosive materials, ionising radiation or contamination by radio-activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity, and
- (v) natural catastrophes such as earthquake, hurricane, typhoon or volcanic activity.

### 19.2 Notice of Force Majeure

If a Party is or will be prevented from performing any of its obligations under the Contract by Force Majeure, then it shall give notice to the other Party of the event or circumstances constituting the Force Majeure and shall specify the obligations, the performance of which is or will be prevented. The notice shall be given within 14 days after the Party became aware, or should have become aware, of the relevant event or circumstance constituting Force Majeure.

The Party shall, having given notice, be excused performance of such obligations for so long as such Force Majeure prevents it from performing them.

Notwithstanding any other provision of this Clause, Force Majeure shall not apply to obligations of either Party to make payments to the other Party under the Contract.

### 19.3 Duty to Minimise Delay

Each Party shall at all times use all reasonable endeavours to minimise any delay in the performance of the Contract as a result of Force Majeure.



A Party shall give notice to the other Party when it ceases to be affected by the Force Majeure.

## 19.4

## Consequences of Force Majeure

If the Contractor is prevented from performing any of his obligations under the Contract by Force Majeure of which notice has been given under Sub-Clause 19.2 *[Notice of Force Majeure]*, and suffers delay and/or incurs Cost by reason of such Force Majeure, the Contractor shall be entitled subject to Sub-Clause 20.1 *[Contractor's Claims]* to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 *[Extension of Time for Completion]*, and
- (b) if the event or circumstance is of the kind described in sub-paragraphs (i) to (iv) of Sub-Clause 19.1 *[Definition of Force Majeure]* and, in the case of sub-paragraphs (ii) to (iv), occurs in the Country, payment of any such Cost.

After receiving this notice, the Employer shall proceed in accordance with Sub-Clause 3.5 *[Determinations]* to agree or determine these matters.

## 19.5

## Force Majeure Affecting Subcontractor

If any Subcontractor is entitled under any contract or agreement relating to the Works to relief from force majeure on terms additional to or broader than those specified in this Clause, such additional or broader force majeure events or circumstances shall not excuse the Contractor's non-performance or entitle him to relief under this Clause.

## 19.6

## Optional Termination, Payment and Release

If the execution of substantially all the Works in progress is prevented for a continuous period of 84 days by reason of Force Majeure of which notice has been given under Sub-Clause 19.2 *[Notice of Force Majeure]*, or for multiple periods which total more than 140 days due to the same notified Force Majeure, then either Party may give to the other Party a notice of termination of the Contract. In this event, the termination shall take effect 7 days after the notice is given, and the Contractor shall proceed in accordance with Sub-Clause 16.3 *[Cessation of Work and Removal of Contractor's Equipment]*.

Upon such termination, the Employer shall pay to the Contractor:

- (a) the amounts payable for any work carried out for which a price is stated in the Contract;
- (b) the Cost of Plant and Materials ordered for the Works which have been delivered to the Contractor, or of which the Contractor is liable to accept delivery: this Plant and Materials shall become the property of (and be at the risk of) the Employer when paid for by the Employer, and the Contractor shall place the same at the Employer's disposal;
- (c) any other Cost or liability which in the circumstances was reasonably incurred by the Contractor in the expectation of completing the Works;
- (d) the Cost of removal of Temporary Works and Contractor's Equipment from the Site and the return of these items to the Contractor's works in his country (or to any other destination at no greater cost); and
- (e) the Cost of repatriation of the Contractor's staff and labour employed wholly in connection with the Works at the date of termination.

19.7  
Release from  
Performance under the  
Law

Notwithstanding any other provision of this Clause, if any event or circumstance outside the control of the Parties (including, but not limited to, Force Majeure) arises which makes it impossible or unlawful for either or both Parties to fulfil its or their contractual obligations or which, under the law governing the Contract, entitles the Parties to be released from further performance of the Contract, then upon notice by either Party to the other Party of such event or circumstance:

- (a) the Parties shall be discharged from further performance, without prejudice to the rights of either Party in respect of any previous breach of the Contract, and
- (b) the sum payable by the Employer to the Contractor shall be the same as would have been payable under Sub-Clause 19.6 [*Optional Termination, Payment and Release*] if the Contract had been terminated under Sub-Clause 19.6.

## 20 Claims, Disputes and Arbitration

20.1  
Contractor's Claims

If the Contractor considers himself to be entitled to any extension of the Time for Completion and/or any additional payment, under any Clause of these Conditions or otherwise in connection with the Contract, the Contractor shall give notice to the Employer, describing the event or circumstance giving rise to the claim. The notice shall be given as soon as practicable, and not later than 28 days after the Contractor became aware, or should have become aware, of the event or circumstance.

If the Contractor fails to give notice of a claim within such period of 28 days, the Time for Completion shall not be extended, the Contractor shall not be entitled to additional payment, and the Employer shall be discharged from all liability in connection with the claim. Otherwise, the following provisions of this Sub-Clause shall apply.

The Contractor shall also submit any other notices which are required by the Contract, and supporting particulars for the claim, all as relevant to such event or circumstance.

The Contractor shall keep such contemporary records as may be necessary to substantiate any claim, either on the Site or at another location acceptable to the Employer. Without admitting liability, the Employer may, after receiving any notice under this Sub-Clause, monitor the record-keeping and/or instruct the Contractor to keep further contemporary records. The Contractor shall permit the Employer to inspect all these records, and shall (if instructed) submit copies to the Employer.

Within 42 days after the Contractor became aware (or should have become aware) of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the Contractor and approved by the Employer, the Contractor shall send to the Employer a fully detailed claim which includes full supporting particulars of the basis of the claim and of the extension of time and/or additional payment claimed. If the event or circumstance giving rise to the claim has a continuing effect:

- (a) this fully detailed claim shall be considered as interim;
- (b) the Contractor shall send further interim claims at monthly intervals, giving the accumulated delay and/or amount claimed, and such further particulars as the Employer may reasonably require; and



- (c) the Contractor shall send a final claim within 28 days after the end of the effects resulting from the event or circumstance, or within such other period as may be proposed by the Contractor and approved by the Employer.

Within 42 days after receiving a claim or any further particulars supporting a previous claim, or within such other period as may be proposed by the Employer and approved by the Contractor, the Employer shall respond with approval, or with disapproval and detailed comments. He may also request any necessary further particulars, but shall nevertheless give his response on the principles of the claim within such time.

Each interim payment shall include such amounts for any claim as have been reasonably substantiated as due under the relevant provision of the Contract. Unless and until the particulars supplied are sufficient to substantiate the whole of the claim, the Contractor shall only be entitled to payment for such part of the claim as he has been able to substantiate.

The Employer shall proceed in accordance with Sub-Clause 3.5 [*Determinations*] to agree or determine (i) the extension (if any) of the Time for Completion (before or after its expiry) in accordance with Sub-Clause 8.4 [*Extension of Time for Completion*], and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract.

The requirements of this Sub-Clause are in addition to those of any other Sub-Clause which may apply to a claim. If the Contractor fails to comply with this or another Sub-Clause in relation to any claim, any extension of time and/or additional payment shall take account of the extent (if any) to which the failure has prevented or prejudiced proper investigation of the claim, unless the claim is excluded under the second paragraph of this Sub-Clause.

20.2  
Appointment of the  
Dispute Adjudication  
Board

Disputes shall be adjudicated by a DAB in accordance with Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*]. The Parties shall jointly appoint a DAB by the date 28 days after a Party gives notice to the other Party of its intention to refer a dispute to a DAB in accordance with Sub-Clause 20.4.

The DAB shall comprise, as stated in the Particular Conditions, either one or three suitably qualified persons ("the members"). If the number is not so stated and the Parties do not agree otherwise, the DAB shall comprise three persons.

If the DAB is to comprise three persons, each Party shall nominate one member for the approval of the other Party. The Parties shall consult both these members and shall agree upon the third member, who shall be appointed to act as chairman.

However, if a list of potential members is included in the Contract, the members shall be selected from those on the list, other than anyone who is unable or unwilling to accept appointment to the DAB.

The agreement between the Parties and either the sole member ("adjudicator") or each of the three members shall incorporate by reference the General Conditions of Dispute Adjudication Agreement contained in the Appendix to these General Conditions, with such amendments as are agreed between them.



The terms of the remuneration of either the sole member or each of the three members, shall be mutually agreed upon by the Parties when agreeing the terms of appointment. Each Party shall be responsible for paying one-half of this remuneration.

If at any time the Parties so agree, they may appoint a suitably qualified person or persons to replace any one or more members of the DAB. Unless the Parties agree otherwise, the appointment will come into effect if a member declines to act or is unable to act as a result of death, disability, resignation or termination of appointment. The replacement shall be appointed in the same manner as the replaced person was required to have been nominated or agreed upon, as described in this Sub-Clause.

The appointment of any member may be terminated by mutual agreement of both Parties, but not by the Employer or the Contractor acting alone. Unless otherwise agreed by both Parties, the appointment of the DAB (including each member) shall expire when the DAB has given its decision on the dispute referred to it under Sub-Clause 20.4, *[Obtaining Dispute Adjudication Board Decision]*, unless other disputes have been referred to the DAB by that time under Sub-Clause 20.4, in which event the relevant date shall be when the DAB has also given decisions on those disputes.

20.3  
Failure to Agree Dispute  
Adjudication Board

If any of the following conditions apply, namely:

- (a) the Parties fail to agree upon the appointment of the sole member of the DAB by the date stated in the first paragraph of Sub-Clause 20.2,
- (b) either Party fails to nominate a member (for approval by the other Party) of a DAB of three persons by such date,
- (c) the Parties fail to agree upon the appointment of the third member (to act as chairman) of the DAB by such date, or
- (d) the Parties fail to agree upon the appointment of a replacement person within 42 days after the date on which the sole member or one of the three members declines to act or is unable to act as a result of death, disability, resignation or termination of appointment,

then the appointing entity or official named in the Particular Conditions shall, upon the request of either or both of the Parties and after due consultation with both Parties, appoint this member of the DAB. This appointment shall be final and conclusive. Each Party shall be responsible for paying one-half of the remuneration of the appointing entity or official.

20.4  
Obtaining Dispute  
Adjudication Board's  
Decision

If a dispute (of any kind whatsoever) arises between the Parties in connection with, or arising out of, the Contract or the execution of the Works, including any dispute as to any certificate, determination, instruction, opinion or valuation of the Employer, then after a DAB has been appointed pursuant to Sub-Clauses 20.2 *[Appointment of the Dispute Adjudication Board]* and 20.3 *[Failure to Agree Dispute Adjudication Board]*, either Party may refer the dispute in writing to the DAB for its decision, with a copy to the other Party. Such reference shall state that it is given under this Sub-Clause.

For a DAB of three persons, the DAB shall be deemed to have received such reference on the date when it is received by the chairman of the DAB.

Both Parties shall promptly make available to the DAB all information, access to the Site, and appropriate facilities, as the DAB may require for the purposes of making a decision on such dispute. The DAB shall be deemed to be not acting as arbitrator(s).

Within 84 days after receiving such reference, or the advance payment referred to in Clause 6 of the Appendix - General Conditions of Dispute Adjudication Agreement, whichever date is later, or within such other period as may be proposed by the DAB and approved by both Parties, the DAB shall give its decision, which shall be reasoned and shall state that it is given under this Sub-Clause. However, if neither of the Parties has paid in full the invoices submitted by each member pursuant to Clause 6 of the Appendix, the DAB shall not be obliged to give its decision until such invoices have been paid in full. The decision shall be binding on both Parties, who shall promptly give effect to it unless and until it shall be revised in an amicable settlement or an arbitral award as described below. Unless the Contract has already been abandoned, repudiated or terminated, the Contractor shall continue to proceed with the Works in accordance with the Contract.

If either Party is dissatisfied with the DAB's decision, then either Party may, within 28 days after receiving the decision, give notice to the other Party of its dissatisfaction. If the DAB fails to give its decision within the period of 84 days (or as otherwise approved) after receiving such reference or such payment, then either Party may, within 28 days after this period has expired, give notice to the other Party of its dissatisfaction.

In either event, this notice of dissatisfaction shall state that it is given under this Sub-Clause, and shall set out the matter in dispute and the reason(s) for dissatisfaction. Except as stated in Sub-Clause 20.7 *[Failure to Comply with Dispute Adjudication Board's Decision]* and Sub-Clause 20.8 *[Expiry of Dispute Adjudication Board's Appointment]*, neither Party shall be entitled to commence arbitration of a dispute unless a notice of dissatisfaction has been given in accordance with this Sub-Clause.

If the DAB has given its decision as to a matter in dispute to both Parties, and no notice of dissatisfaction has been given by either Party within 28 days after it received the DAB's decision, then the decision shall become final and binding upon both Parties.

#### 20.5 Amicable Settlement

Where notice of dissatisfaction has been given under Sub-Clause 20.4 above, both Parties shall attempt to settle the dispute amicably before the commencement of arbitration. However, unless both Parties agree otherwise, arbitration may be commenced on or after the fifty-sixth day after the day on which notice of dissatisfaction was given, even if no attempt at amicable settlement has been made.

#### 20.6 Arbitration

Unless settled amicably, any dispute in respect of which the DAB's decision (if any) has not become final and binding shall be finally settled by international arbitration. Unless otherwise agreed by both Parties:

- (a) the dispute shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce,
- (b) the dispute shall be settled by three arbitrators appointed in accordance with these Rules, and
- (c) the arbitration shall be conducted in the language for communications defined in Sub-Clause 1.4 *[Law and Language]*.

The arbitrator(s) shall have full power to open up, review and revise any certificate, determination, instruction, opinion or valuation of (or on behalf of) the Employer, and any decision of the DAB, relevant to the dispute.



Neither Party shall be limited in the proceedings before the arbitrator(s) to the evidence or arguments previously put before the DAB to obtain its decision, or to the reasons for dissatisfaction given in its notice of dissatisfaction. Any decision of the DAB shall be admissible in evidence in the arbitration.

Arbitration may be commenced prior to or after completion of the Works. The obligations of the Parties and the DAB shall not be altered by reason of any arbitration being conducted during the progress of the Works.

20.7  
Failure to Comply with  
Dispute Adjudication  
Board's Decision

In the event that:

- (a) neither Party has given notice of dissatisfaction within the period stated in Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*],
- (b) the DAB's related decision (if any) has become final and binding, and
- (c) a Party fails to comply with this decision,

then the other Party may, without prejudice to any other rights it may have, refer the failure itself to arbitration under Sub-Clause 20.6 [*Arbitration*]. Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*] and Sub-Clause 20.5 [*Amicable Settlement*] shall not apply to this reference.

20.8  
Expiry of Dispute  
Adjudication Board's  
Appointment

If a dispute arises between the Parties in connection with, or arising out of, the Contract or the execution of the Works and there is no DAB in place, whether by reason of the expiry of the DAB's appointment or otherwise:

- (a) Sub-Clause 20.4 [*Obtaining Dispute Adjudication Board's Decision*] and Sub-Clause 20.5 [*Amicable Settlement*] shall not apply, and
- (b) the dispute may be referred directly to arbitration under Sub-Clause 20.6 [*Arbitration*].



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# **5,000 Apartment Units Affordable Housing Project Phase I**

## **Engineering, Procurement and Construction Contract**



**Between**

**Trinidad and Tobago Housing Development Corporation**

**and**

**China Gezhouba Group International Engineering Co., Ltd**

**May 2019**

**VOLUME II**

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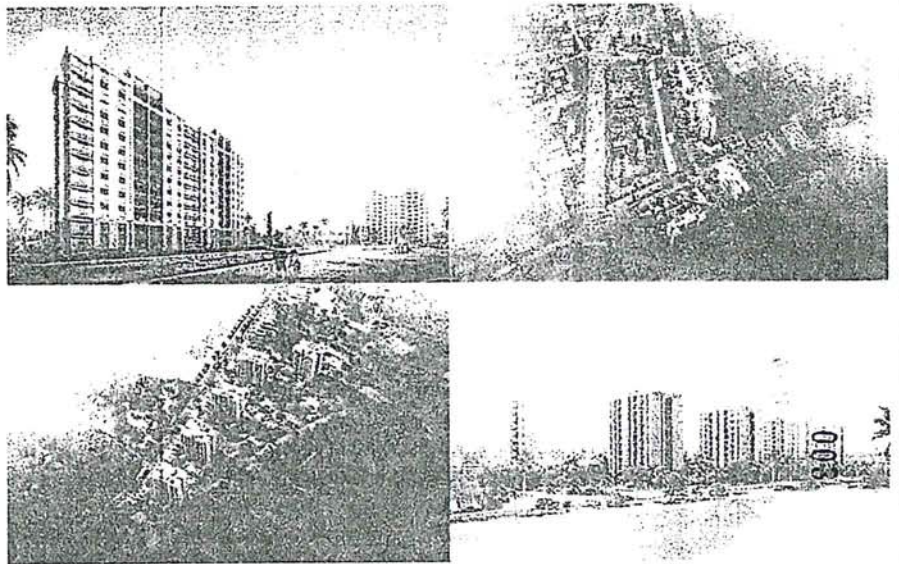


**Part1.1 Design Proposal**

**5000 Apartment Units Affordable Housing Project Phase 1 In TRINIDAD&TOBAGO**

特立尼达和多巴哥5000套经适房项目第一期

2019.03



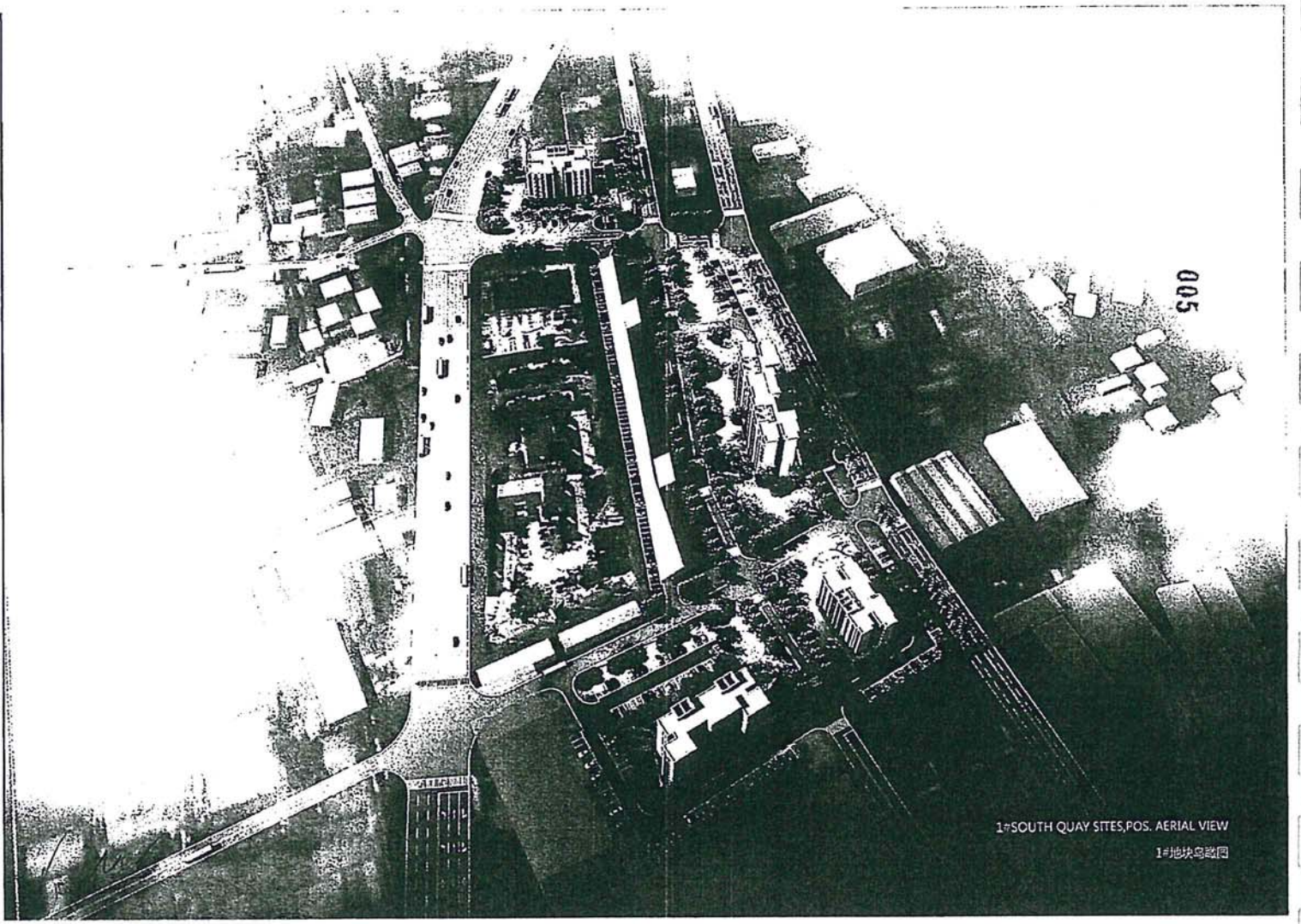
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Catalogue

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1# SOUTH QUAY SITES, POS. AERIAL VIEW

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1# SOUTH QUAY SITES, POS. PERSPECTIVE

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4#LADY HAILES AVENUE,SAN FERNANDO. AERIAL VIEW  
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第一部分 设计说明

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### 1.2 General Description

This proposal is submitted for 2 sites, which are SOUTH QUAY SITES, POS and LADY HAILES AVENUE.

The total area is 4.55 ha is to be developed as Phase-1 works. The total floor area of the phase-1 development is 51,291 m<sup>2</sup> with 439 dwelling units, 58% of which are 3-bedroom type with a maximum inner area of 90 m<sup>2</sup>, 42% of which are 2-bedroom type with a maximum inner area of 74 m<sup>2</sup> type. 667 car parking lots have been arranged in this proposal.

### 1.3 Master Plan Clarification

#### 1#-SOUTH QUAY SITES, POS

South Quay sites is located in the downtown with five flat blocks. In our design, we name these five blocks with A,B,C,D,E. The five blocks are separated by an expressway, Eastern Main Rd and they have higher value of development. All the apartment buildings nearby have 6-11 floors, so we submit all the buildings in our project with 8-12 storeys.

Block E, with its long boundary adjacent to Eastern Main Rd, is planned as a central commercial and amenity area. Block A at the northwest corner has a warehouse in its west and a parking building in its north, both of which have big volumes and cause unpleasant urban views. So we rearrange the layouts of the buildings to avoid negative views from them. After rearrangement, the new orientation of the two buildings is facing an integrated garden in their east and south.

Block E has a long and narrow shape and isn't suitable for an apartment building, so it is used as a visitor parking area and commercial center serving the whole site. The ground floor is used for a

driveway and an open garage, while the second floor is used as amenities. A pedestrian bridge over the expressway is suggested to connect Block C and Block E for the convenience of local people. At least 1 car parking space is provided for every unit in Block A,B,C,D and the total quantity of the parking spaces in this development is calculated by 1.5 cars per unit.

The central park alongside the expressway runs through Block A,B,C,E, and is designed as some open areas for community and recreation, while some activity rooms are designed on the ground floor of some apartment buildings as well.

#### 4#-LADY HAILES AVENUE

This site has the ocean view in its north while has some ocean view barriers in its west. So we rearranged the orientation of the buildings from facing west to facing north directly. All the buildings have 12 layers and are lined up from south to north. The site has 4 entrances and a road loop is designed along the site boundary to optimize the vehicular circulation and parking efficiency. The landscape is integrated with buildings and forms green gardens, especially for children and elders.

### 1.4 Apartment Layouts

Two types of apartment layouts are provided in this proposal, of which, one has 3 bedrooms, 2 washrooms, 1 kitchen and 1 balcony, with the gross floor area 81 m<sup>2</sup> and 90m<sup>2</sup>; the other one has 2 bedrooms, 1 washroom, 1 kitchen and 1 balcony, with the gross floor area 74m<sup>2</sup> and 63m<sup>2</sup>. The buildings 8-12 layers, which have 4 dwelling units each floor, have one lift. The buildings 12 layers, which have 6 dwelling units each floor, have two lifts.

5% of the total dwelling units are differently-abled dwelling units, which are located on the ground floor. According to the difference between the land conditions, we provided two types of building layouts, one is the slab-type and the other one is the tower-type. Every building has desirable sunlight, ventilation and landscape views.

### 1.5 Car Parking

Based on the local soil conditions, both sites have their car parking lots on the ground. Car parking space, Visitor car parking space and Disabled parking spaces are provided based on the approval. In order to get more landscape area and activity spaces, all the car parking spaces are arranged along the internal driveways.

### 1.6 Amenity

For large site like 1#, we arrange some areas for central amenity. For small site like 4#, we put the activity rooms and service rooms on the ground floor of the buildings.

### 1.7 Differently-abled Designs



Differently-abled facility has been designed as follows:

All the internal driveways, sidewalks and central parks are accessible for disables and are marked with internal disabled access symbols. All the entrances of the buildings have barrier-free ways and signs. 5% of the total dwelling units are differently-abled dwelling units, which are located on the ground floor. Enough car parking spaces are designed for those who may be disabled.

## Chapter2 STRUCTURAL DESIGN DESCRIPTION

### 2.1 Introduction

#### 2.1.1 Project Briefing

These projects are designed for residential buildings and related supporting buildings (such as parking lots, amenities, etc). These projects are located in the port of Spain, the capital of Trinidad and Tobago, and the second largest city of San Fernando. There are 2 sites with some 8-12 storeys buildings on them and no basement.

#### 2.1.2 Natural condition

The project sites sit on the seismic zone of the Caribbean plate, so the impact of the earthquake should be considered. Trinidad and Tobago is near the equator, with hot climate and small temperature range.

Both Port of Spain and San Fernando are on the island of Trinidad, located in the north and south of the island respectively. The northern mountainous area of the island is mainly developed from the igneous rock geological structure. The southern plain is developed from the sedimentary tectonic plate.

The groundwater level is 1-3m, which varies due to the season and the location.

### 2.2 Codes and Specifications

Subject	Code reference
General	National Building Code Trinidad & Tobago Trinidad and Tobago Bureau of Standards - Guide to the Design and Construction of Small Buildings- TTS 559-2006 Caribbean Uniform Building Code (CUBIC) Structural Design Guidelines for T&T as issued by Designs Engineering Branch of the Ministry of Works and Infrastructures (MOWI) International Building Code (IBC) (2006)
Loading	BAPE WIND CODE (1981) Wind Speed Maps for the Caribbean for Application with the Wind Load

	Provisions of ASCE 7 shall be used to determine reference velocities as defined in ASCE 7. American Society of Civil Engineers - ASCE 7-95 Minimum Design Loads for Buildings and other structures - Live Loads and Wind Loads
Reinforced concrete	BS 8110:Part 2, Structural Use of Concrete CI - American Concrete Institute publications to be utilized in the design of concrete and masonry structural elements in accordance with the requirements of IBC 2006 and ASCE 7: 18-05: Building Code Requirements for Structural Concrete and Commentary 30-05: Building Code Requirements for Masonry Structures and Commentary
Steelwork	AISC - American Institute of Steel Construction publications to be utilized in the design of structural steel structural elements in accordance with the requirements of IBC 2006 and ASCE 7: 03-05: Code of Standard Practice for Steel Buildings and Bridges 325-05: Steel Construction Manual - Thirteenth Edition 327-05: Seismic Design Manual

Related Chinese building standards and codes

### 2.3 Main building Material

The main materials of the building structure include concrete, steel, masonry and so on. The strength of the concrete can be selected as shown in the following table. The selection of steel bars and masonry needs to be determined by the local market conditions, which requires further investigation.

Element	$f_c'$ (MPa)
Foundations - piles, pile caps, ground beams, Basement slab	35
Reinforced concrete columns	35-45
Reinforced concrete walls	35-45
Plinths, machine bases and builder's works	25
Floor Slab	35
[Note] Concrete strengths noted in the above table are 28 day strengths.	

### 2.4 Structural Design Parameters

Risk Category : II ;

Design Working Life: 50 Years ,



## 2.5 Main load Parameters

### 2.5.1 Floor Live Loads

Only the main Floor live loads are listed.

No	Special Occupancy	Uniformly Distributed load ( kPa )
1	Dwell	2.0
2	Toilet	2.0
3	Corridor serving Private Rooms	2.0
4	Corridor serving Public Room	4.0
4	Stair and Terrace	4.0
5	Open Step Roof	4.0
6	Kitchen of Family	2.0
7	Laundries of Family	3.0
8	Machine Room	5.0
9	Retail or Supermarket	5.0
10	Car park & Vehicle Ramp	2

### 2.5.2 Wind Load

Basic Wind Speeds for Occupancy Category II building (nominal design 3-second gust wind speeds) is taken as 74m/s temporarily.

### 2.5.3 Seismic Action

The seismic action is determined in accordance with the relevant provisions of the US standard ASCE 7. The parameters of seismic ground motions and parameters of earthquake response spectrum are determined based on the website information.

The Peak acceleration of ground motion -PGA are listed as below :

No.	Site	City	Peak Acceleration of Ground Motion PGA ( g )			
			Return Period			
			95yrs	475yrs	975yrs	2475yrs
1	SOUTH QUAY	POS	0.166	0.320	0.417	0.590
4	LADY HAILES AVENUE	SAN FERNANDO	0.150	0.305	0.360	0.503

Accelerations of Earthquake response spectrum ( T=0.2s and T=1.0s) are listed as below :

No.	Site	City	T=0.2s	Accelerations of Earthquake Response Spectrum -SA ( g )			
			T=1.0 s	Return Period			
				95yrs	475yrs	975yrs	2475yrs
1	SOUTH QUAY	POS		0.437	0.837	1.076	1.551
				0.096	0.206	0.281	0.412
4	LADY HAILES AVENUE	SAN FERNANDO		0.378	0.718	0.960	1.370
				0.087	0.186	0.253	0.370
				0.092	0.196	0.267	0.391

## 2.6 Structure Design

### 2.6.1 Upper Structure Design

According to the investigation, the structure should adopt reinforced concrete system. And different structure types are adopted based on numbers of the building floors, as follows:

Levels	Height	Structural type	Site name
12/8	36.0m/24.0m	Reinforced concrete shear wall structure	1# ,SOUTH QUAY SITES ,POS
2	8.0m	Reinforced concrete frame structure	
12	36.0m	Reinforced concrete shear wall structure	4# , LADY HAILES AVENUE , SAN FERNANDO

### 2.6.2 Foundation Design

According to the investigation, No basement is set under the buildings normally. The foundation can take different forms depending on the levels of the buildings. The 12-storey high-rise buildings of site 1# can adopt concrete precast piles (no more than 20m long), and if the precast piles cannot be hammered in due to the shallow depth of the rock formation, augering piles can be used. The 8-storey buildings and 2-storey amenities building of site 1# and the 12-storey buildings of site 4# can adopt the raft foundation or a strip foundation.

But since there is no relevant geological survey data, the foundation design can't be described more in detail.

### Chapter3 WATER SUPPLY AND DRAINAGE DESIGN DESCRIPTION

#### 3.1 Design Guidelines

- > 2018 International Building code
- > 2006 International Plumbing code
- > NFPA13 Standard for the Installation of Sprinkler Systems
- > NFPA14 Standard for the Installation of Standpipe and Hose Systems
- > NFPA10 Standard of Portable Fire Extinguishers
- > NFPA15 Standard water spray fixed systems for fire protection
- > Related Chinese building standards and codes

#### 3.2 Project overview and design scope

The water supply and drainage design include water supply system, drainage system, stand pipe and hose system and sprinkler system.

#### 3.3 Water Supply System

##### 3.3.1 Water Source

Municipal tap water is the mainly water source, and the water quality meets the drinking water standards. The municipal water supply pressure is designed to be greater than 0.3Mpa.

##### 3.3.2 Water consumption

Site name	Maximum daily water consumption ( m <sup>3</sup> /d)
Site 1#: South Quay Site, POS	250
Site 4#: Lady Hailes Avenue, San Fernando	280

##### 3.3.3 Water Supply System

###### 1) SITE 1#: SOUTH QUAY SITE, POS

This site is divided into five blocks: A, B, C, D, and E. There are some 12-storey buildings on the blocks A and C, some 8-storey buildings on the blocks B and D, while there is a garage on the block E. The water supply from the 1st floor to 6th of the buildings are directly supplied by the outdoor municipal water system. A variable frequency pump and water tank is set for water supply above 6th floor. Each block has its own water pump house. Every family has its own water metering. The pressure of each house is controlled at 0.1~0.4Mpa.

###### 2) SITE 4#: LADY HAILES AVENUE, SAN FERNANDO

The site has five 12-storey buildings. The water supply from the 1st floor to 6th of the buildings are directly supplied by the outdoor municipal water system. A variable frequency pump and water tank is set for water supply above 6th floor. Every family has its own water metering.

#### 3.4 Drainage system

##### 3.4.1 Drainage System

Rain and sewage are designed from separate system.

##### 3.4.2 Sewage system

Indoor sewage, waste water is discharged in a shared pipe. All buildings adopt a double drainage standpipe system with a breather pipe. All the sewage in a site is collected to the outdoor sewage pipe system and discharged to the municipal sewage system finally.

##### Sewage discharge

Site name	Maximum daily displacement ( m <sup>3</sup> /d)
Site 1#: South Quay Site, POS	180
Site 4#: Lady Hailes Avenue, San Fernando	200

##### 3.4.3 Storm drainage

The rainwater drainage is calculated according to the local storm intensity. The roof rainwater emission load refers to the amount of 5 years period precipitation. An external rainwater drainage system is adopted. The roof rainwater is collected by the rainwater riser and discharged directly to the outdoor scattered water slope. The outdoor ground rainwater emission load refers to the amount of 3 years period precipitation, which is collected by the road gully and discharged directly to the municipal rainwater pipe.

#### 3.5 Fire system

##### 3.5.1 Standpipe system

A class I standpipe system is installed in each building according to the codes. The fire hydrant and the automatic sprinkler are considered as an integrated fire protection system. The class I standpipe hose connection is located in the staircase.

##### 3.5.2 Sprinkler system

All the residential buildings in each site are equipped with a sprinkler system, which is designed at the light fire risk level. The garage in the block E of site 1 is designed at the general fire risk level. All the sites have their own fire tanks and fire pumps, and all the blocks in the site 1 have their own fire tanks and fire pumps. Two diesel fire pumps are designed, one for use and the other one for standby.

##### 3.5.3 Portable Fire Extinguishers

Some portable fire extinguishers are equipped in the corridors of every floor with middle fire risk level of class A.

## Chapter4 ELECTRICAL DESIGN DESCRIPTION

### 4.1 Design basis and scope

#### 4.1.1 Design codes

- > 2006 International Building Code (IBC)
- > Trinidad and Tobago Bureau of Standards (TTBS)
- > 2008 National Electric Code (NEC)
- > NFPA 70 National Electric Code
- > NFPA 780 Standard for the Installation of Lightning Protection Systems
- > UL 96A Lightning Protection
- > IEEE Std 1100 Powering and Grounding Electronic Equipment
- > Related Chinese building standards and codes
- > Other relevant local laws and regulations

4.1.2 The design scope includes the power, lighting, lightning protection and grounding protection system of this residence and public supporting building project.

#### 4.2 Load level and power supply

1) Project overview: the project consists of 2 sites with a total construction area of 51,291m<sup>2</sup>, and 439 residents in total. This project consists of high-rise residences, garages and public supporting buildings, among which high-rise buildings are level II fireproof buildings and garages are level III garage.

2) Level II loads: fire load, emergency lighting, public area lighting, security systems, passenger elevator, sewage pump, life pump and important room electricity of level II high-rise buildings, public supporting buildings and the garage. The rest are considered as level III loads.

3) This project is powered by a power supply of 12kV (determined by the power supply department). The power supply is drawn from the nearest substation of the power supply department, and it enters the community substation by buried cable.

#### 4.3 Loads calculation

1) The main load data: the total installed capacity is 3,960kW. The residential power is estimated at 80W/m<sup>2</sup>, the public supporting buildings is 60W/m<sup>2</sup>, and the garage is 40W/m<sup>2</sup>. The estimated load data of each block is shown as follow:

The total installed capacity of the site 1 (the floor area is 25,639 m<sup>2</sup>) is 1,908kW. The residential loads are 1,668kW; 144kW for public supporting buildings. The garage is 96kW. The total transformer capacity of the whole site is estimated to be 2,000kVA.

The total installed capacity of site 4 (the floor area is 25,652 m<sup>2</sup>) is 2,052kW, all of which are residential loads. The total transformer capacity of the whole site is estimated to be 2,000kVA.

2) The specific installation location of the distribution substations in each block will be determined by the developer and the power supply department through consultation. The power supply will be drawn from the municipal power grid.

A distribution substation and a transformer substation are proposed to be built in Site 1#. Two 500kVA transformers are installed in each substation, respectively.

A distribution substation and a transformer substation are proposed to be built in Site 4#. Two 500kVA transformers are installed in each substation, respectively.

#### 4.4 Power distribution

1) A distribution room is set on the bottom floor of each high-rise unit to supply the residences and public supporting buildings. A power electric well and a weak current well are set on each floor. Each residence has a unique electricity meter. Electricity meter box is installed in the power electric well of the corresponding floor. The electricity meter box of the multi-storey unit is centrally located in the public area of the bottom floor.

2) The distribution trunk of residential buildings adopts pre-branching cable or plug-in bus-bar, which is laid and installed in the power electric well.

3) A user distribution box with a main circuit breaker is installed in each resident. The main circuit breaker has the function of short circuit, overload, overvoltage and undervoltage protection, and should disconnect the phase line and neutral wire at the same time. The user distribution box is supplied by ~115V power source which is individually led from the electricity meter box.

4) The resident's lighting, general socket, air conditioning socket, kitchen socket and toilet socket circuits are equipped with protective switch, among which the socket is equipped with leakage protection device and the socket is safe type.

#### 4.5 Measurement

A distribution room is set on the bottom floor of residential buildings, garage, amenities, respectively. The electricity meters for residence are centrally installed in the floor electricity box. Other public loads such as elevator and public lighting are measured by the electricity meter in the distribution room.

#### 4.6 Lighting

1) Lighting standard and lighting power density (LPD) value of major sites:

Lobby (ground) 75lx 3.0w/m<sup>2</sup>

Elevator hall (ground) 75lx 3.0w/m<sup>2</sup>

Public walkway (ground) 50lx 2.0w/m<sup>2</sup>

Garage (ground) 30lx 1.8w/m<sup>2</sup>



Manage office and community activity rooms (0.75m) 300lx 8W/m<sup>2</sup>  
Fire safety monitoring room, communication and network equipment machine room (0.75m)  
500lx 13.5W/m<sup>2</sup>

Water pump room (ground) 100lx 3.5W/m<sup>2</sup>

Distribution room (ground) 200lx 6W/m<sup>2</sup>

2) Special distribution box is set for residential stairs and other public lighting, and energy-saving self-extinguishing mode is adopted for stair lamps; LED or energy-saving lamp and fluorescent lamp are adopted for lighting lamps in public parts, which are combined with local decentralized control and set up with emergency evacuation indicator.

3) Use moisture-proof lamps in water pump rooms and other damp places.

4) Emergency lighting is provided in important machine rooms such as substation, fire pump room and fire control room.

5) Emergency evacuation indicator lights shall be set for evacuation walkways and evacuation stairs.

6) Emergency lighting is provided for staircases, elevator rooms and front rooms of residential buildings.

7) Outdoor landscape lighting and building facade lighting are independently controlled and controlled by light sensors.

#### 4.7 Cabling system

1) Outdoor high-voltage and low-voltage distribution lines are directly laid underground.

2) Indoor low-voltage distribution trunk cable is laid in the cable tray.

3) The branch line and the terminal branch line shall be laid through the conduit which is concealed embedded.

#### 4.8 Safe measures

1) The grounding type is TN-S system.

2) Leakage protection switch is set in all socket circuits.

3) Low-smoke halogen free cable and wire are adopted to avoid the release of toxic smoke containing chlorine in fire, to ensure the safe evacuation of personnel and reduce environmental pollution.

#### 4.9 Lightning and grounding protection

1) The lightning protection level of this project is III. Lightning protection belt is laid on the roof to prevent direct lightning strike. The lightning protection level of electronic information system is D.

2) In this project, the grounding system adopts TN-S system, with common ground electrode

mode. The ground resistance is less than 1Ω. All metal pipes in and out of the building are connected with total equipotential, and the toilet is equipped with local terminal boxes of equipotential connection.

3) All electrical shaft or in the distribution room set equipotential connection terminal box and equipotential connection line, under normal circumstances all the buildings are not charged metal pipe (including the metal sheath of the cable, electrical equipment shell, water pipes, etc.) shall be connected to the equipotential connection line and reliable, at the bottom of the metal pipe and the top connected with lightning protection grounding device.

4) Steel frame and concrete reinforcement bars of each floor of the high-rise residential buildings should be connected to each other to form a pressure equalizing ring.

5) Lightning protection and over-voltage protection devices are installed at the power supply of property management center, communication machine room, elevator machine room, distribution room, etc.; The distribution box (cabinet), outdoor distribution box (cabinet) and weak current equipment distribution box (cabinet) of the equipment room are equipped with corresponding surge protector according to the category of insulation shock resistance overvoltage.

#### 4.10 Electrical energy-saving design

1) Reasonably control the lighting standard of major sites and the corresponding lighting power density value.

2) Lighting lamp mainly uses LED lights, straight tube shape trichromatic fluorescent lamps and energy-saving lamps. Fluorescent electronic ballasts (power factor should be 0.9 or above), not only improve the power factor, and also reduces the energy consumption. The arrangement and control of the lamps should make full use of natural lighting.

3) Energy-saving self-extinguishing method is adopted for stair lamps in residential buildings. Lighting control in public areas combines centralization control with local decentralized control.

4) High efficiency and low energy consumption products are selected for transformers.

5) The evacuation indicator light adopts energy-saving lamp or low-power LED light source.

6) Set internal assessment meter and meter according to functional area, floor and large-capacity equipment, and timely monitor the power consumption capacity, which is conducive to optimization and formulation of effective energy-saving measures.

7) The high power water pump is set with frequency conversion soft start-up, and the life pump is set with frequency conversion control system to save energy.

#### 4.11 Open questions

1) We need to further clarify the design boundary between our company and the local power supply department.

2) The power supply plans and the installation and requirements of distribution substations in different areas shall be determined by the power supply department. Developers need to consult local power authorities as soon as possible.

## Chapter5 WEAK ELECTRICITY DESIGN DESCRIPTION

### 5.1 Design basis

- > 2006 International Building Code (IBC)
- > Trinidad and Tobago Bureau of Standards (TTBS)
- > Trinidad and Tobago Electrical Wiring Code (TTS-171)
- > 2008 National Electric Code (NEC)
- > NFPA 70 National Electric Code
- > NFPA 72 National Fire Alarm Code
- > Related Chinese building standards and codes

### 5.2 Design scope

- > Telephone and data communication system
- > Cable TV system
- > Security system
  - Visitor intercom system
  - Home alarm system
  - Access control and one-card system
  - TV monitoring system
  - Perimeter alarm system
  - Electronic patrol system
- > Public/fire broadcasting system
- > Entrance and exit vehicle management system
- > Wiring, lightning protection and grounding
- > Automatic fire alarm and fire linkage control system
- > The intelligent system of the community is designed by the intelligent system integrator. This design is only response for the embedded pipeline.

### 5.3 Design content

#### 5.3.1 Telephone and data communication system

- 1) In this project, a weak current machine room will be set up in each block, and the

telecommunication optical cable will be introduced into the weak current machine room of each block by the urban telephone network, and broadband access will be provided. The telephone cables of each unit building are drawn from the weak current machine room of the local block.

2) One telecommunication room is set up in each unit on the ground floor of each high-rise residential building, and telephone distribution box frame and broadband network exchange equipment are installed in the telecommunication room. Each equipment of the multi-storey house is installed in the common part of the ground floor hanging wall or wall.

3) The incoming telephone of each residence is considered as 2 pairs.

4) The communication line of the community adopts optical fiber to the home (FTTH).

5) A family information distribution box is set in each residence.

#### 5.3.2 Cable TV system

1) Cable TV system is connected with local cable TV networks. Each block is equipped with cable TV machine room (in the weak current machine room).

2) The cable TV of each residence is considered as two terminals.

3) Distribution branch network is adopted.

#### 5.3.3 Security system

This system is able to general manage the visitors intercom system, home alarm system, entrance guard and "all-in-one-card" system, TV monitoring system, perimeter alarm system, electronic patrolling system, and analyze all kinds of alarm signal, and coordinate various security subsystem. Each block is set up with a security fire control center (for security and fire control), respectively.

1) For the convenience of visitors and security of the community, visual intercom system is set up in each unit building.

2) An intercom host and a power device are set at the gate of the first floor. Infrared intrusion detector and hidden door magnetic switch are installed in the first, second and top floor of the residential building. There is an alarm telephone in the elevator car, and the guest intercom management machine is located in the security machine room.

3) Visual intercom system is digital type. Besides call and intercom function, it has the functions for owner extension, such as anti-theft alarm. The resident can call the emergency alarm to the management center at any time.

4) Perimeter protection system is set up in the community, which adopts electronic fence and is arranged around the fence. If there is any illegal invasion of the system, it will alarm the property management center, and the monitoring camera can be linked.

#### 5.3.4 Public/fire broadcasting system

Broadcasting system is set in the garage and the central garden of the community. It can be broadcast either separately or regionally. Music can be played in the background, or broadcast through the microphone. Emergency fire emergency broadcast can be cut in forcibly when the fire

alarm is necessary.

#### 5.3.5 Vehicle entrance and exit management system

The main entrance and exit lanes of the community and the garage are equipped with electric fence machines, vehicle induction coils, induction card readers, ticketing machines and vehicle identification equipment. The data signal is directed to the security room.

#### 5.3.6 Cabling system, lightning protection and grounding system

##### 1) Cabling system

The cables of weak current system are laid in the metal raceway or through the steel pipe. In multi-storey building, the weak current cables are led from the weak current box of 1st floor to user's terminal through metal pipe. In high-rise building, the weak current cables are led to weak current well through the metal raceway and then to the user's terminal through metal pipe.

##### 2) Grounding

The weak current equipments are commonly grounded. The ground resistance of weak current equipment is less than  $1\Omega$ .

##### 3) Lightning protection

The protection measures against lightning induction and invasion of lightning waves are shown as follows:

A) The metal support and shell of the roof weak current equipment shall be equally potential grounded.

B) Equipotential connection shall be made to the metal shell of all weak current equipment in the indoor machine room.

C) Lightning protection grounding, electrical grounding, shielding grounding and operating grounding should form an equipotential network to prevent the conductor potential difference of common-mode interference and the low voltage sensitive equipment damage or cause misoperation caused by the potential difference.

D) All communication cables shall use cables with double metal protective layers, and the outer metal protective layer shall be grounded near the top and outside the entrance of the machine room. When the cable is a single-layer shielding layer, it should be introduced through metal pipe, the two ends of metal pipe should be grounded nearby, and the joint of metal pipe should be crossed.

E) The input and output terminals of weak current equipment shall be equipped with corresponding surge protector according to the type of insulation shock resistance overvoltage.

#### 5.3.7 Fire alarm and linkage control system

1) Set up a fire control center and security control center on each floor.

2) Centralized automatic fire alarm system is adopted. The fire control room is equipped by a central controller host, fire linkage controller, CRT monitors, printers, emergency broadcast device, fire intercom telephone device, fire manual control panel, and power source device, etc.

3) Smoke detectors are installed in the public areas of the residence and community activity room. Also smoke detectors are installed inside the residence. In the place such as stairs, main entrances and exits, manual alarm button, sound and light alarm are installed. Fire broadcasts are installed in the public areas such as public supporting room.

4) When the fire happens, signals will be gotten from the detector, button, water flow indicator, wet alarm valve, and then be transmitted to the fire control center. The center sends a corresponding linkage directive to start the fire pump and exhaust fan, shut down the non-fire power supply through the control module, open all the sound and light alarms and fire emergency broadcasts in the building for evacuation.

#### 5.3.8 Overall circuit design

1) All telephone, data, TV, intercom, monitoring and broadcasting lines are led from the weak current machine room, security center and other central machine rooms.

2) The overall telephone communication cables and Internet network of each block are designed or constructed by local telecom company or other related companies. The overall cable TV system of each block is designed or constructed by the cable TV network center or other related operators. Other ELV systems are also designed or constructed by related operators. All outdoor pipelines of weak current, such as telephone, data, TV and security, are arranged on the same route or laid in the pipe separately.

#### 5.4 Open questions

1) We need to further clarify the design boundary between our company and local telephone, network, TV and other departments.

2) Is the telephone, network, television combined into one system (three-in-one network system) in local area?

## Chapter6 HVAC DESIGN DESCRIPTION

### 6.1 Design Basis

- > NFPA 92A Standard for Smoke-Control Systems Utilizing Barriers and Pressure Differences
- > Smoke Control System: IBC 909
- > ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc
- > ASHRAE 55 Thermal Environmental Conditions for Human Occupancy
- > ASHRAE 90.1 Energy Standard for Buildings except Low-Rise Residential Buildings
- > ASHRAE 62.1 Ventilation for Acceptable Indoor Air Quality
- > Related Chinese building standards and codes



> Architectural professional information

6.2 Project Description and Design Scope

6.2.1 Project Description

This proposal is submitted for 2 sites, which are SOUTH QUAY SITES, POS and LADY HAILES AVENUE. The total area of the two sites is 4.55 ha. The total floor area of the phase one development is 51,291 m<sup>2</sup> with 439 dwelling units.

6.2.2 Design Scope

Air-Conditioning, Ventilation and Smoke Control System for Apartment

Air-Conditioning, Ventilation and Smoke Control System for supporting building

6.3 Design Condition

1 ) Local Calculate Criteria

Average temperature: 22~34°C

2 ) Indoor criteria for air-condition

Space	Temperature (Summer)°C	Fresh Air Quantity (m <sup>3</sup> /h.p)	Comments
Living Room	22	/	
Bedroom	22	/	
Dining Area	22	/	
Rooms in supporting building	22	30	

Indoor criteria for ventilation

Space	Air Change Rate	Comments
Bath (Apartment)	5~10	Mechanical Exhaust and Natural Supply
Laundry Room (Apartment)	5~10	Mechanical Exhaust and Natural Supply
Kitchen (Apartment)	10~15	Mechanical Exhaust and Natural Supply
WC (Supporting Building)	≥15	Mechanical Exhaust and Natural Supply
Substation	20 or calculated based on thermal loads	Mechanical Ventilation and Air-Condition
Water Pump Room	4~6	Mechanical Exhaust and Natural Supply
Car Park (Apartment)	4	Natural Ventilation

6.4 Cooling and Heating Resource

Split-type air-condition system is provided for apartment and Split-type and VRF system are provided for supporting buildings.

6.5 Air-Condition System

Apartment

Split-type air-condition system is used for apartment. Indoor unit type like wall mounted or floor mounted type are decided based on the room area. Outdoor units are placed on platform. Condensate water are drained by risers.

Supporting Building

Split-type and VRF system is considered for supporting buildings. Cassette or duct type indoor units are used. Outdoor units are placed on platform or roof.

Heat recovery type or split type pre-cooling air unit are used for fresh air supply.

6.6 Ventilation System

Baths in apartment uses ceiling mounted fans for mechanical ventilation. Air discharge is on the side wall. Domestic exhaust hood are placed in kitchen and air is discharge to the roof by shaft.

Mechanical room, substation and water pump room are provided with mechanical ventilation.

WC in supporting building are provided with mechanical ventilation. Exhaust air is discharge to the roof.

6.7 Smoke Control System

Staircases uses openable external window for natural smoke exhaust.

Rooms in support building uses openable external window to meet the natural smoke exhaust requirement.

Fire dampers(70 °C) are placed on ventilation duct penetrating fire rating element. Fire dampers(150°C) are placed on kitchen ventilation duct.

6.8 Energy Conservation

Building envelope such as heat transfer coefficient, window-wall ratio or, etc. meet the requirement for energy saving.

Natural ventilation are used for apartment.

High efficient air-condition units are used.

Refrigerant for VRF are environment friendly type.

6.9 Environmental Conservation

Low noise type VRF, split air condition and fans are selected.

Grease in kitchen are exhausted to the roof after treatment by domestic exhaust hood.

Refrigerant for VRF are environment friendly type.

## Contents

### SECTION TWO

### Technical Index

第二部分 技术经济指标

3/5 15/

The Preliminary Technical Proposal Design Scheme 方案经济技术指标

Site No. 基地编号	Location 位置	Area 用地面积 (ha)	Floor Area 总建筑面积 (m <sup>2</sup> )	Inner Area 套内面积 (m <sup>2</sup> )	Building coverage 建筑密度 (%)	Floor area ratio 容积率	Stories per building 建筑层数	Building units 建筑单元	Number of elevators 电梯数量	Dwelling units 总户数	Parking spaces 停车位	Remarks 附注	Phase 分期
1	SOUTH QUAY, SITES POS	2.31	25,639	15,310	19.4%	1.11	12/8	4	8	204	314	Including 5 sites	
4	LADY HAILLES AVENUE, SAN FERNANDO	2.24	25,652	19,310	10.0%	1.15	12	5	5	235	353		
Total/In Average 总计/平均		4.55	51,291	34,620				9	13	439	667		

Remarks: ①5% of the total dwelling units are 'differently-abled' dwelling units, which are located at the ground floor. Based on the approval, enough car parking spaces are for those who may be disabled. ② the ground floor of the buildings has a lobby area with provision for security monitoring of the entrance and elevator and stairways.  
注：①无障碍户型位于建筑底层，其数量占总户数的5%。无障碍车位数量按批文要求设计。②底层减少1户作为门厅。



## Contents

1#	SOUTH QUAY STREET, POS.
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	INDICATORS 指标
	PERSPECTIVE 效果图
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4#	LADY HALES AVENUE SAN FERNANDO
	BASE ANALYSIS 基地分析
	GENERAL LAYOUT 总体规划
	INDICATORS 指标
	PERSPECTIVE 效果图
	TRAFFIC ANALYSIS 交通流分析
	LANDSCAPE ANALYSIS 景观分析
	APARTMENT LAYOUT 户型图

## SECTION THREE

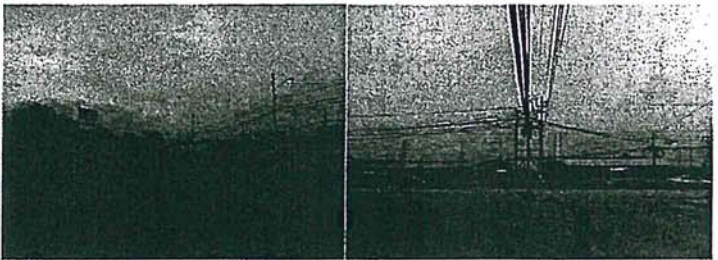
### Proposals

第三部分 分地块方案展示

Wf Ksf



REGIONAL SUMMARY 基地区位



PRESENT SITUATION 基地现状

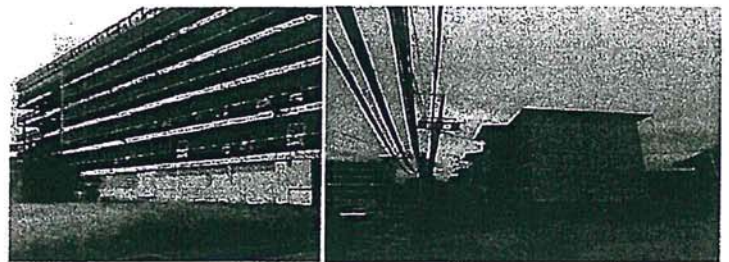
TRAFFIC CONDITIONS 基地周边道路

South quay sites is located in the downtown with five flat blocks. In our design, we name these five blocks with A,B,C,D,E. The five blocks are separated by an expressway, Eastern Main Rd and they have higher value of development. All the apartment buildings nearby have 6-11 floors, so we submit all the buildings in our project with 15 layers.

Block E, with its long boundary adjacent to Eastern Main Rd, is planned as a central commercial and amenity area. Block A at the northwest corner has a warehouse in its west and a parking building in its north, both of which have big volumes and cause unpleasing urban views. So we rearrange the layouts of the buildings from parallel to L shape to avoid negative views from them. After rearrangement, the new orientation of the two buildings is facing an integrated garden in their east and south.

1#用地位于市中心，场地平整，共有5个地块，设计中依次编号为A-E，快速路将用地南北分开，地块整体价值较高，周边住宅为6-11层，建议本案住宅层数做到15层。

E地块长边紧邻道路，拟规划为集中的配套与商业。西北角A地块的西面为仓库，北面为停车楼，两栋楼体量很大，对场地外部视线有一定影响。因此A地块调整了原来的行列式布局，改为L型内向围合，有效遮挡了不利条件，标准层设计为板楼，主要朝向面向东、南面，地块内部的绿化也更完整。



PARKING STRUCTURE IN THE NORTH OF UNIT A  
A地块北面停车楼

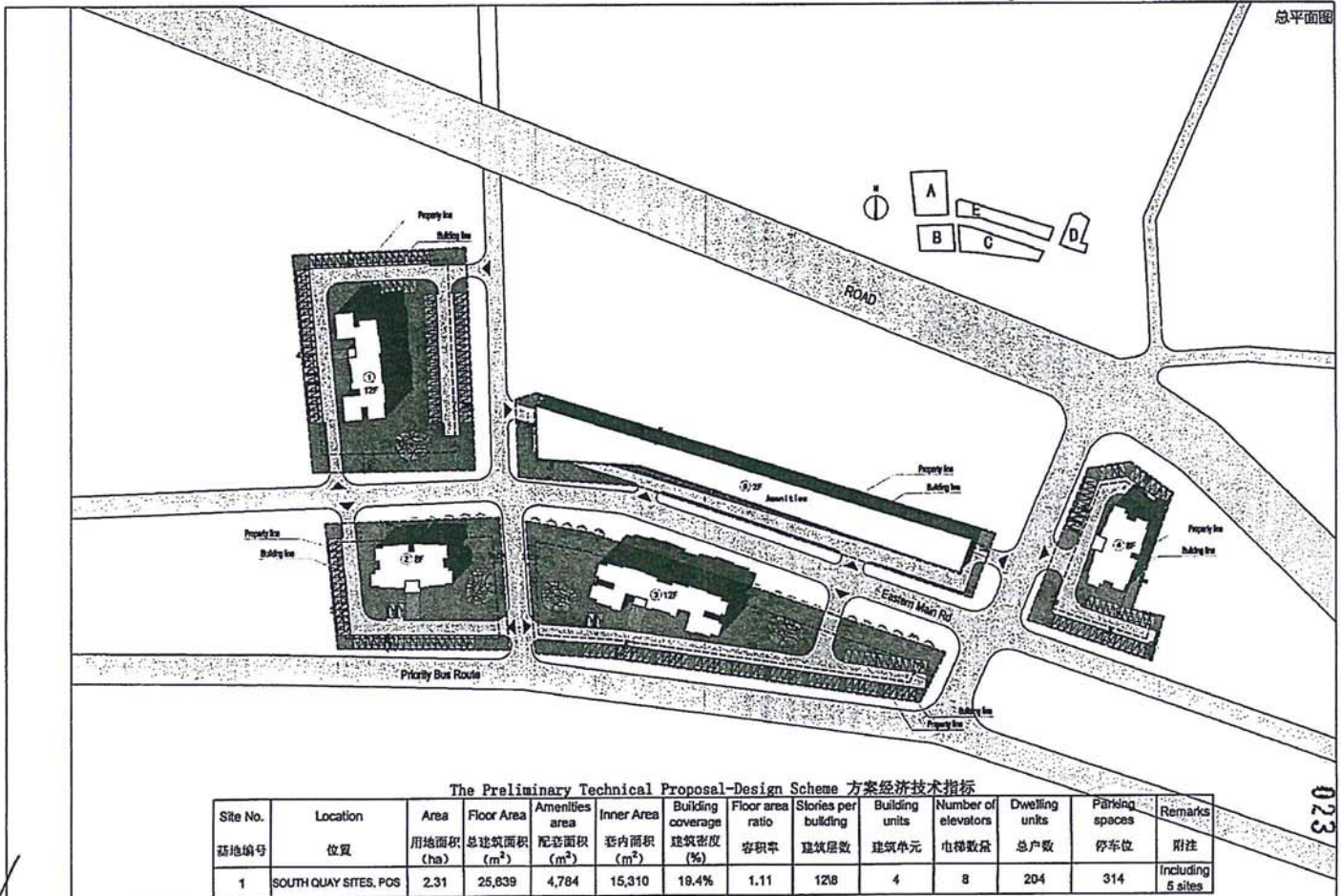
4-FLOOR APARTMENT  
四层住宅楼



1# SOUTH QUAY SITES, POS. 地块

GENERAL LAYOUT

总平面图



The Preliminary Technical Proposal-Design Scheme 方案经济技术指标

Site No.	Location	Area	Floor Area	Amenities area	Inner Area	Building coverage	Floor area ratio	Stories per building	Building units	Number of elevators	Dwelling units	Parking spaces	Remarks
基地编号	位置	用地面积 (ha)	总建筑面积 (m <sup>2</sup> )	配套面积 (m <sup>2</sup> )	套内面积 (m <sup>2</sup> )	建筑密度 (%)	容积率	建筑层数	建筑单元	电梯数量	总户数	停车位	附注
1	SOUTH QUAY SITES, POS	2.31	25,839	4,784	15,310	19.4%	1.11	12/8	4	8	204	314	Including 5 sites

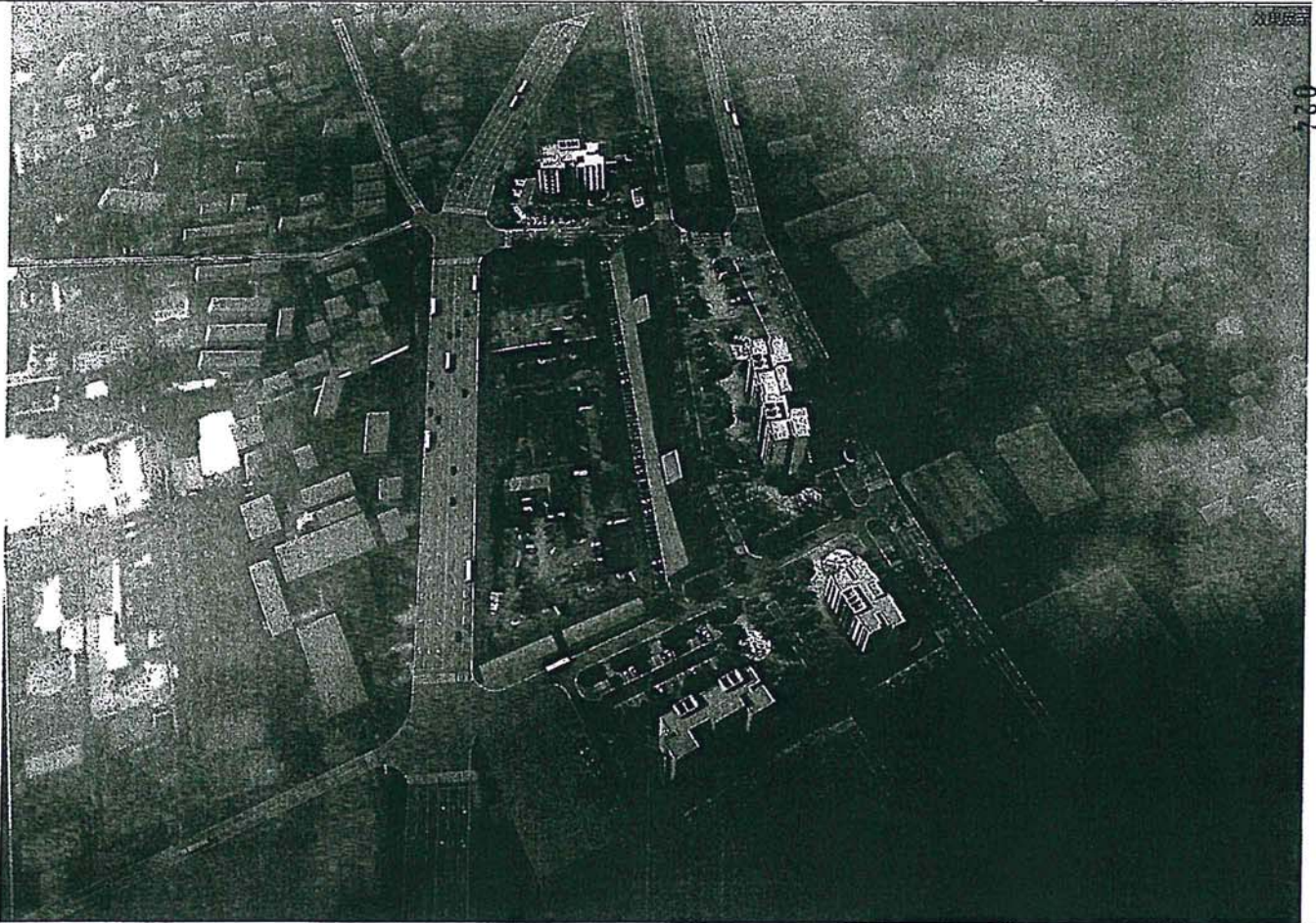
The Concept Design of 5000 Apartments Units A Riverside Housing Project Phase 1 in TIANJIN DATONGZU  
特立尼达和多巴哥5000套公寓项目第一期概念方案设计



1#SOUTH QUAY SITES, POS. 地块 PERSPECTIVE

效果图

024

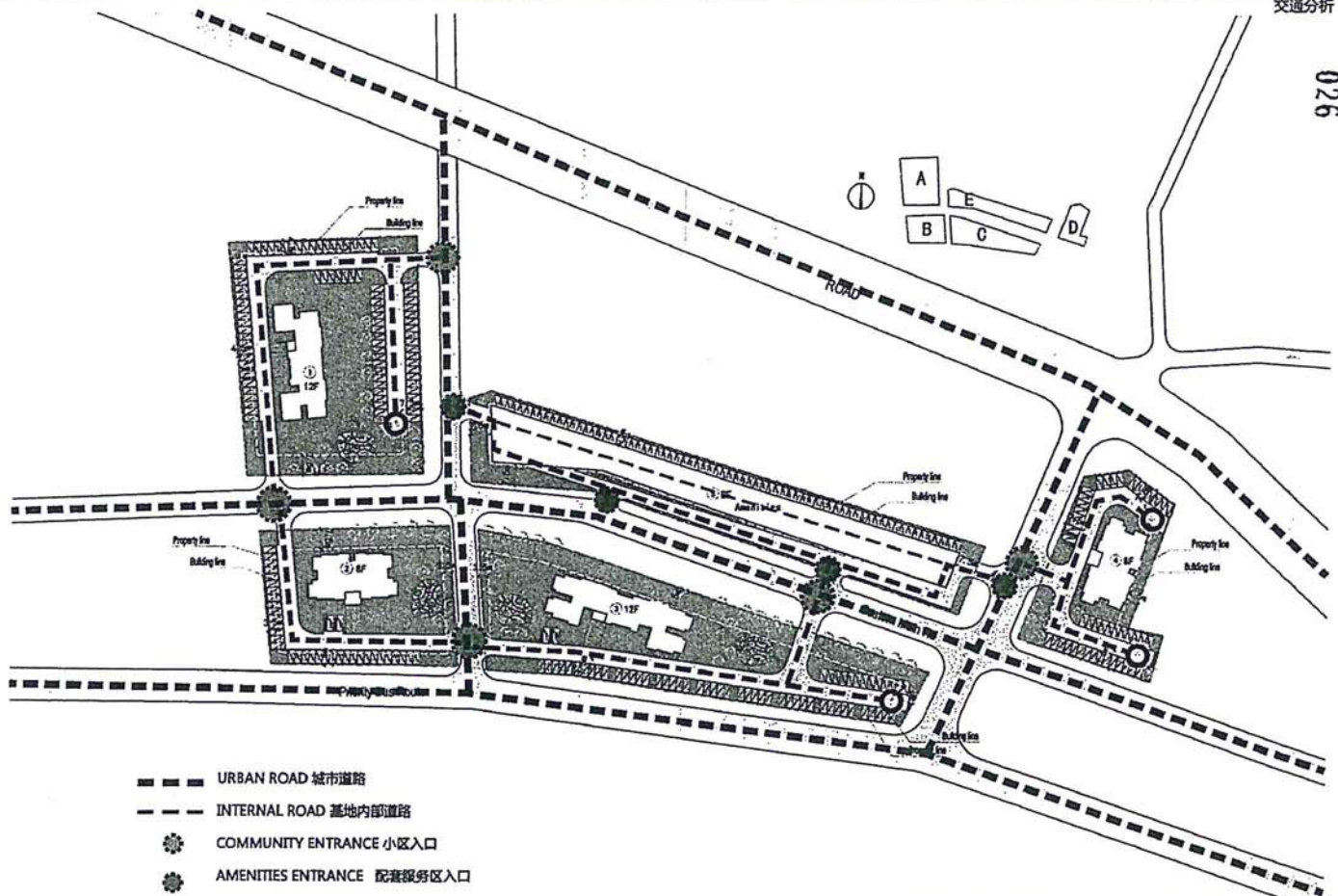


The Concept Design of 5000 Apartment Units Affordable Housing Project Phase 1 (SOUTH QUAY SITES)  
1# 2024 年 5 月 20 日 5000 套公寓项目一期 - 南码头地块

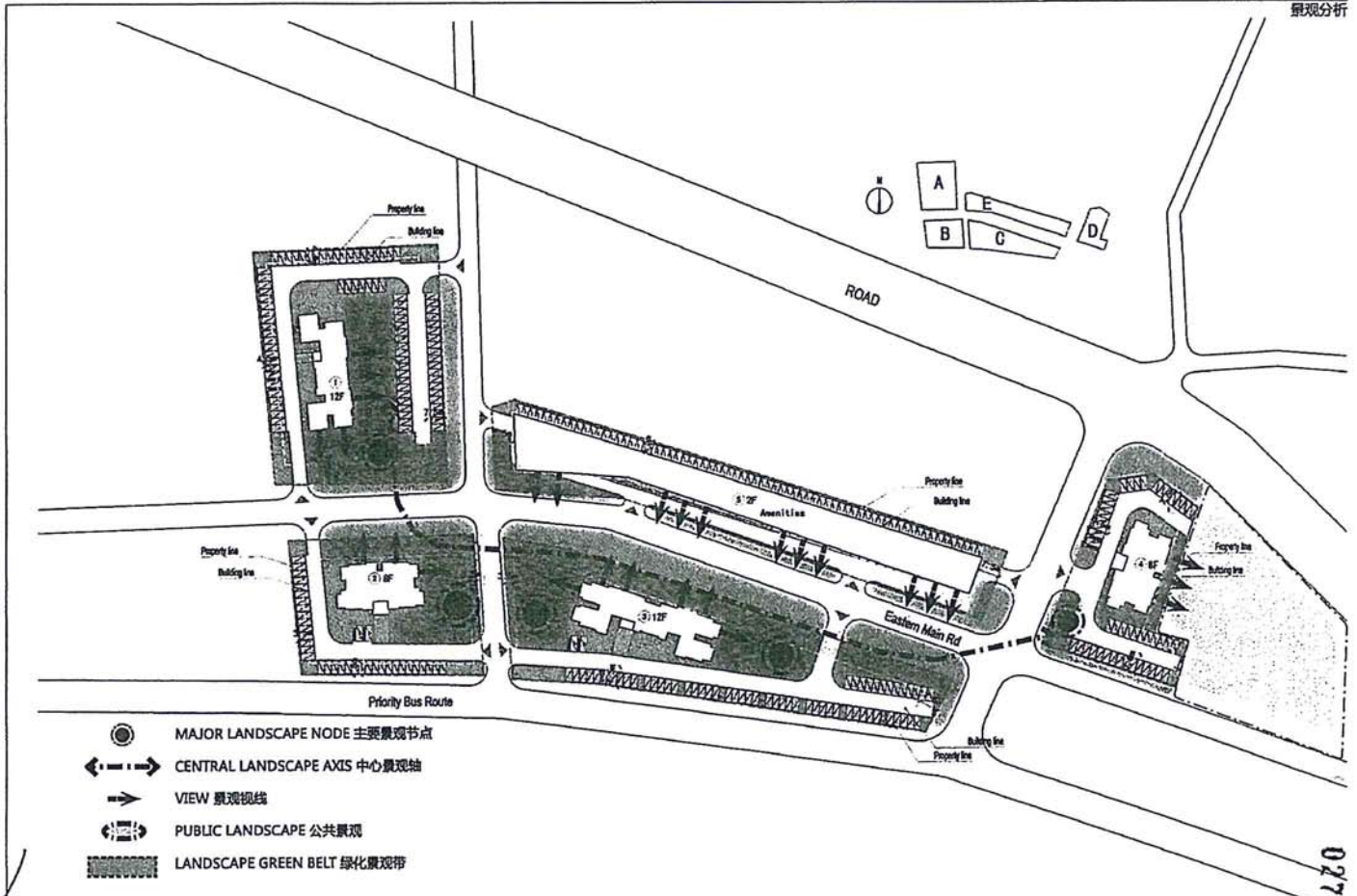


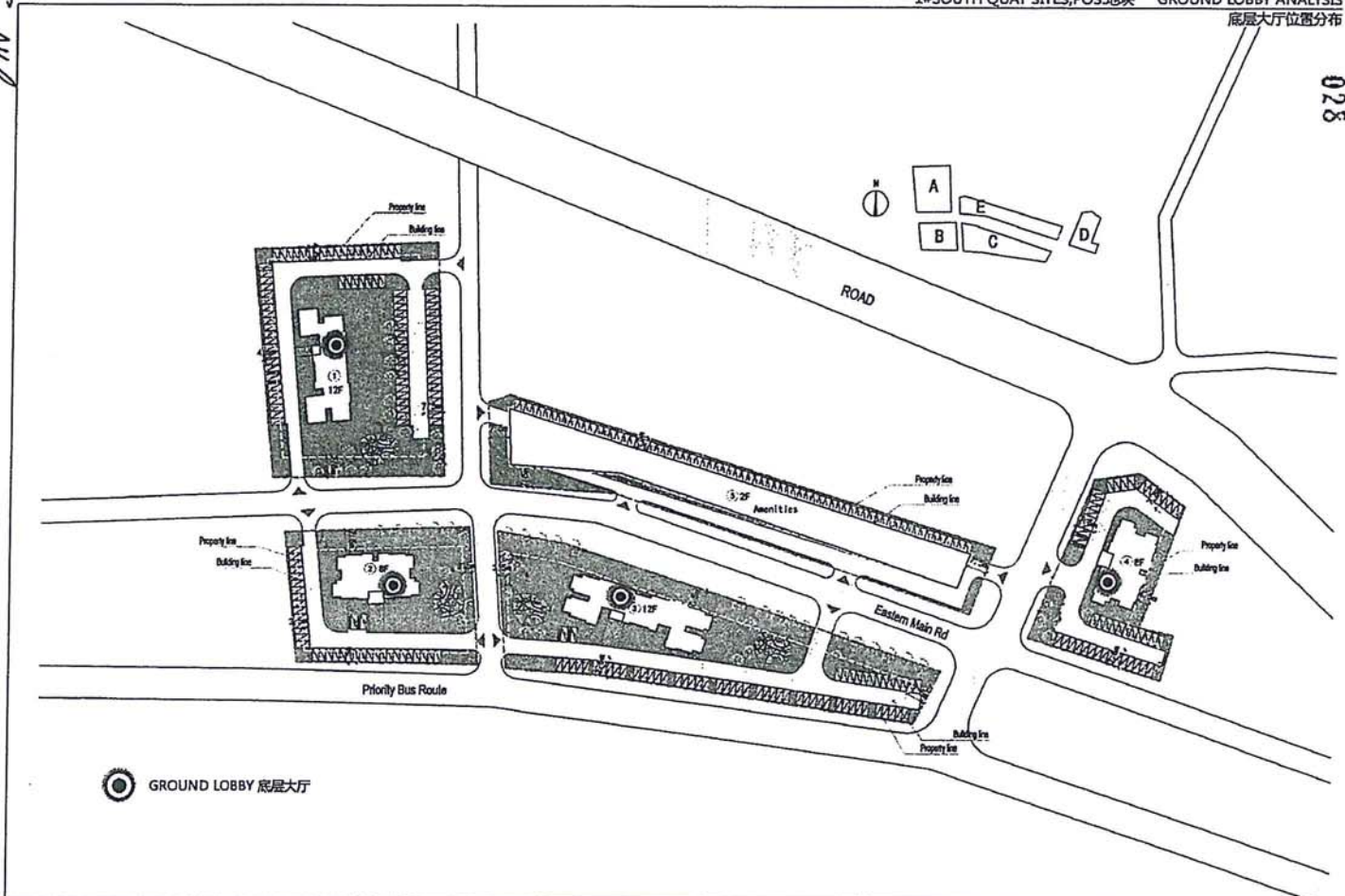


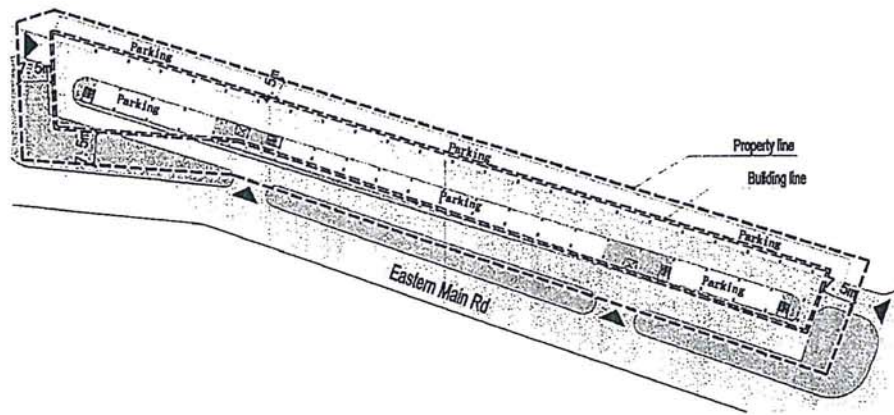
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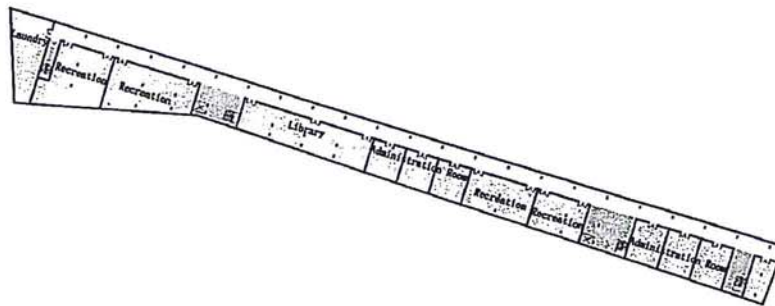






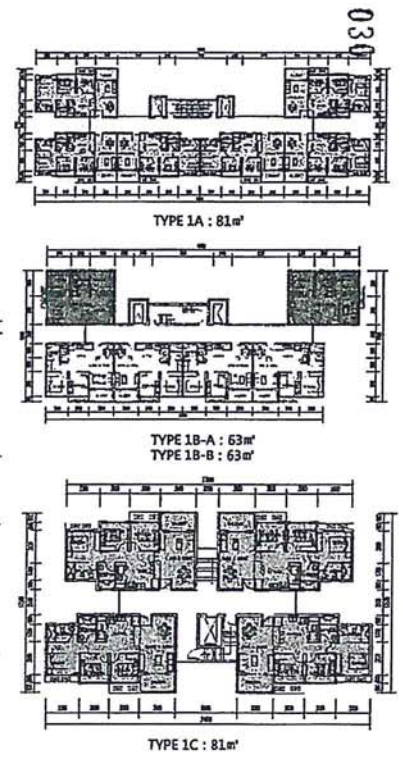
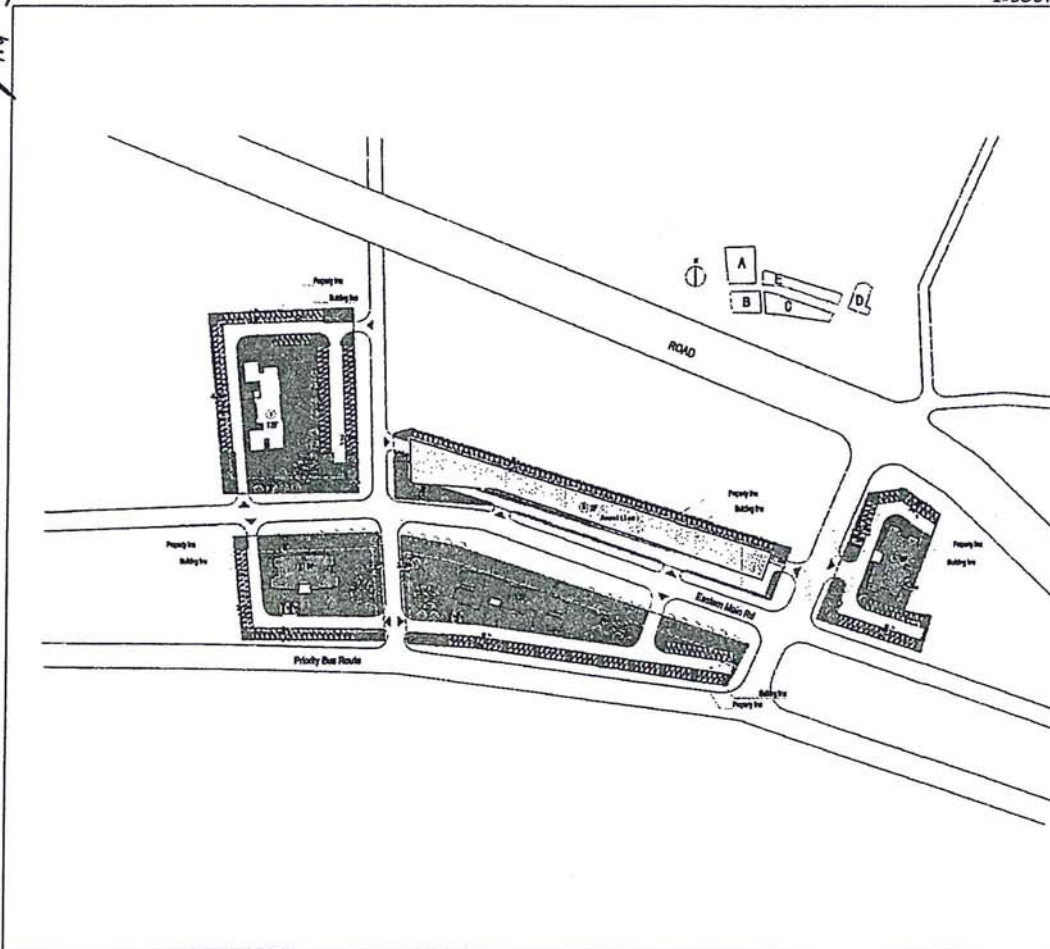


1ST FLOOR PLAN OF AMENITIES 配套建筑一层平面图



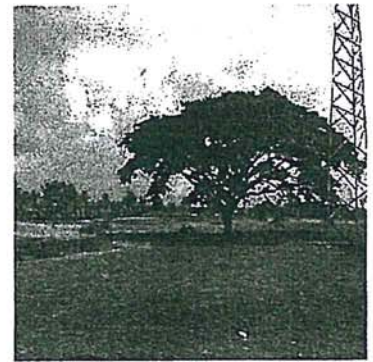
2ND FLOOR PLAN OF AMENITIES 配套建筑二层平面图







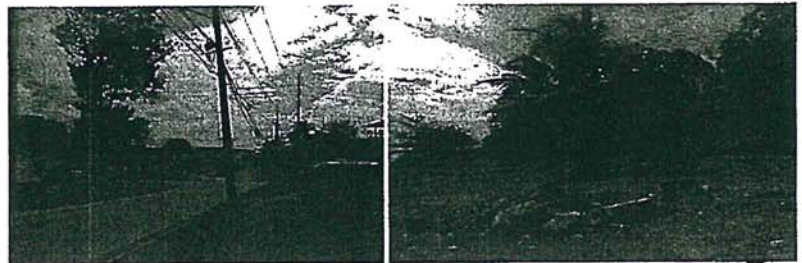
REGIONAL SUMMARY 基地区位



PRESENT SITUATION 基地现状

This site has the ocean view in its north while has some ocean view barriers in its west. So we rearranged the orientation of the buildings from facing west to facing north directly. All the seven buildings have 6 layers and are lined up from south to north. The site has three entrances and a road loop is designed along the plot boundary to optimize the vehicular circulation and parking efficiency. The landscape is integrated with buildings and forms two green gardens, especially for children and elders.

用地北面大海，西面与海岸之间有一定阻隔，方案将楼栋朝向做了调整，西向调整为北向，由南而北布置，尽可能面朝海景，住宅均为六层。地块共设置三个出入口，道路沿基地外侧形成环路，最大化利用了道路的停车、通行功能。景观沿建筑周边布置，并形成了两个绿化庭院，为老人和小孩提供活动休息场所。



PRESENT SITUATION 基地现状

PRESENT SITUATION 基地现状







4#LADY HAILES AVENUE,SAN FERNANDO.地块 PERSPECTIVE



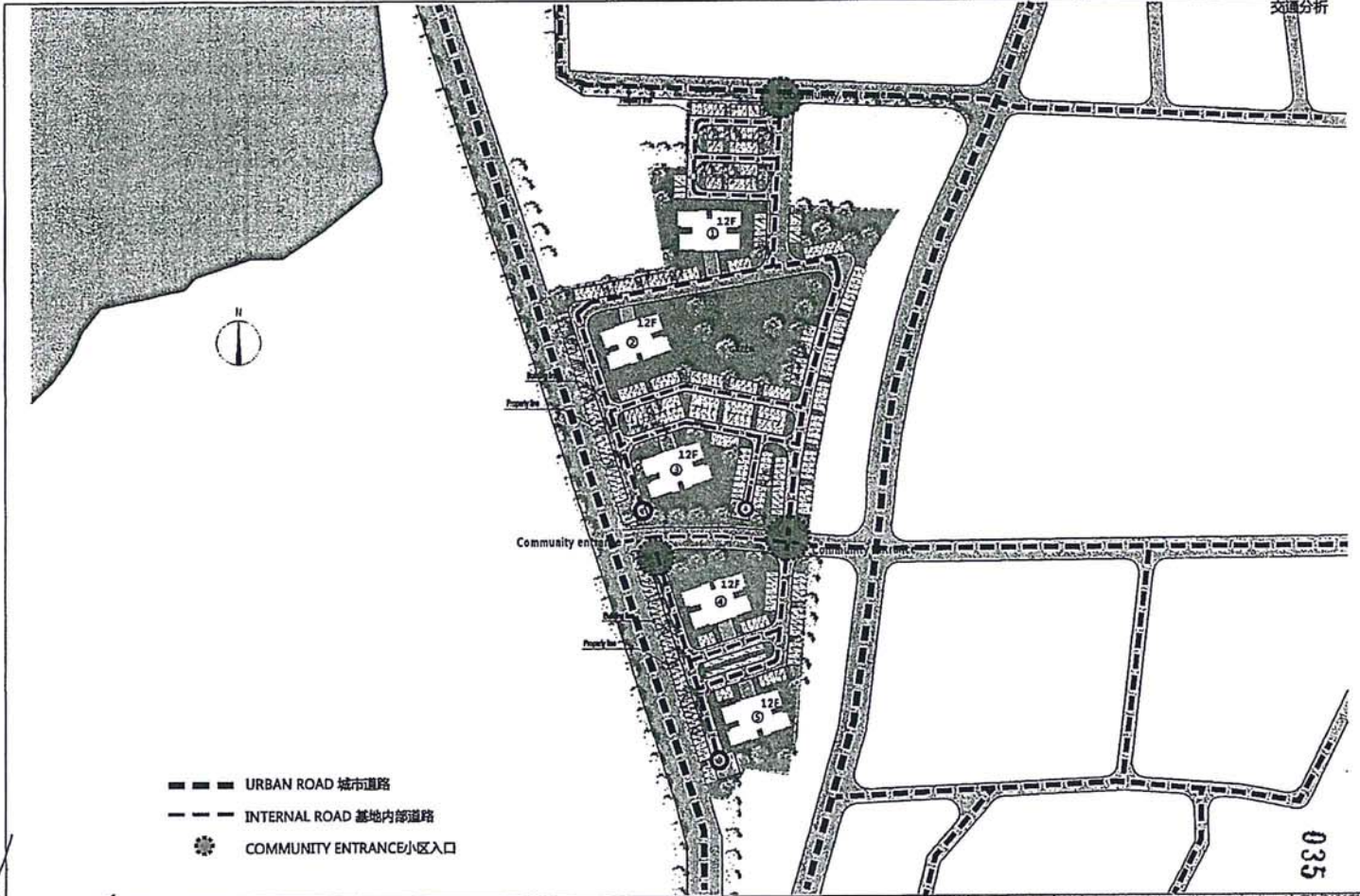
© The Concept Design of 5000 Apartment Units Affordable Housing Project Phase I in TRINIDAD, COLOMBIA  
BY THE ARCHITECTS OF 5000 APARTMENT UNITS AFFORDABLE HOUSING PROJECT



4#LADY HAILES AVENUE,SAN FERNANDO.地块 PERSPECTIVE

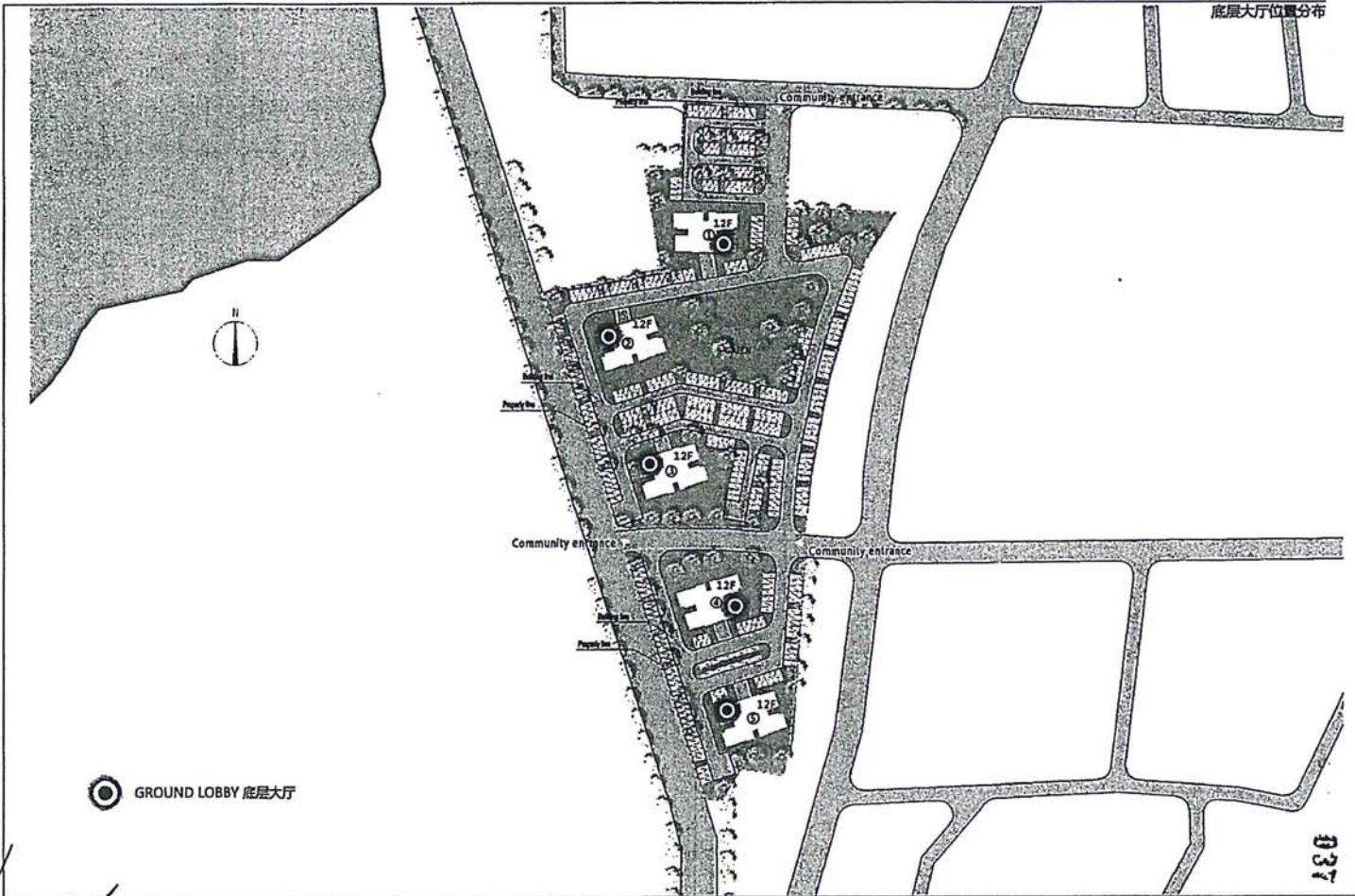


The Concept Design of 5000 Apartment Units Affordable Housing Project Phase 1 in THE HAGUE, CACAO  
特立尼达和多巴哥5000单位经济适用房项目一期概念方案设计



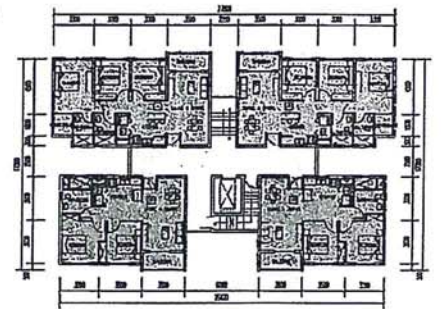
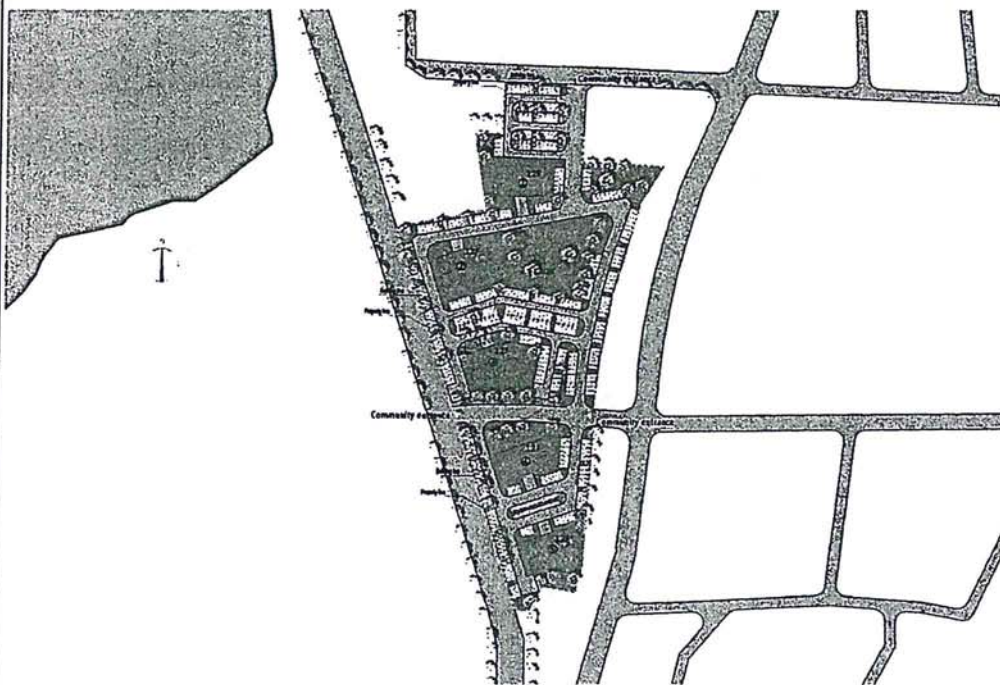






GROUND LOBBY 底层大厅

037



TYPE 4-A : 90m<sup>2</sup>  
TYPE 4-B : 74m<sup>2</sup>



## Contents

LAYOUT-1A  
LAYOUT-1B  
LAYOUT-1C  
LAYOUT-4

### SECTION FOUR

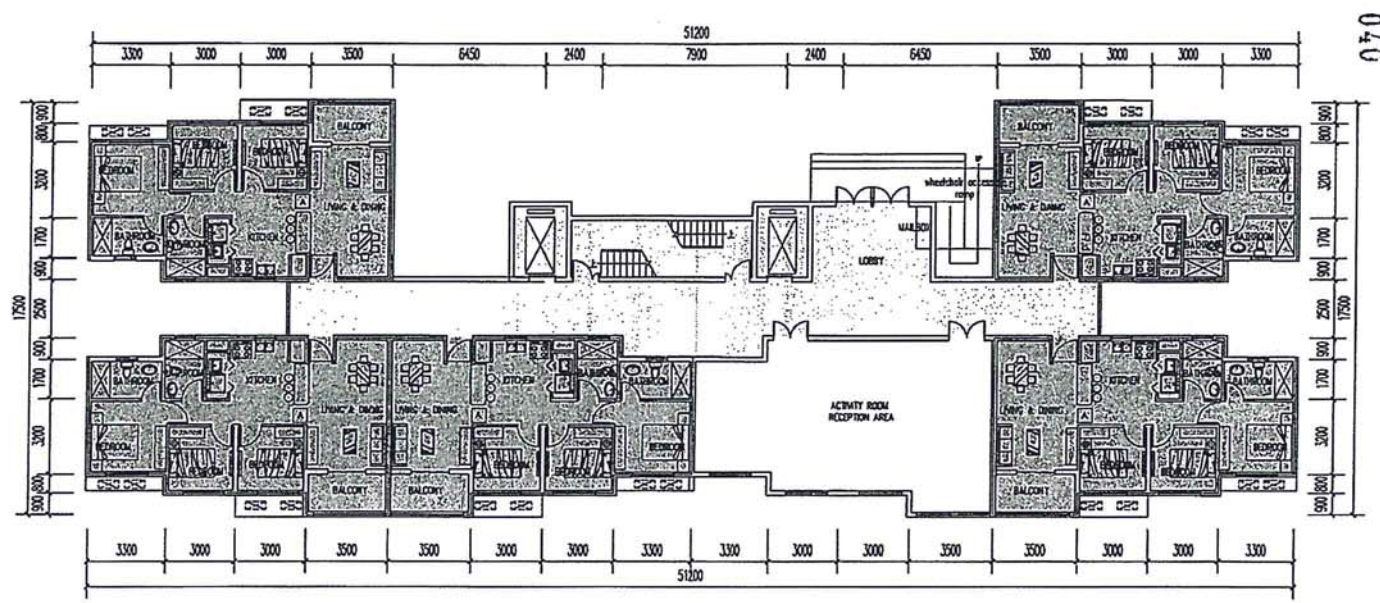
#### Apartment Layout

第四部分 户型设计

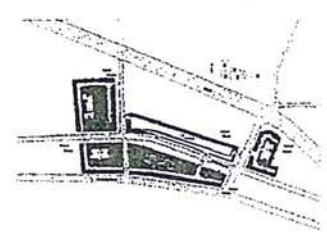
2/5 1/5

Q5

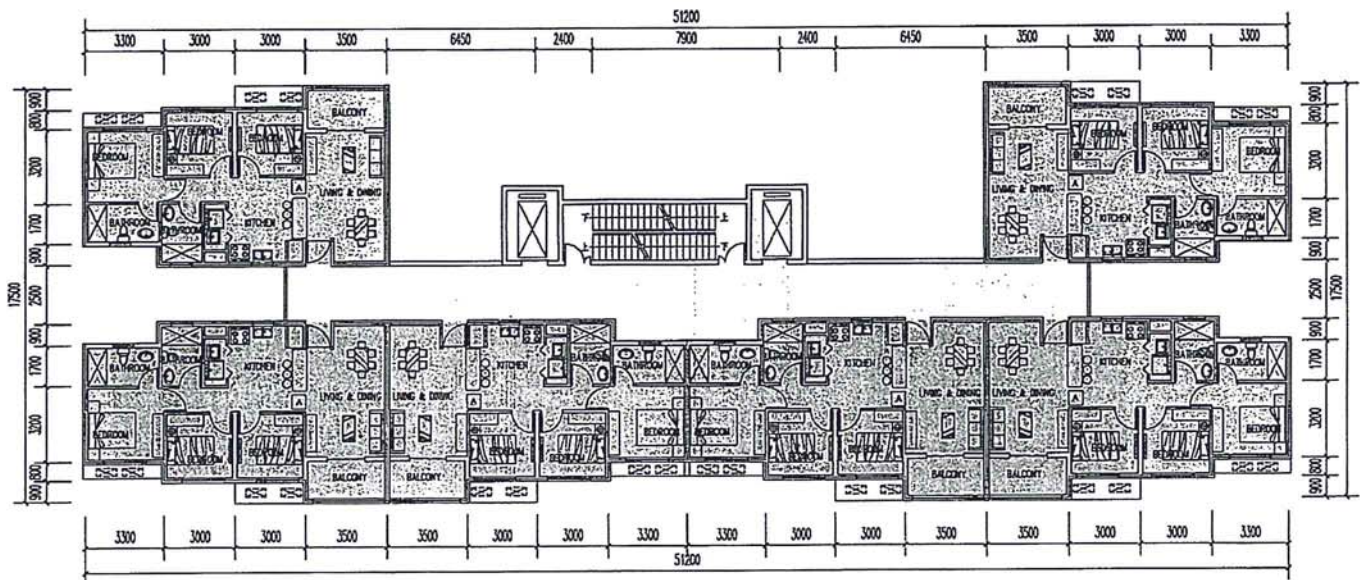
1# SOUTH QUAY SITES, POS. 地块 LAYOUT-1A  
户型设计1A-首层平面



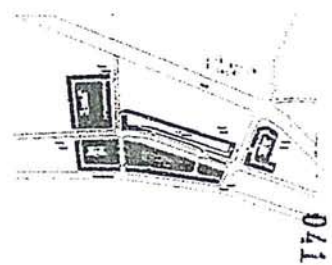
TYPE1A : 81m²



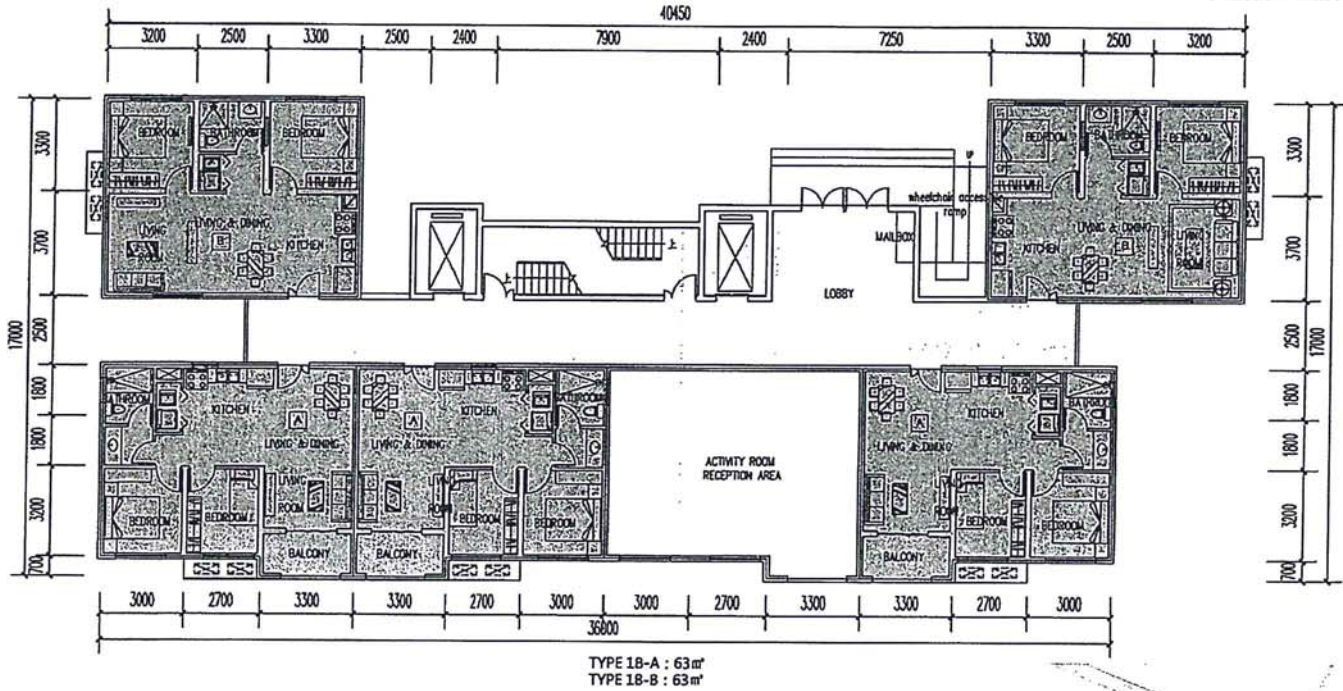


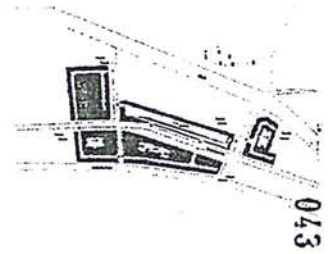
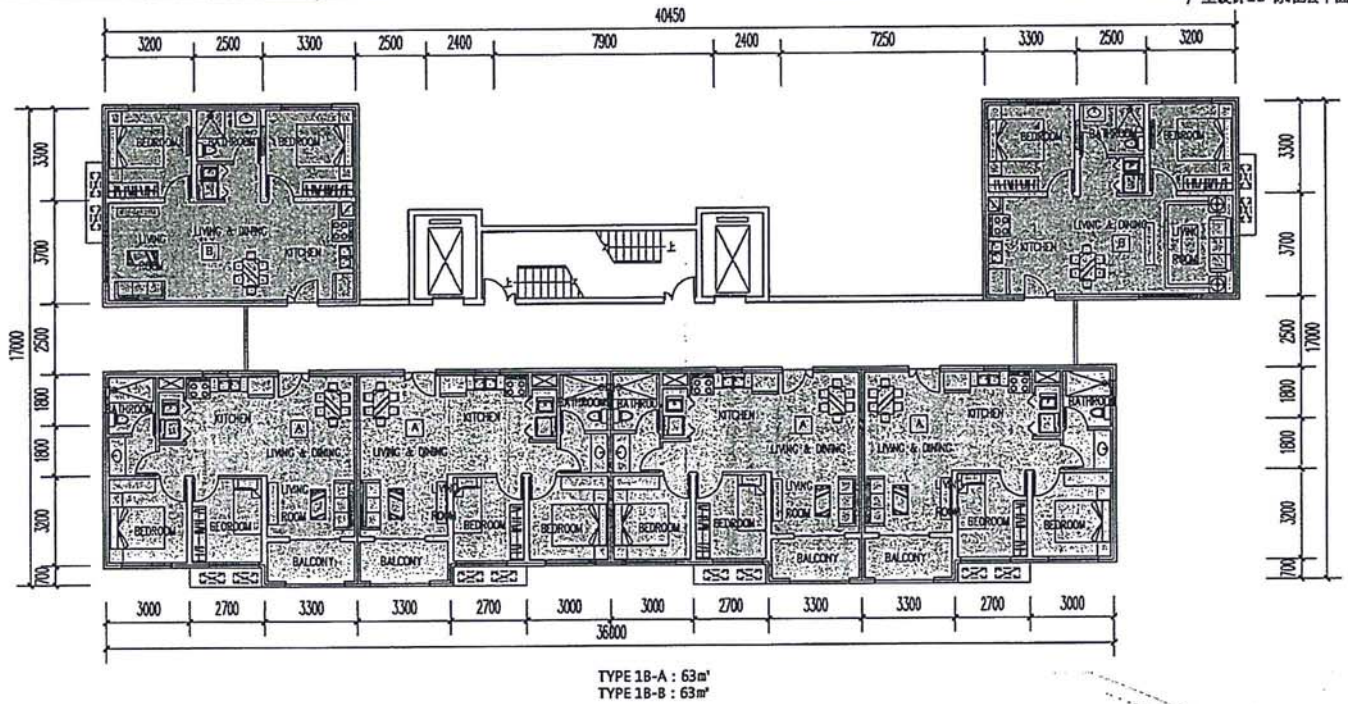


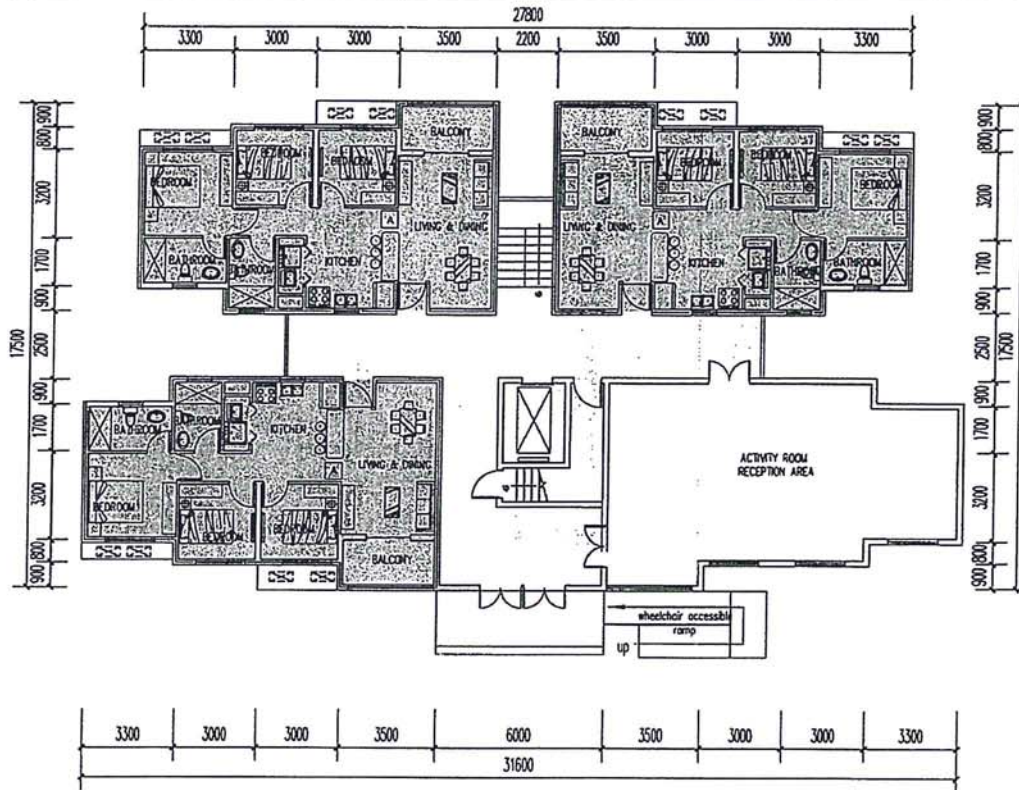
TYPE 1A : 81m²







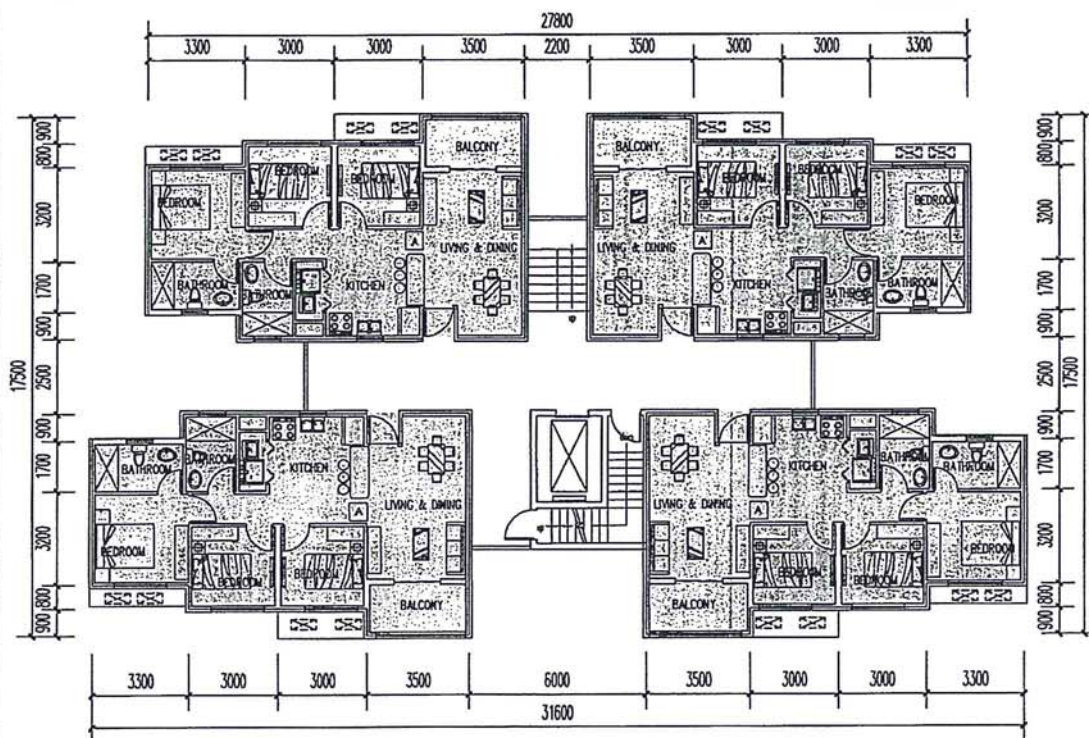




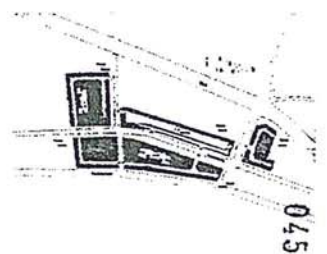
TYPE 1C : 81m²







TYPE 1C : 81m²



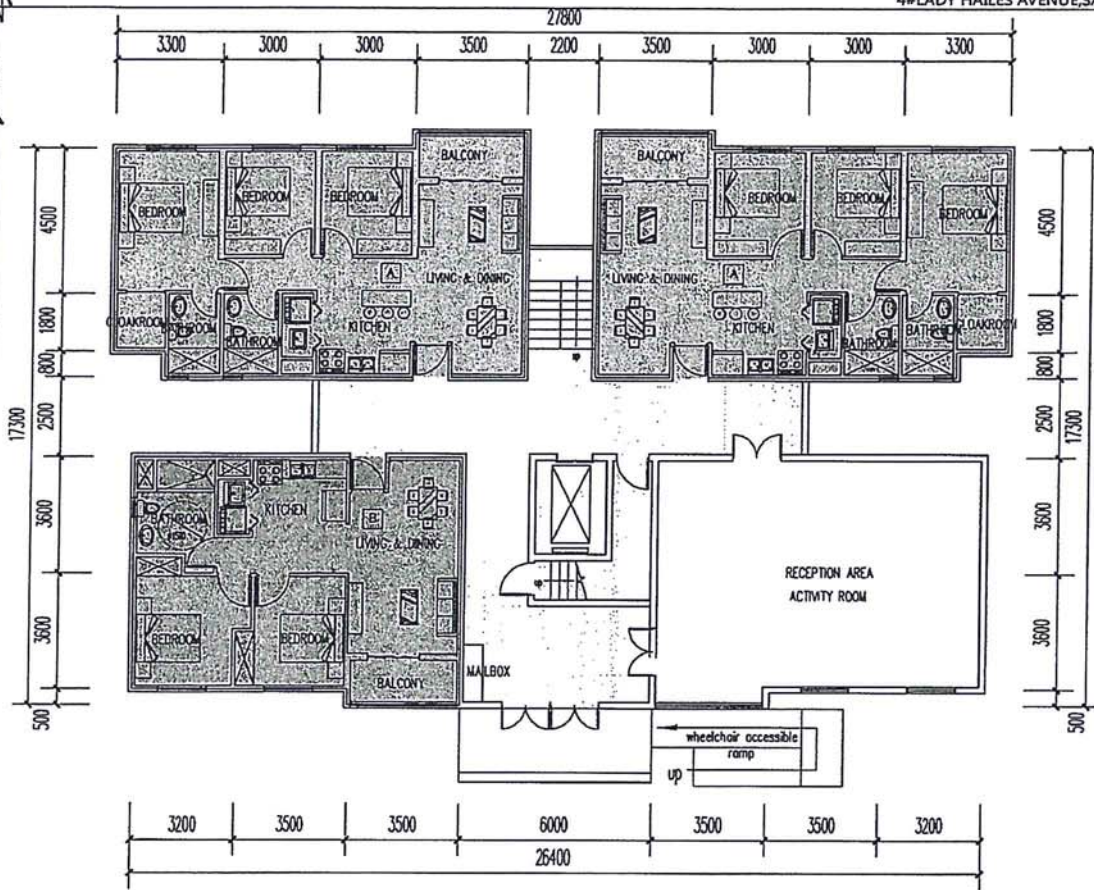
4# LADY HAILES AVENUE, SAN FERNANDO. 地块

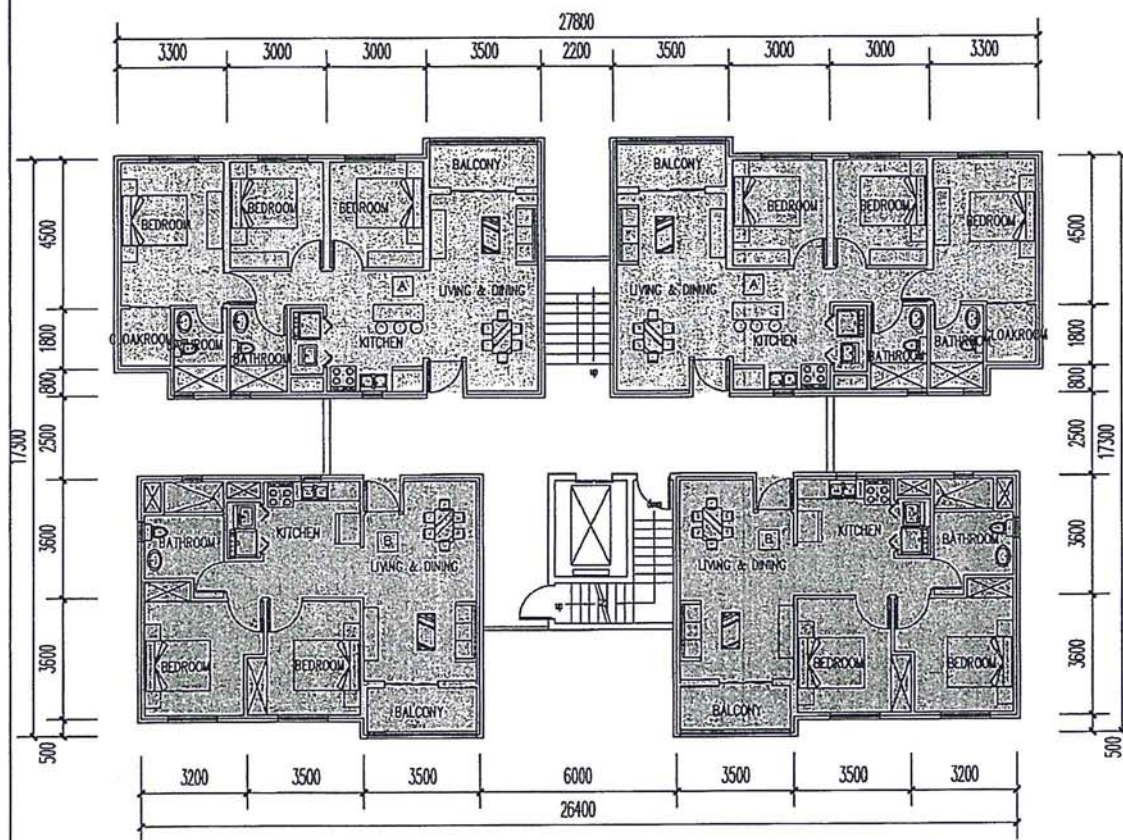
LAYOUT-4

户型设计4-首层平面

046

TYPE 4-A : 90m<sup>2</sup>  
TYPE 4-B : 74m<sup>2</sup>





TYPE 4-A : 90m<sup>2</sup>  
TYPE 4-B : 74m<sup>2</sup>



0.70



## CONTRACTOR'S EPC PROPOSAL

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#### Volume A

##### Part 1      Technical Proposal

##### Part 1.1 Design proposal

[REDACTED]

##### Part 1.3 Subcontractor List

##### Part 1.4 Implementation Programme

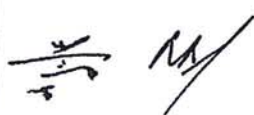
#### Volume B

##### Part 2      Commercial proposal

##### Part 2.1 Contract Price Breakdown

##### Part 2.2 Payment Schedule

##### Part 2.3 Daywork Schedule



## Part 1.2 Statement of Main Construction Methods

### 1. General

#### 1.1 Country Profile

The Republic of Trinidad and Tobago is located in the southeast of the Lesser Antilles Islands in the Caribbean Sea, and separated from Venezuela in the west by the sea. It has a tropical marine climate, with the air temperature of 20-34°C.

This country covering an area of 5,128 km<sup>2</sup> mainly consists of two islands, i.e. Trinidad (4,828 km<sup>2</sup>) and Tobago (300 km<sup>2</sup>), and its total population is approximately 1.3 million. Indians (35.4%) and Africans (34.2%) are two major ethnic groups. There are also mixed races, Europeans, Arab descendants and Chinese.

Trinidad and Tobago achieved independence on August 31, 1962, and became a republic on August 1, 1976. It is now a member of the Commonwealth, and its capital is Port of Spain. Its economy is dominated by energy development and processing, and the output of its energy industry accounts for about 40% of its GDP. In recent years, agriculture, tourism, finance and insurance have been developed rapidly in this country.

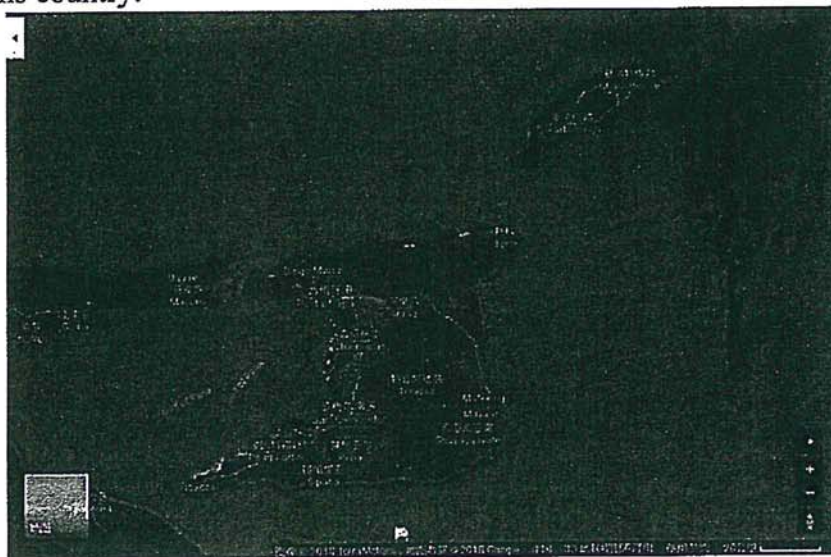


Figure 1-1 Geographic Location of the Republic of Trinidad and Tobago

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## 1.2 Project Overview

The 5,000 affordable houses in Trinidad and Tobago will be developed in three to four phases according to the planning. Phase I involves 439 houses (including simple decoration) and community supporting facilities.

Phase I is composed of two sites in Trinidad, which are located at Port of Spain and San Fernando respectively.

The sites in Phase I cover a total area of 4.55 ha and a total floor area of approximately 51,291 m<sup>2</sup>. The buildings to be constructed consist of 2, 8 and 12 storeys, of which about 58% have an inner area of 81~90m<sup>2</sup> (three-bedroom) and 42% have an inner area of 63~74m<sup>2</sup> (two-bedroom). In total, the planning involves 439 dwelling units and 667 parking lots on the ground. There shall be two elevators per building for 12-storey apartment buildings at South Quay, while one elevator per building for 8-storey buildings at South Quay and also one elevator per building for 8 to 12-storey buildings at Lady Hailes.

Depending on the land conditions, buildings are designed into two types: slab type and tower type. The raft foundation shall be adopted for buildings with 8 floors or less, and the pile foundations for those with more than 8 floors. Each building shall have good daylight, ventilation and viewing conditions.

For large-scale site 1#, centralized supporting facilities shall be built, while for small-scale site 4#, activity rooms and supporting management rooms will be provided on the ground floor.





Table 1-1 Main Parameters of Affordable Housing Project (Phase I) in Trinidad and Tobago

Site No.	Location	Area (ha)	Inner Area (m <sup>2</sup> )	Floor area Ratio (%)	Stories per Building	Building Units	Number of Elevators	Dwelling Units	Parking Lots	Remarks
1	SOUTH QUAY SITES, POS	2.31	15,310	1.11	12/8	4	8	204	314	Including 5 sites
4	LADY HAILES AVENUE, SAN FERNANDO	2.24	19,310	1.53	12	5	5	235	353	
Total/Average		4.55	34,620			9	13	439	667	

Note: 1. Disabled dwelling units shall be located on the ground floor, accounting for 5% of the total. Disabled parking lots shall account for 2% of the total. 2. The space equal to 1 dwelling unit(s) shall be reserved as the lobby on the ground floor.

### **1.3 Project Implementation Conditions**

#### **1.3.1 Natural Conditions**

The project consists of two sites, which are site 1#-SOUTH QUAY,POS and site 4#-LADY HAILES,SAN FERNANDO. The sites are mainly flat abandoned barren lands or old building sites. According to the available information, there are igneous rocks in northern mountains of Trinidad and sedimentary rocks in southern plains. The groundwater level is 1-3m, varying from seasons and site locations.

Trinidad and Tobago is located at about 10° north latitude and has a tropical marine climate. The dry season is from December to next May, which is favorable for construction; and the rainy season is from June to November, in which the total precipitation in June to August with concentrated rainfalls is up to 700-800mm and rainstorms has significant effects on construction.

#### **1.3.2 Site Conditions**

There is a relatively complete set of infrastructures around the sites, where municipal roads and pipe networks are conducive to transportation and electricity and water necessary for the construction can be locally provided.

The project sites are flat, so temporary facilities and construction roads are easy to construct. Both of the sites are small which have no extra land for camp construction.

### **2. Overall Deployment of Construction**

#### **2.1 Project Characteristics**

According to the analysis results, the project has the following characteristics:

(1) Phase I involves 439 houses on two sites, subject to coordinated deployment and with high requirements for construction organization and significant difficulties in construction.



(2) The time limit of the EPC contract is approximately 2 years. Taking into account the large scale, adverse effects of the rainy season, low efficiency of local labor and other unfavorable factors, it is difficult to complete the project as scheduled.


(3) Trinidad and Tobago has a poor security environment. The sites of the project are scattered with great risks of public security, so reliable security measures are needed to ensure the smooth implementation of the project. (According to the instructions of the Owner, the South Quay site is classified as a high-risk one to be highlighted, and Lady Hailes site as medium-risk ones.)

(4) At present, hydrological and geological survey data are not available, so there may be geological risks. In particular, the South Quay sites in a relatively low-lying area is often flooded in the rainy season, due to the poor drainage of surrounding channels.

## 2.2 Construction Schedule

The time limit shall not exceed 15 months for the construction of foundations and main works, 9 months for each construction section of secondary structures and decoration; and outdoor works shall be completed once the corresponding conditions are met during construction. The works on all sites shall be done alternately, with the total period no more than 24 months (including 3 months for design and survey). The construction process shall be organized in sections and batches based on the quantity of works on each site. Considering large quantities of works (about 439 houses), two construction teams shall be arranged to finish the entire project in parallel according to the construction process. On average, each construction team shall complete 200~250 houses or equivalent tasks within the contract time limit.

Depending on the distribution and construction scale of construction sites, the entire project is divided into two areas: site 1# area and site 4# area. Works in these two areas shall be constructed at the same time, and further divided into 2-3 construction sections that



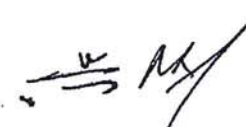


consist of 2-3 independent buildings. All the independent buildings shall be finished alternately. The specific arrangement is as follows.

The 1# site area shall be divided into three construction sections: 1# and 2# building section, 3# and 4# building section, and 5# building section. One construction team shall be appointed to construct the foundations and main works of 1# and 2# buildings first, and then simultaneously complete the foundations and main works of 3# and 4# buildings as well as secondary structures and decoration of 1# and 2# buildings, and so on, until the 5# building is completed.

The 4# site area shall be divided into two sections: 1# to 2# building section, 3# to 5# building section. One construction teams shall be appointed to work on the foundation and main structure of the 1# to 2# building section, immediately followed by the foundation and main structure construction of the 3# to 5# building section. Meanwhile, the secondary structure and finishing works of the 1# to 2# shall be carried out until they are completed. And so forth, until the completion of the 3# to 5# building section.

After the commencement of full-scale construction, the project will involve a number of buildings and working surfaces, large overall scale, and great demands for labor, so labor allocation shall be dominated by skillful workers come from China and other countries, supplemented by local workers. The ratio of foreign workers to local workers shall be around 1:2.



## 2.3 Block Diagram of Organization

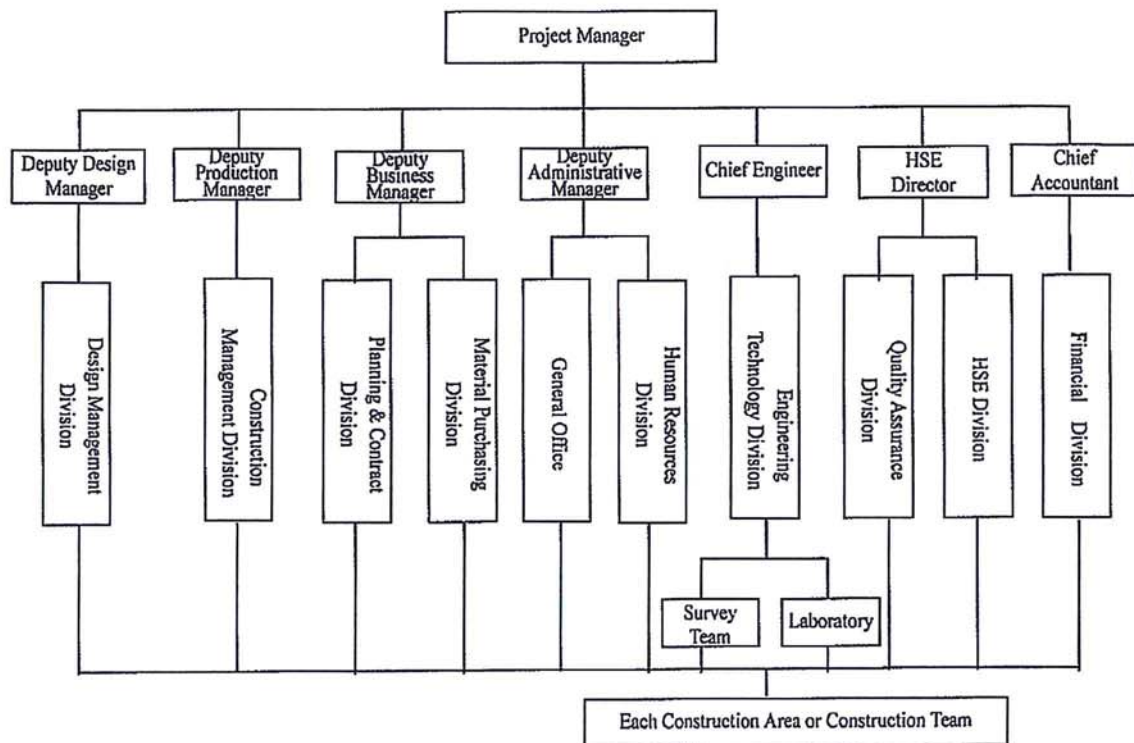


Figure 2-1 Block Diagram of Project Organization

## 2.4 Management Responsibilities

### 2.4.1 Three-level Management

Level 1: project manager - assuming overall responsibilities for the project.

Level 2: project directors - assisting the project manager in the work of respective departments.

Level 3: various functional departments.

### 2.4.2 Functional Divisions

**Design Management Division:** conduct the survey and design of the entire project.

**Construction Management Division:** implement the project and carry out overall control of the quality, progress and safety.

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Planning & Contract Division: formulate and review all contracts of the project, and coordinate the work with local communities and governments.

Material Purchasing Division: purchase equipment and materials, and manage the mobilization, use and demobilization of on-site materials.

General Office: formulate and issue documents, and manage the food, clothing, housing and transportation of all personnel engaged in the entire project.

Human Resources Division: allocate and coordinate construction workers, recruit local labor, and record and issue labor contracts and wages.

Engineering Technology Division: select specifications and standards, formulate the technical guidance for construction, rationally separate works, and coordinate the preparation of plans for the use of various materials.

Quality Assurance Division: establish and operate the quality assurance system, inspect, manage and control the construction quality, and perform the quality acceptance.

HSE Division: conduct the HSE work, environmental protection, safety education and guarantee and occupational health management of the entire project.

Financial Division: plan the funding of the entire project, settle the project funds, and perform the statistics, review and payment of wages.

### 3. Construction Layout

#### (1) General construction layout of site 1#

Five independent buildings in site 1# area include two 12-storey residence building, two 8-storey residence building, one 2-storey community supporting facility, which amounts to 204 dwelling units. The temporary office, warehouse, and processing plant will be set, and also security office is to be built considering the community environment





complexity.

(2) General construction layout of site 4#

Five 12-storey residence buildings which amount to 235 dwelling units are proposed to be built. The temporary office, warehouse and processing plant are to be set up next to the roadside.

### 3.1 Office and Living Camp

HDC shall provide a land for constructor's temporary camp within 5 km from either site.

It is planned to build office and living facilities on the temporary site, and rent nearby houses if necessary. The number of personnel is about 400 in the peak construction period. The planned floor area is about 1,500m<sup>2</sup>, and the entire project covers an area of 5,000m<sup>2</sup>. The area of houses to be rented is about 200m<sup>2</sup>.

### 3.2 Construction Road Planning

The two sites are located in urban areas, where there are good traffic conditions and the terrains are flat. In addition to the existing traffic conditions, a 5km construction road shall be built with the 4-6m wide sand-gravel pavement, in order to facilitate the construction.

### 3.3 Water and Power Layout

Water supply: production and domestic water is considered to be taken from the municipal water pipeline network. A water storage pool shall be built in the camp and concrete mixing station, with two sprinklers.

Power supply: production and domestic power is considered to be connected from the municipal power supply network and diesel generators (about 200 kW) are planned to be provided as emergency backup power supplies.

### 3.4 Concrete batching System

Concrete aggregates to be used in the project shall be purchased.

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It is planned to purchase ready-mixed concrete for the project. 2 to 3 mobile concrete mixers ( $0.35\text{m}^3$ ) or mixer trucks shall be applied to mix a small amount of concrete as needed.

### **3.5 Processing Plant and Storage Facilities**

The comprehensive processing plant (for processing of rebars and timber, maintenance of formworks, and prefabrication of small components) and storage facilities for cement, rebars and timbers shall be set on site 1# and site 4# respectively. A comprehensive warehouse shall be provided for storage of equipment accessories, and labor protection materials.

### **3.6 Mechanical Equipment Repair Shop**

It is planned to set a mechanical equipment and motor repair shop on the contractor's temporary camp, mainly for simple repair and maintenance of mechanical equipment and automobiles. Local resources shall be used for overhaul. There are complete fueling facilities around the project, so vehicles can be refueled with local resources during the construction period. One fuel truck (10t) shall be provided to refuel mechanical equipment on the site.

### **3.7 Medical Facilities**

In order to ensure the health of construction workers, one health center shall be established on the main camp, including doctors with rich experience in first aid, and commonly used appliances and drugs.

### **3.8 Attached Drawings**

General Construction Layout for Site 1#

General Construction Layout for Site 4#

General Layout for Construction Camp

Auxiliary Factories for Construction



#### 4. Allocation and Organization of Construction Resources

##### 4.1 Main Construction Machinery

S/N	Name	Specification/Model/Capacity	Quantity	Remarks
1	Excavator	0.8 ~ 1.0m <sup>3</sup>	2	
2	Crawler bulldozer	110kW	2	
3	Loader	3.0m <sup>3</sup>	2	
4	Loader	1.0~1.5m <sup>3</sup>	2	
5	Road roller	13t	1	
6	Grader	PY160	1	
7	Frog tamper		2	
8	Diesel pile driver	D62	1	Rented
9	Dump truck	15~20t	4	
10	Tower crane	QTZ40	6	
11	Concrete pump	HBT30	2	
12	Concrete mixer truck	10~12m <sup>3</sup>	4	
13	Hoist		9	
14	Sprinkler	8~10t	2	
15	Tanker	8~10t	1	
16	Flatbed trailer	20t	1	Rented
17	Mobile crane	8t	1	
18	Mobile crane	16~25t	1	Rented
19	Concrete mixer	0.35m <sup>3</sup>	2	
20	Diesel generator	100kW	1	



21	Diesel generator	15~50kW	2	
22	Submersible pump	0.25~1.0kw	10	
23	Total station	Leica	2	
24	Level	Leica	2	

#### 4.2 Main Labor Allocation

The project involves 28 management personnel, including 8 foreign senior managers. Two construction teams (consisting of 100 workers, respectively) shall be employed to construct the project. In total, 200 Chinese(or third countries) workers shall be recruited. Considering the labor ratio of 1:1, the total number of Chinese(or third countries) and foreign workers shall be 400 in the peak period. The details of Chinese workers are shown below.

S/N	Type of Work	Labor Planning and Input in Construction Phase		
		Foundation	Main works	Decoration
		Number of Workers Required	Number of Workers Required	Number of Workers Required
1	Steel fixer	50	50	
2	Welder	5	5	5
3	Formwork fixer	80	80	
4	Concretor	20	20	15
5	Brick layer	20	20	30
6	Plasterer	0	0	30
9	Inlayer	0	0	30
10	Plumber	10	10	10
11	Painter	5	5	40
12	Decoration carpenter	0	0	20
13	Machinery operators	5	5	5

14	Waterproofing worker	0	0	10
15	Chef	5	5	5
16	Total	200	200	200

## 5. Main Method Statement

According to the scale and site distribution of the entire project, two areas will be constructed simultaneously, and further divided into 2-3 construction sections that shall consist of 5-6 independent buildings. All independent buildings shall be constructed by two construction teams in parallel according to the flow process. Each construction team consist of 60~70 workers and shall build approximately 200~250 houses during the contract period.

### 5.1 Engineering Survey and Setting-out

5.1.1 The instruments (such as the level, theodolite, measuring tape, steel ruler and tower ruler) used in the survey and setting-out shall be checked and inspected (with appropriate certificates and permits).

5.1.2 Engineering survey and setting-out shall be performed based on the benchmarks and coordinates provided by the Owner and checked by the construction teams and re-checked by the Owner before excavation. Wherever possible, the axis shall be led to the fixed wall and cement ground, and cross ink lines shall be set out.

5.1.3 Temporary coordinates and benchmarks shall be set, and protective measures shall be taken to control piles (with concrete piers).

5.1.4 Setting-out shall be carried out based on the control points provided by the Owner. The main control axis must be not easy to damage by man-made factors according to the actual situation on the site. The control axis shall be surveyed with the theodolite, and the remaining ones can be measured with the steel ruler.



Figure 5-1 Engineering Survey and Setting-out

#### 5.1.5 Setting of Gray Line of Foundation Pit

The gray lines of foundation pits shall be set according to the control piles or axis piles of buildings as well as the foundation drawings, followed by self-inspection and inspection by relevant departments before formal excavation.

#### 5.1.6 Building Foundation Setting-out

##### (1) foundation setting-out

When the plain concrete cushion of the foundation is completed, the control pile position on each main axis shall be recorded and inspected for collision and displacement according to the setting-out results. Then the main axis shall be set out and checked on the plain concrete cushion via the theodolite. The axes, border lines, pile position lines and collecting sump lines required in construction of rafts and independent foundations shall be set with ink based on the main axis.

##### (2) Setting-out re-checking

The construction work shall not be executed before the owner confirms the setting-out.

The elevation measurement below  $\pm 0.000$  is as follows

As the foundations involved in the project are not at the same elevation, including the control foundation and the foundations below

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$\pm 0.000$ . Long wooden piles shall be mounted around foundation pits during excavation. Ball cap nails shall be applied on the side faces of wooden piles, and numbered with paint on the pile edges. The cap elevation of ball cap nails shall be measured with the steel ruler and level, based on the benchmarks specified by the Owner, followed by numbering and recording. Finally, the level shall be installed in the foundation pit to measure the cap elevation of nails. The closure difference shall be controlled within a rational range. Two parts shall be checked while the foundation elevation is measured.

#### 5.1.7 Vertical Control of Building

When the building is constructed to  $\pm 0.000$ , the axis should be projected upward layer by layer with the structural height increasing, as a basis for setting-out of each layer and vertical control of the structure. As there are high requirements for vertical deviations, the accuracy and method of vertical survey of the axis shall adapt to these requirements, to ensure the project quality.

##### (1) Allowable deviation

The vertical deviation of different layers and the whole building shall not exceed the allowable sum

##### (2) vertical surveying and key points

a. after the completion of foundation blinding, according to the building horizontal control network, and after the controlling pile calibration of main axis, the cross main axis line shall be set accurately to the frame column in the edge of the ground floor and the frame column next to the precast opening, and highlighted by red line after marking by ink cross line as the basis for upward measurement.

b. the detailed setting-out cannot be carried out until the cross angle comes to 90degree after re-checking main axis by the theodolite in the control point of casting layer.

c. before vertical surveying, the instrument shall be checked and calibrated. The instrument shall be put below the construction layer,

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therefore, protective measure shall be taken to avoid the destruction from the fallen object against instrument.

#### 5.1.8 Settlement Observation

(1) settlement observation spot setting :

The proposed project shall carry out the settlement observation according to Building Deformation Measurement Regulation.

(2) The settlement shall be observed when the first layer is completed, once per layer during construction, once a month during decoration after the completion of main works, at least four times in the first year after the project completion, at least twice in the second year, and once a year subsequently, until the settlement is stable. The settlement observation points shall be embedded according to the drawing requirements.

(3) Three aspects (personnel, instruments and time) may be designated in the observation process. At the same time, the instruments applied shall be checked before each observation, to avoid the influence on observation results. All observation dates and data shall be recorded accurately, and filed in the chart form. In the event of any abnormality, causes shall be immediately investigated and handled.

(4) the control point shall not be less than 2, closely protective measure shall be taken to avoid any destruction of the surveying point.

(5). Surveying points setting and method shall follow the rules of burying 4 settlement point respectively to execute the settlement observation and all of them shall be closely protected.



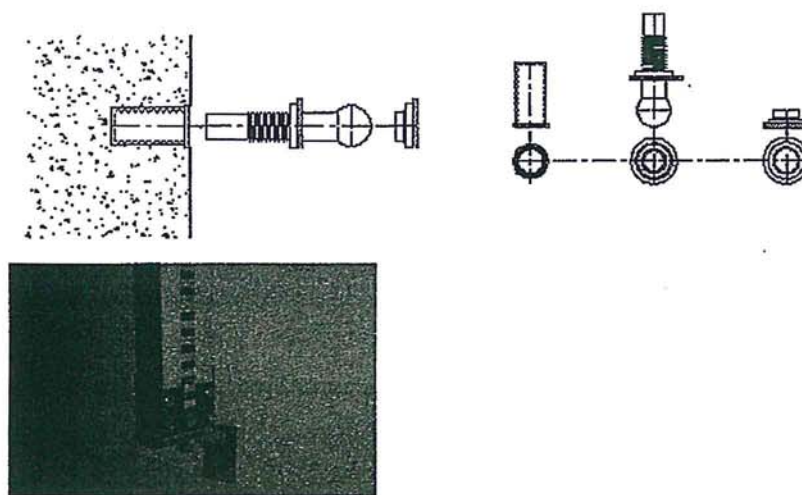


Figure 5-2 Layout of Settlement Observation Points

## 5.2 Pile Foundation Construction

The precast concrete foundation piles shall be constructed with the diesel pile driver. All the precast piles shall be mounted from one side and in one direction, according to the principles of “installing deep, large and long piles before those shallow, small and short”.

The precast piles must not be lifted until they reach 70% of the design strength and driven until they reach 100% of the design strength. Piling shall be performed with appropriate force, and the knocking stroke shall be controlled to be approximately 2m to protect the pile heads. Pile extension shall be carried out after the piles are laid through the hard soil layer. Measures shall be taken in the piling process to prevent the fracture or damage.

The pile foundation will not be adopted for site 4#

## 5.3 Earthworks

### 5.3.1 Earthwork Excavation

Earthwork excavation shall be conducted according to the principles of “supporting before excavation, layer-by-layer excavation and no over-excavation”. The original soil at the pit bottom shall be reserved.

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After manual excavation to the design elevation, the excavated soil shall be load by the excavator, and transported by the dump truck to the spoil yard.

5.3.2 Specific precautions are as follows.

(1) the excavation shall be executed in two seperate layers, excess excavation is prohibited.

(2) The slope of the foundation pit shall be graded, and guardrails made of steel pipe shall be erected on brickwork cofferdams.

(3) The excavators shall be prevented from mutual collision to cause hazards during the earthwork excavation of the foundation pit.

(4) dumping truck shall be washed before moving out in the washing area.

(5) Lighting facilities shall be installed as needed for construction at night, and obvious signs shall be erected on dangerous sections.

(6) when the foundation soil is incongruent to the design, or ancient tomb, cave, buried object, loose soil pit, brick pit, hard soil in the local scale, rubber soil is found in the process of foundation pit excavation, work shall not be executed before further research is done by professionals.

(7) The areas around the foundation pit shall be always observed during excavation. In the event of poor conditions, immediateky report to the related department.



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Figure 5-3 Earthwork Excavation

### 5.3.3 Earthwork Backfilling

(1) Backfilling shall not be started until the foundation works are completed and the formalities of inspection of concealed works are handled.

(2) The backfill of foundations and below the ground, apron and step foundations shall be compacted layer by layer, where the thickness of each layer shall not exceed 250mm and the compaction coefficient shall comply with the design requirements.

(3) The silty clay or soil approved by the Owner shall be used, free of bricks, tiles or stones.

(4) Prior to earth backfilling, debris, water and fluid mud shall be cleared, and the acceptance of concealed works shall be completed.

(5) The backfill cushion shall be rolled or compacted layer by layer, with the compaction coefficient conforming to the design requirements.

### 5.3.4 Foundation pit drainage

Considering the environmental characteristics such as frequent rainfall and the distance to the sea, the groundwater level will be relatively high, so it is necessary to consider the precipitation of the base trough. It is planned to install dewatering wells on the outer side of the foundation pit. The diameter of the dewatering wells is  $\phi 380$ . The depth of the wells depends on the water level. The elevation of the wellhead is 500 mm higher than that of the outdoor plateau. The spacing of dewatering wells is 20-30 M. The number of dewatering wells is adjusted according to the actual situation of the site. The dewatering reaches not less than 0.5 meters below the bottom.

## 5.4 Reinforcement Works

### 5.4.1 Quality Requirements for Rebars

(1) Material purchase, supply and mobilization planning





The rebars to be used in the project shall be purchased from the large-scale steel mill, in strict accordance with the ISO9002 quality system standards.

The rebar planning shall be prepared by the Construction Management Division based on the construction progress, and approved by the Project Manager before purchase. The ex-factory conformity and material certificates of rebars shall be provided.

(2) On-site visual inspection

Rebars shall be sampled from each batch and visually inspected for cracking, crusting or folding on their surfaces. Bumps are acceptable, but must not exceed the height of transverse ribs. The outer surfaces of rebars must be free of rust.

(3) Batching

Each batch shall consist of rebars of the same brand, furnace number, specification and delivery status, and tested and inspected according to relevant regulations.

5.4.2 Rebar Processing and Stacking

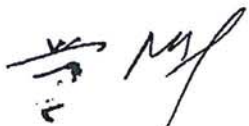
The rebar stacking area shall comply with the requirements for rain and fire protection. The power shall be led from the distribution box in the vicinity.

(1) Rebar processing

Rebars shall be processed on the site, and cut under the guidance of the personnel designated by the Construction Management Division, with the cutting form approved.

Rebars shall be processed by a professional team on the site, with the dimensions controlled stringently. The rebars with unqualified dimensions must not be used. The shapes and sizes of rebars must comply with the drawing requirements.

Rebars shall be straightened by mechanical means. For 90° or 135° bending at the ends, the bending diameter (D) shall be 4d or greater, and the length of straight sections shall be determined according to the





specifications. Short rebars fabricated in the cutting process shall be connected as much as possible to prevent waste.

The rebar processing equipment shall be regularly maintained.

#### (2) Rebar stacking

Rebars shall be stacked in the designated place, hardened or paved with the C10 concrete (thickness: 100mm) to achieve good flatness.

A sign shall be erected in the rebar stacking area, indicating the precautions such as the position, specification, quantity, safety, and quality.

Rebar stacking and identification shall be carried out by the designated personnel and in a centralized manner based on the specifications and categories. Stirrups, straight rebars, positioning rebars and split heads shall be separately stacked in the designated place.

Rebars must not be directly placed on the ground and shall be covered with plastic sheets on rainy days to prevent rusting.

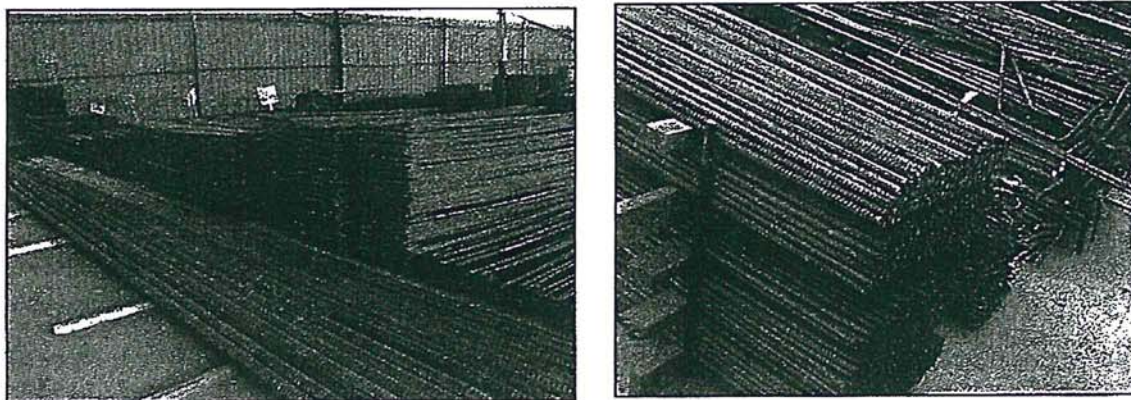


Figure 5-4 Schematic Diagram of Rebar Stacking

#### 5.4.3 Rebar Connection and Binding

##### (1) Preparation

The finished rebars shall be checked for the conformity of the grade, model, shape, size and quantity to the bill of materials. The 20-22# wires, rebar hooks, skids, wrenches, wire brushes and chalk shall be prepared for binding.

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(2) Rebar binding of foundation bottom slab and beam

The rebar position lines shall be set out at 5cm away from the edges of slabs, according to the spacing requirements in the drawing, including the rebar position lines on the foundation beams.

The rebars at the bottom layer shall be laid first in the direction dependent on the forces on the bottom, and on the short side first and then long side.

All the intersections of rebars of the bottom slabs shall be tied.

Mortar pads of the concrete protective layer of bottom slabs shall be laid in the plum shape and at intervals of 1m.

Based on the set-out pile position lines, one layer of positioning rebars shall be laid on the top surface of upper rebars of foundation beams, and the joint bars of columns in the foundation shall be securely tied to the rebars of the foundation beams or bottom slabs. The anchorage length of joint bars shall meet the specifications. One layer of horizontal positioning ladder shall be laid on the joint bars, and securely connected with the joint bars after the verticality of joint bars is adjusted.



Figure 5-5 Binding of Foundation Rebars

(2) Binding of column rebars

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When the upper section of the column differs from the lower section, the lap parts exposed outside the lower column rebars shall be adjusted within the beam height before binding. After rebar trimming, one stirrup shall be applied at 50mm away from the top concrete surface of the column, and one positioning column stirrup at 50mm.

After the frame column rebars are connected, the stirrup spacing lines shall be marked on the erected vertical rebars according to the drawing requirements. Stirrups shall be inserted one by one from the column top, lifted and tied from top to bottom via buckles, and made vertical to main rebars. The stirrup hook joints shall be staggered in the bearing rebar direction.

The rebars in each column at the bottom of the column shall be positioned with formworks, two top formworks per side. The positioning block shall be applied on the stirrup at the top of the column.

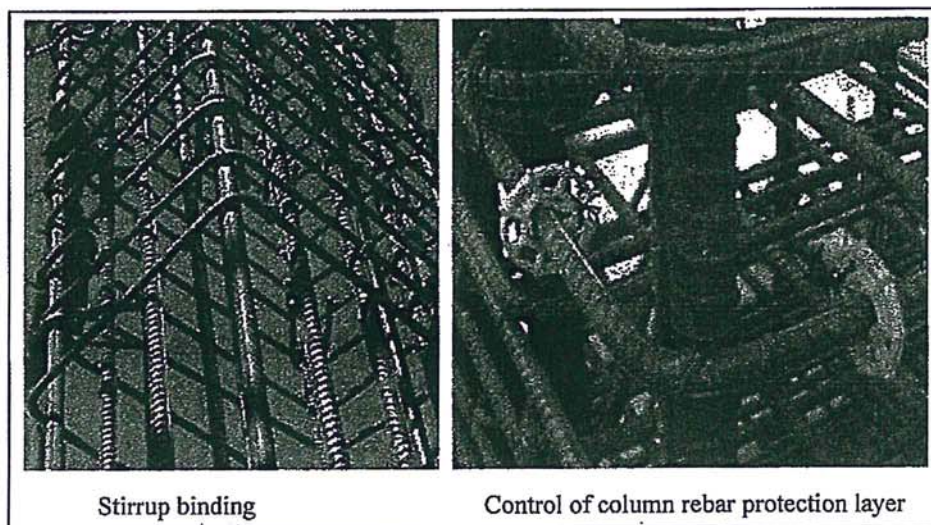


Figure 5-6 Binding of Column Rebars

#### (4) Binding of beam rebars

The stirrup spacing shall be marked on the bottom formworks of beams before stirrups are installed.

The lower longitudinal bearing rebars through the main beam shall be laid first one by one with the marked spacing; then the lower longitudinal rebars through the secondary beam shall be laid with stirrups,

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followed by the installation of erection rebars of main and secondary beams. The erection rebars and stirrups shall be tied securely at the specified intervals.

The upper longitudinal rebars of the frame beam shall be laid through intermediate nodes, and the anchorage length of the lower longitudinal rebars thereof in the intermediate nodes shall meet the specifications.

The stirrups of the upper longitudinal rebars of the beam should be tied with buckles.

The first stirrup at the end of the beam shall be set at 50mm away from the edge of the beam and column node, and the stirrups at the intersection between the beam end and column shall be installed densely.

Concrete pads shall be applied at intervals of 1m and in two rows under the bearing rebars of the main and secondary beams.

Additional stirrups shall be set on the main beam and at the secondary beam support, of which the number and diameter shall be the same as those of the stirrups in the beam.

In order to ensure that main rebars at two ends of the upper part of the beam are mounted in correct positions, one supporting rebar shall be added on the upper part of the beam.

#### (5) Binding of top slab rebars

Debris on the formworks shall be cleaned. The intervals of main and distribution rebars shall be marked via chalk on formworks, and the first back strap shall be 50mm away from the wall.

Main bearing rebars shall be laid first based on the marked intervals, followed by the distribution rebars.

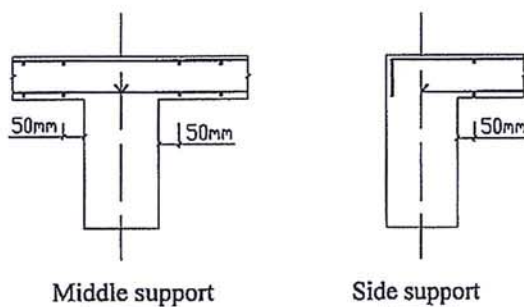
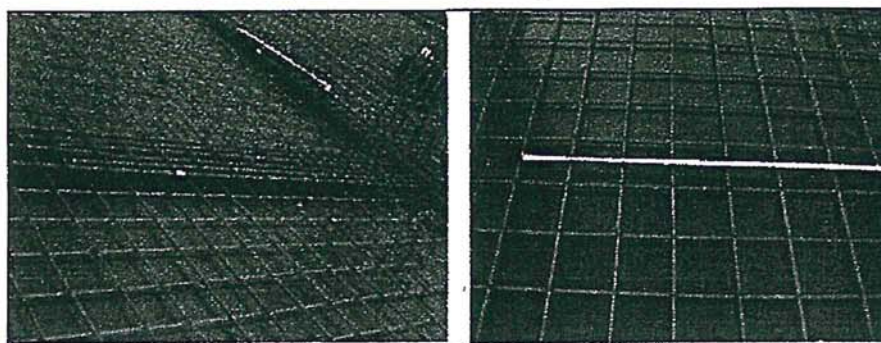
Slab stiffeners are generally tied with splayed buckles at all intersections. The upper rebars shall be tied downwards, while the lower rebars upwards.



Concrete cushions shall be applied in the plum shape under rebars, and the thickness thereof shall meet the requirements of the protective layer.

Lap joints of slab stiffeners shall be installed in the positions with less stress, and the upper iron parts shall be lapped within  $1/3$  of the span.

The upper rebars of top slabs shall be fixed by split heads ( $\Phi 12$  rebar) at intervals of 1,000mm. The split heads shall be laid on the lower iron parts under the top slabs, with the height dependent on the slab thickness.



1. The rebars under slabs shall be anchored for more than  $5d$  in the support and extended to the beam centerline.
2. The rebars on slabs shall be anchored for more than  $L_{ae}$ .
3. The rebars under slabs must not be lapped within the span, while those on slabs must not be lapped on the support.

Figure 5-7 Binding of Slab Stiffeners

#### (6) Binding of stair rebars

The position lines of main and distribution rebars shall be marked on the bottom slabs of stairs. Main rebars shall be tied first at all intersections, followed by distribution rebars.

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## 5.5 Formwork Engineering

Bamboo plywood and wooden formworks shall be applied on each component according to the following requirements, with the vertical and horizontal supports made of steel pipe.

### 5.5.1 Formwork Erection Sequence

Erection of simple scaffolding → installation of column and wall formworks → installation of bent frames for beams and slabs → installation of beam formworks → installation of slab formworks → inspection and reexamination

### 5.5.2 Column & Wall Formwork

Erection of wooden formworks of the frame column: the column formworks shall be provided with wooden edges at intervals no greater than 300mm, and erected with double rows of steel pipe stirrups at intervals of 400mm to 800mm and more densely at the bottom of the column. One  $\Phi 12$  cross diagonal screw shall be added between the stirrups, and laid in the PVC pipe to facilitate the removal and repeated use of the screw. The column stirrups shall be connected to the beam formwork support after formwork correction.

### 5.5.3 Beam and Slab Formwork

(1) The bent frame shall be erected with  $\Phi 48 \times 3.5$  steel scaffolds. The 50mm thick wooden formworks shall be laid under the small beam. The prefabricated beam bottom and side formworks shall be applied on the bent frame of the frame column.

(2) When the beam height exceeds 700mm,  $\Phi 10 @ 600$ mm diagonal screws shall be added in the beam. The beam shall be reinforced with through-wall screws at intervals of 600mm to 900mm in the height direction, and at intervals of 600mm in the length direction. The beam supports shall be connected with slab supports to form an overall stable support system.





(3) When the span of cast-in-situ reinforced concrete beams and slabs is 4m or greater, the formworks concerned shall be arched as required.

## **5.6 Concrete Engineering**

### **5.6.1 Concrete Pouring**

(1) Prior to concrete pouring, the formworks, brackets, rebars, embedded parts, through-wall sleeves and reserved holes shall be inspected and recorded according to the design requirements.

(2) The debris inside the formworks and oil stains on rebars shall be cleaned. The formwork gaps and holes shall be filled. Wooden formworks shall be kept wet by means of spraying water, but without water accumulation.

(3) The concrete uniformity, compactness and structural integrity shall be guaranteed in the pouring process. The rebars and embedded parts shall be mounted in correct positions. The formworks and brackets shall not be loose or subject to excessive deformation.

(4) Elevation control: the floor elevation shall be surveyed on the rebars or steel pipes by means of setting-out and tracking inspection with the level.

(5) The Letter of Responsibilities for Construction Goals of Sub-divisional Works shall be filled each time before pouring. Pouring of important parts shall be recorded.

(6) The wall columns, beams and slabs shall be poured at a time. Before pouring, a 50-70mm thick layer of cement mortar with the same mix ratio as the original concrete shall be applied. Pouring shall be performed layer by layer. When a thick layer of mortar is formed on the top of the wall column, a small number of gravels shall be added into mortar, followed by careful vibration.

(7) Concrete vibration: the cushion course shall be compacted with the flatbed vibrator, while the others via the immersion vibrator to form a 30cm thick layer of concrete.



(8) Special personnel must be designated to observe the formworks, brackets, rebars and embedded parts in the pouring process. In the event of any deformation, the dislocated part shall be corrected in a timely manner.

(9) After vibration, concrete shall be leveled promptly via the scraper, and the exposed gravels shall be pressed by the wooden trowel into concrete. In particular, detailed structures such as steps and shear wall feet shall be flat with clear edges and corners. Wire exposure and insufficient formwork dimensions are forbidden during construction.



Figure 5-8 Concrete Pouring

#### 5.6.2 Key Points of Concrete Pumping

(1) In order to ensure the piping stability and protect the finished rebars, special bracket channels shall be erected on the horizontal part of the concrete conveying pipe, and the vertical part shall be secured with steel pipes, according to the characteristics of the construction site. Horizontal pipes shall be fixed with brackets or pads at intervals of approximately 3m, to facilitate dredging, assembly and cleaning.

(2) The bend of the pump pipe from the horizontal to vertical direction or from the vertical to horizontal direction shall be fixed with

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the steel pipe, due to the vertical press of concrete and impact of pumping.

(3) When used, the placing machine must not be directly mounted on rebars. Instead, a wooden plate shall be laid under the placing machine. The pull rope of the placing machine must not be secured on rebars.

(4) During concrete pouring of the horizontal structure, placing must not be carried out continuously in one position, but shall be completed by means of horizontal movement within 2-3m, vertical to the formworks.

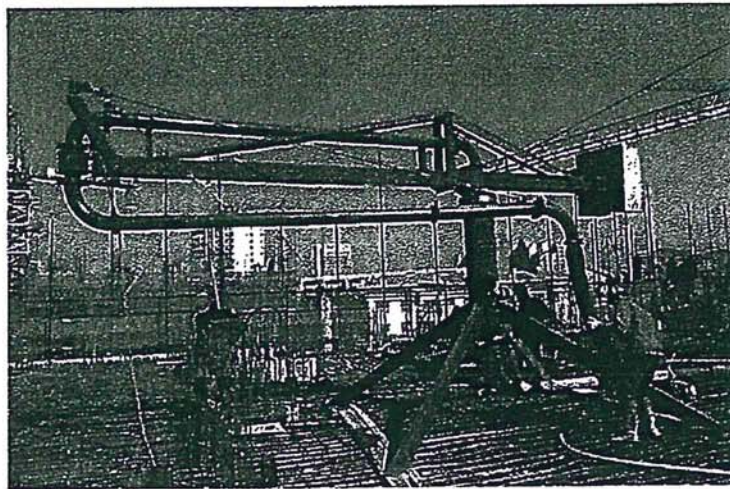


Figure 5-9 Concrete Placing

### 5.6.3 Concrete Pumping Requirements

(1) The concrete conveying pipe shall be fixed prior to concrete pouring.

(2) Connection of the placing boom: after the placing boom is stabilized, the concrete conveying pipe shall be connected to the pump pipe on the placing boom, and then the placing boom shall be turned to check the stability of the placing machine. At the same time, all joints of the conveying pipe shall be checked for safety and reliability.

(3) Power-on for pumping: after all concealed works are pre-inspected and the conveying pipe is laid, the placing machine shall be connected and turned on to start pumping.

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(4) After the concrete pump is started, an appropriate amount of water shall be pumped first onto the hopper and piston of the concrete pump as well as the part exposed to concrete on the inner wall of the conveying pipe. Then an appropriate amount of mortar with the same mix ratio as concrete shall be pumped through the conveying pipe.

(5) Concrete shall be pumped at a uniform low speed and the pump shall be ready for reversing in the early period of pumping. The pumping speed shall gradually rise. Meanwhile, the pressure of the concrete pump and the operation of each system shall be observed. Concrete must not be pumped at a normal speed until all systems work properly.

(6) Concrete shall be pumped continuously, and the interruption time must not exceed the allowable duration from concrete mixing to the end of pouring.

(7) During concrete pumping, there should be adequate concrete in the receiving hopper to prevent blockage caused by air suction. The non-poured part inside the conveying pipe must be free of scattered concrete, to avoid the nonconformity of re-pouring quality.

(8) When the expected pumping interval exceeds 45 minutes or concrete is segregated, residual concrete inside the pipe shall be flushed immediately with pressurized water or compressed air or by other means.

(9) After pouring, the pipe shall be cleaned in a timely manner. All the personnel shall be away from the outlet of the placing boom to avoid injuries caused by the ball flushed out. Once a ball is flushed out, the background shall be immediately notified to cut off the water supply.

(10) The concrete pump shall be operated in strict accordance with the operational requirements. The conveying pipe shall be cleaned immediately after concrete pumping or pumping of concrete with different mix ratios.

#### 5.6.4 Protection and Curing of Finished Product

(1) After concrete pouring, concrete or mortar scattered on layers on and under formworks shall be cleaned in a timely manner.



(2) Manual operation must not be done before final setting or during early curing of concrete.

(3) The floor concrete shall be prepared in batches and categories and spread uniformly as carefully as possible according to the operating procedures.

(4) Bottom formworks must not be removed until the concrete bearing structure reaches the specified strength.

(5) The side formworks of shear walls and columns shall be removed and placed with care, and must not be thrown randomly, in order to prevent damage to the exposed corners.


(6) The floor slab concrete shall be promptly covered with film and cured with water within 12h after pouring. The times of water spraying shall ensure that concrete is always wet. After the formworks of the frame column are dismantled, curing liquid shall be sprayed or the film shall be applied immediately.

### 5.7 Scaffolding

Scaffolding shall be erected in accordance with the engineering characteristics, construction needs and relevant technical regulations.

#### (1) Pole erection

The bottom scaffolding shall adopt a floor-standing structure with double bent frames. Poles shall be erected on 5cm thick pads and at intervals of 1.5m, and connected via butt buckles. The joints of adjacent poles shall be kept staggered for 1.5m. The displacement distance of two adjacent joints within one step and with one pole in between shall not be less than 50cm, and the distance between each joint center and end must not be greater than 50cm ( $1/3$  of the step). The scaffold shall be erected up according to the construction progress. The erection height on each layer shall be 1.5m above the construction layer. The top end of the pole shall be 1.5m above the upper surface of the eave. The pole in the innermost row shall be 35cm away from the exterior wall, and the spacing between inner and outer rows shall be 0.9m.





(2) Longitudinal and transverse crossbar

Large crossbars shall be set at intervals of 1.50m and connected via butt buckles. The joint displacement distance must not be within one span. Small crossbars shall be erected at the intersections of large crossbars and poles. The outer ends of small crossbars shall be extended for 100mm.

Bars to be connected with the wall shall be set based on three spans in the horizontal direction and two steps in the vertical direction. Bars shall be locked on the structural column or T-shaped wall.

(3) Cross bridging structure

The width of each cross bridging structure shall not be less than four spans. The angle between the diagonal bars and ground shall be  $45^{\circ}$ - $60^{\circ}$ . Cross bridging structures shall be mounted continuously in the height direction, lapped as needed for no less than 1m, and secured with three buckles at the same intervals. The diagonal bars of cross bridging structures shall be secured at the extension end of the transverse crossbar or the corresponding pole via the rotary buckle. The distance between the main node and the centerline of the rotary buckle shall not be greater than 150mm.

(4) The dense mesh shall be suspended. While the scaffold is erected up, the dense mesh shall be connected via nylon ropes (5mm) through all holes in a fully sealed manner, and must not be tied with iron or lead wires. Nets shall be laid at vertical intervals of less than 10m on the construction layer.

## 5.8 Masonry Engineering

### 5.8.1 Material Requirements

(1) The infilled wall shall be constructed with aerated concrete blocks in strict accordance with the block quality requirements. The blocks delivered to the site must be carefully checked by the material staff for edge or corner missing, and immediately sampled and inspected as required after delivery to the site.





(2) Medium sand of appropriate grade shall be used, with the silt content less than 5%. The lime paste must be fully aged for more than 7 days before use.

(3) The mix ratio sheet must be provided for mortar.

(4) The age of blocks shall exceed 28 days and the strength thereof shall meet the design requirements. Water shall be sprayed to keep the masonry surface wet.

#### 5.8.2 Operational Requirements

##### (1) Mortar

a. Raw materials: composite Portland cement and medium sand (silt content: not greater than 5%) shall be used, without debris such as grass roots. The lime paste shall be prevented from drying, freezing and contamination. It is forbidden to use the dehydrated and hardened lime paste.

b. Mixing and use: the mechanical mixing time shall not be less than 2min. Mortar shall be mixed in a container as needed. The cement mortar must be used within 3h after mixing and within 2h when the maximum air temperature exceeds 30°C.

c. Sampling: mortar samples shall be randomly selected at the outlet of the mixer. One group of samples shall be taken from the same plate.

##### (2) Construction

a. The technician needs to draw the tile layout drawing of the infilled wall prior to the construction.

b. When the height of the infilled wall is 4m or greater, horizontal waist walls shall be connected with the frame columns at two ends in the middle of the wall. When the wall length is more than twice the storey height, reinforced concrete columns in the wall shall be poured with C25 concrete.

c. Structural columns shall be mounted with the horizontal spacing no more than 2.5m in the length direction of the parapet wall. Both the



structural columns and coping ring beams shall be reinforced according to the design requirements.

d. The infilled wall shall be constructed with staggered joints, of which the lap length must not be less than  $\frac{1}{3}$  of the block length.

e. The horizontal and vertical joints should be 15mm wide (mortar fullness: no less than 90%), without transparent, bastard or dummy joints.

f. There should be no scaffolding holes in the infilled wall.

g. The tie bars shall be post-bonded in the project, with the spacing conforming to the modulus requirements of blocks.

h. Staggered joints shall be reserved first backwards and then forwards in the masonry on the edges of reinforced concrete structural columns, of which the displacement distance shall not be less than 60mm.

i. A gap (3-5cm) shall be reserved when the infilled wall is constructed to the bottom of the beam or slab, and filled at least 14 days after the works are completed.

g. The buried penstock trough must be repaired and subject to the acceptance of concealed parts.

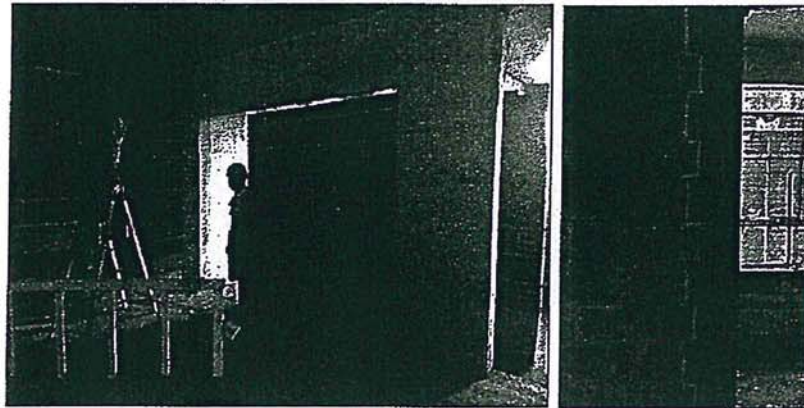


Figure 5-10 Masonry Construction

## 5.9 Decoration Engineering

After the acceptance of main structures, interior and exterior decoration can be reasonably organized during construction.

### 5.9.1 Interior Wall Plastering

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(1) Construction site and working conditions

- a. The project mainly involves the plastering of interior walls.
- b. The scaffolds and related boards shall be erected before the interior wall plastering, to prevent the mortar from falling onto the ground to cause waste.
- c. The convex parts on the surfaces of concrete frame columns shall be fully ground, including honeycombs, pitted surfaces, and exposed rebars, and leveled layer by layer with cement mortar. The exposed rebar and galvanized wire heads shall be removed.
- d. The brick wall shall be made wet one day before plastering. Water must be sprayed in advance onto the wall consisting of aerated concrete blocks, and shotcreting shall be carried out to the concrete wall.

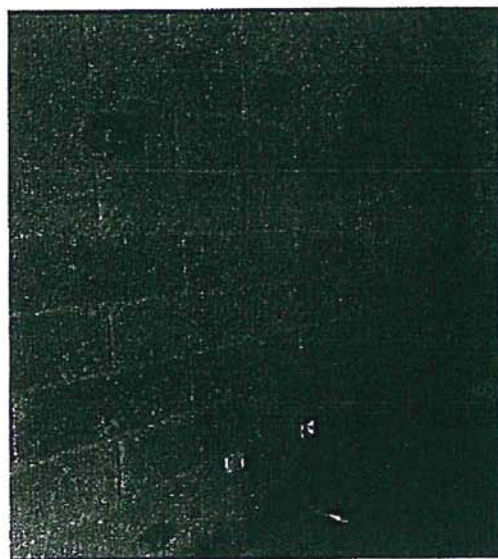


Figure 5-11 Plastering and Shotcreting

(2) Material requirements

- a. Cement: composite Portland cement.
- b. Sand: with mean particle size of 0.35-5mm.
- c. Lime: made by curing quicklime for 7 days or more, without contamination.
- d. Construction equipment: mortar mixer, platform scale, 5mm sieve, narrow barrow, iron plate, iron shovel, flat shovel, vat, mortar tank,

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rubber hose, mortar board, wooden trowel, iron trowel, internal (external) corner trowel, plastic trowel, iron trowel, large bar, medium bar, crossbar, wire brush, broom, chalk powder package, small white line, and plummet.

### (3) Process

Base treatment → right angle and square inspection and mortar cake pasting → wall stiffening (standard stiffeners) → corner protection → cement mortar plastering of window sill → bottom plastering → intermediate plastering → cement mortar covering (including the cement skirting board and dado) → wall covering → curing.

### (4) Operating process

a. Base treatment: roughening, right angle and square inspection, pier construction, wall stiffening, bottom and intermediate plastering with cement mortar (1:2.5) or cement polymer mortar, and flattening with a grinding board. Before the mortar is solidified, the surface shall be roughened with a broom, or cross lines shall be drawn with a steel trowel at intervals to prevent the base from hollowing.

b. Cement mortar plastering of the surface: the surface shall be plastered (thickness: 5-8mm) with cement mortar (1:2.5) or as required in the design on the day following intermediate plastering. In order to prevent wall roughening, attention shall be paid to the mix ratio during construction. The water-cement ratio shall be controlled in strict accordance with the disclosure requirements.

c. Large-scale plastering: lines must be suspended before plastering. When the wall is more than 6m long, through lines shall be applied in the horizontal direction. The walls of each floor shall be divided to prevent shrinkage cracks after plastering.

### (5) Technical measures for plastering

#### a. Key points of construction technology

Before plastering, dust, dirt and oil stains on the base surface shall be cleared, and water shall be sprayed to keep the surface wet. Plastering

shall be carried out layer by layer. When the total plastering thickness is 35mm or greater, anti-cracking measures with fiber meshes shall be taken. During plastering of the intersections of bases constructed with different materials, the galvanized welded mesh shall be added for reinforcement. The lap width between the reinforcing mesh and each base shall not be less than 150mm.

Reinforcement measures are needed normally in the case of thick plastering and connection of bases constructed with different materials.

b. Quality standards

The secure and attractive bonding without cracking or hollowing is critical for the quality of plastering, so the base surface must be properly treated according to the specifications. The variety and performance of general plastering materials shall meet the design requirements. The cement setting time and stability shall be qualified. Mortar shall be mixed as required in the design.

Normally, the surface to be plastered shall meet the following requirements: the general surface to be plastered is smooth and clean, with flat and clear joints; the plastered layer is free of peeling or hollowing; and the surface is without ash explosion or cracking. The plastered surfaces of protective corners, holes, grooves and boxes shall be neat and smooth; and those behind pipes shall be flat. The total thickness of the plastered layer shall meet the design requirements; cement mortar must not be applied on the lime mortar layer; the covering gypsum plaster must not be used on the cement mortar layer. The dividing joints shall be set in accordance with the design requirements, with the uniform width and depth, smooth surfaces, and neat edges and corners. Wherever required, drip lines (trays) that are neat and straight shall be provided, of which the inner parts shall be higher than the outer parts and the width and depth shall not be less than 10mm.

c. Protection of finished products in plastering: the embedded parts in walls shall be protected, and wire boxes, troughs and holes reserved for

NA



plumbing equipment must not be sealed. The floor surface shall be properly protected, so mortar shall not be directly mixed on the floor.



Figure 5-12 Plastering

#### 5.9.2 Cement Floor Engineering

##### (1) Base cleaning

Before the construction of the surface course, floating mortar and construction waste on the base course shall be cleared, followed by flushing with pressurized water.

##### (2) Concrete floor

a. The base shall be cleaned, flushed and kept wet without water accumulation.

b. Leveling shall be performed based on the ground design elevation, by fixing the horizontal elevation, plastering within a small scale in four inner corners of rooms as required, and small-scale intermediate plastering at intervals of approximately 1.5m.

c. Before paving, the surface course shall be treated with one layer of plain cement mortar and simultaneously compacted with the paving machine.

d. Curing shall be started 24h after the concrete surface is laid and smoothed. Under normal circumstances, the surface course shall be fully

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covered with the wet materials and cured with water for 5-7 days at normal temperature.

### 5.9.3 Tiled Floor Engineering

#### (1) Base cleaning

Before the construction of the surface course, floating mortar and construction waste on the base course shall be cleaned, followed by flushing with pressurized water.

#### (2) Floor tile

a. Tiles shall be selected according to the material acceptance criteria. All types of tiles shall be regular with edges and corners in good conditions as well as uniform color, free of cracking, surface roughening and warping.



b. Construction control lines shall be set out based on the drawings and benchmark lines (checked in advance). The cross control lines perpendicular to each other shall be set out on major parts (special parts and intersections of different patterns and materials) to control and inspect the position and construction quality. All the control lines set out shall be checked and recorded, followed by protection for efficient use.

c. Stiffeners shall be applied at intervals of no more than 1.5m according to the elevation in the drawing and the control line in the case of different elevations. The cement mortar of 1:2 or 1:2.5 shall be applied, and through lines shall be tied to check the conformity of the height.

d. Mortar shall be uniformly applied on the clean base course. Then a bonding course shall be made with dry hard cement mortar (1:2 or 1:2.5), and leveled via the scraper and compacted with the iron trowel until mortar is tightly bonded with the base course.

e. Trial tiling shall be performed according to the finished tile layout drawing. Sample rooms shall be finished and accepted before large-scale tiling.

f. The plain cement and 108 glue (appropriate amount) shall be applied on the back sides of tiles, with the uniform plastering thickness.



g. Vibration shall be performed via the rubber hammer with uniform force in the tiling process, to prevent damage to tiles. The tile flatness shall be checked with the spirit level, and the tile joints shall be checked via through lines. The surface shall be flat, with the consistent color and smooth tile joints and cross joints. All joints shall be made flat at the same height. Tiles shall be bonded securely without hollowing, according to the surface elevation and design requirements.

h. Finished product protection: it is forbidden to step onto the finished surface or transport materials within 24h after curing. When the finished surface meets the strength requirements, a special transportation and walking passage shall be made with rubber pads. All contaminants on the finished surface shall be immediately removed with saw dust.



Figure 5-13 Laying of Floor Tiles

#### 5.9.4 Coating

(1) Base requirements: the mortar course of the base course shall be flat, solid and clean, where the moisture content shall be less than 10%. The floating sand, dust and bumps on the wall surface and top surface shall be cleared, and the release agent and oil stains on the surfaces shall be removed with alkaline water.

(2) Puttying: the putty used shall have high strength and not be softened or expanded in water, with no powder felt by hand. Prior to puttying, gaps in the pits, holes and damaged parts on the wall surface shall be leveled. The number of putty layers depends on the flatness of

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the wall surface. Normally, putty shall be fully and smoothly applied in the horizontal, vertical and horizontal direction in sequence. The surface shall be ground with sandpaper each time after drying, and floating surface shall be removed with wet cloth.

(3) Coating: uniform coating shall be performed at intervals of about 4h and from top to bottom, followed by careful treatment in the horizontal direction.

(4) Finished product protection: it is not necessary to clean the coated wall surface after drying, in order to avoid dust. After the imitation porcelain surface is dried, water must not be sprinkled close to the surface, to avoid contamination. Also, the wall surface must not be touched by the dirty hand. The finished wall surface shall be properly protected from collision. The ground doors, windows, glass and hardware must not be contaminated in the coating process.

### **5.10 Interior Waterproofing**

#### **5.10.1 Operational Requirements**

(1) The mortar of the base course must be securely bonded without cracks. The surface thereof shall be flat, but may not be smooth. There must be no defects such as hollowing, loosening, bulging, pitting, sanding, peeling, etc. All the internal and external corners must be made as small round corners (20mm).

(2) The surface of the base course shall be dry.

(3) The waterproof coating shall be applied at a height of 250mm on four wall surfaces of kitchens, 500mm in toilets, and 1,800mm within 1,000mm around showers.

(4) Cleaning: mortar bumps, dust and debris on the surface of the base course shall be cleaned thoroughly.

#### **5.10.2 Basic Practice**

(1) Holes shall be reserved accurately for pipes in toilets during construction of main structures. Post-chiseling is forbidden.

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(2) When water supply and drainage pipes of toilets are laid through floors, sleeves must be used at a height of 20mm above the surface course. Gaps (3-5mm) shall be reserved between the sleeves and pipes.

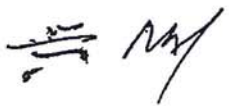
(3) The gaps between the sleeves and floor holes shall be filled with C20 fine aggregate concrete, doped with the expansive agent (cement content: 5%), to avoid gaps caused by concrete shrinkage. Concrete shall be vibrated clockwise with round steel ( $\Phi 12$ ) for at least 30 times, until there is floating mortar without settlement.

(4) When the tube reinforcement material is laid, the gaps around sleeves shall be sealed with the construction sealant, ensuring that coils are lapped with the sealant around the roots of pipes. The additional course shall be applied up from the roots of pipes to above the upper openings of sleeves. The gaps between the sleeves and pipes shall be tightly filled with the construction sealant.

(5) After the waterproof layer is finished, the impounding test shall be tested at 20-30mm above the highest point on the ground. The test results shall be regarded acceptable in the case of no leakage within 24h, and related records shall be made.

(6) During the laying of floor tiles of toilets, the floor slopes shall be kept consistent to smoothly discharge water into floor drains. The surface courses within 300 mm around the water supply and drainage pipes shall be obviously sloped and higher than the adjacent surfaces.

(7) Except for pedestal pans and floor drains, water stops shall be made at the roots of all pipes (including sanitary fixture drains) to 20mm above the surface course. The plane size of water stops depends on the pipe thickness. The floor drains in toilets shall be wrapped with a waterproof layer, which shall be set in the same method as that between the sleeves and holes. The pipes through floor slabs of kitchens and balconies shall also be mounted in strict accordance with the above practice.



## 5.11 Door and Window Installation Engineering

### 5.11.1 Quality Requirements

(1) The wind pressure resistance, air permeability and rainwater penetration resistance shall comply with relevant regulations.

(2) Doors and windows shall be connected to concrete structures via the nail gun. For aerated concrete block walls, concrete blocks shall be pre-installed, and window frames shall be connected via the nail gun.

### 5.11.2 Key Points of Installation

(1) Window frames shall be installed when main structures are basically completed, and window sashes shall be erected when interior decoration is basically finished, in order to avoid damage during civil construction.

(2) Before the installation of door and window frames, the sizes of all holes shall be checked for compatibility with these frames.

(3) The 50 control lines and vertical lines shall be set out on indoor floors, and the benchmarks of door and window frames shall be made as a basis of installation.

(4) The doors and windows on one façade shall be neat and consistent in the horizontal and vertical direction. Any significant deviation shall be corrected in a timely manner.

## 5.12 Roof Engineering

### 5.12.1 Leveling Course Construction

Process: base treatment → pipe root sealing → slope elevatoin setting-out → water spraying → debris removal to avoid the influence on the effective thickness of the leveling course.

(1) Prior to the construction, the paving height, thickness and slope of the leveling course and the positions of embedded parts shall be marked.

(2) Raw material requirements for cement mortar: plain cement of Grade 32.5# or above and clean medium or coarse sand shall be used, with the silt content meeting the specifications.



(3) The thickness of the mortar leveling course shall meet the design requirements, and the roof and slope shall comply with the drainage needs. Lines shall be set for benchmark tiles before the leveling course is paved.

(4) The cement mortar leveling course shall be plastered after the final setting of benchmark tiles. One layer of plain cement shall be applied at the same time with plastering. The roof slope must be strictly controlled based on the height of benchmark tiles, and completed continuously at a time.

(5) The mix ratio of cement mortar shall meet the design requirements.

(6) Parapets and water outlets on the roofs shall be chamfered, with the radius no less than 100mm.

(7) Quality control of leveling course

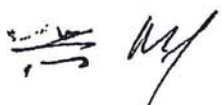
a. Materials used in the sloping and leveling process must comply with the design requirements and specifications.

b. The leveling course shall be securely bonded, without loosening, peeling, sanding, hollowing, etc. The surface of the leveling course must be checked with the 2m rulers for straightness. The gap between the leveling course and ruler shall not exceed 5mm, only allowing one gentle change per meter. Hollow spots shall be leveled with cement mortar.

c. The slope must be accurate and in line with the design requirements.

d. At junctions of two faces, such as walls, parapets, risers, flashing areas, eaves, gutters, water outlets, ridges, vent pipes and exhaust pipes shall be arced, with the radius of 100-150mm.

e. Dividing joints shall be set separately and filled with the caulking material, of which the width and vertical and horizontal spacing shall meet the relevant requirements.





f. The slopes around water outlets shall be accurate. The 20mm wide and 20mm deep troughs shall be reserved on the contact parts between the outlet cups and base course, and filled with the sealing material.

#### 5.12.2 Waterproof Layer Construction

(1) The base surface for waterproof layer construction must be cleaned to remove dust and debris. Hard mortar blocks and protruding parts on the surface shall be shoveled and cleared. The internal and external corners shall be plastered into arcs or obtuse angles.

(2) The base surface for waterproof layer construction shall be kept dry, flat and secured, without defects such as hollowing, cracking and sanding.

(3) Detailed parts such as pipe roots, drains and internal and external corners exposed on roofs shall be repaired with the additional course, followed by the inspection as well as acceptance of concealed works.

(4) The waterproof layer must not be constructed on rainy or windy days.



Figure 5-14 Roof Waterproofing

#### 5.12.3 Construction of Waterproof Protective Layer

(1) Base treatment: dust and debris on the base course must be thoroughly cleaned.

(2) The completed insulation surface shall be flat without trolleys or heavy objects, where walking shall be minimized.

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(3) Protective layer of C20 fine aggregate concrete and surface course of cement mortar: reinforcing meshes ( $\Phi 4@150$ ) shall be tied and divided into grids of 6m or smaller according to the design, where the joint width shall be 10mm. The surface shall be plastered and compacted with the wooden trowel in the concrete pouring process, and rolled and leveled before the initial setting of concrete.

(4) 24h after the concrete surface course is completed, curing shall be performed for at least one week by means of applying a plastic film and spraying water.

(5) Dividing joints shall be thoroughly cleaned and filled with asphalt sand or paste.

#### 5.12.4 Finished Product Protection

Manual operation must not be performed until the compressive strength of concrete reaches 5MPa. Paint and mortar must not be stored on plates, and the tile surface shall be prevented from damage caused by hard devices such as iron pipes.

Temporary sealing and protective measures shall be taken to water outlets, inner drains and deformation joints to prevent blockage caused by debris. Municipal pipes shall be cleaned after the project is completed.

### 5.13 Water & Electricity Installation and Fire Protection Engineering

#### 5.13.1 Basic Requirements

(1) The specifications, models and materials of pipe components and supports shall meet the design requirements. Material certificates, quality certificates and necessary inspection certificates shall be submitted.

(2) Pipes must be installed according to the process and location requirements specified in the design documents.

(3) Pipes shall be kept clean without debris and can be emptied and dredged during operation.

(4) All pipe connectors shall be tightly secured.





(5) Valves and instruments shall be tight without leakage, and reliable and easy to operate.

(6) Pipe supports and hangers shall be selected properly and secured for the safety and reliability during operation.

(7) Pipes shall be kept straight in the vertical and horizontal direction, and the slopes shall comply with the design requirements. Forced connection must be avoided between pipes and equipment. When fasteners are loosened, connectors shall be in the correct and free positions.

(8) Pipes shall be subject to appropriate corrosion treatment and thermal insulation.

(9) The reliability and integrity of building structures shall not be damaged during the pipe installation.

(10) Flanges, welds or other connectors shall be installed with conveniences in overhaul, and must not be attached onto walls, floor slabs or pipe supports. The installation of insulated pipes shall be conducive to thermal insulation.

(11) All pipes, valves and fittings that have been degreased shall be wiped with white cloth and checked for grease on inner surfaces during installation. If there is grease, these parts shall be degreased again.

#### 5.13.2 Pipe Prefabrication

(1) Pipes shall be prefabricated wherever possible to reduce the fixed welds and on-site installation workload.

(2) Pipe fabrication shall be performed according to the pipe segment drawing of the piping system.

(3) Pipe components shall be selected according to the quantity, specification and material requirements in the pipe segment drawing during the pipe prefabrication. The prefabrication sequence and pipe numbers shall be determined based on the system numbers in the pipe segment drawing.

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(4) Prefabricated pipes shall be segmented reasonably. The processing length of sealed segments depends on the sizes measured on the site, taking into account the conveniences in transportation and installation.

(5) Following the prefabrication of pipe segments, quality inspection shall be carried out. Welds must be subject to nondestructive testing and heat treatment before next procedure.

(6) The prefabricated pipe segments shall be numbered promptly, and welder codes and inspection marks shall be indicated in the pipe segment drawing.

(7) The prefabricated pipe segments must be subject to pressure testing before derusting, anti-corrosive treatment and thermal insulation.

(8) The prefabricated pipe segments must be rigid, without permanent deformation during transportation and lifting. Whenever necessary, some parts should be reinforced.

#### 5.13.3 Valve Installation

(1) Before the installation, the models, specifications and materials of valves shall be checked as per the design documents, and visual inspection and pressure testing shall be carried out to avoid the use of unqualified valves.

(2) Valves shall be installed in the closed state.

(3) The valve installation direction shall be determined according to the direction of medium flow.

(4) Valves on horizontal pipe segments shall be installed with hand wheels upward under normal circumstances, and downward or towards one side in special cases. The lifting type check valves, pressure reducing valves and regulating valves shall be installed on horizontal pipes or risers as required.

(5) When valves and flanges are installed simultaneously, bolt holes shall be distributed around the vertical center on a horizontal pipe, and in easy-to-operate positions on a vertical pipe.



(6) When valves and pipes are assembled, it is forbidden to knock the seals or valves with the hammer or other tools. Flange seals shall be prevented from damage by striking arc in the welding process.

(7) The valve actuator and drive shall be flexible to operate and accurate to indicate, without blockage.

(8) The installation heights and positions of valves shall be conducive to overhaul, generally at a height of 1.2m. When the valve centers are 1.8m above the ground, valves should be set in a centralized manner on an operation platform. The net spacing of hand wheels of pipe valves shall not be less than 100mm.

(9) The valves installed shall be properly protected, and not be opened or closed without permission. Protective covers shall be applied during cross operation.

(10) Relevant valves shall be subject to core pulling inspection after pipe flushing.

(11) After the valves are installed, obvious marks shall be made based on the valve opening and closing and the piping system.

(12) The flange model shall be determined according to the design requirements. When the design requirements are not available, refer to relevant atlas.

#### 5.13.4 Support Installation

(1) The spacing of pipe supports shall meet the design and material requirements.

(2) The dimensions of supports shall be determined based on the site conditions. It is forbidden to adopt electric welding for cutting and drilling. Flashes and burrs shall be removed, and welds shall be in the full state without slag inclusion. Except the parts embedded in concrete, anti-rust paint shall be applied in a timely manner.

(3) The supports in a row shall be installed after setting-out. Ventilation riser supports shall not be used as water supply supports. The heights of supports on one layer shall be made consistent, generally one



support at 1.4m when the storey height is less than 3m and two pipe clamps on average on drainage pipes when the storey height is more than 4m.

#### 5.13.5 Pipe Painting, Corrosion Protection and Thermal Insulation

(1) Pipes shall be derusted and painted according to the requirements in the design documents before and after installation.

(2) Prior to painting, rust and welding slag on pipe surfaces shall be removed until the metal luster is exposed and there is no oil, acid, alkali, water or dust. All pipes must be thoroughly derusted before painting.

(3) The type, color, number of layers and marking of paint shall comply with the provisions of the design documents.

(4) Pipe supports should not be painted in the same color as pipes. Unless otherwise specified in the design, they shall be painted in gray.

(5) Pipe painting shall be carried out in steps. Paint must not be applied again until the previous layer is dry. Under normal circumstances, prime paint and antirust paint shall be applied once or twice, and the color of the second layer should be slightly different from that of the first layer. The thickness of each paint layer should be appropriate. Repair or re-painting must be performed in the event of wetness, peeling, sagging or bottom exposure.

(6) The pipe insulation shall meet the design requirements, and be carried out after pressure testing and painting.

(7) For main insulating materials, quality certificates shall be provided by manufacturers, proving that their types, specifications and properties meet the design requirements.

(8) Vertical pipes shall be insulated from top to bottom, and the lap width of the moisture-proof layer and protective layer shall be 30-50mm.

(9) The insulating material shall be tightly attached onto the surface of the pipe to be insulated, and must not be filled in the gap between the tracing pipe and main pipe.



(10) Valves and flanges shall be insulated after thermal or cold fastening as required. The insulation layer shall be conducive to flange dismantling, with the bolt length plus 25mm gap reserved on one side. The valve insulation layer must not affect the filler replacement.

(11) The metal protective layer shall be tightly clamped, without peeling or roughening. The ring joints and longitudinal joints shall be connected or undercut downwards. When self-tapping screws are used, the moisture-proof layer must not be pierced. The screw spacing shall not be greater than 200mm, and the ports of the damaged layer shall be sealed.

#### 5.13.6 Installation of Indoor Water Supply Pipe

(1) The surfaces of the pipe and connector shall be kept flat and clean without oil stains. Marks shall be made at the insertion depth of the pipe.

(2) The pipe shall be heated within the entire insertion depth on the welding tool, including the pipe and connector.

(3) After heating, the pipe shall be steadily and evenly pushed into the connector to form a complete and solid combination.

(4) The connector can be adjusted within a few seconds after the pipe and connector are welded.

(5) The PP-R pipe shall be installed in the shaft according to the following rules. When there is an anchor respectively in the vicinity of two branch pipes of the main pipe, the main pipe can be vertically expanded or contracted between two floor slabs, and the maximum distance between two anchors inside the shaft shall not exceed 3m. Expansion can also be compensated by other means, such as the installation of an "expansion branch pipe" in the above branch pipe.

(6) For the pipe connected by means of hot melting, the hydraulic test shall be tested 24h after connection.

(7) Before the hydraulic test, the pipe shall be secured, with the connector exposed.

(8) The pipe shall be filled with water to discharge air therein in the water-tightness test.

(9) The pressure should be applied by a manual pump, for which the boosting time shall not be less than 10min and the pressure accuracy of the test instrument shall be 0.01Mpa.

(10) After reaching the test pressure (no more than 0.06Mpa), the pressure shall be kept for 1h.

(11) After 2h stabilization under 1.15 times of the operating pressure, the pressure drop must not exceed 0.03Mpa. and at the same time, all connectoins shall be checked for leakage.

#### 5.13.7 Installation of Indoor Drainage Pipe

(1) The adhesive that is volatile shall be sealed immediately after use. The bonding place shall be well ventilated and away from the naked flame.


(2) The connector shall be clean and attractive, and the excess adhesive shall be removed immediately after bonding.

(3) The adhesive shall be applied evenly and the bonded part shall be cleaned.

(4) Expansion joint setting: the PVC sewage pipe shall be provided with the expansion joint on each layer. When the water flow convergence fittings are mounted on floor slabs, expansion joints shall be located on these fittings; otherwise, expansion joints shall be installed on floor slabs. Before the installation of expansion joints, the plug-in test shall be carried out, with an expansion gap (2-3m) reserved at the bottom.

(5) The drainage pipe shall be sloped according to the design requirements. When a reducer is used, the upper part of the pipe shall be kept horizontal, and the section outside the roof shall be installed in the waterproof steel sleeve through the slab, followed by the water filling test, water flow test and ball passing test.

#### 5.13.8 Pressure Test and Flushing





After the entire water supply and drainage system is installed, the water supply test, heating pressure test and flushing test shall be carried out in accordance with the design requirements and specifications. The drainage system shall be subject to the water filling test and ball passing test, sanitary fixtures to the water holding test, and domestic water supply pipes to the disinfection and flushing test.

#### 5.13.9 Preventive Measures for Common Quality Problems

(1) Pipe installation: main quality problems include the dripping, floating, dropping, leakage, blockage, reversing, coordinate and elevation incorrectness of supports and sanitary fixtures, poor insulation and anti-corrosive treatment, etc.

(2) After the pipe installation, the tightness and strength shall be tested, pipes and connectors shall be checked for defects such as cracks, sand holes and thread integrity.

(3) Leakage of pipe connection: nozzles shall be carefully cleaned before connection. The socket shall be installed in the direction of medium flow, and the bell end in the opposite direction of medium flow. The PVC pipe shall be subject to the closed water test after the installation.

(4) Nonconformity of the pipe support: the appropriate support and hanger shall be selected during construction, with the spacing meeting the specifications and drawing requirements. They shall be secured and must not be drilled by means of electric welding.

(5) Valve leakage: the valve filler shall be properly sealed, the valve shall not be damaged, and the gland shall be pressed tightly and operated correctly.

(6) Unsmooth water flow and turbid water in the water supply pipe: the pipe shall be cleaned to remove dirt and debris before the installation and flushed after the installation.



(7) Blockage of the drainage pipe: the pipe shall be cleaned to remove debris before the installation and subject to the water flow test and ball passing test after the installation.

(8) Improper and loose installation of sanitary fixtures: the support shall be secured, and the sanitary fixtures shall be tightly attached onto the wall surface and leveled with the spirit level.

(9) Leakage at the connection between the closet pan and water supply pipe: the rubber bowl at the connection between the closet pan and water supply pipe shall be tightened twice in a staggered manner via the 14# copper wire; and the gap at the connection between the outlet of the closet pan and the drainage pipe shall be filled with putty or 1:5 lime paste.

(10) Poor water-collecting effect of the floor drain: the floor drain shall be installed properly, with the reasonable slope (no adverse slope), and the grille shall be 5mm lower than the ground.

(11) Bubbling, sagging, rusting of the paint film of the support: rust and dirt on the clean surface shall be removed before painting, and the support shall be inspected in the painting process. In the event of incomplete painting, paint repair shall be carried out carefully. The sag shall be removed by the blade before the paint film is completely dry. If there is still bubbling, the support should be painted again.

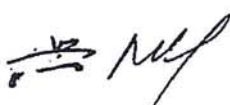
#### 5.13.10 System Debugging

The construction personnel engaged in the project must be familiar with the drawings, product manuals and system control principles, and able to conduct system debugging under the guidance and coordination of the manufacturer.

Debugging sequence: local parts, units and system.

### 6. Construction in Rainy Season

The construction shall be organized reasonably. The foundations shall be completed before the rainy season, and interior masonry and decoration works shall be conducted rationally during the rainy season.



The preparations for construction in the rainy season shall be carefully made in advance, including relevant devices such as pumps, and an appropriate number of waterproof materials such as plastic sheets and felts. Attention shall be paid to weather forecasts and weather changes, and preventive actions shall be taken. The site shall be inspected after heavy rains to reduce losses.



The key point of construction in the rainy season is overall planning of drainage on the construction site, including the prevention of water flow into the site and discharge of on-site water, pumping from the bottom of the foundation pit, and drainage on the ground. The drainage design shall be based on the local maximum rainfall over years and the requirements of construction. Specific measures are as follows: temporary drainage ditches shall be built around buildings to prevent water flow into the site; when the construction site is lower than the ground, the appropriate pump shall be installed in the foundation pit for mechanical or manual drainage based on the water flow; and when the construction site is higher than the ground, the drainage channel with the appropriate slope shall be constructed to discharge rainwater.

On-site temporary facilities shall be erected with rain-proof and leak-proof measures, and all flood control devices, equipment and tools shall be stacked and used according to the provisions, such as straw bags and barrels. At the same time, night shifts shall be strengthened for prompt safeguarding, and close attention shall be paid to the weather forecast.

## **7. HSE Plan**

The safety production assurance measures shall be taken to prevent various accidents (including major accidents).

The general guidelines for safety work are as follows: "safety first, prevention first, and comprehensive control".





The safety and security work can help to maintain the normal production order and work order of the enterprise, thereby facilitating normal production.

The construction site shall be fully enclosed by fences, and the living, office and production quarters shall also be separated by fences.

Site arrangement: the entrance, exit and stacking yard and the ground and roads for main facilities shall be hardened with concrete and kept flat. All roads shall be smooth and neat. Drainage facilities shall be installed to smoothly discharge water out of the site, thereby preventing water accumulation on the site.

The on-site temporary facilities, offices, canteens, dormitories, toilets and bathrooms shall be arranged according to the construction site plan, and the construction areas shall be separated from office and living quarters.

Sanitary facilities: canteens and drinking sheds shall be built on the construction site to supply clean drinking water.

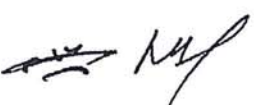
Health care and first aid: health care and medicine kits, commonly used drugs and first-aid appliances shall be prepared on the construction site, and first-aid personnel that have received health training shall be appointed on the site.

Greening: all possible conditions shall be created for greening on the site.

## **8. Civilized Construction**

The civilized construction management and supervision organization led by the Project Manager shall be established. The post responsibility system shall be established and improved to implement civilized construction and improve the consciousness and responsibility of all construction personnel for civilized construction.

The overall management of construction personnel shall be strengthened. The opinions and suggestions of local administrative





departments shall be respected, and various administrative management systems and regulations shall be consciously observed.

The relationship with local governments and surrounding people shall be handled properly, and the comprehensive security management shall be carried out jointly with local polices.

All temporary facilities on the construction site shall be laid and managed according to the general layout, to keep the construction site orderly.

The steel, cement and other materials on the site shall be warehoused if possible and the materials that are not warehoused shall be provided with covering and cushioning measures against rain and sunlight.

The environmental awareness of construction personnel shall be enhanced to reduce pollution sources and protect the vegetation.

The construction site shall be managed, with all machines neat, unified and stacked in the designated places.

The national laws and regulations on labor and environmental protection shall be observed.

## **9. Green Construction**

The Project Department shall establish a green construction leading group, with the Project Manager as the first responsible person and project management personnel as its members.

Measures shall be taken to control emissions. Construction machinery shall be equipped with flue gas treatment equipment, and maintained regularly to reduce the exhaust gas emission. During the construction with volatile materials, sealing measures against leakage shall be taken to minimize volatilization and prevent spillage.

Water pollution control: the sewage recycling and sedimentation basin shall be set on the site for sedimentation before sewage is discharged into the sewage pipeline network. The production and living sewage shall be discharged after sedimentation according to the standards.



The sediments shall be promptly cleaned, and the sewage shall be recycled as much as possible after sedimentation.

Noise pollution shall be managed in a closed manner to avoid disturbances to the surrounding environment. The timber/rebar sheds and mixers shall be enclosed on the site. Materials shall be handled with care during processing to effectively reduce noise.

Prevention and control of solid waste pollution: solid waste shall be kept the unified temporary storage yard, promptly removed, and managed in a classified manner (recyclable and non-recyclable). The recyclable materials shall be recycled as much as possible.

#### **10. Annex**

Annex 1: Handover List of The Affordable Housing Project (Phase I) in Trinidad and Tobago

Annex 2: Material Procurement List & Source of The Affordable Housing Project (Phase I) in Trinidad and Tobago



Indoor Part			
S/N	Components	Details	Remarks
1	Bedroom	600*600 general ceramic tile floor General interior painting General prefabricated door set General plastic-steel window	
2	Balcony	300*300 general anti-skidding ceramic tiles floor General exterior painting Aluminum sliding door General plastic-steel window	
3	Living Room	600*600 general ceramic tile floor General interior painting General steel burglary-resistant door General plastic-steel window	
4	Kitchen	300*300 general anti-skidding ceramic tiles floor General interior painting General plastic-steel window Concrete prefabricated chimney General kitchen cupboard	
5	Laundry	300*300 general anti-skidding ceramic tiles floor General PVC suspended ceiling 300*450 general glaze wall tiles Plastic-steel door General plastic-steel window	
6	Washroom	300*300 general anti-skidding ceramic tiles floor General PVC suspended ceiling 300*450 general glaze wall tiles Plastic-steel door General plastic-steel window General ceramic closetool General ceramic basin Simple shower General ventilation fan	
7	Cloak Room	600*600 general ceramic tile floor General interior painting Aluminum sliding door General plastic-steel window	
8	Lobby/Corridor	600*600 general ceramic tile floor General interior painting General metal burglary entrance door General plastic-steel window	
9	Staircase	Cement mortar floor General interior painting General wooden fire-resistant door General plastic-steel window Metal balustrade with mixed painting	
10	Reception Room	600*600 general ceramic tile floor General interior painting Prefabricated general door set General plastic-steel window	
11	Pipe Shaft	Cement mortar floor Cement mortar wall Wooden fire-resistant door	
12	Elevator	General elevator	
13	Strong Current Distribution Box	General type meeting function requirement	
14	Multimedia Hub	General type meeting function requirement	
15	Water Meter	General type meeting function requirement	
16	Electricity Meter	General type meeting function requirement	



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17	Firefighting Box, Indication/Control System	Follow the local standard regulations, if not applicable, follow the Chinese standard	
18	Lighting	Ceiling-mounted indoor lamp	
19	Socket	General socket	
20	AC Socket	General socket	
21	Internet Cable, TV & Telephone Socket	General socket	
Outdoor Part			
S/N	Components	Details	Remarks
1	Exterior Wall	Mortar bedding+exterior putty+exterior painting	
2	Roof	Waterproof roof with exposed golden foil	
3	Drainage Pipe And Condensated Water Pipe	PVC drainage pipe, PVC condensated water pipe	
4	Lightning Protection Test	Follow the design specifications	
Exterior Ancillary Facility			
S/N	Description	Details	Remarks
1	Road Within The Site	Concrete pavement	
2	Parking Lots	Concrete parking lots	
3	Greening Within The Site	Turf greening (planting soil shall be provided by Employer if needed)	
4	Fence	masonry wall (0.5m high) with steel fence on the top	
5	Gate	General metal gate welded by profile steel	

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**Annex 2: Affordable Housing Project (Phase I) in Trinidad and Tobago**  
**Material Procurement List & Source**

All/partially locally procured materials			
S/N	Description	Procurement Source	Remarks
1	Cement	Local	
2	Sand	Local	
3	Gravel	Local	
4	Ready-mixed concrete	Local	
5	Blocks&bricks	Local	
6	Timber	Local	
7	Glass	Local	
8	Balustrade material	Local	
9	Anti-termite chemical	Local	
10	Painting	Local	
11	Rainwater pipe,condensated water pipe	Local	
12	Water supply&drainage,firefighting pipe and appliances	Local	
13	Firefighting,security system	Local	
14	Electrical pipes, wires/cables	Local	
15	Switch,socket,weak current appliances	Local	
16	Power distribution box and weak current box	Local	
17	Elevator	General Elevator	
18	Ventilation system	Local	
19	Street light	Local	
20	Rebars	Partially local, and import	
21	Floor tiles	Partially local, and import	
22	Wall tiles	Partially local, and import	
Imported materials(procured locally if price is reasonable in Trinidad and Tobago)			
S/N	Description	Procurement Source	Remarks
1	Waterproof material	Import	
2	Plywood	Import	
3	Steel pipe,fastener	Import	
4	Door set	Import	
5	Fire-resistant door	Import	
6	Burglary-resistant door	Import	
7	Window,aluminum profile steel	Import	
8	Sanitary appliances	Import	
9	PVC suspended ceiling	Import	
10	Kitchen cupboard	Import	

Note:

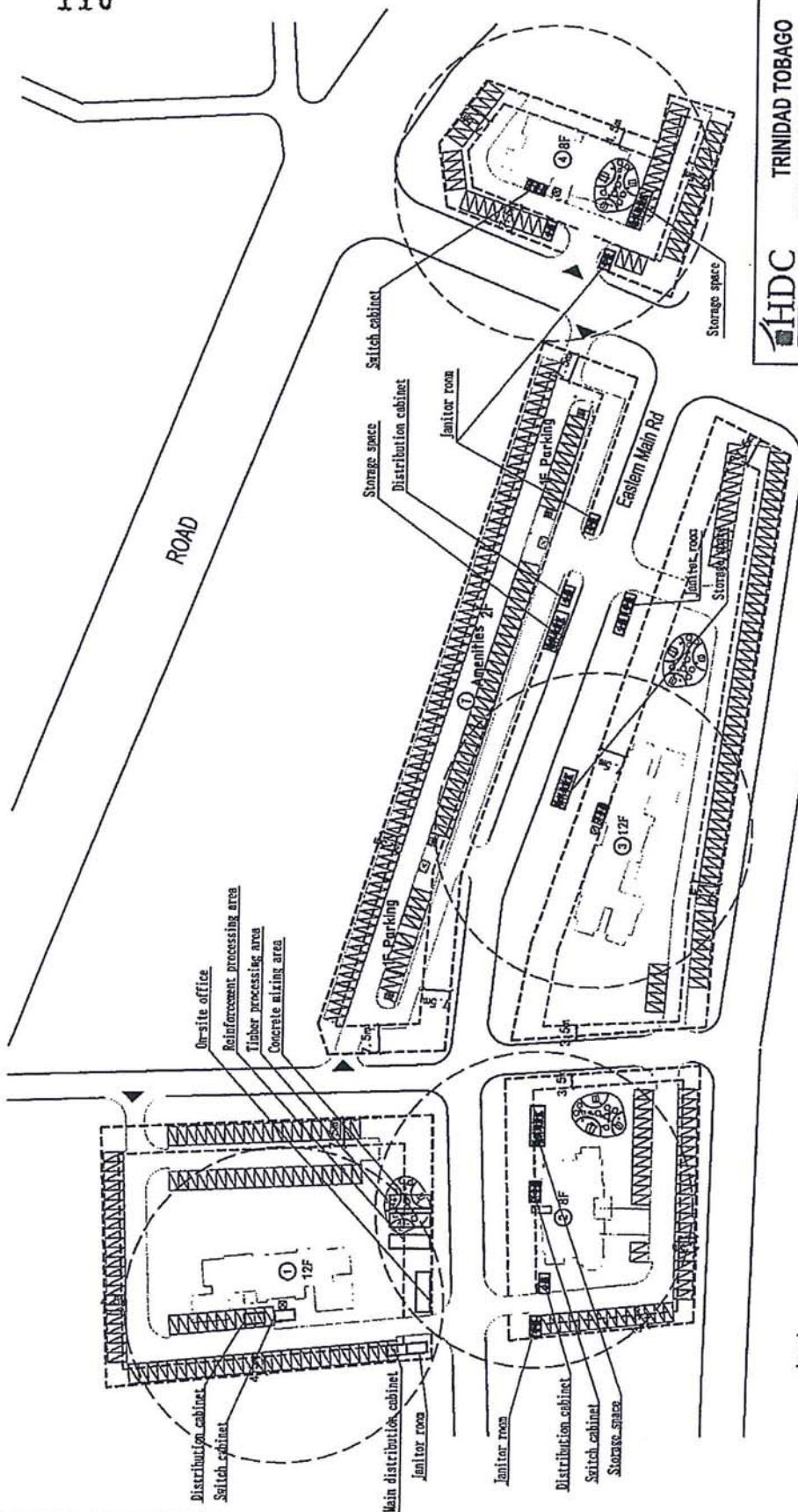
1.The procurement source mentioned above is for reference only, the plan may be changed in practice.

2.Local procurement refers to the procurement in Trinidad and Tobago, Import means the source outside Trinidad and Tobago.



# GENERAL CONSTRUCTION LAYOUT FOR SITE 1#

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Legends:



Torre Crane Coverage Line  
Existing Road

Notes:

1. The contractor's temporary camp will be deployed on the parcel provided by HDC within 5km from each site, while on-site offices, storage spaces, janitor rooms and simple auxiliary facilities will be deployed on each site.
2. The layout in this drawing is for illustration only and will be adjusted according to the situation when implemented.



TRINIDAD TOBAGO  
HOUSING DEVELOPMENT CORPORATION

5,000 Apartment Units Affordable Housing Project-Phase I



China Gezhouba Group  
International Engineering Co., Ltd

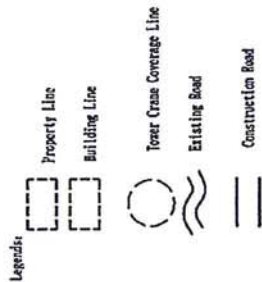
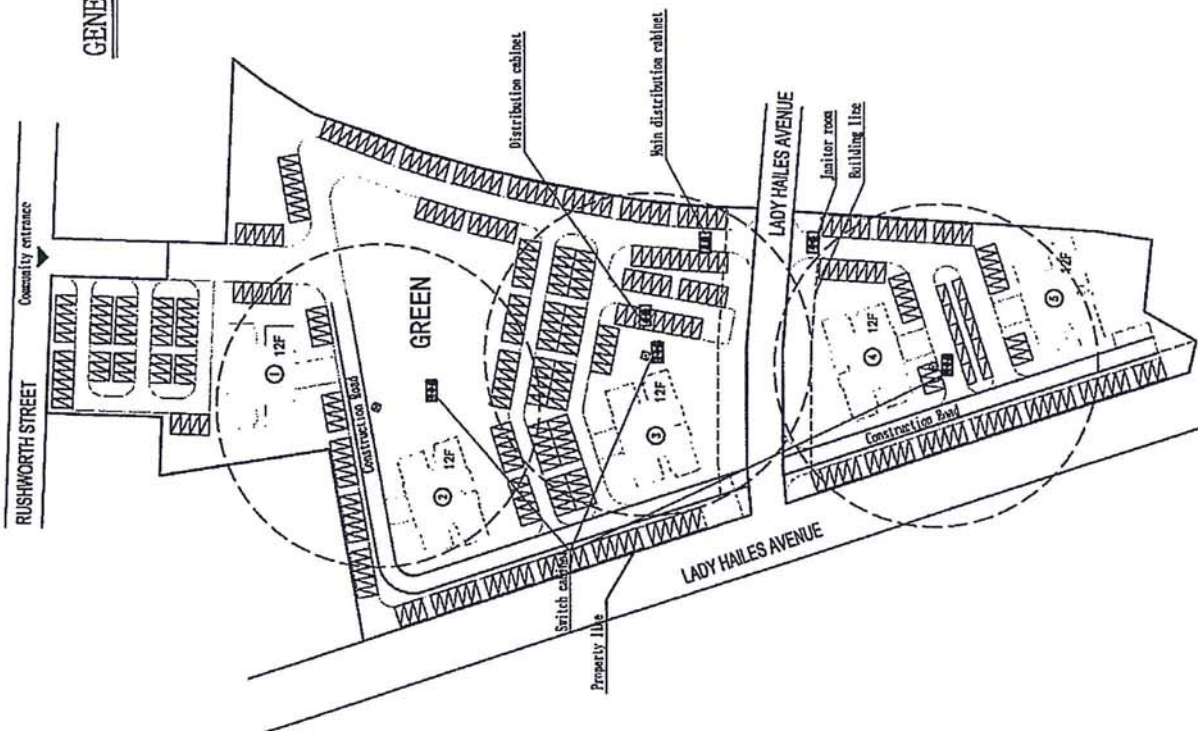
GENERAL CONSTRUCTION LAYOUT  
FOR SITE 1#

part 1.2-01

Drawn	Check	Scale
None	None	None
None	None	None
None	None	None
None	None	None
None	None	None



# GENERAL CONSTRUCTION LAYOUT FOR SITE 4#



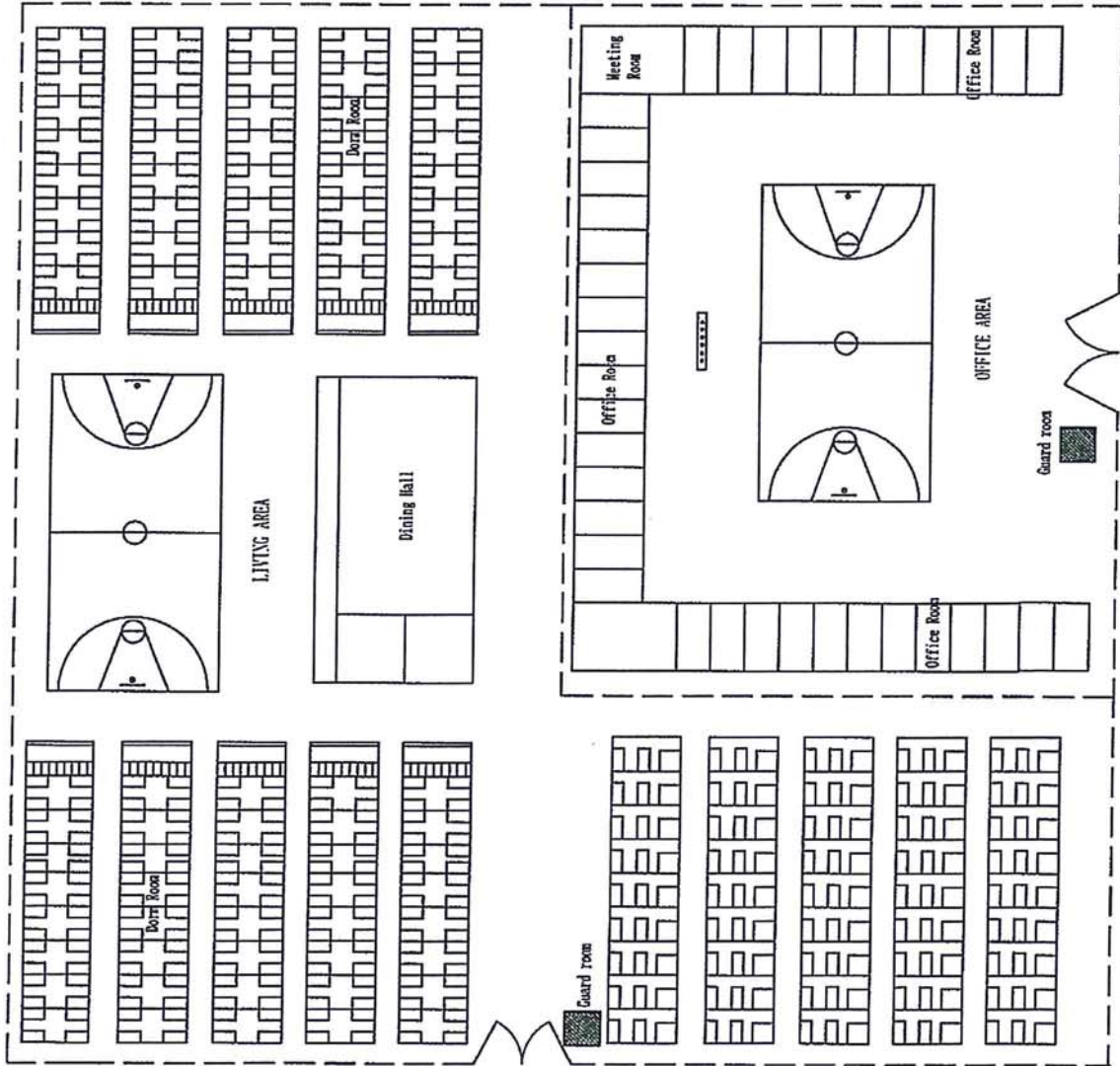
## Notes:

1. The contractor's temporary camp will be deployed on the parcel provided by HDC within 5km from each site, while on-site offices, storage spaces, janitor rooms and simple auxiliary facilities will be deployed on each site.
2. The layout in this drawing is for illustration only and will be adjusted according to the situation when implemented.

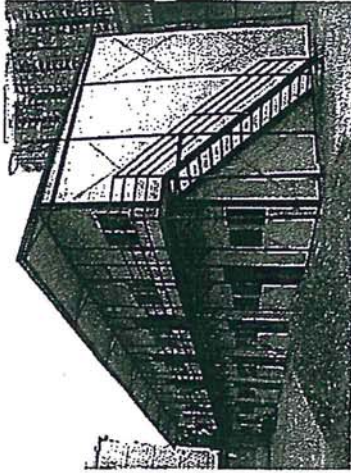
<b>TRINIDAD TOBAGO</b> HOUSING DEVELOPMENT CORPORATION		5,000 Apartment Units Affordable Housing Project-Phase I	
<b>China Gezhongba Group</b> International Engineering Co., Ltd		GENERAL CONSTRUCTION LAYOUT FOR SITE 4#	
Prep.	Date	Drawn	Scale
Checked		Approved	
			part 1.2-02

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# GENERAL LAYOUT FOR CONSTRUCTION CAMP




Light Steel Movable Housing

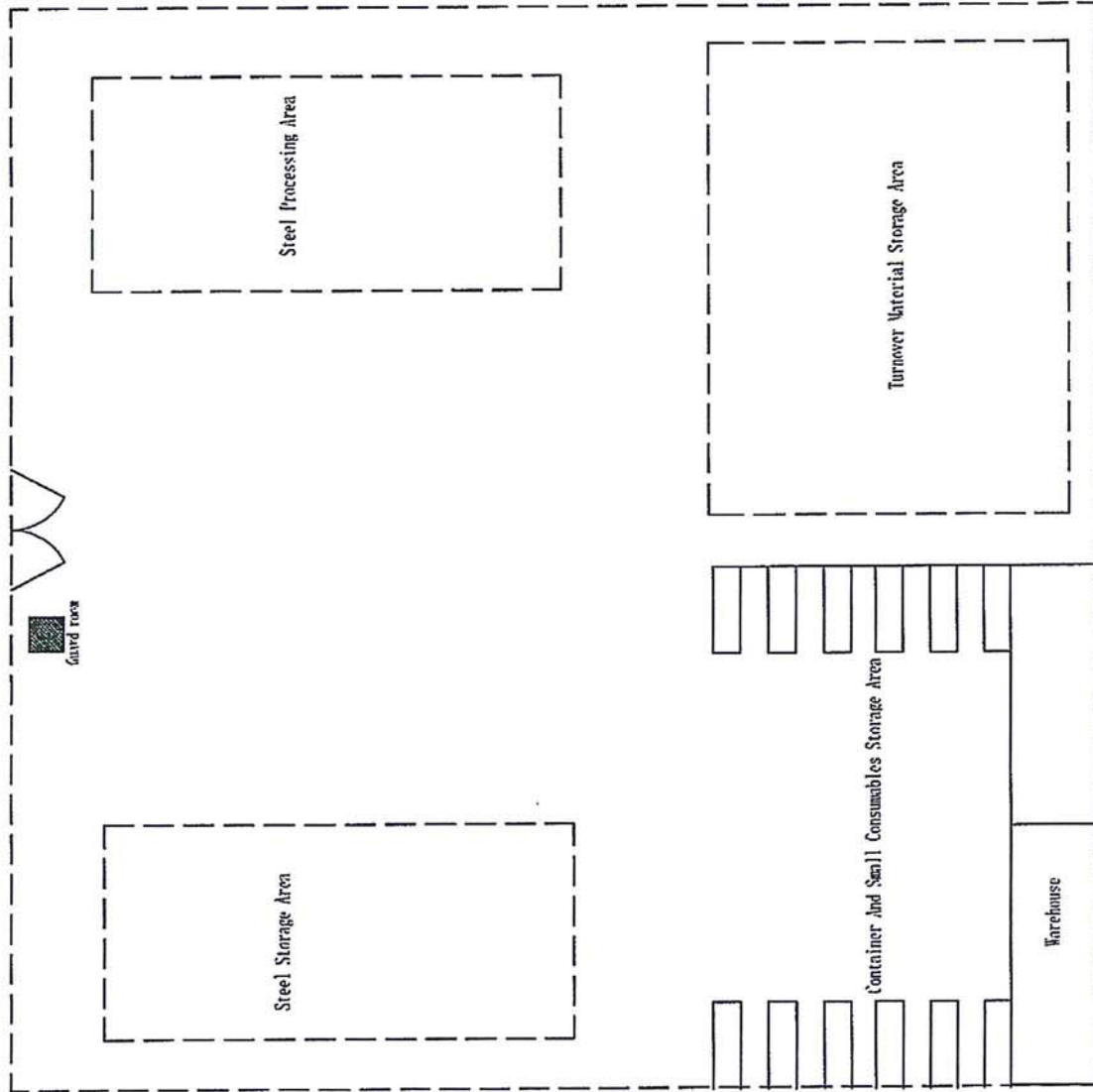


## Notes:

1. The construction camp will be deployed on the parcel provided by HDC within 5km from each site, including offices, living facilities, hatching plant, etc.
2. The camp will adopt light steel movable housing that can be easily assembled.
3. The layout in this drawing is for illustration only and will be adjusted according to the situation when implemented.

 <b>TRINIDAD TOBAGO</b> HOUSING DEVELOPMENT CORPORATION		<b>China Gezhouba Group</b> International Engineering Co., Ltd	
5,000 Apartment Units Affordable Housing Project-Phase I		GENERAL LAYOUT FOR CONSTRUCTION CAMP	
Drawn	Checkd	Approut	Scale
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# AUXILIARY FACTORIES FOR CONSTRUCTION



## Notes:

1. Auxiliary factories will be deployed within the construction camp, including steel processing plant and warehouse, etc.
2. The layout in this drawing is for illustration only and will be adjusted according to the situation when implemented.



TRINIDAD AND TOBAGO  
HOUSING DEVELOPMENT CORPORATION

5,000 Apartment Units Affordable Housing Project-Phase I



China Gezhouba Group  
International Engineering Co., Ltd

Drawn	Check	Scale

AUXILIARY FACTORIES FOR CONSTRUCTION  
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part 1.2-04

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## CONTRACTOR'S EPC PROPOSAL

### Table of Contents

#### **Part 1      Technical Proposal**

Part 1.1 Design proposal

Part 1.2 Statement of Main Construction Methods

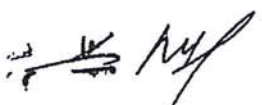
Part 1.3 Statement of Main Construction Methods

Part 1.4 Implementation Programme

#### **Part 2      Commercial proposal**

Part 2.1 Pricing Schedule

Part 2.2 Interim Payment Certificate Schedule and Payment Schedule



**Part 1.3 Subcontractor List**

List hereunder the principal Subcontractors and other persons and organizations that the Contractor intends to employ if awarded the Contract, including those who are to furnish the principal items of material and equipment, and the Work to be done by them. The Subcontractors have not yet been selected by the Contractor, who shall not be bound by such list.

	Description of Work	Name of Subcontractor	Address of Contractor
1	Design works	China Shipbuilding NDRI Engineering CO., Ltd	303 Wuning road, Shanghai, China
2	Site survey and geotechnical exploration	APR Associates Limited	32 Agostini Street, St. Joseph, Trinidad, W.I.
3	Site survey and geotechnical exploration	Earth Investigation Systems Limited	#2 Perseverance Street, Petit Bourg San Juan, Trinidad



## CONTRACTOR'S EPC PROPOSAL

### Table of Contents

#### Volume A

##### Part 1 Technical Proposal

Part 1.1 Design proposal

Part 1.2 Statement of Main Construction Methods

Part 1.3 Subcontractor List




#### Volume B

##### Part 2 Commercial proposal

Part 2.1 Contract Price Breakdown

Part 2.2 Payment Schedule

Part 2.3 Daywork Schedule





## Part 1.4 Implementation Programme

### 1. Project Characteristics

According to the analysis results, major difficulties and countermeasures for the construction of the project are as follows.

(1) Phase I involves 439 houses on two sites, subject to coordinated deployment and with high requirements for construction organization and significant difficulties in construction.

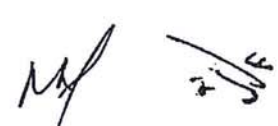
Countermeasures: Based on the characteristics of the project, rationally plan the division, establish a professional construction team, and allocate enough personnel and equipment for parallel flow operations, to meet the quality and duration requirements of the project.

(2) The duration of the EPC contract is approximately 2 years. Considering the large scale, adverse effects of the rainy season, low efficiency of local labor and other unfavorable factors, it is difficult to complete the project as scheduled.

Countermeasures: Reasonably arrange the alternation and connection of construction procedures; strengthen the control of the construction process and communication with local meteorological departments; obtain the trend of climate change in advance; and perform main works mainly in the dry season and interior decoration as needed in the rainy season.

(3) Trinidad and Tobago has a poor security environment. The sites of the project are scattered with great risks of public security, so reliable security measures are needed to ensure the smooth implementation of the project. (According to the instructions of the Owner, the South Quay site is classified as a high-risk one to be highlighted, and Lady Hailes site as medium-risk one.)

Countermeasures: Before the commencement, communicate with residents around the construction sites in advance, with the assistance of the Owner, to obtain their understanding and support. After the



commencement, carry out the site enclosure and security work. Employ local policemen to guard high-risk site, and appoint security personnel for the other sites.

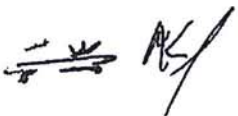
(4) At present, hydrological and geological survey data are not available, so there may be geological risks. In particular, the South Quay site in a relatively low-lying area is often flooded in the rainy season, due to the poor drainage of surrounding channels.

Countermeasures: Before the commencement, ask the Owner to improve drainage facilities around all sites (especially South Quay Sites, POS), so that the sites will not be affected by water-logging during construction.

## **2. Construction Arrangement**

The foundation and main structure construction schedule of the whole project shall not exceed 15 months; the construction tasks of secondary structure and decoration shall not exceed 9 months; and the outdoor projects shall be executed according to the conditions of the project progress in parallel. The whole sub-region shall carry out the construction in the flow process, and the total construction period shall not exceed 24 months (including 3 months of design and survey work); as for the construction organization mode, works will be organized in the way of flow process in stages and batches according to the size of each site; In the arrangement of the construction team, considering the large amount of the project as a whole (about 439 units), the whole project will be constructed in parallel by two construction teams. During the contract period, each construction team needs to complete 200~250 units or equivalent workload of construction tasks.

According to the scale and site distribution, the entire project shall be divided into two areas which are site 1# and site 4#. Simultaneous work will be carried out in two sites. The two areas shall be further divided into 2-3 construction sections consisting of 2-3 independent buildings. All the independent buildings shall be finished alternately. The





specific arrangement is as follows.

The 1# site area shall be divided into three construction sections: 1# and 2# building section, 3# and 4# building section, and 5# building section. One construction team shall be appointed to construct the foundations and main works of 1# and 2# buildings first, and then simultaneously complete the foundations and main works of 3# and 4# buildings as well as secondary structures and decoration of 1# and 2# buildings, and so on, until the 5# building is completed.

The 4# site area shall be divided into two sections: 1# to 2# building section, 3# to 5# building section. One construction team shall be appointed to work and finish the foundation and main structure of the 1# to 2# building section, immediately followed by the foundation and main structure construction of the 3# to 5# building section. Meanwhile, the secondary structure and finishing works of the 1# to 2# shall be carried out until they are completed. And so forth, until the completion of the 3# to 5# building section.

After the commencement of full-scale construction, the project will involve a lot of buildings and working surfaces, large overall scale, and great demands for labor, so labor allocation shall be dominated by skillful workers from China or other countries, supplemented by local workers. The ratio of foreign workers to local workers shall be around 1:2.

### 3. Construction Schedule

#### (1) Construction schedule of site 1#

Main structures of 1# and 2# buildings shall be completed in 7 months, and secondary structures and decoration in 9 months. Main structures of 3# and 4# buildings shall be completed in 7 months, and secondary structures and decoration in 9 months. The total duration of alternate construction is 21 months.

#### (2) Construction schedule of site 4#

Main structures of 1#, and 2# buildings on the 4# site shall be



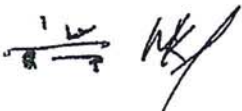



completed in 5.5 months, and secondary structures and decoration in 10 months; main structures of 3#, 4# and 5# buildings shall be completed in 5.5 months, and secondary structures and decoration in 10 months. The total duration of alternate construction is 20 months.

#### **4. Attachments**

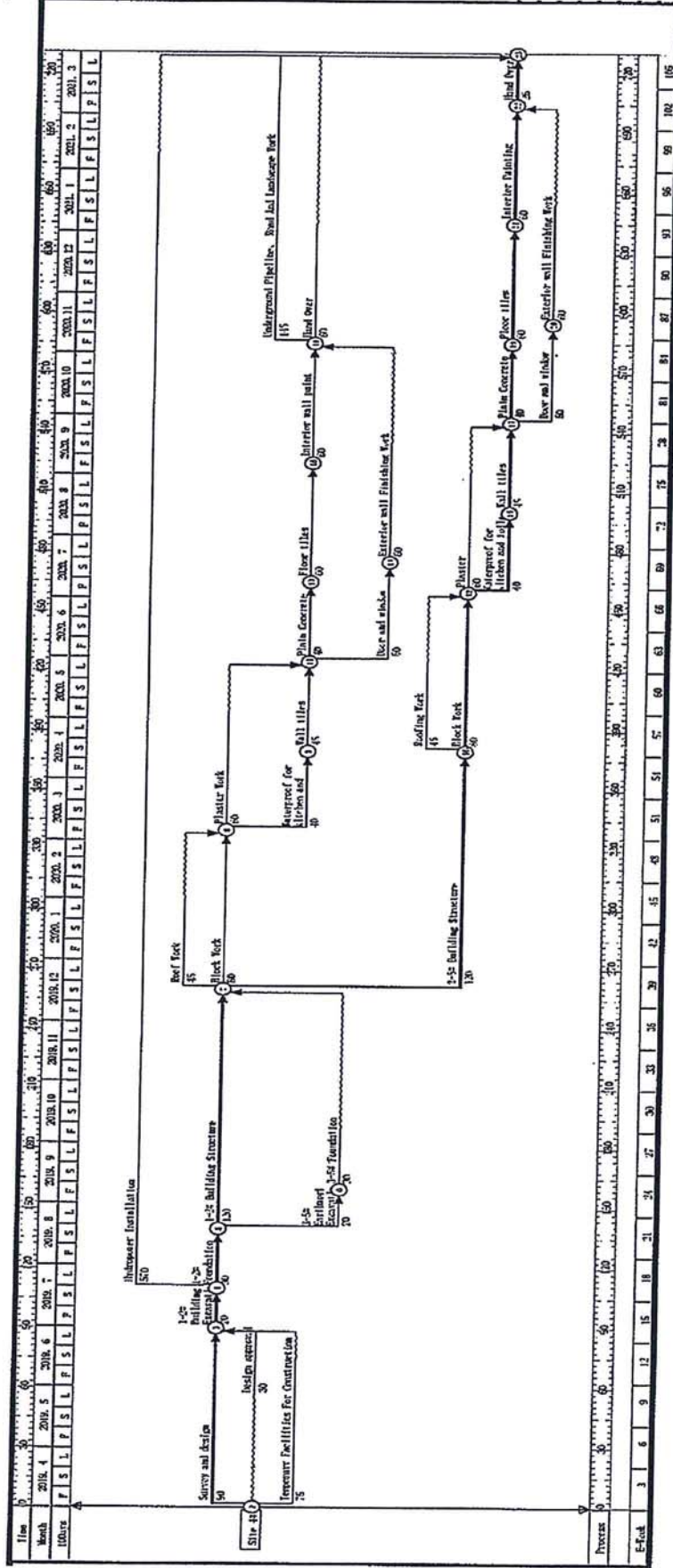
Part 1.4-1 The Implementation Schedule For Site 1#-SOUTH QUAY, POS

Part 1.4-2 The Implementation Schedule For Site 4#-LADY HAILES, SANFERNADO

 1.4-1  
1.4-2



Part 1.4-2 Implementation Schedule for Site 4#





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Part 2.2 Interim Payment Certificate Schedule and Payment Schedule

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5,000 Apartment Units Affordable Housing Project Phase I  
Pricing Schedule



Summary

Part No.	Content	Price(USD)	Note
1	General Requirements	4,618,963.57	
2	Survey, Site Investigation and Design	1,915,269.89	
3	Construction for 1#SOUTH QUAY SITES	31,911,163.99	
4	Construction for 4#LADY HAILES AVENUE SITES	31,063,048.80	
5=Σ(1,2,3,4)	Net Bid Price	69,508,446.25	
6	Provisional Sums	2,230,964.75	
7=6+5	Contract Price (excluding VAT)	71,739,411.00	

**5,000 Apartment Units Affordable Housing Project Phase I  
Pricing Schedule**

**Part 1-General Requirements**

No.	Item	Unit	Quantity	Unit Price USD	Total Price USD	Description
<b>1</b>	<b>General Requirements</b>				<b>4,618,963.57</b>	
1.1	Guarantee	LS	1	169,485.52	169,485.52	Advance Payment Guarantee and Retention money guarantee
1.2	Insurance	LS	1	1,241,357.22	1,241,357.22	Insurance under sub-clause 18.1 of condions of contract
<b>1.3</b>	<b>Contractor's Camps</b>				<b>2,700,215.60</b>	
1.3.1	Camps for 1#SOUTH QUAY SITES	LS	1	1,371,495.42	1,371,495.42	
1.3.2	Camps for 4#LADY HAILES AVENUE SITES	LS	1	1,328,720.18	1,328,720.18	
1.4	Site Clearance after completion	LS	1	507,905.23	507,905.23	

Part 1



5,000 Apartment Units Affordable Housing Project Phase I  
Pricing Schedule

Part 2-Survey, Site Investigation and Design

No.	Item	Unit	Quantity	Unit Price USD	Total Price USD	Description
2	Survey, Site Investigation and Design				1,915,269.89	
2.1	Survey and Site Investigation	LS	1	518,036.51	518,036.51	
2.2	Design	LS	1	1,397,233.38	1,397,233.38	
2.2.1	Conceptual design	LS	1	419,170.01	419,170.01	
2.2.2	Preliminary design	LS	1	419,170.01	419,170.01	
2.2.3	Development design	LS	1	558,893.36	558,893.36	

**5,000 Apartment Units Affordable Housing Project Phase I**

**Pricing Schedule**

**Summary of Part 3-Construction for 1#SOUTH QUAY SITES**

No.	Item	Unit	Quantity	Unit Price USD	Total Price USD	Description
3	Summary of Part 3				31,911,163.99	
3.1	Earthworks	LS	1.00	618,412.92	618,412.92	
3.2	Foundation works	LS	1.00	3,095,822.56	3,095,822.56	
3.3	Main works	LS	1.00	13,384,318.39	13,384,318.39	
3.4	Building decoration works	LS	1.00	6,941,951.49	6,941,951.49	
3.5	Outdoor ancillary works	LS	1.00	846,694.90	846,694.90	
3.6	Outdoor supporting works	LS	1.00	1,308,554.49	1,308,554.49	
3.7	Water supply and drainage, fire hydrant and sprinkler system	LS	1.00	811,078.59	811,078.59	
3.8	Electric , electronic and fire alarm	LS	1.00	3,029,491.00	3,029,491.00	
3.9	Ventilation	LS	1.00	158,468.38	158,468.38	
3.10	Outdoor pump house	LS	1.00	377,776.12	377,776.12	
3.11	Outdoor supporting installation	LS	1.00	667,860.84	667,860.84	
3.12	Transformation and distribution system	LS	1.00	670,734.31	670,734.31	

7/5

Part 3

*[Signature]*

5,000 Apartment Units Affordable Housing Project Phase I

Pricing Schedule

Part 3-Construction for 1#SOUTH QUAY SITES

No.	Item	Unit	Quantity	Unit Price USD	Total Price USD	Description
3	Sub-total of Part 3				31,911,163.99	
3.1	Earthworks				618,412.92	
3.1.1	Surface cleaning and spoil transportation	LS	1.00	189,189.00	189,189.00	Surface cleaning is considered at thickness of ±30cm and at haulage within 5km
3.1.2	Earth excavation	LS	1.00	139,984.55	139,984.55	The depth is considered at 2m, including rod sounding, but no groundwater is considered
3.1.3	Earth backfill	LS	1.00	289,239.37	289,239.37	the volume of excavation minus that of foundation concrete below the natural ground level is considered backfilling only, and the backfilling between the natural ground level and designed outdoor ground level is not considered, and the backfilling is considered using excavated soil on the site and compaction is included, but purchased backfill materials is not considered.
3.2	Foundation works				3,095,822.56	
3.2.1	Pile works (C30)	LS	1.00	2,102,708.30	2,102,708.30	The average depth of pile is considered to be less than 20 m. Piles will be used for the two 12-storey buildings.
3.2.2	Foundation cushion (C15)	LS	1.00	154,292.20	154,292.20	
3.2.3	Concrete of pile caps (C30)	LS	1.00	52,111.20	52,111.20	
3.2.4	Raft foundation concrete works (C30)	LS	1.00	391,502.38	391,502.38	Depth of raft is considered to be less than 500 mm.
3.2.5	Concrete of foundation beams (C30)	LS	1.00	64,645.91	64,645.91	
3.2.6	Concrete of strip foundation (C30)	LS	1.00	323,763.08	323,763.08	
3.2.7	Termite prevention	LS	1.00	6,799.49	6,799.49	
3.3	Main works				13,384,318.39	
3.3.1	Concrete of shear wall and frame column	LS	1.00	2,468,427.89	2,468,427.89	
3.3.2	Concrete for beams and slabs	LS	1.00	1,316,799.11	1,316,799.11	
3.3.3	Concrete stairs	LS	1.00	55,814.21	55,814.21	



# 5,000 Apartment Units Affordable Housing Project Phase I

## Pricing Schedule

### Part 3-Construction for 1#SOUTH QUAY SITES

No.	Item	Unit	Quantity	Unit Price USD	Total Price USD	Description
3.3.4	Secondary structure (concrete for constructional column, ring beam, lintel, etc.)	LS	1.00	219,707.14	219,707.14	
3.3.5	Concrete of fence, roof overhang, coping, canopy, etc.	LS	1.00	89,662.72	89,662.72	
3.3.6	Concrete pumping	LS	1.00	193,625.00	193,625.00	
3.3.7	Flue and air duct	LS	1.00	45,648.00	45,648.00	
3.3.8	Formworks	LS	1.00	3,572,938.69	3,572,938.69	
3.3.9	Rebar works	LS	1.00	2,916,292.01	2,916,292.01	
3.3.10	Masonry works	LS	1.00	754,695.79	754,695.79	
3.3.11	Scaffolding	LS	1.00	818,909.66	818,909.66	
3.3.12	Vertical transportation	LS	1.00	636,103.59	636,103.59	
3.3.13	Slope roof works	LS	1.00	137,880.93	137,880.93	Steel roofing and thermal insulation color steel plate
3.3.14	Flat roof works	LS	1.00	157,813.65	157,813.65	Including sloping, two waterproof layers, heat insulation and rigid surface
3.4	Building decoration works				6,941,951.49	
3.4.1	ground and Floor tile works	m <sup>2</sup>	23,844.27	44.82	1,068,700.18	
3.4.2	Stair surface tile works	m <sup>2</sup>	572.00	34.23	19,579.56	
3.4.3	Stair railings	m	573.90	110.99	63,697.16	include for Balcony railings for each apartment unit
3.4.4	Block skirting	m <sup>2</sup>	4,106.20	64.63	265,383.71	
3.4.5	Interior wall plastering	m <sup>2</sup>	48,714.10	15.61	760,427.10	
3.4.6	Interior wall tile works	m <sup>2</sup>	12,819.50	51.23	656,742.99	
3.4.7	Interior wall and roof coating	m <sup>2</sup>	72,558.37	11.80	856,188.77	
3.4.8	Waterproofing	m <sup>2</sup>	3,629.36	31.66	114,905.54	
3.4.9	Downpipe and gutter spout funnel	m	2,280.00	11.94	27,223.20	
3.4.10	Aluminum alloy window	m <sup>2</sup>	3,576.95	238.13	851,779.10	
3.4.11	Interior wooden door	Nos.	1,240.00	321.53	398,697.20	
3.4.12	Sliding door of balcony	Nos.	204.00	680.91	138,905.64	

5,000 Apartment Units Affordable Housing Project Phase I

Pricing Schedule

Part 3-Construction for 1#SOUTH QUAY SITES

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No.	Item	Unit	Quantity	Unit Price USD	Total Price USD	Description
3.4.13	Entrance door	Nos.	204.00	452.28	92,265.12	
3.4.14	Unit door	Nos.	4.00	3,063.72	12,254.88	
3.4.15	Public place door	Nos.	270.00	356.93	96,371.10	
3.4.16	Ceilling	m <sup>2</sup>	20,511.20	36.53	749,274.14	
3.4.17	Exterior wall decoration	m <sup>2</sup>	9,231.00	5.40	49,847.40	Including the exterior wall plastering and ordinary exterior wall coating
3.4.18	Wire mesh of wall	m <sup>2</sup>	69,225.30	3.00	207,675.90	
3.4.19	Fiberglass mesh of wall	m <sup>2</sup>	5,900.00	32.07	189,213.00	
3.4.20	Kitchen, cabinet and wall-hung cupboard	Set	204.00	1,582.45	322,819.80	Including: counter-top, cupboards, drawers & upper cabinets
3.5	Outdoor ancillary works				846,694.90	
3.5.1	Apron	LS	1.00	37,108.21	37,108.21	
3.5.2	Step and ramp	LS	1.00	3,157.23	3,157.23	Based on the cement surface
3.5.3	Septic tank	LS	1.00	101,076.52	101,076.52	Based on brick masonry septic tank
3.5.4	Rainwater and drainage gutter	LS	1.00	637,361.40	637,361.40	Inside diameter: 1m; depth: 1.5m; plastered brick structure
3.5.5	Fire pool	LS	1.00	67,991.54	67,991.54	
3.6	Outdoor supporting works				1,308,554.49	
3.6.1	Outdoor road	LS	1.00	238,213.95	238,213.95	
3.6.2	Outdoor greening	LS	1.00	99,411.46	99,411.46	Ordinary lawn
3.6.3	Fitness and recreational facilities	LS	1.00	42,404.20	42,404.20	
3.6.4	Ground parking space	LS	1.00	203,915.53	203,915.53	
3.6.5	Community fence	LS	1.00	565,593.60	565,593.60	
3.6.6	Gate, guard room and other supporting rooms	LS	1.00	159,015.75	159,015.75	
3.7	Water supply and drainage, fire hydrant and sprinkler system				811,078.59	Also include for a Laundry sink in each apartment unit.
3.7.1	Water closet	Nos.	344.00	229.80	79,051.20	One in each bathroom.

**5,000 Apartment Units Affordable Housing Project Phase I**

**Pricing Schedule**

**Part 3-Construction for 1#SOUTH QUAY SITES**

No.	Item	Unit	Quantity	Unit Price USD	Total Price USD	Description
3.7.2	Washbasin	Nos.	344.00	155.09	53,350.96	One in each bathroom.
3.7.3	Shower	Nos.	344.00	201.32	69,254.08	One in each bathroom.
3.7.4	Kitchen Sink	Nos.	204.00	128.25	26,163.00	
3.7.5	Water supply pipe	m	7,931.85	13.41	106,366.11	
3.7.6	Drainage pipe	m	5,370.00	28.18	151,326.60	
3.7.7	Valve, water meter and other components	Nos.	1,588.00	69.71	110,699.48	
3.7.8	Fire hydrant and sprinkle pipe	m	1,911.00	98.76	188,730.36	
3.7.9	Fire hydrant	Nos.	40.00	653.42	26,136.80	Including the dry powder fire extinguisher, hose, water gun, reel, etc.
3.8	Electric , electronic and fire alarm				3,029,491.00	
3.8.1	Electric piping (steel)	m	26,944.86	12.68	341,660.82	
3.8.2	Electric piping (plastic)	m	55,116.82	4.37	240,860.50	
3.8.3	Switch, socket, and weak-current appliances	Nos.	10,597.00	16.41	173,896.77	
3.8.4	Lamp	Set	3,534.00	20.35	71,916.90	
3.8.5	Electrical wiring	m	130,062.62	2.28	296,542.77	
3.8.6	Weak-current wire	m	64,542.99	1.80	116,177.38	
3.8.7	Fire line	m	10,382.24	3.29	34,157.57	
3.8.8	Cable	m	6,296.26	59.08	371,983.04	
3.8.9	Cable bridge	m	738.00	75.03	55,372.14	
3.8.10	Distribution box (power, lighting and electricity meter)	Nos.	100.00	3,254.08	325,408.00	
3.8.11	Distribution box (indoor)	Nos.	204.00	351.19	71,642.76	
3.8.12	Lightning protection welding, round steel, and flat steel	m	2,957.00	9.99	29,540.43	
3.8.13	Weak-current box	Nos.	775.00	67.40	52,235.00	
3.8.14	Fire alarm host equipment	Set	4.00	25,306.01	101,224.04	
3.8.15	Fire alarm equipment	Nos.	1,568.00	68.65	107,643.20	
3.8.16	Elevator	Nos.	8.00	79,903.71	639,229.68	

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*J.K. Ng*  
Part 3



5,000 Apartment Units Affordable Housing Project Phase I

Pricing Schedule

Part 3-Construction for 1#SOUTH QUAY SITES

No.	Item	Unit	Quantity	Unit Price USD	Total Price USD	Description
3.9	Ventilation				158,468.38	Air Conditioner is not included
3.9.1	Fan and bathroom ventilator	Nos.	344.00	191.09	65,734.96	
3.9.2	Air valve	Nos.	366.00	253.37	92,733.42	
3.10	Outdoor pump house				377,776.12	
3.10.1	Fire and water supply pressure regulator	Set	4.00	68,321.45	273,285.80	Including the water tank, pump, pressure tank and control box
3.10.2	Valve and accessories	Nos.	136.00	198.41	26,983.76	
3.10.3	Water supply pipe	m	80.00	123.28	9,862.40	
3.10.4	Switch, socket and lamp	Nos.	64.00	78.77	5,041.28	
3.10.5	Wire and cable	m	2,648.00	12.17	32,226.16	
3.10.6	Electric piping (steel)	m	2,052.00	14.50	29,754.00	
3.10.7	Distribution box	Set	8.00	77.84	622.72	
3.11	Outdoor supporting installation				667,860.84	
3.11.1	Water supply pipe	m	720.00	25.55	18,396.00	
3.11.2	Drainage pipe	m	1,080.00	86.34	93,247.20	
3.11.3	Fire hydrant pipe	m	780.00	82.54	64,381.20	
3.11.4	Valve	Nos.	48.00	244.64	11,742.72	
3.11.5	Valve well and drainage well	Nos.	84.00	1,653.33	138,879.72	
3.11.6	Road lamp	Nos.	144.00	1,102.09	158,700.96	
3.11.7	Security system	Set	1.00	182,513.04	182,513.04	
3.12	Transformation and distribution system				670,734.31	
3.12.1	Cable	m	810.00	176.94	143,321.40	
3.12.2	630KV transformer	Set	4.00	116,640.74	466,562.96	
3.12.3	Protective tube	Nos.	810.00	30.70	24,867.00	
3.12.4	Distribution box	Set	7.00	1,010.45	7,073.15	
3.12.5	Cable well	Nos.	18.00	1,606.10	28,909.80	

**5,000 Apartment Units Affordable Housing Project Phase I**

**Pricing Schedule**

**Summary of Part 4-Construction for 4#LADY HAILES AVENUE SITES**

No.	Item	Unit	Quantity	Unit Price USD	Total Price USD	Description
<b>4</b>	<b>Summary of Part 4</b>				<b>31,063,048.80</b>	
4.1	Earthworks	LS	1.00	475,253.74	475,253.74	
4.2	Foundation works	LS	1.00	677,095.56	677,095.56	
4.3	Main works	LS	1.00	15,017,125.69	15,017,125.69	
4.4	Building decoration works	LS	1.00	7,113,495.69	7,113,495.69	
4.5	Outdoor ancillary works	LS	1.00	866,034.80	866,034.80	
4.6	Outdoor supporting works	LS	1.00	1,040,579.40	1,040,579.40	
4.7	Water supply and drainage, fire hydrant and sprinkler system	LS	1.00	942,405.99	942,405.99	
4.8	Electric , electronic and fire alarm	LS	1.00	2,958,543.59	2,958,543.59	
4.9	Ventilation	LS	1.00	170,140.40	170,140.40	
4.10	Outdoor pump house	LS	1.00	377,776.12	377,776.12	
4.11	Outdoor supporting installation	LS	1.00	620,227.07	620,227.07	
4.12	Transformation and distribution system	LS	1.00	804,370.75	804,370.75	

  
Part 4

5,000 Apartment Units Affordable Housing Project Phase I

Pricing Schedule

Part 4-Construction for 4#LADY HAILES AVENUE SITES

No.	Item	Unit	Quantity	Unit Price USD	Total Price USD	Description
4	Sub-total of Part 4				31,063,048.80	
4.1	Earthworks				475,253.74	
4.1.1	Surface cleaning and spoil transportation	LS	1.00	183,456.00	183,456.00	Surface cleaning is considered at thickness of $\pm 30$ cm and at haulage within 5km
4.1.2	Earth excavation	LS	1.00	90,504.96	90,504.96	The depth is considered less than 2m, including rod sounding, but no groundwater is considered
4.1.3	Earth backfill	LS	1.00	201,292.78	201,292.78	the volume of excavation minus that of foundation concrete below the natural ground level is considered backfilling only, and the backfilling between the natural ground level and designed outdoor ground level is not considered, and the backfilling is considered using excavated soil on the site and compaction is included, but purchased backfill materials is not considered
4.2	Foundation works				677,095.56	No pile works is considered.
4.2.1	Pipe works (C30)				-	N/A
4.2.2	Foundation cushion (C15)	LS	1.00	136,985.86	136,985.86	
4.2.3	Concrete of pile caps (C30)				-	N/A
4.2.4	Raft foundation concrete works (C30)	LS	1.00	536,839.30	536,839.30	Depth of raft is considered to be less than 650 mm.
4.2.5	Concrete of foundation beams (C30)				-	N/A
4.2.6	Concrete of strip foundation (C30)				-	N/A
4.2.7	Termite prevention	LS	1.00	3,270.40	3,270.40	
4.3	Main works				15,017,125.69	
4.3.1	Concrete of shear wall and frame column	LS	1.00	2,778,334.97	2,778,334.97	
4.3.2	Concrete for beams and slabs	LS	1.00	1,621,597.35	1,621,597.35	
4.3.3	Concrete stairs	LS	1.00	102,817.70	102,817.70	
4.3.4	Secondary structure (concrete for constructional column, ring beam, lintel, etc.)	LS	1.00	220,803.44	220,803.44	



**5,000 Apartment Units Affordable Housing Project Phase I**

**Pricing Schedule**

**Part 4-Construction for 4#LADY HAILES AVENUE SITES**

No.	Item	Unit	Quantity	Unit Price USD	Total Price USD	Description
4.3.5	Concrete of fence,roof overhang,coping, canopy,etc	LS	1.00	133,205.70	133,205.70	
4.3.6	Concrete pumping	LS	1.00	199,777.78	199,777.78	
4.3.7	Flue and airduct	LS	1.00	22,348.50	22,348.50	
4.3.8	Formworks	LS	1.00	3,655,820.43	3,655,820.43	
4.3.9	Rebar works	LS	1.00	3,078,360.31	3,078,360.31	
4.3.10	Masonry works	LS	1.00	1,572,916.51	1,572,916.51	
4.3.11	Scaffolding	LS	1.00	819,324.88	819,324.88	
4.3.12	Vertical transportation	LS	1.00	636,426.12	636,426.12	
4.3.13	Slope roof works			-	-	N/A
4.3.14	Flat roof works	LS	1.00	175,392.00	175,392.00	Including sloping, two waterproof layers, heat insulation and rigid surface
4.4	Building decoration works				7,113,495.69	
4.4.1	Floor tile works	m <sup>2</sup>	23,856.36	44.82	1,069,242.06	
4.4.2	Stair surface	m <sup>2</sup>	1,054.00	34.23	36,078.42	
4.4.3	Stair railings	m	900.00	110.99	99,891.00	include for Balcony railings for each apartment unit
4.4.4	Block skirting	m <sup>2</sup>	4,115.00	64.63	265,952.45	
4.4.5	Interior wall plastering	m <sup>2</sup>	48,738.80	15.61	760,812.67	
4.4.6	Interior wall tile works	m <sup>2</sup>	12,826.00	51.23	657,075.98	
4.4.7	Interior wall and roof coating	m <sup>2</sup>	72,595.16	11.80	856,622.89	
4.4.8	Waterproofing	m <sup>2</sup>	4,142.40	31.66	131,148.38	
4.4.9	Downpipe and gutter spout funnel	m	2,520.00	11.94	30,088.80	
4.4.10	Aluminum alloy window	m <sup>2</sup>	4,140.00	238.13	985,858.20	
4.4.11	Interior wooden door	Nos.	1,200.00	321.53	385,836.00	
4.4.12	Sliding door of balcony	Nos.	235.00	680.91	160,013.85	
4.4.13	Entrance door	Nos.	235.00	452.28	106,285.80	
4.4.14	Unit door	Nos.	5.00	3,063.72	15,318.60	
4.4.15	Public place door	Nos.	120.00	356.93	42,831.60	

# 5,000 Apartment Units Affordable Housing Project Phase I

## Pricing Schedule

### Part 4-Construction for 4#LADY HAILES AVENUE SITES

No.	Item	Unit	Quantity	Unit Price USD	Total Price USD	Description
4.4.16	Ceilling	m <sup>2</sup>	2,408.40	32.07	77,237.39	
4.4.17	Exterior wall decoration	m <sup>2</sup>	19,239.00	5.40	103,890.60	Including the exterior wall plastering and ordinary exterior wall coating
4.4.18	Wire mesh of wall	m <sup>2</sup>	69,260.40	3.00	207,781.20	
4.4.19	Fiberglass mesh of wall	m <sup>2</sup>	20,521.60	36.53	749,654.05	
4.4.20	Kitchen, cabinet and wall-hung cupboard	Set	235.00	1,582.45	371,875.75	Including counter-top with cupboards, drawers & upper cabinets
4.5	Outdoor ancillary works				866,034.80	
4.5.1	Apron	LS	1.00	40,338.43	40,338.43	
4.5.2	Step and ramp	LS	1.00	6,434.10	6,434.10	Based on the cement surface
4.5.3	Septic tank	LS	1.00	126,345.65	126,345.65	Based on brick masonry septic tank
4.5.4	Rainwater and drainage gutter	LS	1.00	624,925.08	624,925.08	Inside diameter: 1m; depth: 1.5m; plastered brick structure
4.5.5	Fire pool	LS	1.00	67,991.54	67,991.54	
4.6	Outdoor supporting works				1,040,579.40	
4.6.1	Outdoor road	LS	1.00	351,575.40	351,575.40	
4.6.2	Outdoor greening	LS	1.00	93,869.41	93,869.41	Ordinary lawn
4.6.3	Fitness and recreational facilities	LS	1.00	10,601.05	10,601.05	
4.6.4	Ground parking space	LS	1.00	229,242.61	229,242.61	
4.6.5	Community fence	LS	1.00	291,684.63	291,684.63	
4.6.6	Gate, guard room and other supporting rooms	LS	1.00	63,606.30	63,606.30	
4.7	Water supply and drainage, fire hydrant and sprinkler system				942,405.99	Also include for a Laundry sink in each apartment unit.
4.7.1	Water closet	Nos.	360.00	229.80	82,728.00	One in each bathroom.
4.7.2	Washbasin	Nos.	360.00	155.09	55,832.40	One in each bathroom.
4.7.3	Shower	Nos.	360.00	201.32	72,475.20	One in each bathroom.
4.7.4	Kitchen Sink	Nos.	235.00	128.25	30,138.75	

# 5,000 Apartment Units Affordable Housing Project Phase I

## Pricing Schedule

### Part 4-Construction for 4#LADY HAILES AVENUE SITES

No.	Item	Unit	Quantity	Unit Price USD	Total Price USD	Description
4.7.5	Water supply pipe	m	8,442.00	13.41	113,207.22	
4.7.6	Drainage pipe	m	6,126.40	28.18	172,641.95	
4.7.7	Valve, water meter and other components	Nos.	1,829.00	69.71	127,499.59	
4.7.8	Fire hydrant and sprinkle pipe	m	2,518.00	98.76	248,677.68	
4.7.9	Fire hydrant	Nos.	60.00	653.42	39,205.20	Including the dry powder fire extinguisher, hose, water gun, reel, etc.
4.8	Electric , electronic and fire alarm				2,958,543.59	
4.8.1	Electric piping (steel)	m	32,276.00	12.68	409,259.68	
4.8.2	Electric piping (plastic)	m	64,196.00	4.37	280,536.52	
4.8.3	Switch, socket, and weak-current appliances	Nos.	9,230.00	16.41	151,464.30	
4.8.4	Lamp	Set	4,193.00	20.35	85,327.55	
4.8.5	Electrical wiring	m	140,326.00	2.28	319,943.28	
4.8.6	Weak-current wire	m	76,944.00	1.80	138,499.20	
4.8.7	Fire line	m	13,623.00	3.29	44,819.67	
4.8.8	Cable	m	5,107.00	59.08	301,721.56	
4.8.9	Cable bridge	m	710.40	75.03	53,301.31	
4.8.10	Distribution box (power, lighting and electricity meter)	Nos.	105.00	3,254.08	341,678.40	
4.8.11	Distribution box (indoor)	Nos.	235.00	351.19	82,529.65	
4.8.12	Lightning protection welding, round steel, and flat steel	m	3,748.00	9.99	37,442.52	
4.8.13	Weak-current box	Nos.	825.00	67.40	55,605.00	
4.8.14	Fire alarm host equipment	Set	5.00	25,306.01	126,530.05	
4.8.15	Fire alarm equipment	Nos.	1,899.00	68.65	130,366.35	
4.8.16	Elevator	Nos.	5.00	79,903.71	399,518.55	
4.9	Ventilation				170,140.40	Air Conditioner is not included
4.9.1	Fan and bathroom ventilator	Nos.	360.00	191.09	68,792.40	
4.9.2	Air valve	Nos.	400.00	253.37	101,348.00	



5,000 Apartment Units Affordable Housing Project Phase I

Pricing Schedule

Part 4-Construction for 4#LADY HAILES AVENUE SITES

No.	Item	Unit	Quantity	Unit Price USD	Total Price USD	Description
4.10	Outdoor pump house				377,776.12	
4.10.1	Fire and water supply pressure regulator	Set	4.00	68,321.45	273,285.80	
4.10.2	Valve and accessories	Nos.	136.00	198.41	26,983.76	
4.10.3	Water supply pipe	m	80.00	123.28	9,862.40	
4.10.4	Switch, socket and lamp	Nos.	64.00	78.77	5,041.28	
4.10.5	Wire and cable	m	2,648.00	12.17	32,226.16	
4.10.6	Electric piping (steel)	m	2,052.00	14.50	29,754.00	
4.10.7	Distribution box	Set	8.00	77.84	622.72	
4.11	Outdoor supporting installation				620,227.07	
4.11.1	Water supply pipe	m	770.00	25.55	19,673.50	
4.11.2	Drainage pipe	m	1,170.00	86.34	101,017.80	
4.11.3	Fire hydrant pipe	m	845.00	82.54	69,746.30	
4.11.4	Valve	Nos.	52.00	244.64	12,721.28	
4.11.5	Valve well and drainage well	Nos.	98.00	1,653.33	162,026.34	
4.11.6	Road lamp	Nos.	156.00	1,102.09	171,926.04	
4.11.7	Security system	Set	1.00	83,115.81	83,115.81	
4.12	Transformation and distribution system				804,370.75	
4.12.1	Cable	m	877.50	176.94	155,264.85	
4.12.2	630KV transformer	Set	5.00	116,640.74	583,203.70	
4.12.3	Protective tube	Nos.	810.00	30.70	24,867.00	
4.12.4	Distribution box	Set	12.00	1,010.45	12,125.40	
4.12.5	Cable well	Nos.	18.00	1,606.10	28,909.80	

## CONTRACTOR'S EPC PROPOSAL

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### Part 2.2 - Interim Payment Certificate Schedule and Payment Schedule

Advance Payment :

10%

Contract Price ( Excluding VAT ) :

71,739,411.00

Unit :

USD

Month	IPC No.	% of Completion	Amount of completion	Advance Payment	Amount of IPC	Amount of Payment	VAT	Notes
		a	b	c	d	e	f	
N/A	Inv.0	-	-	7,173,941	7,173,941	7,173,941	896,743	
1	IPC.1	2.7%	1,936,964	-193,696	1,743,268	-	217,908	
2	IPC.2	2.8%	2,008,704	-200,870	1,807,833	-	225,979	
3	IPC.3	3.1%	2,223,922	-222,392	2,001,530	-	250,191	
4	IPC.4	3.5%	2,510,879	-251,088	2,259,791	-	282,474	
5	IPC.5	4.0%	2,869,576	-286,958	2,582,619	-	322,827	
6	IPC.6	4.6%	3,300,013	-330,001	2,970,012	-	371,251	
7	IPC.7	4.7%	3,371,752	-337,175	3,034,577	-	379,322	
8	IPC.8	4.8%	3,443,492	-344,349	3,099,143	-	387,393	
9	IPC.9	5.6%	4,017,407	-401,741	3,615,666	-	451,958	
10	IPC.10	5.8%	4,160,886	-416,089	3,744,797	-	468,100	
11	IPC.11	6.0%	4,304,365	-430,436	3,873,928	-	484,241	
12	IPC.12	6.2%	4,447,843	-444,784	4,003,059	-	500,382	
13	IPC.13	5.8%	4,160,886	-416,089	3,744,797	-	468,100	
14	IPC.14	5.7%	4,089,146	-408,915	3,680,232	-	460,029	
15	IPC.15	5.0%	3,586,971	-358,697	3,228,273	-	403,534	
16	IPC.16	4.7%	3,371,752	-337,175	3,034,577	-	379,322	
17	IPC.17	4.5%	3,228,273	-322,827	2,905,446	-	363,181	
18	IPC.18	4.0%	2,869,576	-286,958	2,582,619	-	322,827	
19	IPC.19	3.8%	2,726,098	-272,610	2,453,488	-	306,686	
20	IPC.20	3.4%	2,439,140	-243,914	2,195,226	-	274,403	
21	IPC.21	3.1%	2,223,922	-222,392	2,001,530	1,743,268	250,191	IPC.1
22	IPC.22	3.0%	2,152,182	-215,218	1,936,964	1,807,833	242,121	IPC.2
23	IPC.23	2.0%	1,434,788	-143,479	1,291,309	4,261,321	161,414	IPC.3-4
24	IPC.24	1.2%	860,873	-86,087	774,786	5,552,630	96,848	IPC.5-6



### Part 2.2 - Interim Payment Certificate Schedule and Payment Schedule

Advance Payment : 10% Contract Price ( Excluding VAT ) : 71,739,411.00  
Unit : USD

Month	IPC No.	% of Completion	Amount of completion	Advance Payment	Amount of IPC	Amount of Payment	VAT	Notes
		a	b	c	d	e	f	
Total 1		100.0%	71,739,411	-0	71,739,411	20,538,993	8,967,426	
25						9,749,386		IPC.7 - 9
26						11,621,785		IPC.10 - 12
27						10,653,303		IPC.13 - 15
28						8,522,642		IPC.16 - 18
28						6,650,243		IPC.19 - 21
30						4,003,059		IPC.22 - 24
Total 2			-	-	-	51,200,418	-	
Total 3			71,739,411	-0	71,739,411	71,739,411	8,967,426	3=1+2

Note 1: The currency of payment shall be in TT Dollars using the exchange rate specified in the Contract for converting.

Note 2: The time for payment of IPC.1 to 2 shall not be later than month 21 to 22 irrespectively;

The time of payment for IPC.3 to 4 shall not be later than month 23;

The time of payment for IPC.5 to 6 shall not be later than month 24;

The time of payment for IPC.7 - 9 shall not be later than month 25;

The time of payment for IPC.10 - 12 shall not be later than month 26;

The time of payment for IPC.13 - 15 shall not be later than month 27;

The time of payment for IPC.16 - 18 shall not be later than month 28;

The time of payment for IPC.19 - 21 shall not be later than month 29;

The time of payment for IPC.22 - 24 shall not be later than month 30.

Month n means the ordinal month after the Commencement Date. For example, month 21 means the 21st month after the Commencement Date.

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**VOLUME II**

- **CONTRACTOR'S EPC PROPOSAL**

**EMPLOYER'S REQUIREMENTS**

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THE TRINIDAD AND TOBAGO HOUSING DEVELOPMENT  
CORPORATION

EMPLOYER'S REQUIREMENTS

FOR THE 5000 APARTMENT UNITS  
AFFORDABLE HOUSING PROJECT  
- PHASE 1

APRIL 2019

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## 1. INTRODUCTION

- 1.1. The Trinidad and Tobago Housing Development Corporation (HDC) seeks to engage China Gezhouba Group International Engineering Co., Ltd to Design, Build & Finance Apartment Units at the HDC's South Quay, Port-of-Spain and Lady Hailes, San Fernando Sites.
- 1.2. The South Quay site is located in the Capital City of Port of Spain and is bounded along the North by the Old St Joseph Road and on the South by the Priority Bus Route. The Eastern Main Road passes through the South Quay site, dividing the land into multiple parcels.
- 1.3. The Lady Hailes site is located in the City of San Fernando and is surrounded by Rushworth Street on the north and Lady Hailes Avenue along the west.
- 1.4. The following Scope of Works & Employer's Requirements shall be managed through the FIDIC Conditions of Contract for EPC/ Turnkey Projects, First Edition 1999, with detailed Particular Conditions.

## 2. SCOPE OF WORKS

### 2.1. Design

- 2.1.1. The Contractor shall Carry out design works as required for the development and construction of multi-storey apartment buildings, and supporting facilities within the site such as roadways, drainage structures, water infrastructure, wastewater infrastructure, mechanical and electrical, landscape works. The Employer shall provide the access points of municipal resources (water, sewage, electricity, gas, etc.) within the site boundary.
- 2.1.2. The works shall conform to the requirements of all the relevant statutory bodies of Trinidad & Tobago and to the Employers Requirements.
- 2.1.3. The Employer shall be responsible for land acquisition and resettlement, and shall complete demolish of existing buildings before the sites being handed over to the Contractor.







- 2.1.4. The Contractor shall perform all designs and calculations for the structural and infrastructure works including roadways, drainage, water and wastewater, electrical system, in accordance with all codes, standards and guidelines as required by statutory and governing bodies.
- 2.1.5. The Employer shall use its best efforts to assist the Contractor to obtain all required Statutory Approvals based on design and construction requirements.

## 2.2 Construction

- 2.2.1. The Contractor shall carry out construction and installation works as required for the full implementation of apartment buildings, supporting facilities within the site such as roadways, drainage systems, water and wastewater infrastructure, electrical systems.
- 2.2.2. The works shall conform to the requirements of all statutory bodies and the Employer specifications.
- 2.2.3. Any permanent or existing works damaged due to the Contractor's responsibility during this construction shall be reinstated to original at the contractor's expense.

## 3. STATUTORY REQUIREMENTS

All Design and Construction Works shall satisfy the requirements of the following regulatory and statutory bodies of Trinidad and Tobago, and the Employer shall use its best efforts to assist the Contractor to obtain relevant approvals:

- 3.1. Environmental Management Authority (EMA)
- 3.2. Town & Country Planning Division (TCPD)
- 3.3. Water & Sewerage Authority (WASA)
- 3.4. Ministry of Works & Transport (MOWT) - Drainage Division and Designs - Engineering Branch
- 3.5. Trinidad & Tobago Fire Service (TTFS)
- 3.6. Trinidad & Tobago Electricity Commission (TTEC)
- 3.7. Port-of-Spain Corporation (for South Quay site)
- 3.8. San Fernando City Corporation (for Lady Hailes site)

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#### 4. TECHNICAL DOCUMENTS/ CONTRACTORS DOCUMENTS

Technical documents shall be submitted to the Employer for review and for agreement at each stage of the project development and prior to procurements and final implementations on site.

All documents shall be described in English language.

Even when using large (24"x36") drawing sheet format, all drawings, charts and schedules shall be legible when printed on tabloid (11"x17") size sheets.

The deliverables for the technical document at each stage shall be inclusive of the following:

##### 4.1. Schematic Designs

Provide drawings and other forms of graphic imagery to show options for the schematic Site layouts and Building designs.

4.1.1 Project Brief – Provide narrative on design overview for architectural, structural, civil, water, and wastewater, mechanical & electrical proposals.

4.1.2 For Site design: Include preliminary layouts for site analyses, Land-Use Plans and for the Master Plan site layout.

4.1.3 For Building designs: Include preliminary architectural layouts (including floor plans, roof plans and elevations) for the typical building blocks and general layouts for the typical individual housing unit types.

4.1.4 Provide planning tabulations, calculations and any materials /system specifications to describe the design compliances (with the Employer & Statutory requirements) and advantages of the schematic proposals.

##### 4.2. Design Development & Final Design

Provide drawings and other graphic imagery to fully describe proposals for the Site layouts, Building designs & Infrastructure.

4.2.1 For Site: Include final architectural design layouts and presentation graphics for site land-use plans and for site master plans (inclusive of arrangements and sizes for parking



accommodations, landscaping, common amenities, vehicular & pedestrian circulation system, residential structures and ancillary structures).

Also provide detail site plans as needed to clearly describe layouts for individual site parcels.

Include detail proposals for boundary treatments, site amenities and any ancillary structures.

- 4.2.2 For Buildings: Include final architectural design drawings and presentation graphics for the building blocks (including scaled and dimensioned floor plans, roof plans, sections and elevations) and detailed layouts for the individual housing unit types.

Include specifications and code compliances for Structural systems & components as well as for Fire Suppressant, Plumbing and M&E services.

- 4.2.3 For Infrastructure: Include description overview and specifications with code compliance references and diagrams where necessary to describe the proposed systems and components for Civil Works (for roadways, drainage, retaining structures, site works) Water & Wastewater, Mechanical & Electrical systems.

- 4.2.4 Provide final planning tabulations and calculations. Provide description of proposed materials, finishes and services systems in compliance with the Employer's requirements and the relevant Building Codes and relevant professional codes for each discipline (e.g. Plumbing, Fire, Electrical, etc).

- 4.2.5 Analysis & Design Reports: Provide full site condition investigative reports and drawings based on Geotechnical, Hydrological and Topography Surveys procured by Contractor. Provide design reports inclusive of all analyses, calculation, codes, methodologies and assumptions as used in the design development for Building Works and Infrastructure Works.

#### 4.3. Construction Drawings

Provide full construction drawings, details, schedules and specifications to facilitate the accurate costing, construction and finishes for the Site external Works, Infrastructure Works, Buildings and property amenities.

- 4.3.1 For General Site: Fully dimensioned, scaled and descriptive drawings and details for Site Setting-Out Plans for Master Plan as well as detailed layouts for individual site parcels.

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- Provide Site Sections.
- Provide Landscape Plans.
- Provide Site Details for site features, site access element, boundary treatment, ancillary structures, parking, etc.

4.3.2 For Infrastructure: Fully dimensioned, scaled and descriptive drawing layouts, sections and details to describe systems and components for all Civil Works (for roadways, drainage, retaining structures, site works) Water & Wastewater, Mechanical & Electrical systems.

4.3.3 For Buildings: Fully dimensioned, scaled and descriptive drawings, details, schedules and finishes for all components of all building blocks and for the individual housing unit types. Drawing sets shall include layouts and specifications and code compliances for all construction components related to the Architectural, Structural, Plumbing, Mechanical & Electrical (M&E) and Fire Suppressants designs and systems.

4.3.4 Analysis & Design Reports:

Provide final reports on the site analyses, calculations, reference codes, methodologies and assumptions for the execution of the Building Works and Infrastructure Works.

4.3.5 Cost & Timelines: Provide cost and timeline for the overall projects. Include cost breakdown for infrastructure works, general building works, cost per building block, and cost per apartment unit. Provide construction implementation strategy for the sites.

