



**NED UNIVERSITY OF ENGINEERING & TECHNOLOGY**  
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Director Procurement

"Say No to Corruption"

No. PC/NED/RG-152585/8103/260

Dated: 21.04.2022

The  
Director Information and Advertisement  
Information Department,  
Government of Sindh,  
Karachi.

**Most Urgent Please**

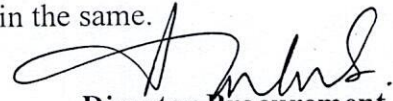
**CORRIGENDUM**

|   |   |
|---|---|
| <b>Tender # PC/NED/RG/Link Road/<br/>8103/2022 dated 18.04.2022</b> | <b>Relocation of Village Link Road at Thar<br/>Institute of Engineering Sciences &amp;<br/>Technology Tharparkar.</b> |
|---|---|

With reference to above Tender Notice published in Newspapers on 21.04.2022 with INF/KRY-2001/2022, all bidders & concerned are informed that the following corrections have been made in the said tender.

| S# | Earlier                         | Corrected                       |
|----|---------------------------------|---------------------------------|
| 1. | Time of Completion<br>12 Months | Time of Completion<br>03 Months |
| 2. | Tender Fee<br>Rs 3,000/-        | Tender Fee<br>Rs 2,000/-        |

However, all other terms & conditions of the tender will remain the same.

  
Director Procurement  
21.04.2022





**NED UNIVERSITY OF ENGINEERING & TECHNOLOGY  
PROCUREMENT CELL**

Phone # 99261261- 68, (Ext. 2471 & 2501) Fax # 99261255, e-mail: [dp@neduet.edu.pk](mailto:dp@neduet.edu.pk)

**"Say No to Corruption"**



**Director Procurement**

No. DP/ RG-152585/8103/238  
April 18, 2022

**Notice Inviting Tender**

1. NEDUET invites sealed bids from interested Bidders having adequate experience in carrying out projects of similar nature for following work:

| S# | Name of Work   | Estimated Cost Rs in Million | Time of Completion |
|----|--|------------------------------|--------------------|
| 1. | Relocation of Village Link Road at Thar Institute of Engineering Sciences & Technology Tharparkar.<br>Tender No. PC/NED/RG/Link Road / 8103/2022 | 12.311                       | 12 Months          |

2. **Eligibility:**

- Valid registration with Pakistan Engineering Council (PEC) upto June, 2022 having Category C-6 or above & registered in relevant disciplines CE-10, CE-01, CE-02.
- Valid NTN from FBR and must be an Active Taxpayer.
- Valid Sales Tax Certificate from SRB.

3. **Method of Procurement**

Single Stage One Envelope Procedure under SPP Rules 46(1) where each bid shall comprise a single envelope containing financial proposal & technical information.


4. **Tender Documents Issuance Schedule:**

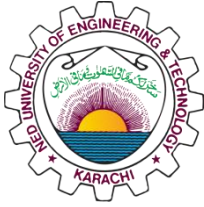
The tender documents can be collected from office of ADP-II, NEDUET, Main Campus, Karachi from **25 April 2022** to **11 May 2022** during office hours upon payment of Rs 3,000/- (Non-refundable) in shape of Pay Order in favor of Director Finance, NEDUET, Karachi.

5. **Tender Documents Submission Schedule:**

All bids must be accompanied by a Bid Security equivalent to 2% of the bid price in the form of pay order / Bank Guarantee in favor of Director Finance, NEDUET. Bidders are advised to submit their completed bids on or before **11:00 am, 12<sup>th</sup> May, 2022** at office of ADP-II. The bids shall be opened **on the same day at 11:30 am** at the same avenue in the presence of University Procurement Committee and the representatives of bidders. If the opening date is declared as holiday then the proposals will be opened on next working day at same time and avenue.

6. NEDUET reserve the rights to accept or reject any or all bids in pursuance to provisions under SPP Rules. Complete Bidding Documents is also available on SPPRA web portal [www.ppms.pprasinidh.gov.pk](http://www.ppms.pprasinidh.gov.pk) as well as on official website of NEDUET [www.neduet.edu.pk](http://www.neduet.edu.pk).

  
**Director Procurement**  
18.04.2022



**NED UNIVERSITY OF  
ENGINEERING & TECHNOLOGY  
KARACHI**



**Establishment of Thar Institute of Engineering, Sciences and  
Technology-TIEST, Islamkot  
(Constituent College of NED University)**

**TENDER DOCUMENTS**

**Relocation of Village Link Road at Thar Institute of  
Engineering, Sciences & Technology Tharparkar**

**MARCH, 2022**



**Head Office (Karachi):** Suite No. 314, 3rd Floor, Mashriq Center, Gulshan-e-Iqbal Block-14, Karachi

**Ph:** 021-34941059 **Mob:** 0300-8251864 **Fax:** 021-34890770

**Multan Office:** House No. 1379, F Block, Wapda Town, Phase II, Multan.

**DI Khan Office:** Office No. 21, 1st Floor, Cantt Market, Dera Ismail Khan Tel No: 0966-715755 & Cell # 0336-0109883

**Website:** [www.ess-i-aar.com](http://www.ess-i-aar.com) **Email:** [info@ess-i-aar.com](mailto:info@ess-i-aar.com) & [eia1946@hotmail.com](mailto:eia1946@hotmail.com)



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**Director Procurement**



## **TABLE OF CONTENTS**

| <b>Description</b>  | <b>Page No.</b> |
|---|-----------------|
| <b>INVITATION FOR BIDS</b>  | <b>4</b>        |
| <b>Form</b>   | <b>5</b>        |
| <b>INSTRUCTIONS TO BIDDERS</b>  | <b>6</b>        |
| <b>A. General</b>   | <b>7</b>        |
| IB.1 Scope of Bid   | <b>7</b>        |
| IB.2 Source of Funds  | <b>7</b>        |
| IB.3 Eligible Bidders   | <b>7</b>        |
| IB.4 One Bid Per Bidder   | <b>7</b>        |
| IB.5 Cost of Bidding  | <b>7</b>        |
| IB.6 Site Visit   | <b>8</b>        |
| <b>B. Bidding Documents</b>   | <b>8</b>        |
| IB.7 Contents of Bidding Documents  | <b>8</b>        |
| IB.8 Clarification of Bidding Documents   | <b>9</b>        |
| IB.9 Amendment of Bidding Documents   | <b>9</b>        |
| <b>C. Preparation of Bids</b>   | <b>9</b>        |
| IB.10. Language of Bid  | <b>9</b>        |
| IB.11 Documents Comprising the Bid  | <b>9</b>        |
| IB.12 Bid Prices  | <b>11</b>       |
| IB.13 Currencies of Bid and Payment   | <b>11</b>       |
| IB.14 Bid Validity  | <b>11</b>       |
| IB.15 Bid Security  | <b>12</b>       |
| IB.16 Alternate Proposals by Bidder   | <b>12</b>       |
| IB.17 Pre-Bid Meeting   | <b>13</b>       |
| IB.18 Format and Signing of Bid   | <b>13</b>       |
| <b>D. Submission of Bids for Single Stage Single Envelope Bidding Procedure</b>         | <b>14</b>       |
| IB.19 Sealing and Marking of Bids   | <b>14</b>       |
| IB.20 Deadline for Submission of Bids   | <b>14</b>       |
| IB.21 Late Bids   | <b>15</b>       |
| IB.22 Modification, Substitution and Withdrawal of Bids                                 | <b>15</b>       |
| <b>E. Bid Opening and Evaluation for Single Stage Single Envelope Bidding Procedure</b> | <b>16</b>       |

|           |  |           |
|-----------|--|-----------|
| IB.23     | Bid Opening  | 16        |
| IB.24     | Process to be Confidential   | 16        |
| IB.25     | Clarification of Bids  | 16        |
| IB.26     | Examination of Bids and Determination of Responsiveness                        | 17        |
| IB.27     | Correction of Errors   | 17        |
| IB.28     | Evaluation and Comparison of Bids  | 17        |
| <b>F.</b> | <b>Award of Contract</b>   | <b>21</b> |
| IB.29     | Award  | 21        |
| IB.30     | Employer's Right to Accept any Bid and to Reject any or all Bids               | 21        |
| IB.31     | Notification of Award  | 21        |
| IB.32     | Performance Security   | 22        |
| IB.33     | Signing of Contract Agreement  | 22        |
| IB.34     | General Performance of the bidders   | 22        |
| IB.35     | Integrity Pact   | 22        |
| IB.36     | Instructions not Part of Contract  | 23        |
|           | <b>BIDDING DATA SHEET</b>  | <b>24</b> |
|           | <b>LETTERS OF TECHNICAL BID/PRICE BID AND APPENDICES TO BID</b>                | <b>27</b> |
|           | Letter of Technical Bid  | 28        |
|           | Letter of Price Bid  | 30        |
|           | Appendix-A to Bid : Special Stipulations                                       | 32        |
|           | Appendix-B to Bid : Foreign Currency Requirements                              | 34        |
|           | Appendix-C to Bid : Price Adjustment Under Clause 70 of Conditions of Contract | 35        |
|           | Appendix-D to Bid : Bill of Quantities   | 36        |
|           | Appendix-E to Bid : Proposed Construction Schedule                             | 38        |
|           | Appendix-F to Bid : Method of Performing the Work                              | 39        |
|           | Appendix-G to Bid : List of Major Equipment – Related Items                    | 40        |
|           | Appendix-H to Bid : Construction Camp and Housing Facilities                   | 42        |
|           | Appendix-I to Bid : List of Subcontractors                                     | 44        |
|           | Appendix-J to Bid : Estimated Progress Payments                                | 45        |
|           | Appendix-K to Bid : Organization Chart of the Supervisory Staff and Labor      | 46        |
|           | Appendix-L to Bid : Integrity Pact   | 47        |



|  |                |
|--|----------------|
| <b>FORMS</b>   | <b>48</b>      |
| <b>Bid Security</b>  | <b>49</b>      |
| <b>Form of Performance Security</b>  | <b>51</b>      |
| <b>Form of Contract Agreement</b>  | <b>53</b>      |
| <b>Mobilization Advance Guarantee/Bond</b>                                 | <b>55</b>      |
| <b>Indemnity Bond For Secured Advance Against Material Brought at Site</b> | <b>57</b>      |
| <br><b>Part-I: GENERAL CONDITIONS OF CONTRACT</b>                          | <br><b>68</b>  |
| <b>Part-II: PARTICULAR CONDITIONS OF CONTRACT</b>                          | <b>135</b>     |
| <br><b>TECHNICAL SPECIFICATION</b>   | <br><b>150</b> |
| <br><b>SCHEDULE-B (BILL OF QUANTITIES)</b>                                 | <br><b>208</b> |
| <br><b>DRAWINGS</b>  | <br><b>211</b> |

**INVITATION  
FOR  
BIDS**



## INVITATION FOR BIDS

Date: \_\_\_\_\_  
Bid Reference No.: \_\_\_\_\_

1. The Director Procurement, NED University of Engineering & Technology invites sealed bids, under Single Stage-Single Envelope bidding procedure, from eligible firms or persons licensed by the Pakistan Engineering Council in the category C6 or above & registered in relevant disciplines CE-10, CE-01, CE-02 for the Works **“Relocation of Village Link Road at Thar Institute of Engineering, Sciences & Technology Tharparkar”** which will be completed in 03 months.
2. Eligible Bidders may obtain further information, inspect and acquire the Bidding Documents from the Office of the Employer, at office of The Director Procurement, NED University of Engineering & Technology, Karachi.
3. The tender documents can be collected from office of The Director Procurement, NED University of Engineering & Technology, Karachi upon payment of Rs. 2000/- (Non-Refundable) up to 14th April, 2022 during office hours. Payments are to be made in favor of “The Director Finance-NEDUET, Karachi” in the shape of Pay Order / Bank Draft.
4. All bids must be accompanied by a Bid Security equivalent to 2% of the bid price in the form of pay order/bank guarantee from the scheduled bank. Interested firms are requested to submit their duly completed bids on or before 11:00 am, 15th April, 2022 at office of The Director Procurement, NED University of Engineering & Technology, Karachi. The bids will be opened on the same day at 11:30 am at the same venue in the presence of University Procurement Committee and the representatives of contractors.

# **INSTRUCTIONS TO BIDDERS**



## **INSTRUCTIONS TO BIDDERS**

(Note: These Instructions to Bidders along with Bidding Data Sheet will not be part of the Contract and will cease to have effect once the contract is signed.)

### **A. GENERAL**

#### **IB.1 Scope of Bid**

- 1.1 The Employer as defined in the Bidding Data Sheet hereinafter called “the Employer” wishes to receive bids for the construction and completion of works as described in these Bidding Documents, and summarized in the Bidding Data Sheet hereinafter referred to as the “Works”.
- 1.2 The successful bidder will be expected to complete the Works within the time specified in Appendix-A to Bid.

#### **IB.2 Source of Funds**

- 2.1 The employer had got approved scheme under title “Establishment of Thar Institute of Engineering, Sciences and Technology-TIEST, Tharparkar” from PDWP Government of Sindh in ADP 2020-2021 and had sufficient allocations for CFY 2021-2022 under ADP No. 650 and intends to spend proportions of cost for execution of this work.

#### **IB.3 Eligible Bidders**

- 3.1 This Invitation for Bids is open to all bidders meeting the following requirements:
  - a. Duly licensed by the Pakistan Engineering Council (PEC) in the category relevant to the value of the Works.

#### **IB.4 One Bid per Bidder**

- 4.1 Each bidder shall submit only one bid either by himself, or as a partner in a joint venture. A bidder who participates in more than one bid (other than alternatives pursuant to Clause IB.16) will be disqualified.

#### **IB.5 Cost of Bidding**

- 5.1 The bidders shall bear all costs associated with the preparation and submission of their respective bids and the Employer will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

## **IB.6 Site Visit**

- 6.1 The bidders are advised to visit and examine the Site of Works and its surroundings and obtain for themselves on their own responsibility all information that may be necessary for preparing the bid and entering into a contract for construction of the Works. All cost in this respect shall be at the bidders own expense.
- 6.2 The bidders and any of their personnel or agents will be granted permission by the Employer to enter upon his premises and lands for the purpose of such inspection, but only upon the express condition that the bidders, their personnel and agents, will release and indemnify the Employer, his personnel and agents from and against all liability in respect thereof and will be responsible for death or personal injury, loss of or damage to property and any other loss, damage, costs and expenses incurred as a result of such inspection.

## **B. BIDDING DOCUMENTS**

### **IB.7 Contents of Bidding Documents**

- 7.1 The Bidding Documents, in addition to invitation for bids, are those stated below and should be read in conjunction with any Addenda issued in accordance with Clause IB.9.
  1. Instructions to Bidders.
  2. Bidding Data Sheet.
  3. General Conditions of Contract, Part-I(GCC).
  4. Particular Conditions of Contract, Part-II(PCC).
  5. Specifications – Special Provisions.
  6. Specifications – Technical Provisions.
  7. Form of Bid & Appendices to Bid.
  8. Bill of Quantities (Appendix-D to Bid).
  9. Form of Bid Security.
  10. Form of Contract Agreement.
  11. Forms of Performance Security and Mobilization Advance Guarantee/Bond and Form of Indemnity Bond for Secured Advance
  12. Drawings.
- 7.2 The bidders are expected to examine carefully the contents of all the above documents. Failure to comply with the requirements of bid submission will be at the Bidder's own risk. Pursuant to Clause IB.26, bids which are not substantially responsive to the requirements of the Bidding Documents will be rejected.



## **IB.8 Clarification of Bidding Documents**

- 8.1 Any prospective bidder requiring any clarification (s) in respect of the Bidding Documents may notify the Employer in writing at the Employer's address indicated in the Invitation for Bids. The Employer will respond to any request for clarification which he receives earlier than 28 days prior to the deadline for submission of bids. Copies of the Employer's response will be forwarded to all purchasers of the Bidding Documents, including a description of the enquiry but without identifying its source.

## **IB.9 Amendment of Bidding Documents**

- 9.1 At any time prior to the deadline for submission of bids, the Employer may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective bidder, modify the Bidding Documents by issuing addendum.
- 9.2 Any addendum thus issued shall be part of the Bidding Documents pursuant to IB 7.1 hereof and shall be communicated in writing to all purchasers of the Bidding Documents. Prospective bidders shall acknowledge receipt of each addendum in writing to the Employer.
- 9.3 To afford prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may extend the deadline for submission of bids in accordance with Clause IB.20

## **C. PREPARATION OF BIDS**

### **IB.10 Language of Bid**

- 10.1 The bid and all correspondence and documents related to the bid exchanged by a bidder and the Employer shall be in the bid language stipulated in the Bidding Data Sheet and Particular Conditions of Contract. Supporting documents and printed literature furnished by the bidders may be in any other language provided the same are accompanied by an accurate translation of the relevant parts in the bid language, in which case, for purposes of evaluation of the bid, the translation in bid language shall prevail.

### **IB.11 Documents Comprising the Bid**

- 11.1 Each bidder shall:
- a) submit a written power of attorney authorizing the signatory of the bid to act for and on behalf of the bidder;
  - b) update the information indicated and listed in the Bidding Data and previously submitted with the application for prequalification, and continue to meet the minimum criteria set out in the prequalification documents which as a minimum, would include the following:
    - I. Evidence of access to financial resources along with average annual construction turnover;
    - II. Financial predictions for the current year and the two following years including the effect of known commitments;
    - III. Work commitments since prequalification;

- IV. Current litigation information; and
- V. Availability of critical equipment

And

- c) furnish a technical proposal taking into account the various Appendices to Bid specially the following:
  - Appendix-E to Bid Proposed Construction Schedule
  - Appendix-F to Bid Method of Performing the Work
  - Appendix-G to Bid List of Major Equipment
  - Appendix-K to Bid Organization Chart for Supervisory Staff
  - and other pertinent information such as mobilization programme etc;

11.2 Bids submitted by a JV shall include a copy of the Joint Venture Agreement entered into by all partners. Alternatively, a Letter of Intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all partners and submitted with the bid, together with a copy of the proposed agreement. The role to be played by each partner to be specified therein. Bids submitted by a joint venture of two (2) or more firms shall comply with the following requirements:

- (a) In case of a successful bid, the Form of JV Agreement shall be signed so as to be legally binding on all partners within 7 days of the receipt of letter of acceptance failing which the contract and the letter of acceptance shall stand void and redundant.
- (b) One of the joint venture partners shall be nominated as being in charge; and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the joint venture partners;
- (c) The partner-in-charge shall always be duly authorized to deal with the Employer regarding all matters related with and/or incidental to the execution of Works as per the terms and Conditions of JV Agreement and in this regard to incur any and all liabilities, receive instructions, give binding undertakings and receive payments on behalf of the joint venture;
- (d) All partners of the joint venture shall at all times and under all circumstances be liable jointly and severally for the execution of the Contract in accordance with the Contract terms and a statement to this effect shall be included in the authorization mentioned under Sub-Para (b) above as well as in the Form of Bid and in the Form of JV Agreement (in case of a successful bid); and
- (e) A copy of JV agreement shall be submitted before signing of the Contract, stating the conditions under which JV will function, its period of duration, the persons authorized to represent and obligate it and which persons will be directly responsible for due performance of the Contract and can give valid receipts on behalf of the joint venture, the proportionate participation of the several firms forming the joint venture, and any other information necessary to permit a full appraisal of its functioning. The JV Agreement shall be made part of the contract. No amendments / modifications whatsoever in the joint venture agreement shall be agreed to between the joint venture partners without prior written consent of the Employer.

11.3 The Bidder shall furnish, as part of the Technical Bid, a Technical Proposal including a statement of work methods, equipment, personnel, schedule and any other information as stipulated Bidding Forms, in sufficient detail to demonstrate the adequacy of the Bidders"

proposal to meet the work requirements and the completion time referred to in Sub-Clause 1.2 hereof.

#### **IB.12 Bid Prices**

- 12.1 Unless stated otherwise in the Bidding Documents, the Contract shall be for the whole of the Works as described in IB 1.1 hereof, based on the unit rates and / or prices submitted by the bidder.
- 12.2 The bidders shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by a bidder will not be paid for by the Employer when executed and shall be deemed covered by rates and prices for other items in the Bill of Quantities.
- 12.3 All duties, taxes and other levies payable by the Contractor under the Contract, or for any other cause, as on the date 28 days prior to the deadline for submission of bids shall be included in the rates and prices and the total Bid Price submitted by a bidder.  
Additional / reduced duties, taxes and levies due to subsequent additions or changes in legislation shall be reimbursed / deducted as per Sub-Clause 70.2 of the General Conditions of Contract Part-I.
- 12.4 The rates and prices quoted by the bidders are subject to adjustment during the performance of the Contract in accordance with the provisions of Clause 70 of the Conditions of Contract. The bidders shall furnish the prescribed information for the price adjustment formulae in Appendix C to Bid and shall submit with the bids such other supporting information as required under the said clause.

#### **IB.13 Currencies of Bid and Payment**

- 13.1 The unit rates and the prices shall be quoted by the bidder entirely in Pak rupees. A bidder expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer's country (referred to as the "Foreign Currency Requirements") shall indicate the same in Appendix-B to Bid. The proportion of the Bid Price (excluding Provisional Sums) needed by him for the payment of such Foreign Currency Requirements either (i) entirely in the currency of the Bidder's home country or, (ii) at the bidder's option, entirely in Pak rupees provided always that a bidder expecting to incur expenditures in a currency or currencies other than those stated in (i) and (ii) above for a portion of the foreign currency requirements, and wishing to be paid accordingly, shall indicate the respective portions in his bid.
- 13.2 The rates of exchange to be used by the bidder for currency conversion shall be the TT & OD Selling Rates published or authorized by the State Bank of Pakistan prevailing on the date 28 days prior to the deadline for submission of bids. For the purpose of payments, the exchange rates used in bid preparation shall apply for the duration of the Contract.

#### **IB.14 Bid Validity**

- 14.1 Bids shall remain valid for the period stipulated in the Bidding Data Sheet after the Date of Bid Opening specified in Clause IB.23.

- 14.2 In exceptional circumstances, prior to expiry of the original bid validity period, the Employer may request that the bidders extend the period of validity for a specified additional period which shall in no case be more than the original bid validity period. The request and the responses thereto shall be made in writing. A bidder may refuse the request without forfeiting his Bid Security. A bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of his Bid Security for the period of the extension, and in compliance with Clause IB.15 in all respects.

#### **IB.15 Bid Security**

- 15.1 Each bidder shall furnish, as part of his bid, a Bid Security in the amount stipulated in the Bidding Data Sheet in Pak Rupees or an equivalent amount in a freely convertible currency.
- 15.2 The Bid Security shall be, at the option of the bidder, in the form of Deposit at Call or a Bank Guarantee issued by a Scheduled Bank in Pakistan or from a foreign bank duly counter guaranteed by a Scheduled Bank in Pakistan in favor of the Employer valid for a period 28 days beyond the Bid Validity date.
- 15.3 Any bid not accompanied by an acceptable Bid Security shall be rejected by the Employer as non-responsive.
- 15.4 The bid securities of unsuccessful bidders will be returned as promptly as possible, but not later than 14 days after the date of issuance of work order.
- 15.5 The Bid Security of the successful bidder will be returned when the bidder has furnished the required Performance Security and signed the Contract Agreement.
- 15.6 The Bid Security may be forfeited:
- (a) If the bidder withdraws his bid except as provided in IB 22.1;
  - (b) If the bidder does not accept the correction of his Bid Price pursuant to IB 27.2 hereof; or
  - (c) In the case of successful bidder, if he fails within the specified time limit to:
    - (i) Furnish the required Performance Security;
    - (ii) Sign the Contract Agreement, or
    - (iii) Furnish the required JV agreement within 7 days of the receipt of letter of acceptance.

#### **IB.16 Alternate Proposals by Bidder**

- 16.1 Should any bidder consider that he can offer any advantages to the Employer by a modification to the designs, specifications or other conditions, he may, in addition to his bid to be submitted in strict compliance with the Bidding Documents, submit any Alternate Proposal(s) containing (a) relevant design calculations; (b) technical specifications; (c) proposed construction methodology; and (d) any other relevant details / conditions, provided always that the total sum entered on the Letter of Price Bid shall be that which represents complete compliance with the Bidding Documents. The technical details and financial implication involved are to be submitted in two separate sealed



envelopes as to be followed in main bid proposals.

- 16.2 Alternate Proposal(s), if any, of the lowest evaluated responsive bidder only may be considered by the Employer as the basis for the award of Contract to such bidder.

#### **IB.17 Pre-Bid Meeting**

- 17.1 The Employer may, on his own motion or at the request of any prospective bidder(s), hold a pre-bid meeting to clarify issues and to answer any questions on matters related to the Bidding Documents. The date, time and venue of pre-bid meeting, if convened, is as stipulated in the Bidding Data Sheet. All prospective bidders or their authorized representatives shall be invited to attend such a pre-bid meeting.
- 17.2 The bidders are requested to submit questions, if any, in writing so as to reach the Employer not later than seven (7) days before the proposed pre-bid meeting.
- 17.3 Minutes of the pre-bid meeting, including the text of the questions raised and the replies given will be transmitted without delay to all purchasers of the Bidding Documents. Any modification of the Bidding Documents listed in IB 7.1 hereof, which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause IB.9 and not through the minutes of the pre-bid meeting.
- 17.4 Absence at the pre-bid meeting will not be a cause for disqualification of a bidder.

#### **IB.18 Format and Signing of Bid**

- 18.1 Bidders are particularly directed that the amount entered on the Letter of Price Bid shall be for performing the Contract strictly in accordance with the Bidding Documents.
- 18.2 All appendices to Bid are to be properly completed and signed.
- 18.3 No alteration is to be made in the Letters of Price and Technical Bids nor in the Appendices thereto except in filling up the blanks as directed. If any such alterations be made or if these instructions be not fully complied with, the bid may be rejected.
- 18.4 The Bidder shall prepare one original of the Technical Bid and one original of the Price Bid comprising the Bid as described in Bidding Data Sheet against IB 11 and clearly mark it "ORIGINAL - TECHNICAL BID" and "ORIGINAL - PRICE BID". In addition, the Bidder shall submit two (2) copies of the Bid and clearly mark each of them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.
- 18.5 The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified in the Bidding Data Sheet and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Bid, except for unamended printed literature, shall be signed or initialed by the person signing the bid.
- 18.6 Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the bid.

18.7 Bidders shall indicate in the space provided in the Letter of Technical and Price Bids, their full and proper addresses at which notices may be legally served on them and to which all correspondence in connection with their bids and the Contract is to be sent.

18.8 Bidders should retain a copy of the Bidding Documents as their file copy.

**D. SUBMISSION OF BIDS FOR SINGLE STAGE SINGLE ENVELOPE BIDDINGPROCEDURE**

**IB.19 Sealing and Marking of Bids**

19.1 Each bidder shall submit his bid as under:

- (a) ORIGINAL and each copy of the Bid shall be separately sealed and put in separate envelopes and marked as such.
- (b) The envelopes containing the ORIGINAL and copies will be put in one sealed envelope and addressed / identified as given in IB 19.2 hereof.
- (c) The technical bid should comprise of documents listed in IB11.1 (A) & the price bid should comprise of documents listed in IB 11.1 (B) which shall be placed in sinlge envelopes in accordance with IB 11.1.

19.2 The inner and outer envelopes shall:

- (a) Be addressed to the Employer at the address provided in the Bidding Data Sheet;
- (b) Bear the name and identification number of the contract as defined in the Bidding Data Sheet; and
- (c) Provide a warning not to open before the time and date for bid opening, as specified in the Bidding Data Sheet.

19.3 In addition to the identification required in IB 19.2 hereof, the inner envelope shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared "late" pursuant to Clause IB.21

19.4 If the outer envelope is not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the Bid.

**IB.20 Deadline for Submission of Bids**

- 20.1
- (a) Bids must be received by the Employer at the address specified no later than the time and date stipulated in the Bidding Data Sheet.
  - (b) Bids with charges payable will not be accepted, nor will arrangements be undertaken to collect the bids from any delivery point other than that specified above. Bidders shall bear all expenses incurred in the preparation and delivery of bids. No claims will be entertained for refund of such expenses.
  - (c) Where delivery of a bid is by mail and the bidder wishes to receive an

acknowledgment of receipt of such bid, he shall make a request for such acknowledgment in a separate letter attached to but not included in the sealed bid package.

- (d) Upon request, acknowledgment of receipt of bids will be provided to those making delivery in person or by messenger.

20.2 The Employer may, at his discretion, extend the deadline for submission of Bids by issuing an amendment in accordance with Clause IB.9, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will thereafter be subject to the deadline as extended.

#### **IB.21 Late Bids**

21. (a) Any bid received by the Employer after the deadline for submission of bids prescribed in Clause IB.20 will be returned unopened to such bidder.

- (b) Delays in the mail, delays of person in transit, or delivery of a bid to the wrong office shall not be accepted as an excuse for failure to deliver a bid at the proper place and time. It shall be the bidder's responsibility to determine the manner in which timely delivery of his bid will be accomplished either in person, by messenger or by mail.

#### **IB.22 Modification, Substitution and Withdrawal of Bids**

22.1 Any bidder may modify, substitute or withdraw his bid after bid submission provided that the modification, substitution or written notice of withdrawal is received by the Employer prior to the deadline for submission of bids.

22.2 The modification, substitution, or notice for withdrawal of any bid shall be prepared, sealed, marked and delivered in accordance with the provisions of Clause IB.19 with the outer and inner envelopes additionally marked "MODIFICATION", "SUBSTITUTION" or "WITHDRAWAL" as appropriate.

22.3 No bid may be modified by a bidder after the deadline for submission of bids except in accordance with IB 22.1 and 27.2.

22.4 Withdrawal of a bid during the interval between the deadline for submission of bids and the expiration of the period of bid validity specified in the Form of Bid may result in forfeiture of the Bid Security in pursuance to Clause IB.15.

### **E BID OPENING AND EVALUATION FOR SINGLE STAGE SINGLE ENVELOPE BIDDING PROCEDURE**

#### **IB. 23 Bid Opening**

23.1 The Employer will open the bids, including withdrawals, substitution and modifications made pursuant to Clause IB.22, in the presence of bidders' representatives who choose to attend, at the time, date and location stipulated in the Bidding Data. The bidder's representatives who are present shall sign a register evidencing their attendance.

- 23.2 Envelopes marked “MODIFICATION”, “SUBSTITUTION” or “WITHDRAWAL” shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Clause IB.22 shall not be opened.
- 23.3 The bidder’s name, total Bid Price and price of any Alternate Proposal(s), any discounts, bid modifications, substitution and withdrawals, the presence or absence of Bid Security, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening of bids.
- 23.4 Employer shall prepare minutes of the bid opening, including the information disclosed to those present in accordance with the Sub-Clause 23.3.

#### **IB.24 Process to be Confidential**

- 24.1 Information relating to the examination, clarification, evaluation and comparison of bid and recommendations for the award of a contract shall not be disclosed to bidders or any other person not officially concerned with such process before the announcement of bid evaluation report which shall be done at least ten 10 days prior to issue of Letter of Acceptance. The announcement to all Bidders will include table(s) comprising read out prices, discounted prices, price adjustments made, final evaluated prices and recommendations against all the bids evaluated. Any effort by a bidder to influence the Employer’s processing of bids or award decisions may result in the rejection of such bidder’s bid. Whereas any bidder feeling aggrieved may lodge a written complaint not later than fifteen (15) days after the announcement of the bid evaluation report. However mere fact of lodging a complaint shall not warrant suspension of the procurement process.

#### **IB.25 Clarification of Bids**

- 25.1 To assist in the examination, evaluation and comparison of bids, the Employer may, at his discretion, ask any bidder for clarification of his bid including breakdowns of unit rates. The request for clarification and the response shall be in writing but no change in the price or substance of the bid shall be sought. If a bid is submitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the bids in accordance with Clause IB.22.
- 25.2 If a Bidder does not provide clarifications of its Bid by the date and time set in the Employer’s request for clarification, its bid may be rejected.

#### **IB.26 Examination of Bids and Determination of Responsiveness**

- 26.1 Prior to the detailed evaluation of bids, the Employer will determine whether each bid is substantially responsive to the requirements of the Bidding Documents.
- 26.2 A substantially responsive bid is one which (i) meets the eligibility criteria; (ii) has been properly signed; (iii) is accompanied by the required Bid Security. (iv) Includes signed Integrity Pact where required as per clause B.35 and (v) conforms to all the terms, conditions and specifications of the Bidding Documents, without material deviation or reservation. A material deviation or reservation is one (i) which affect in any substantial way the scope, quality or performance of the Works; (ii) which limits in any substantial way, inconsistent with the Bidding Documents, the Employer’s rights or the bidders

obligations under the Contract; (iii) adoption/rectification whereof would affect unfairly the competitive position of other bidders presenting substantially responsive bids. Only substantially responsive bid shall be considered for further evaluation.

- 26.3 If a bid is not substantially responsive, it may not subsequently be made responsive by correction or withdrawal of the non-conforming material deviation or reservation. The Employer may, however, seek confirmation/ clarification in writing which shall be responded in writing.

## **IB.27 Correction of Errors**

- 27.1 Bids determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:

- (a) Where there is a discrepancy between the amounts in figures and in words, the amount in words will govern; and
- (b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern, unless in the opinion of the Employer there is an obviously gross misplacement of the decimal point in the unit rate, in which case the line item total as quoted will govern and the unit rate will be corrected.

- 27.2 The amount stated in the Letter of Price Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and with the concurrence of the bidder, shall be considered as binding upon the bidder. If the bidder does not accept the corrected Bid Price, his Bid will be rejected, and the Bid Security shall be forfeited in accordance with IB.15.6 (b) hereof.

## **IB.28 Evaluation and Comparison of Bids**

### **DETAILED TECHNICAL EVALUATION CRITERIA**

| S.No. | Category                       | Weightage/ Marks/ Points |           |
|-------|--------------------------------|--------------------------|-----------|
|       |                                | Maximum                  | Minimum A |
| 1.    | Professional Experience Record | 35                       | 25        |
| 2.    | Financial Soundness            | 30                       | 20        |
| 3.    | Personnel Capabilities         | 15                       | 10        |
| 4.    | Equipment Capabilities         | 20                       | 15        |
|       | <b>Total:</b>                  | <b>100</b>               | <b>70</b> |

*Note: To qualify, applicants must receive not less than an aggregate 70% points of maximum 100 points.*

*If two or more than two bidders quote the same price and the situation of tie up has arisen then work shall be awarded to the bidder having higher technical soundness.*

### **1. Mandatory Requirements**

All the applicants shall be subjected to initial scrutiny using the following criteria:

- Registration with Pakistan Engineering Council in Category C-6 or above and at least in specialization codes CE10, CE01 and CE02. The contractor should enclose PEC Registration Certificate, valid for the year June 2022
- The Bidder should be registered with FBR and Sindh Revenue Board - SRB for both Income and Sales Tax, with company name appearing on the active taxpayer list (ATL). The contractor should also submit copy of Registration Certificate of NTN and SNTN and print from ATL
- The bidder shall submit affidavit of no litigation history, affidavit of non-blacklisting, affidavit of never indulge in any corrupt, fraudulent and collusive practices. The bidder shall also submit affidavit that the information and documents provided with this pre-qualification document is correct.
- Having an experience for execution and completion of projects of similar nature in remote areas particularly in desert area or far-flung destinations.

## 2. Professional Experience Record

*Experience for Projects Completed will be evaluated as below.*

### **General**

*(Information regarding similar / comparable projects completed is to be supported by documents such as Taking over / Completion Certificate, Maintenance / Defects Liability Certificate and any other relevant document).*

| Sr. No.           | Description   | Maximum Points |
|-------------------|---|----------------|
| 1.                | General Experience of Infrastructure Works<br>Projects executed of over Rs. 25.00 Million<br>(05 Marks for one Projects and 05 Marks for each additional project) | 10             |
| 2.                | Projects of Similar Nature Executed With Universities<br>(05 Marks for each project)  | 10             |
| 3.                | Projects of Similar Nature in Hand Preferably With Universities<br>(05 Marks for each project)  | 10             |
| 4.                | Experience of working with NED University as a Contractor / Supplier Etc.<br>(2.5 Marks for each project)   | 5              |
| <b>Sub Total:</b> |   | <b>35</b>      |

## 3. Financial Soundness

Tendering Capability of an applicant will be taken as follows:

- The Audited Balance Sheets and Annual Turn Over for the last three years from Chartered Accountant firm must be submitted and should demonstrate the soundness of the applicant's financial position, showing long term profitability. Where necessary, the Employer will make inquiries with the applicant's bankers.
- Points shall be awarded under this category based on the following criteria:



| Sr. No.                      | Description                                       | Marks Assigned | Criteria for Marks Obtained  |
|------------------------------|---|----------------|--|
| a)                           | Average Annual Turnover for Last three (03) Years | 10             | <ul style="list-style-type: none"> <li>Five (05) Point is given if the available bank credit line limit is equal to Rs. 25 Million</li> <li>One (01) additional point is given for every Rs. 5.00 Million increase in the credit line.</li> <li>Full Points are given in case of limit exceeding Rs. 50.00 Million</li> </ul>                                |
| b)                           | Working Capital in last 3 Years                   | 10             | <ul style="list-style-type: none"> <li>Five (05) Points are given if the average working capital for last three years is equal to Rs. 25.00 Million</li> <li>One (01) additional point is given for every Rs. 5.00 Million increase in the working capital.</li> <li>Full Points are given in case of working capital exceeding Rs.50 Million</li> </ul>     |
| c)                           | Years Available Bank Credit Line                  | 10             | <ul style="list-style-type: none"> <li>Five (05) Points are given if the available bank credit line is equal to Rs. 25.00 Million</li> <li>One (01) additional point is given for every Rs. 5.00 Million increase in the available bank credit line.</li> <li>Full Points are given in case of available bank credit line exceeding Rs.50 Million</li> </ul> |
| <b>Total Marks Allocated</b> |   |                | <b>30</b>  |

#### 4. Personnel Capabilities

##### • Brief Discussion of Personnel Capabilities

Personnel deputed on site will be evaluated on the basis of following points:

(Information regarding education qualification, total work experience and specific work experience is to be supported by documents such as copy of education qualification certificate / degree and CVs of concerned personnel proposed position, duly signed and, any other relevant documents).

| Sr. No. | Description             | Maximum Points |
|---------|-------------------------|----------------|
| 1.      | Site Engineer           | 5              |
| 2.      | Lab Technician          | 2              |
| 3.      | Quantity Surveyor       | 3              |
| 4.      | Surveyor                | 3              |
| 5.      | Site Supervisor (Civil) | 2              |
|         | <b>Sub Total:</b>       | <b>15</b>      |

\* All Safety measures will be the responsibility of Site Engineer.

#### 5. Equipment Capabilities

The applicant should own, or have assured access to (through rented, lease, purchase agreement or other means), the following key equipment (limited to only major items of

equipment) in full working order, and must demonstrate that, based on known commitments, these will be available for deployment on the proposed contract or works. The applicant may also list alternative equipment which he would propose for the contract together with an explanation of the alternate proposal.

Points will be given on the basis of the following criteria:

| <b>Sr. No.</b> | <b>Description</b>                                      | <b>Max. Points</b> |
|----------------|---|--------------------|
| 1              | Rollers   | 3                  |
| 2              | Dumper  | 3                  |
| 3              | Excavator   | 3                  |
| 4              | Tractor Trolley   | 3                  |
| 5              | Grader  | 3                  |
| 6              | Electric Generator ( <i>Minimum capacity 5-10 KVA</i> ) | 3                  |
| 7              | Survey Equipment  | 2                  |
|                | <b>Total Maximum Points</b>                             | <b>20</b>          |

- 28.1 The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Clause IB.26.
- 28.2 In evaluating the Bids, the Employer will determine for each Bid the evaluated Bid Price by adjusting the Bid Price as follows:
- (a) Making any correction for errors pursuant to Clause IB.27;
  - (b) Excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities, but including competitively priced Day work; and
  - (c) Making an appropriate adjustment for any other acceptable variation or deviation.
- 28.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in Bid evaluation.
- 28.4 If the Bid of the successful bidder is seriously unbalanced in relation to the Employer's estimate of the cost of work to be performed under the Contract, the Employer may require the bidder to produce detailed price analyses for any or all items of the Bill of Quantities to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the Performance Security set forth in Clause IB.32 be increased at the expense of the successful bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful bidder under the Contract.

## **F. AWARD OF CONTRACT**

### **IB.29 Award**

- 29.1 Subject to Clauses IB.30 and IB.34, the Employer will award the Contract to the bidder whose bid has been determined to be substantially responsive to the Bidding Documents and who has offered the lowest evaluated Bid Price, provided that such bidder has been determined to be eligible in accordance with the provisions of Clause IB.3 and qualify pursuant to IB 29.2.
- 29.2 The Employer, at any stage of the bid evaluation, having credible reasons for or prima facie evidence of any defect in bidder's capacities, may require the bidders to provide information concerning their professional, technical, financial, legal or managerial competence whether already pre-qualified or not:

Provided that such qualification shall only be laid down after recording reasons in writing. They shall form part of the records of that bid evaluation report.

### **IB.30 Employer's Right to accept any Bid and to reject any or all Bids**

- 30.1 Notwithstanding Clause IB.29, the Employer reserves the right to accept or reject any Bid, and to annul the bidding process and reject all bids, at any time prior to award of Contract, without thereby incurring any liability to the affected bidders or any obligation except that the grounds for rejection of all bids shall upon request be communicated to any bidder who submitted a bid, without justification of grounds. Rejection of all bids shall be notified to all bidders promptly.

### **IB.31 Notification of Award**

- 31.1 Prior to expiration of the period of bid validity prescribed by the Employer, the Employer will notify the successful bidder in writing ("Letter of Acceptance") that his Bid has been accepted. This letter shall name the sum which the Employer will pay the Contractor in consideration of the execution and completion of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called the "Contract Price").
- 31.2 No Negotiation with the bidder having evaluated as lowest responsive or any other bidder shall be permitted.
- 31.3 The notification of award and its acceptance by the bidder will constitute the formation of the Contract, binding the Employer and the bidder till signing of the formal Contract Agreement.
- 31.4 Upon furnishing by the successful bidder of a Performance Security, the Employer will promptly notify the other bidders that their Bids have been unsuccessful and return their bid securities.

### **IB.32 Performance Security**

- 32.1 The successful bidder shall furnish to the Employer a Performance Security in the form and the amount stipulated in the Bidding Documents and the Conditions of Contract within a period of 28 days after the receipt of the Letter of Acceptance.

*Not Applicable*

- 32.2 Failure of the successful bidder to comply with the requirements of IB.32.1 or IB.33 or IB.35 shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security.

### **IB.33 Signing of Contract Agreement**

- 33.1 Within 14 days from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the Employer will send the successful bidder the Contract Agreement in the form provided in the Bidding Documents, incorporating all agreements between the parties.
- 33.2 The formal Agreement between the Employer and the successful bidder shall be executed within 14 days of the receipt of the Contract Agreement by the successful bidder from the Employer.

### **IB. 34 General Performance of the Bidders**

The Employer reserves the right to obtain information regarding performance of the bidders on their previously awarded contracts/works. The Employer may in case of consistent poor performance of any Bidder as reported by the employers of the previously awarded contracts, inter alia, reject his bid and/or refer the case to the Pakistan Engineering Council (PEC). Upon such reference, PEC in accordance with its rules, procedures and relevant laws of the land take such action as may be deemed appropriate under the circumstances of the case including black listing of such Bidder and debarring him from participation in future bidding for similar works.

### **IB.35 Integrity Pact**

The Bidder shall sign and stamp the Integrity Pact provided at Appendix-L to Bid in the Bidding Documents for all Federal Government procurement contracts exceeding Rupees ten million. Failure to provide such Integrity Pact shall make the bidder non-responsive.

### **IB.36 Instructions not Part of Contract**

Bids shall be prepared and submitted in accordance with these Instructions which are provided to assist bidders in preparing their bids, and do not constitute part of the Bid or the Contract Documents.

## **BIDDING DATA SHEET**

**Bidding Data Sheet****1.1 Name and address of the Employer:****1.1 Name of the Project & Summary of the Works:**

Relocation of Village Link Road Wide at Thar Institute of Engineering, Sciences & Technology Tharparkar

**2.1 Name of the Borrower/Source of Financing/Funding Agency:**

The Procuring Agency has arranged funds from PDWP Government of Sindh under ADP No. 650 of CFY 2021-2022 with sufficient allocations.

**10.1 Bid language:**

English

**11.1 (A) The Bidder shall submit with its Technical Bid the following documents:**

- (a) Letter of Technical Bid
- (b) Bid Security (IB.15)
- (c) Written confirmation authorizing the signatory of the Bid to commit the Bidder (IB.18.5)
- (d) Special Stipulations (as filled by the Employer) (appendix –A)
- (e) Availability of Specified Equipment (appendix –G)
- (f) Integrity Pact (appendix –L)
- (g) Financial Competence and Access to financial Resources (appendix –M)
- (h) Past Performance, Current Commitment, Qualification and Experience (appendix –N)

**11.1(B) The Bidder shall submit with its Price Bid the following documents:**

- (a) Letter of Price Bid
- (b) Bill of Quantities (appendix –D)
- (c) Estimated Progress Payments (appendix –J)

413.1 Bidders to quote entirely in Pak. rupees only.

14.1 Period of Bid Validity:

Period of Bid Validity is 90 days after the date of bid opening.

15.1 Amount of Bid Security:

Amount of Bid Security shall be 2% of the Bid Price in Pak Rupees.

18.4 Number of copies of the Bid to be completed and returned:  
One Original plus One Copy

19.2(a) Employer's address for the purpose of Bid submission:

Office of the Director Procurement, NED University of Engineering & Technology, Karachi

20.1(a) Deadline for submission of bids:

As mentioned in the Notice Inviting Tender-NIT

23.1 Venue, time, and date of Bid opening:

As mentioned in the Notice Inviting Tender-NIT



**Letters of Bid**  
**Appendices to Bid**

## **Letter of Bid**

Date: .....

Bid Reference No: .....

(Name of Contract/Works)

To: .....

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (IB) 9;
- (b) We offer to execute and complete in conformity with the Bidding Documents the following Works:
- (c) Our Bid consisting of the Technical Bid and the Price Bid shall be valid for a period of ..... days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (d) As security for due performance of the under takings and obligations of our bid, we submit here with a Bid security, in the amount specified in Bidding Data Sheet, which is valid (at least) 28 days beyond validity of Bid itself.
- (e) We are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process, other than alternative offers submitted in accordance with IB16 (as applicable) .
- (f) We agree to permit Employer or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors. This permission is extended for verification of any information provided in our Technical Bid which comprises all documents enclosed herewith in accordance with IB.11.1 of the Bidding Data Sheet.

**LTB-2**

- (g) We agree to permit Employer or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors. This permission is extended for verification of any information provided in our Technical Bid which comprises all documents enclosed herewith in accordance with IB.11.1 of the Bidding Data Sheet.
- (h) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (IB)9;
- (i) The total price of our Bid, excluding any discounts offered in item (c) below is:
- (j) The discounts offered and the methodology for their application are:
- (k) Our Bid shall be valid for a period of ..... days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (l) If our Bid is accepted, we commit to obtain a performance security in accordance with the Bidding Documents;
- (m) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed and we do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other bidder for the Works.
- (n) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.
- (o) We agree to permit Employer or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors. This permission is extended for verification of any information provided in our Technical Bid which comprises all documents enclosed herewith in accordance with IB.11.1 of the Bidding Data Sheet.
- (p) If awarded the contract, the person named below shall act as Contractor's Representative.

Name .....

In the capacity of .....

Signed .....

.....

Duly authorized to sign the Bid for and on behalf of .....

Date .....

.....

Address.....

## SPECIAL STIPULATIONS

### Clause Conditions of Contract

|     |  |               |   |
|-----|--|---------------|---|
| 1.  | Employer's name and address  | 1.1.2.2 & 1.3 | Office of The Director Procurement, NED University of Engineering & Technology, Karachi.<br>Phone: 92-21-99261261-8 Ext: 2460                                 |
| 2.  | Engineer's name and address  | 1.1.2.4 & 1.3 | Not Applicable  |
| 3.  | Law applicable   | 5.1(b)        | The law to be applied is the law of Islamic Republic of Pakistan  |
| 4.  | Time for Commencement  | 41.1          | Within 14 days from the date of receipt of Engineer's Notice to Commence which shall be issued within fourteen (14) days after signing of Contract Agreement. |
| 5.  | Time for Completion  | 43.1, 48.2    | 3 months from the date of receipt of Work Orders.   |
| 6.  | Defects Liability Period   | 49.1          | 3 months (90 days) Days from the date of completion.  |
| 7.  | Percentage of Retention Money  | 60.2          | 5 % of the amount of Interim Payment Certificate.   |
| 8.  | Limit of Retention Money   | 60.2          | 5 % of Contract Price stated in the Work Order.   |
| 9.  | Minimum amount of Running Account Bills  | 60.2          | Up to 5% of the Accepted Contract Price   |
| 10. | Time of Payment from delivery of Engineer's Interim Payment Certificate to the Employer. | 60.10         | 30 days in case of local currency or 42 days in case of foreign funded projects.  |

**FOREIGN CURRENCY REQUIREMENTS**  
**(If required and only in case of International Bidding)**

1. The Bidder may indicate here in below his requirements of foreign currency (if any), with reference to various inputs to the Works.
2. Foreign Currency Requirement as percentage of the Bid Price excluding Provisional Sums \_\_\_\_\_%.
3. Table of Exchange Rates

| Unit of Currency  | Equivalent in Pak. Rupees |
|-------------------|---------------------------|
| Australian Dollar | -----                     |
| Euro              | -----                     |
| Japanese Yen      | -----                     |
| U.K. Pound        | -----                     |
| U.S. Dollars      | -----                     |
| -----             | -----                     |
| -----             | -----                     |

**COST ESCALATION-DIFFERENCE OF COST UNDER CLAUSE 70 OF  
CONDITIONS OF CONTRACT**

The Price Escalation-Difference of Cost shall be payable to the contractor under the contract provisions in accordance to time to time notifications of office of the Chief Engineer Highways, Hyderabad, Government of Sindh as per policy for ADP works.

*Not Applicable*

**BILL OF QUANTITIES**

**A. Preamble**

1. The Bill of Quantities shall be read in conjunction with the Conditions of Contract, Specifications and Drawings.
2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work executed and measured by the Contractor and verified by the Engineer and valued at the rates and prices entered in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix in accordance with provisions of the Contract.
3. The rates and prices entered in the priced Bill of Quantities shall, except insofar as it is otherwise provided under the Contract include all costs of Contractor's plant, labour, supervision, materials, execution, insurance, profit, taxes and duties, together with all general risks, liabilities and obligations set out or implied in the Contract. Furthermore all duties, taxes and other levies payable by the Contractor under the Contract, or for any other cause, as on the date 28 days prior to deadline for submission of Bids, shall be included in the rates and prices and the total Bid Price submitted by the Bidder.
4. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of items against which the Contractor will have failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.
5. The whole cost of complying with the provisions of the Contract shall be included in the items provided in the priced Bill of Quantities, and where no items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related items of the Works.
6. General directions and description of work and materials are not necessarily repeated nor summarised in the Bill of Quantities. References to the relevant sections of the Bidding Documents shall be made before entering prices against each item in the priced Bill of Quantities.
7. Provisional sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Engineer in accordance with Sub-Clause 58.2 of Part I, General Conditions of Contract.



**BILL OF QUANTITIES**

**B. Work Items**

1. As per attached Schedule B.

**PROPOSED CONSTRUCTION SCHEDULE**

Pursuant to Sub-Clause 43.1 of the General Conditions of Contract, the Works shall be completed on or before the date stated in Appendix-A to Bid. The Bidder shall provide as Appendix-E to Bid, the Construction Schedule in the bar chart (CPM, PERT or any other to be specified herein) showing the sequence of work items and the period of time during which he proposes to complete each work item in such a manner that his proposed programme for completion of the whole of the Works and parts of the Works may meet Employer's completion target in days noted below and counted from the date of receipt of Engineer's Notice to Commence. (Attach sheets as required for the specified form of Construction Schedule):

DescriptionTime for Completion

- a) Whole Works \_\_\_\_\_ days
- b) Part-A \_\_\_\_\_ days (If applicable)
- c) Part-B \_\_\_\_\_ days (If applicable)
- d) \_\_\_\_\_ days
- e) \_\_\_\_\_ days

**METHOD OF PERFORMING THE WORK**

The Bidder is required to submit a narrative outlining the method of performing the Work. The narrative should indicate in detail and include but not be limited to:

1. Organization Chart indicating head office and field office personnel involved in management and supervision, engineering, equipment maintenance and purchasing.
2. Mobilization in Pakistan the type of facilities including personnel accommodation, office accommodation, provision for maintenance and for storage, communications, security and other services to be used.
3. The method of executing the Works, the procedures for installation of equipment and machinery and transportation of equipment and materials to the site.
4. Quality control / Quality assurance measures to be adopted including procedures to be followed for carrying out all tests required under specifications.

**LIST OF MAJOR EQUIPMENT – RELATED ITEMS**

The Bidder will provide a list of all major equipment and related items, under separate heading for items owned, to be purchased or to be arranged on lease by him to carry out the Works. The information shall include make, type, capacity, and anticipated period of utilization for all equipment which shall be in sufficient detail to demonstrate fully that the equipment will meet all requirements of the Specifications.

**LIST OF MAJOR EQUIPMENT**

| <b>Owned<br/>Purchased<br/>or Leased</b> | <b>Description<br/>of Unit<br/>(Make,<br/>Model,<br/>Year)</b> | <b>Capacity<br/>HP<br/>Rating</b> | <b>Condition</b> | <b>Present<br/>Location or<br/>Source</b> | <b>Date of<br/>Delivery<br/>at Site</b> | <b>Period of<br/>Work on<br/>Project</b> |
|--|--|-----------------------------------|------------------|---|---|--|
| <b>1</b>                                 | <b>2</b>   | <b>3</b>                          | <b>4</b>         | <b>5</b>                                  | <b>6</b>                                | <b>7</b>                                 |
| a. Owned                                 |  |                                   |                  |   |   |  |
| b. To be<br>Purchased                    |  |                                   |                  |   |   |  |
| c. To be<br>arranged on<br>Lease         |  |                                   |                  |   |   |  |

**Equipment:**

The Bidder must demonstrate that it has the key equipment listed hereafter:

| No. | PLANT/EQUIPMENT                    |                      |  |  |                                       |
|-----|------------------------------------|----------------------|--|--|---------------------------------------|
|     | Equipment Type and Characteristics | Total Nos. available | Under Utilization on other projects, if applicable | Nos. waiting to be shifted to new project(s) | Min. Number Required for this Project |
| 1   |                                    |                      |  |  |                                       |
| 2   |                                    |                      |  |  |                                       |
| 3   |                                    |                      |  |  |                                       |
| 4   |                                    |                      |  |  |                                       |
| 5   |                                    |                      |  |  |                                       |
| 6   |                                    |                      |  |  |                                       |
|     |                                    |                      |  |  |                                       |

### CONSTRUCTION CAMP AND HOUSING FACILITIES

The Contractor in accordance with Clause 34 of the Conditions of Contract shall provide description of his construction camp's facilities and staff housing requirements.

The Contractor shall be responsible for pumps, electrical power, water and electrical distribution systems, and sewerage system including all fittings, pipes and other items necessary for servicing the Contractor's construction camp.

The Bidder shall list or explain his plan for providing these facilities for the service of the Contract as follows:

1. Site Preparation (clearing, land preparation, etc.).
2. Provision of Services.
  - a) Power (expected power load, etc.).
  - b) Water (required amount and system proposed).
  - c) Sanitation (sewage disposal system, etc.).
3. Construction of Facilities
  - a) Contractor's Office. Workshop and Work Areas (areas required and proposed layout, type of construction of buildings, etc.).
  - b) Warehouses and Storage Areas (area required, type of construction and layout).
  - c) Housing and Staff Facilities (Plans for housing for proposed staff, layout, type of construction, etc.).
4. Construction Equipment Assembly and Preparation (detailed plans for carrying out this activity).

5. Other Items Proposed (Security services, etc.). The Contractor should mention here what are his proposed environmental measures for the project as per EPA rules like treatment of wastewater and water quality etc. The Contractor shall submit a detailed EMP (Environmental Management Plan) to describe how materials are removed from site and disposed off at a safe location, prevention for the contamination of ground and surface water in neighboring areas etc. including remedial measures for adoption.
6. Detail of testing Lab with testing equipment etc.

*Not Applicable*

**LIST OF SUBCONTRACTORS**

I/We intend to subcontract the following parts of the Work to subcontractors. In my/our opinion, the subcontractors named hereunder are reliable and competent to perform that part of the work for which each is listed.

Enclosed are documentation outlining experience of subcontractors, the curriculum vitae and experience of their key personnel who will be assigned to the Contract, equipment to be supplied by them, size, location and type of contracts carried out in the past.

| <b>Part of Work</b><br><b>(Give Details)</b> | <b>Subcontractor</b><br><b>(With Complete Address)</b> |
|--|--|
| 1  | 2  |
|  |  |



**ESTIMATED PROGRESS PAYMENTS**

Bidder's estimate of the value of work which would be executed by him during each of the periods stated below, based on his Programme of the Works and the Rates in the Bill of Quantities, expressed in thousands of Pakistani Rupees:

| <b>Quarter/ Year/ Period</b> | <b>Amounts<br/>(1,000 Rs.)</b> |
|------------------------------|--------------------------------|
| <b>1</b>                     | <b>2</b>                       |
| Ist Quarter                  |                                |
| 2 <sup>nd</sup> Quarter      |                                |
| 3 <sup>rd</sup> Quarter      |                                |
| 4 <sup>th</sup> Quarter      |                                |
| .....                        |                                |
| .....                        |                                |
| .....                        |                                |
| .....                        |                                |
| <b>Bid Price</b>             |                                |

Not Applicable

**ORGANIZATION CHART  
FOR THE  
SUPERVISORY STAFF AND LABOUR**

*Not Applicable*

**(INTEGRITY PACT)**

**DECLARATION OF FEES, COMMISSION AND BROKERAGE ETC.  
PAYABLE BY THE SUPPLIERS OF GOODS, SERVICES & WORKS IN  
CONTRACTS WORTH RS. 10.00 MILLION OR MORE**

Contract No. \_\_\_\_\_ Dated \_\_\_\_\_  
Contract Value: \_\_\_\_\_  
Contract Title: \_\_\_\_\_

..... [Name of Supplier] hereby declares that it has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of Pakistan (GoP) or any administrative subdivision or agency thereof or any other entity owned or controlled by GoP through any corrupt business practice.

Without limiting the generality of the foregoing, [name of Supplier] represents and warrants that it has fully declared the brokerage, commission, fees etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultation fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP, except that which has been expressly declared pursuant hereto.

[Name of Supplier] certifies that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with GoP and has not taken any action or will not take any action to circumvent the above declaration, representation or warranty.

[Name of Supplier] accepts full responsibility and strict liability for making any false declaration, not making full disclosure, misrepresenting facts or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right, interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other rights and remedies available to GoP under any law, contract or other instrument, be voidable at the option of GoP.

Notwithstanding any rights and remedies exercised by GoP in this regard, [name of Supplier] agrees to indemnify GoP for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoP in an amount equivalent to ten times the sum of any commission, gratification, bribe, finder's fee or kickback given by [name of Supplier] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP.

Name of Employer: .....  
Signature: .....  
[Seal]

Name of Contractor: .....  
Signature: .....  
[Seal]

**FORMS**

**BID SECURITY  
PERFORMANCE SECURITY  
CONTRACT AGREEMENT  
MOBILIZATION ADVANCE GUARANTEE/BOND  
AND  
INDEMNITY BOND FOR SECURED ADVANCE**

**BID SECURITY**  
**(Bank Guarantee)**

Security Executed on \_\_\_\_\_  
(Date)

Name of Surety (Bank) with Address: \_\_\_\_\_  
(Scheduled Bank in Pakistan)

Name of Principal (Bidder) with Address \_\_\_\_\_

Penal Sum of Security Rupees . \_\_\_\_\_ (Rs. \_\_\_\_\_)

Bid Reference No. \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bid and at the request of the said Principal (Bidder) we, the Surety above named, are held and firmly bound unto

\_\_\_\_\_ (hereinafter called the 'Employer') in the sum stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Bidder has submitted the accompanying Bid dated \_\_\_\_\_ for Bid No. \_\_\_\_\_ for \_\_\_\_\_ (Particulars of Bid) to the said Employer; and

WHEREAS, the Employer has required as a condition for considering said Bid that the Bidder furnishes a Bid Security in the above said sum from a Scheduled Bank in Pakistan or from a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan, to the Employer, conditioned as under:

- (1) that the Bid Security shall remain in force up to and including the date 28 days after the deadline for validity of bids as stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Surety is hereby waived;
- (2) that the Bid Security of unsuccessful Bidders will be returned by the Employer after expiry of its validity or upon signing of the Contract Agreement; and
- (3) that in the event of failure of the successful Bidder to execute the proposed Contract Agreement for such work and furnish the required Performance Security, the entire said sum be paid immediately to the said Employer pursuant to Clause 15.6 of the Instruction to Bidders for the successful Bidder's failure to perform.

NOW THEREFORE, if the successful Bidder shall, within the period specified therefore, on the prescribed form presented to him for signature enter into a formal Contract with the said Employer in accordance with his Bid as accepted and furnish within twenty eight (28) days of his being requested to do so, a Performance Security with good and sufficient surety, as may be required, upon the form prescribed by the said Employer for the faithful performance and proper fulfillment of the said Contract or in the event of non-withdrawal of the said Bid within the time specified for its validity then this obligation shall be void and of no effect, but otherwise to remain in full force and effect.

PROVIDED THAT the Surety shall forthwith pay the Employer, the said sum upon first written demand of the Employer (without cavil or argument) and without requiring the Employer to prove or to show grounds or reasons for such demand, notice of which shall be sent by the Employer by registered post duly addressed to the Surety at its address given above.

PROVIDED ALSO THAT the Employer shall be the sole and final judge for deciding whether the Principal (Bidder) has duly performed his obligations to sign the Contract Agreement and to furnish the requisite Performance Security within the time stated above, or has defaulted in fulfilling said requirements and the Surety shall pay without objection the said sum upon demand from the Employer forthwith and without any reference to the Principal (Bidder) or any other person.

IN WITNESS WHEREOF, the above bounden Surety has executed the instrument under its seal on the date indicated above, the name and seal of the Surety being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

SURETY (Bank)

WITNESS:

Signature \_\_\_\_\_

1. \_\_\_\_\_

Name \_\_\_\_\_

\_\_\_\_\_

Title \_\_\_\_\_

Corporate Secretary (Seal)

Corporate Guarantor (Seal)

2. \_\_\_\_\_

\_\_\_\_\_  
Name, Title & Address

**FORM OF PERFORMANCE SECURITY**  
**(Bank Guarantee)**

Guarantee No. \_\_\_\_\_  
Executed on \_\_\_\_\_  
Expiry date \_\_\_\_\_

[Letter by the Guarantor to the Employer]

Name of Guarantor (Bank) with address: \_\_\_\_\_  
(Scheduled Bank in Pakistan)

Name of Principal (Contractor) with address: \_\_\_\_\_

Penal Sum of Security (express in words and figures) \_\_\_\_\_

Letter of Acceptance No. \_\_\_\_\_ Dated \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bidding Documents and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Principal we, the Guarantor above named, do hereby and firmly bound unto the \_\_\_\_\_ (hereinafter called the Employer) in the penal sum of the amount stated above of the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has accepted the Employer's above said Letter of Acceptance for \_\_\_\_\_ (Name of Contract) for the \_\_\_\_\_ (Name of Project).

NOW THEREFORE, if the Principal (Contractor) shall well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfill all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause 49, Defects Liability, of Conditions of Contract are fulfilled.

Our total liability under this Guarantee is limited to the sum stated above and it is a condition of any liability attaching to us under this Guarantee that the claim for payment in writing shall be received by us within the validity period of this Guarantee, failing which we shall be discharged of our liability, if any, under this Guarantee.

We, \_\_\_\_\_ (the Guarantor), waiving all objections and defences under the Contract, do hereby irrevocably and independently guarantee to pay to the Employer without delay upon the Employer's first written demand without cavil or arguments and without requiring the Employer to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Employer's written declaration that the Principal has refused or failed to perform the obligations under the Contract which payment will be effected by the Guarantor to Employer's designated Bank & Account Number.

PROVIDED ALSO THAT the Employer shall be the sole and final judge for deciding whether the Principal (Contractor) has duly performed his obligations under the Contract or has defaulted in fulfilling said obligations and the Guarantor shall pay without objection any sum or sums up to the amount stated above upon first written demand from the Employer forthwith and without any reference to the Principal or any other person.

IN WITNESS WHEREOF, the above-bounden Guarantor has executed this Instrument under its seal on the date indicated above, the name and corporate seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Witness:

1. \_\_\_\_\_

\_\_\_\_\_  
Corporate Secretary (Seal)

2. \_\_\_\_\_

\_\_\_\_\_  
Name, Title & Address

\_\_\_\_\_  
Guarantor (Bank)

Signature \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

\_\_\_\_\_  
Corporate Guarantor (Seal)



**FORM OF CONTRACT AGREEMENT**

THIS CONTRACT AGREEMENT (hereinafter called the "Agreement") made on the \_\_\_\_\_ day of \_\_\_\_\_ (month) 20\_\_\_\_ between \_\_\_\_\_ (hereafter called the "Employer") of the one part and \_\_\_\_\_ (hereafter called the "Contractor") of the other part.

WHEREAS the Employer is desirous that certain Works, viz \_\_\_\_\_ should be executed by the Contractor and has accepted a Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein.

NOW this Agreement witnesseth 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 documents after incorporating addenda / Clarification as agreed or otherwise, if any, except those parts relating to Instructions to Bidders shall be deemed to form and be read and construed as part of this Contract, viz:
  - (a) The Contract Agreement;
  - (b) The Letter of Acceptance;
  - (c) The completed Form of Bid;
  - (d) Special Stipulations (Appendix-A to Bid);
  - (e) The Particular Conditions of Contract – Part II;
  - (f) The General Conditions – Part I;
  - (g) The priced Bill of Quantities (Appendix-D to Bid);
  - (h) The completed Appendices to Bid (B, C, E to O);
  - (i) The Drawings;
  - (j) The Specifications.
  - (k) \_\_\_\_\_ (any other)
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 execute and complete the Works and remedy defects therein in conformity and in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor, in consideration of the execution and completion of the Works as per provisions of the Contract, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS WHEREOF the parties hereto have caused this Agreement to be executed on the day, month and year first before written in accordance with their respective laws.

Signature of the Contactor

\_\_\_\_\_  
(Seal)

Signature of Employer

\_\_\_\_\_  
(Seal)

Signed, Sealed and Delivered in the presence of:

Witness:

\_\_\_\_\_

(Name, Title and Address)

Witness:

\_\_\_\_\_

(Name, Title and Address)

**MOBILIZATION ADVANCE GUARANTEE/BOND**

Guarantee No. \_\_\_\_\_ Date \_\_\_\_\_

WHEREAS \_\_\_\_\_ (hereinafter called the 'Employer') has entered into a Contract for  
 \_\_\_\_\_  
 (Particulars of Contract)  
 with \_\_\_\_\_ (hereinafter called the "Contractor").

AND WHEREAS, the Employer has agreed to advance to the Contractor, at the Contractor's request, an amount of Rupees \_\_\_\_\_ (Rs \_\_\_\_\_) which amount shall be advanced to the Contractor as per provisions of the Contract.

AND WHEREAS, the Employer has asked the Contractor to furnish Guarantee to secure the mobilization advance for the performance of his obligations under the said Contract.

AND WHEREAS, \_\_\_\_\_  
 (Scheduled Bank in Pakistan or Insurance Company acceptable to the Employer)  
 (hereinafter called the "Guarantor") at the request of the Contractor and in consideration of the Employer agreeing to make the above advance to the Contractor has agreed to furnish the said Guarantee.

NOW, THEREFORE, the Guarantor hereby guarantees that the Contractor shall use the advance for the purpose of the mentioned Contract and if he fails and commits default in fulfillment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Employer for payment not exceeding the aforementioned amount.

Notice in writing of any default, of which the Employer shall be the sole and final judge, on the part of the Contractor, shall be given by the Employer to the Guarantor, and on such first written demand, payment shall be made by the Guarantor of all sums then due under this Guarantee without any reference to the Contractor and without any objection.

This Guarantee shall remain in force until the advance is fully adjusted against payments from the Interim Payment Certificates of the Contractor or until \_\_\_\_\_ whichever is earlier.  
 (Date)

The Guarantor's liability under this Guarantee shall not in any case exceed the sum of Rupees \_\_\_\_\_ (Rs \_\_\_\_\_).

This Guarantee shall remain valid up to the aforesaid date and shall be null and void after the aforesaid date or earlier if the advance made to the Contractor is fully adjusted against payments from Interim Payment Certificates of the Contractor provided that the Guarantor agrees that the aforesaid period of validity shall be deemed to be extended if on the above mentioned date the advance payment is not fully adjusted.

GUARANTOR

1.

Signature
2.

Name
3.

Title

WITNESS

1.

Corporate Secretary (Seal)
2.

(Name Title & Address) Corporate Guarantor(Seal)

Not Applicable

**INDEMNITY BOND  
FOR SECURED ADVANCE  
AGAINST MATERIALS BROUGHT AT SITE**

(ON RS.40 NONJUDICIAL STAMP PAPER)

This Deed of Indemnity is issued by M/s. \_\_\_\_\_  
\_\_\_\_\_ (Name of the Contractor) in favour of  
M/s. \_\_\_\_\_ (Name of the Employer).

**Whereas** \_\_\_\_\_ (hereinafter called the Employer) has paid the Secured Advance against the cost of material through any Bank or like agency by any other method by virtue of the terms of the contract existing between the parties. The details of the material and their price for which secured advance is being sought for the period \_\_\_\_\_ till consumption of the material is as under:-

- |    |       |              |           |             |
|----|-------|--------------|-----------|-------------|
| 1. | _____ | at Rs. _____ | per _____ | = Rs. _____ |
| 2. | _____ | at Rs. _____ | per _____ | = Rs. _____ |
| 3. | _____ | at Rs. _____ | per _____ | = Rs. _____ |
| 4. | _____ | at Rs. _____ | per _____ | = Rs. _____ |

**THEREFORE THIS DEED OF INDEMNITY WITNESSETH AS FOLLOWS:**

I/We \_\_\_\_\_ do hereby indemnify M/s. \_\_\_\_\_ for all losses due to thefts, arson, pilferage, loss due to flood and inundation, shrinkage, deterioration and depreciation etc. through any act of Man or God or slump in the Market of any or all the materials financed or paid by the Employer on our request for financing payment against material.

I/We \_\_\_\_\_ shall indemnify \_\_\_\_\_ against any or all claims, action damages arising out of or resulting to the said material.

I/We \_\_\_\_\_ further declare that we will faithfully abide by the above declaration and solemnly affirm that we will not remove, sell, pilferage any of the materials against which M/s. \_\_\_\_\_ has paid us such a secured advance and will not pledge the same with any Bank, Finance Corporation, Firm, Company, Individual or the like agency or create any charge whereon in any from what so ever.

I/We \_\_\_\_\_ do hereby also declare that in the event of my/our infringement of the declaration made above \_\_\_\_\_ will be entitled to forfeit all such material and also proceed against me/us according to the relevant clause pertaining to breach of contract and further invoke the power or seek any remedies secured of \_\_\_\_\_ under the contract Agreement signed with us or otherwise available under law.

Place \_\_\_\_\_ Dated \_\_\_\_\_

Contractor \_\_\_\_\_

## [Notes on the Conditions of Contract]

The Conditions of Contract comprise two parts:

- (a) **Part I - General Conditions of Contract**
- (b) **Part II - Particular Conditions of Contract**

Over the years, a number of “model” General Conditions of Contract have evolved. The one used in these Standard Bidding Documents was prepared by the International Federation of Consulting Engineers (Federation Internationale des Ingenieurs-Conseils, or FIDIC), and is commonly known as the FIDIC Conditions of Contract. (The used version is the fourth edition, 1987, reprinted in 1992 with further amendments).

The FIDIC Conditions of Contract have been prepared for an ad measurement (unit price or unit rate) type of contract, and cannot be used without major modifications for other types of contract, such as lump sum, turnkey, or target cost contracts.

The standard text of the General Conditions of Contract chosen must be retained intact to facilitate its reading and interpretation by bidders and its review by the Client. Any amendments and additions to the General Conditions, specific to the contract in hand, should be introduced in the Particular Conditions of Contract.

The use of standard conditions of contract for all civil Works will ensure comprehensiveness of coverage, better balance of rights or obligations between Employer and Contractor, general acceptability of its provisions, and savings in time and cost for bid preparation and review, leading to more economic prices.

The FIDIC Conditions of Contract are copyrighted and may not be copied, faxed, or reproduced. Without taking any responsibility of its being accurate, Pakistan Engineering Council with prior consent of FIDIC Secretariat, has reproduced herein the FIDIC General **Conditions of Contract for reference purpose only which cannot be used by the users** for preparing their bidding documents. The bidding document may include a purchased copy, the cost of which can be retrieved as part of the selling price of the bidding document. Alternatively, the FIDIC Conditions of Contract can be referred to in the bidding documents, and the bidders are advised to obtain copies directly from FIDIC.\*

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\* Add the following text if the bidding documents, as issued, do not include a copy:

“Copies of the FIDIC Conditions of Contract can be obtained from:

FIDIC Secretariat

P.O. Box 86

1000 Lausanne 12

Switzerland

e-mail: [fidic.pub@fidic.org](mailto:fidic.pub@fidic.org) – [FIDIC.org/book](http://FIDIC.org/book)



FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS

# **CONDITIONS OF CONTRACT FOR WORKS OF CIVIL ENGINEERING CONSTRUCTION**

**PART I GENERAL CONDITIONS  
WITH FORMS OF TENDER AND AGREEMENT**

FOURTH EDITION 1987  
Reprinted 1988 with editorial amendments  
Reprinted in 1992 with further amendments

## PART I: GENERAL CONDITIONS

### **Definitions and Interpretation**

- 1.1 Definitions
- 1.2 Headings and Marginal Notes
- 1.3 Interpretation
- 1.4 Singular and Plural
- 1.5 Notices, Consents, Approvals, Certificates and Determinations

### **Engineer and Engineer's Representative**

- 2.1 Engineer's Duties and Authority
- 2.2 Engineer's Representative
- 2.3 Engineer's Authority to Delegate
- 2.4 Appointment of Assistants
- 2.5 Instructions in Writing
- 2.6 Engineer to Act Impartially

### **Assignment and Subcontracting**

- 3.1 Assignment of Contract
- 4.1 Subcontracting
- 4.2 Assignment of Subcontractors' Obligations

### **Contract Documents**

- 5.1 Language/s and Law
- 5.2 Priority of Contract Documents
- 6.1 Custody and Supply of Drawings and Documents
- 6.2 One Copy of Drawings to be Kept on Site
- 6.3 Disruption of Progress
- 6.4 Delays and Cost of Delay of Drawings
- 6.5 Failure by Contractor to Submit Drawings
- 7.1 Supplementary Drawings and Instructions
- 7.2 Permanent Works Designed by Contractor
- 7.3 Responsibility Unaffected by Approval

### **General Obligations**

- 8.1 Contractor's General Responsibilities
- 8.2 Site Operations and Methods of Construction
- 9.1 Contract Agreement



- 10.1 Performance Security
- 10.2 Period of Validity of Performance Security
- 10.3 Claims under Performance Security
- 11.1 Inspection of Site
- 12.1 Sufficiency of Tender
- 12.2 Not Foreseeable Physical Obstructions or Conditions
- 13.1 Work to be in Accordance with Contract
- 14.1 Programme to be Submitted
- 14.2 Revised Programme
- 14.3 Cash Flow Estimate to be Submitted
- 14.4 Contractor not Relieved of Duties or Responsibilities
- 15.1 Contractor's Superintendence
- 16.1 Contractor's Employees
- 16.2 Engineer at Liberty to Object
- 17.1 Setting-out
- 18.1 Boreholes and Exploratory Excavation
- 19.1 Safety, Security and Protection of the Environment
- 19.2 Employer's Responsibilities
- 20.1 Care of Works
- 20.2 Responsibility to Rectify Loss or Damage
- 20.3 Loss or Damage Due to Employer's Risks
- 20.4 Employer's Risks
- 21.1 Insurance of Works and Contractor's Equipment
- 21.2 Scope of Cover
- 21.3 Responsibility for Amounts not Recovered
- 21.4 Exclusions
- 22.1 Damage to Persons and Property
- 22.2 Exceptions
- 22.3 Indemnity by Employer
- 23.1 Third Party Insurance (including Employer's Property)
- 23.2 Minimum Amount of Insurance
- 23.3 Cross Liabilities
- 24.1 Accident or Injury to Workmen
- 24.2 Insurance Against Accident to Workmen
- 25.1 Evidence and Terms of Insurances
- 25.2 Adequacy of Insurances
- 25.3 Remedy on Contractor's Failure to Insure
- 25.4 Compliance with Policy Conditions
- 26.1 Compliance with Statutes, Regulations
- 27.1 Fossils
- 28.1 Patent Rights
- 28.2 Royalties
- 29.1 Interference With Traffic and Adjoining Properties
- 30.1 Avoidance of Damage to Roads
- 30.2 Transport of Contractor's Equipment or Temporary Works
- 30.3 Transport of Materials or Plant
- 30.4 Waterborne Traffic
- 31.1 Opportunities for Other Contractors
- 31.2 Facilities for Other Contractors

- 32.1 Contractor to Keep Site Clear
- 33.1 Clearance of Site on Completion

### **Labour**

- 34.1 Engagement of Staff and Labour
- 35.1 Returns of Labour and Contractor's Equipment

### **Materials, Plant and Workmanship**

- 36.1 Quality of Materials, Plant and Workmanship
- 36.2 Cost of Samples
- 36.3 Cost of Tests
- 36.4 Cost of Tests not Provided for
- 36.5 Engineer's Determination where Tests not Provided for
- 37.1 Inspection of Operations
- 37.2 Inspection and Testing
- 37.3 Dates for Inspection and Testing
- 37.4 Rejection
- 37.5 Independent Inspection
- 38.1 Examination of Work before Covering up
- 38.2 Uncovering and Making Openings
- 39.1 Removal of Improper Work, Materials or Plant
- 39.2 Default of Contractor in Compliance

### **Suspension**

- 40.1 Suspension of Work
- 40.2 Engineer's Determination following Suspension
- 40.3 Suspension lasting more than 84 Days

### **Commencement and Delays**

- 41.1 Commencement of Works
- 42.1 Possession of Site and Access Thereto
- 42.2 Failure to Give Possession
- 42.3 Rights of Way and Facilities
- 43.1 Time for Completion
- 44.1 Extension of Time for Completion
- 44.2 Contractor to Provide Notification and Detailed Particulars
- 44.3 Interim Determination of Extension
- 45.1 Restriction on Working Hours
- 46.1 Rate of Progress
- 47.1 Liquidated Damages for Delay
- 47.2 Reduction of Liquidated Damages
- 48.1 Taking-Over Certificate
- 48.2 Taking-Over of Sections or Parts
- 48.3 Substantial Completion of Parts
- 48.4 Surfaces Requiring Reinstatement

## **Defects Liability**

- 49.1 Defects Liability Period
- 49.2 Completion of Outstanding Work and Remedying Defects
- 49.3 Cost of Remedying Defects
- 49.4 Contractor's Failure to Carry Out Instructions
- 50.1 Contractor to Search

## **Alterations, Additions and Omissions**

- 51.1 Variations
- 51.2 Instructions for Variations
- 52.1 Valuation of Variations
- 52.2 Power of Engineer to Fix Rates
- 52.3 Variations Exceeding 15 percent
- 52.4 Daywork

## **Procedure for Claims**

- 53.1 Notice of Claims
- 53.2 Contemporary Records
- 53.3 Substantiation of Claims
- 53.4 Failure to Comply
- 53.5 Payment of Claims

## **Contractor's Equipment, Temporary Works and Materials**

- 54.1 Contractor's Equipment, Temporary Works and Materials; Exclusive Use for the Works.
- 54.2 Employer not Liable for Damage
- 54.3 Customs Clearance
- 54.4 Re-export of Contractor's Equipment
- 54.5 Conditions of Hire of Contractor's Equipment
- 54.6 Costs for the Purpose of Clause 63
- 54.7 Incorporation of Clause in Subcontracts
- 54.8 Approval of Materials not Implied

## **Measurement**

- 55.1 Quantities
- 56.1 Works to be Measured
- 57.1 Method of Measurement
- 57.2 Breakdown of Lump Sum Items

## **Provisional Sums**

- 58.1 Definition of “Provisional Sum”
- 58.2 Use of Provisional Sums
- 58.3 Production of Vouchers

#### **Nominated Subcontractors**

- 59.1 Definition of “Nominated Subcontractors”
- 59.2 Nominated Subcontractors; Objection to Nomination
- 59.3 Design Requirements to be Expressly Stated
- 59.4 Payments to Nominated Subcontractors
- 59.5 Certification of Payments to Nominated Subcontractors

#### **Certificates and Payment**

- 60.1 Monthly Statements
- 60.2 Monthly Payments
- 60.3 Payment of Retention Money
- 60.4 Correction of Certificates
- 60.5 Statement at Completion
- 60.6 Final Statement
- 60.7 Discharge
- 60.8 Final Payment Certificate
- 60.9 Cessation of Employer’s Liability
- 60.10 Time for Payment
- 61.1 Approval only by Defects Liability Certificate
- 62.1 Defects Liability Certificate
- 62.2 Unfulfilled Obligations

#### **Remedies**

- 63.1 Default of Contractor
- 63.2 Valuation at Date of Termination
- 63.3 Payment after Termination
- 63.4 Assignment of Benefit of Agreement
- 64.1 Urgent Remedial Work

#### **Special Risks**

- 65.1 No Liability for Special Risks
- 65.2 Special Risks
- 65.3 Damage to Works by Special Risks
- 65.4 Projectile, Missile
- 65.5 Increased Costs arising from Special Risks
- 65.6 Outbreak of War
- 65.7 Removal of Contractor’s Equipment on Termination
- 65.8 Payment if Contract Terminated

#### **Release from Performance**

- 66.1 Payment in Event of Release from Performance

**Settlement of Disputes**

- 67.1 Engineer's Decision  
67.2 Amicable Settlement  
67.3 Arbitration  
67.4 Failure to Comply with Engineer's Decision

**Notices**

- 68.1 Notice to Contractor  
68.2 Notice to Employer and Engineer  
68.3 Change of Address

**Default of Employer**

- 69.1 Default of Employer  
69.2 Removal of Contractor's Equipment  
69.3 Payment on Termination  
69.4 Contractor's Entitlement to Suspend Work  
69.5 Resumption of Work

**Changes in Cost and Legislation**

- 70.1 Increase or Decrease of Cost  
70.2 Subsequent Legislation

**Currency and Rates of exchange**

- 71.1 Currency Restrictions  
72.1 Rates of Exchange  
72.2 Currency Proportions  
72.3 Currencies of Payment for Provisional Sums

**REFERENCE TO PART II**

**INDEX**

**TENDER (NOT USED)**

**AGREEMENT (NOT USED)**

## **PART I - GENERAL CONDITIONS**

### **Definitions and Interpretation**

#### **1.1 Definitions**

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

- (a) (i) "Employer" means the person named as such in Part II of these Conditions and the legal successors in title to such person, but not (except with the consent of the Contractor) any assignee of such person.
- (ii) "Contractor" means the person whose tender has been accepted by the Employer and the legal successors in title to such person, but not (except with the consent of the Employer) any assignee of such person.
- (iii) "Subcontractor" means any person named in the Contract as a Subcontractor for a part of the Works or any person to whom a part of the Works has been subcontracted with the consent of the Engineer and the legal successors in title to such person, but not any assignee of any such person.
- (iv) "Engineer" means the person appointed by the Employer to act as Engineer for the purposes of the Contract and named as such in Part II of these Conditions.
- (v) "Engineer's Representative" means a person appointed from time to time by the Engineer under Sub-Clause 2.2.
- (b) (i) "Contract" means these Conditions (Parts I and II), the Specification, the Drawings, the Bill of Quantities, the Tender, the Letter of Acceptance, the Contract Agreement (if completed) and such further documents as may be expressly incorporated in the Letter of Acceptance or Contract Agreement (if completed).
- (ii) "Specification" means the specification of the Works included in the Contract and any modification thereof or addition thereto made under Clause 51 or submitted by the Contractor and approved by the Engineer.
- (iii) "Drawings" means all drawings, calculations and technical information of a like nature provided by the Engineer to the Contractor under the Contract and all drawings, calculations, samples, patterns, models,

operation and maintenance manuals and other technical information of a like nature submitted by the Contractor and approved by the Engineer.

- (iv) "Bill of Quantities" means the priced and completed bill of quantities forming part of the Tender.
  - (v) "Tender" means the Contractor's priced offer to the Employer for the execution and completion of the Works and the remedying of any defects therein in accordance with the provisions of the Contract, as accepted by the Letter of Acceptance.
  - (vi) "Letter of Acceptance" means the formal acceptance by the Employer of the Tender.
  - (vii) "Contract Agreement" means the contract agreement (if any) referred to in Sub-Clause 9.1.
  - (viii) "Appendix to Tender" means the appendix comprised in the form of Tender annexed to these Conditions.
- (c) (i) "Commencement Date" means the date upon which the Contractor receives the notice to commence issued by the Engineer pursuant to Clause 41.
- (ii) "Time for Completion" means the time for completing the execution of and passing the Tests on Completion of the Works or any Section or part thereof as stated in the Contract (or as extended under Clause 44) calculated from the Commencement Date.
- (d) (i) "Tests on Completion" means the tests specified in the Contract or otherwise agreed by the Engineer and the Contractor which are to be made by the Contractor before the Works of any Section or part thereof are taken over by the Employer.
- (ii) "Taking-Over Certificate" means a certificate issued pursuant to Clause 48.
- (e) (i) "Contract Price" means the sum stated in the Letter of Acceptance as payable to the Contractor for the execution and completion of the Works and the remedying of any defects therein in accordance with the provisions of the Contract.
- (ii) "Retention Money" means the aggregate of all monies retained by the Employer pursuant to Sub-Clause 60.2(a).
- (iii) "Interim Payment Certificate" means any certificate of payment issued by the Engineer other than the Final Payment Certificate.

- (iv) "Final Payment Certificate" means the certificate of payment issued by the Engineer pursuant to Sub-Clause 60.8.
- (f) (i) "Works" means the Permanent Works and the Temporary Works or either of them as appropriate.
- (ii) "Permanent Works" means the permanent works to be executed (including Plant) in accordance with the Contract
- (iii) "Temporary Works" means all temporary works of every kind (other than Contractor's Equipment) required in or about the execution and completion of the Works and the remedying of any defects therein.
- (iv) "Plant" means machinery, apparatus and the like intended to form or forming part of the Permanent Works.
- (v) "Contractor's Equipment" means all appliances and things of whatsoever nature (other than Temporary Works) required for the execution and completion of the Works and the remedying of any defects therein, but does not include Plant, materials or other things intended to form or forming part of the Permanent Works.
- (vi) "Section" means a part of the Works specifically identified in the Contract as a Section.
- (vii) "Site" means the places provided by the Employer where the Works are to be executed and any other places as may be specifically designated in the Contract as forming part of the Site.
- (g) (i) "cost" means all expenditure properly incurred or to be incurred, whether, on or off the Site, including overhead and other charges properly allocable thereto but does not include any allowance for profit.
- (ii) "day" means calendar day.
- (iii) "foreign currency" means a currency of a country other than that in which the Works are to be located.
- (iv) "writing" means any hand-written, type-written, or printed communication, including telex, cable and facsimile transmission.

#### **1.21.2 Headings and Marginal Notes**

The headings and marginal notes in these Conditions shall not be deemed part thereof or be taken into consideration in the interpretation or construction thereof or of the Contract.

### **1.3 Interpretation**

Words importing persons or parties shall include firms and corporations and any organization having legal capacity.

### **1.4 Singular and Plural**



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

## **1.5 Notices, Consents, Approvals, Certificates and Determinations**

Wherever in the Contract provision is made for the giving or issue of any notice, consent, approval, certificate or determination by any person, unless otherwise specified such notice, consent, approval, certificate or determination shall be in writing and the words "notify", "certify" or "determine" shall be construed accordingly. Any such consent, approval, certificate or determination shall not unreasonably be withheld or delayed.

## **Engineer and Engineer's Representative**

### **2.1 Engineer's Duties and Authority**

- (a) The Engineer shall carry out the duties specified in the Contract.
- (b) The Engineer may exercise the authority specified in or necessarily to be implied from the Contract, provided, however, that if the Engineer is required, under the terms of his appointment by the Employer, to obtain the specific approval of the Employer before exercising any such authority, particulars of such requirements shall be set out in Part II of these Conditions. Provided further that any requisite approval shall be deemed to have been given by the Employer for any such authority exercised by the Engineer.
- (c) Except as expressly stated in the Contract, the Engineer shall have no authority to relieve the Contractor of any of his obligations under the Contract.

### **2.2 Engineer's Representative**

The Engineer's Representative shall be appointed by and be responsible to the Engineer and shall carry out such duties and exercise such authority as may be delegated to him by the Engineer under Sub-Clause 2.3.

### **2.3 Engineer's Authority to Delegate**

The Engineer may from time to time delegate to the Engineer's Representative any of the duties and authorities vested in the Engineer and he may at any time revoke such delegation. Any such delegation or revocation shall be in writing and shall not take effect until a copy thereof has been delivered to the Employer and the Contractor.

Any communication given by the Engineer's Representative to the Contractor in accordance with such delegation shall have the same effect as though it had been given by the Engineer. Provided that:

- (a) any failure of the Engineer's Representative to disapprove any work, materials or Plant shall not prejudice the authority of the Engineer to disapprove such

work, materials or Plant and to give instructions for the rectification thereof;  
and

- (b) if the Contractor questions any communication of the Engineer's Representative he may refer the matter to the Engineer who shall confirm, reverse or vary the contents of such communication.

## **2.4 Appointment of Assistants**

The Engineer or the Engineer's Representative may appoint any number of persons to assist the Engineer's Representative in the carrying out of his duties under Sub-Clause 2.2. He shall notify to the Contractor the names, duties and scope of authority of such persons. Such assistants shall have no authority to issue any instructions to the Contractor save in so far as such instructions may be necessary to enable them to carry out their duties and to secure their acceptance of materials, Plant or workmanship as being in accordance with the Contract, and any instructions given by any of them for those purposes shall be deemed to have been given by the Engineer's Representative.

## **2.5 Instructions in Writing**

Instructions given by the Engineer shall be in writing, provided that if for any reason the Engineer considers it necessary to give any such instruction orally, the Contractor shall comply with such instruction. Confirmation in writing of such oral instruction given by the Engineer, whether before or after the carrying out of the instruction, shall be deemed to be an instruction within the meaning of this Sub-Clause. Provided further that if the Contractor, within 7 days, confirms in writing to the Engineer any oral instruction of the Engineer and such confirmation is not contradicted in writing within 7 days by the Engineer, it shall be deemed to be an instructions of the Engineer.

The provisions of this Sub-Clause shall equally apply to instructions given by the Engineer's Representative and any assistants of the Engineer or the Engineer's Representative appointed pursuant to Sub-Clause 2.4.

## **2.6 Engineer to Act Impartially**

Wherever, under the Contract, the Engineer is required to exercise his discretion by:

- (a) giving his decision, opinion or consent,
- (b) expressing his satisfaction or approval,
- (c) determining value, or
- (d) otherwise taking action which may affect the rights and obligations of the Employer or the Contractor

He shall exercise such discretion impartially within the terms of the Contract and having regard to all the circumstances. Any such decision, opinion, consent expression of satisfaction, or approval, determination of value or action may be opened up, reviewed or revised as provided in Clause 67.

## **Assignment and Subcontracting**

### **3.1 Assignment of Contract**

The Contractor shall not, without the prior consent of the Employer (which consent, notwithstanding the provisions of Sub-Clause 1.5, shall be at the sole discretion of the Employer), assign the Contract or any part thereof, or any benefit or interest therein or thereunder, otherwise than by:

- (a) a charge in favour of the Contractor's bankers of any monies due or to become due under the Contract, or
- (b) assignment to the Contractor's insurers (in cases where the insurers have discharged the Contractor's loss or liability) of the Contractor's right to obtain relief against any other party liable.

### **4.1 Subcontracting**

The Contractor shall not subcontract the whole of the Works. Except where otherwise provided by the Contract, the Contractor shall not subcontract any part of the Works without the prior consent of the Engineer. Any such consent shall not relieve the Contractor from any liability or obligation under the Contract and he shall be responsible for the acts, defaults and neglects of any Subcontractor, his agents, servants or workmen as fully as if they were the acts, defaults or neglects of the Contractor, his agents servants or workmen.

Provided that the Contractor shall not be required to obtain such consent for:

- (a) the provision of labour,
- (b) the purchase of materials which are in accordance with the standards specified in the Contract,
- (c) the subcontracting of any part of the Works for which the Subcontractor is named in the Contract.

### **4.2 Assignment of Subcontractors' Obligations**

In the event of a Subcontractor having undertaken towards the Contractor in respect of the work executed, or the goods, materials, Plant or services supplied by such Subcontractor, any continuing obligation extending for a period exceeding that of the Defects Liability Period under the Contract, the Contractor shall at any time, after the expiration of such Period, assign to the Employer, at the Employer's request and cost, the benefit of such obligation for the unexpired duration thereof.

## **Contract Documents**

### **5.1 Language/s and Law**

There is stated in Part II of these Conditions:

- (a) the language or languages in which the Contract documents shall be drawn up, and
- (b) the country or state the law of which shall apply to the Contract and according to which the Contract shall be construed.

If the said documents are written in more than one language, the language according to which the Contract shall be construed and interpreted is also stated in Part II of these Conditions, being therein designated the "Ruling Language".

### **5.2 Priority of Contract Documents**

The several documents forming the Contract are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Engineer who shall thereupon issue to the Contractor instructions thereon and in such event, unless otherwise provided in the Contract, the priority of the documents forming the Contract shall be as follows:

- (1) The Contract Agreement (if completed);
- (2) The Letter of Acceptance;
- (3) The Tender;
- (4) Part II of these Conditions;
- (5) Part I of these Conditions; and
- (6) Any other document forming part of the Contract.

### **6.1 Custody and Supply of Drawings and Documents**

The Drawings shall remain in the sole custody of the Engineer, but two copies thereof shall be provided to the Contractor free of charge. The Contractor shall make at his own cost any further copies required by him. Unless it is strictly necessary for the purposes of the Contract, the Drawings, Specification and other documents provided by the Employer or the Engineer shall not, without the consent of the Engineer, be used or communicated to a third party by the Contractor. Upon issue of the Defects Liability Certificate, the Contractor shall return to the Engineer all Drawings, Specification and other documents provided under the Contract.

The Contractor shall supply to the Engineer four copies of all Drawings, specification and other documents submitted by the Contractor and approved by the Engineer in accordance with Clause 7, together with a reproducible copy of any material which cannot be reproduced to an equal standard by photocopying. In addition the Contractor shall supply such further copies of such Drawings,

Specification and other documents as the Engineer may request in writing for the use of the Employer, who shall pay the cost thereof.

## **6.2 One Copy of Drawings to be Kept on Site**

One copy of the Drawings, provided to or supplied by the Contractor as aforesaid, shall be kept by the Contractor on the Site and the same shall at all reasonable times be available for inspection and use by the Engineer and by any other person authorised by the Engineer in writing.

## **6.3 Disruption of Progress**

The Contractor shall give notice to the Engineer, with a copy to the Employer, whenever planning or execution of the Works is likely to be delayed or disrupted unless any further drawing or instruction is issued by the Engineer within a reasonable time. The notice shall include details of the drawing or instruction required and of why and by when it is required and of any delay or disruption likely to be suffered if it is late.

## **6.4 Delay and Cost of Delay of Drawings**

If, by reason of any failure or inability of the Engineer to issue, within a time reasonable in all the circumstances, any drawing or instruction for which notice has been given by the Contractor in accordance with Sub-Clause 6.3, the Contractor suffers delay and/or incurs costs then the Engineer shall, after due consultation with the Employer and the Contractor, determine:

- (a) any extension of time to which the Contractor is entitled under Clause 44, and
- (b) the amount of such costs, which shall be added to the Contract Price, and shall notify the Contractor accordingly, with a copy to the Employer.

## **6.5 Failure by Contractor to Submit Drawings**

If the failure or inability of the Engineer to issue any drawings or instructions is caused in whole or in part by the failure of the Contractor to submit Drawings, Specification or other documents which he is required to submit under the Contract, the Engineer shall take such failure by the Contractor into account when making his determination pursuant to Sub-Clause 6.4.

## **7.1 Supplementary Drawings and Instructions**

The Engineer shall have authority to issue to the Contractor, from time to time, such supplementary Drawings and instructions as shall be necessary for the purpose of the proper and adequate execution and completion of the Works and the remedying of any defects therein. The Contractor shall carry out and be bound by the same.

## **7.2 Permanent Works Designed by Contractor**

Where the Contract expressly provides that part of the Permanent Works shall be designed by the Contractor, he shall submit to the Engineer, for approval:

- (a) such drawings, specifications, calculations and other information as shall be necessary to satisfy the Engineer as to the suitability and adequacy of that design, and
- (b) operation and maintenance manuals together with drawings of the Permanent Works as completed, in sufficient detail to enable the Employer to operate, maintain, dismantle, reassemble and adjust the Permanent Works incorporating that design. The Works shall not be considered to be completed for the purposes of taking over in accordance with Clause 48 until such operation and maintenance manuals together with drawings on completion have been submitted to and approved by the Engineer.

### **7.3 Responsibility Unaffected by Approval**

Approval by the Engineer, in accordance with Sub-Clause 7.2, shall not relieve the Contractor of any of his responsibilities under the Contract.

## **General Obligations**

### **8.1 Contractor's General Responsibilities**

The Contractor shall, with due care and diligence, design (to the extent provided for by the Contract), execute and complete the Works and remedy any defects therein in accordance with the provisions of the Contract. The Contractor shall provide all superintendence, labour, material, Plant, Contractor's Equipment and all other things, whether of a temporary or permanent nature, required in and for such design, execution, completion and remedying of any defects, so far as the necessity for providing the same is specified in or is reasonably to be inferred from the Contract.

### **8.2 Site Operations and Methods of Construction**

The Contractor shall take full responsibility for the adequacy, stability and safety of all Site operations and methods of construction. Provided that the Contractor shall not be responsible (except as stated hereunder or as may be otherwise agreed) for the design or specification of Permanent Works, or for the design or specification of any Temporary Works not prepared by the Contractor. Where the Contract expressly provides that part of the Permanent Works shall be designed by the Contractor, he shall be fully responsible for that part of such Works, notwithstanding any approval by the Engineer.

### **9.1 Contract Agreement**

The Contractor shall, if called upon so to do, enter into and execute the Contract Agreement, to be prepared and completed at the cost of the Employer, in the form annexed to these Conditions with such modification as may be necessary.

## **10.1 Performance Security**

If the Contract requires the Contractor to obtain security for his proper performance of the Contract, he shall obtain and provide to the Employer, such security within 28 days after the receipt of the Letter of Acceptance, in the sum stated in the Appendix to Tender. When providing such security to the Employer, the Contractor shall notify the Engineer of so doing. Such security shall be in the form annexed to these Conditions or in such other form as may be agreed between the Employer and the Contractor. The institution providing such security shall be subject to the approval of the Employer. The cost of complying with the requirements of this Clause shall be borne by the Contractor, unless the Contract otherwise provides.

## **10.2 Period of Validity of Performance Security**

The performance security shall be valid until the Contractor has executed and completed the Works and remedied any defects therein in accordance with the Contract. No claim shall be made against such security after the issue of the Defects Liability Certificate in accordance with Sub-Clause 62.1 and such security shall be returned to the Contractor within 14 days of the issue of the said Defects Liability Certificate.

## **10.3 Claims under Performance Security**

Prior to making a claim under the performance security the Employer shall, in every case, notify the Contractor stating the nature of the default in respect of which the claim is to be made.

## **11.1 Inspection of Site**

The Employer shall have made available to the Contractor, before the submission by the Contractor of the Tender, such data on hydrological and sub-surface conditions as have been obtained by or on behalf of the Employer from investigations undertaken relevant to the Works but the Contractor shall be responsible for his own interpretation thereof.

The Contractor shall be deemed to have inspected and examined the Site and its surroundings and information available in connection therewith and to have satisfied himself (so far as is practicable, having regard to considerations of cost and time) before submitting his Tender, as to:

- (a) the form and nature thereof, including the sub-surface conditions,
- (b) the hydrological and climatic conditions,
- (c) the extent and nature of work and materials necessary for the execution and completion of the Works and the remedying of any defects therein, and
- (d) the means of access to the Site and the accommodation he may require,

and, in general, shall be deemed to have obtained all necessary information, subject as above mentioned, as to risks, contingencies and all other circumstances which may influence or affect his Tender.

The Contractor shall be deemed to have based his Tender on the data made available by the Employer and on his own inspection and examination, all as aforementioned.

#### **12.1 Sufficiency of Tender**

The Contractor shall be deemed to have satisfied himself as to the correctness and sufficiency of the Tender and of the rates and prices stated in the Bill of Quantities, all of which shall, except insofar as it is otherwise provided in the Contract, cover all his obligations under the Contract (including those in respect of the supply of goods, materials, Plant or services or of contingencies for which there is a Provisional Sum) and all matters and things necessary for the proper execution and completion of the Works and the remedying of any defects therein.

#### **12.2 Not Foreseeable Physical Obstructions or Conditions**

If, however, during the execution of the Works the Contractor encounters physical obstructions or physical conditions, other than climatic conditions on the Site, which obstructions or conditions were, in his opinion, not foreseeable by an experienced contractor, the Contractor shall forthwith give notice thereof to the Engineer, with a copy to the Employer. On receipt of such notice, the Engineer shall if in his opinion such obstructions or conditions could not have been reasonably foreseen by an experienced contractor, after due consultation with the Employer and the Contractor, determine:

- (a) any extension of time to which the Contractor is entitled under Clause 44, and
- (b) the amount of any costs which may have been incurred by the Contractor by reason of such obstructions or conditions having been encountered, which shall be added to the Contract Price,

and shall notify the Contractor accordingly, with a copy to the Employer. Such determination shall take account of any instruction which the Engineer may issue to the Contractor in connection therewith, and any proper and reasonable measures acceptable to the Engineer which the Contractor may take in the absence of specific instructions from the Engineer.

#### **13.1 Work to be in Accordance with Contract**

Unless it is legally or physically impossible, the Contractor shall execute and complete the Works and remedy any defects therein in strict accordance with the Contract to the satisfaction of the Engineer. The Contractor shall comply with and adhere strictly to the Engineer's instructions on any matter, whether mentioned in the Contract or not, touching or concerning the Works. The Contractor shall take instructions only from the Engineer (or his delegate).



#### **14.1 Programme to be Submitted**

The Contractor shall, within the time stated in Part II of these Conditions after the date of the Letter of Acceptance, submit to the Engineer for his consent a programme, in such form and detail as the Engineer shall reasonably prescribe, for the execution of the Works. The Contractor shall, whenever required by the Engineer, also provide in writing for his information a general description of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works.

#### **14.2 Revised Programme**

If at any time it should appear to the Engineer that the actual progress of the Works does not conform to the programme to which consent has been given under Sub-Clause 14.1, the Contractor shall produce, at the request of the Engineer, a revised programme showing the modifications to such programme necessary to ensure completion of the Works within the Time for Completion.

#### **14.3 Cash Flow Estimate to be Submitted**

The Contractor shall, within the time stated in Part II of these Conditions after the date of the Letter of Acceptance, provide to the Engineer for his information a detailed cash flow estimate, in quarterly periods, of all payments to which the Contractor will be entitled under the Contract and the Contractor shall subsequently supply revised cash flow estimates at quarterly intervals, if required to do so by the Engineer.

#### **14.4 Contractor not Relieved of Duties or Responsibilities**

The submission to and consent by the Engineer of such programmes or the provision of such general descriptions or cash flow estimates shall not relieve the Contractor of any of his duties or responsibilities under the Contract.

#### **15.1 Contractor's Superintendence**

The Contractor shall provide all necessary superintendence during the execution of the Works and as long thereafter as the Engineer may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. The Contractor, or a competent and authorised representative approved of by the Engineer, which approval may at any time be withdrawn, shall give his whole time to the superintendence of the Works. Such authorised representative shall receive, on behalf of the Contractor, instructions from the Engineer.

If approval of the representative is withdrawn by the Engineer, the Contractor shall, as soon as is practicable, having regard to the requirement of replacing him as hereinafter mentioned, after receiving notice of such withdrawal, remove the representative from the Works and shall not thereafter employ him again on the Works in any capacity and shall replace him by another representative approved by the Engineer.

## **16.1 Contractor's Employees**

The Contractor shall provide on the Site in connection with the execution and completion of the Works and the remedying of any defects therein:

- (a) only such technical assistants as are skilled and experienced in their respective callings and such foremen and leading hands as are competent to give proper superintendence of the Works, and
- (b) such skilled, semi skilled and unskilled labour as is necessary for the proper and timely fulfilling of the Contractor's obligations under the Contract.

## **16.2 Engineer at Liberty to Object**

The Engineer shall be at liberty to object to and require the Contractor to remove forthwith from the Works any person provided by the Contractor who, in the opinion of the Engineer, misconducts himself, or is incompetent or negligent in the proper performance of his duties, or whose presence on Site is otherwise considered by the Engineer to be undesirable, and such person shall not be again allowed upon the Works without the consent of the Engineer. Any person so removed from the Works shall be replaced as soon as possible.

## **17.1 Setting-out**

The Contractor shall be responsible for:

- (a) the accurate setting-out of the Works in relation to original points, lines and levels of reference given by the Engineer in writing,
- (b) the correctness, subject as above mentioned of the position, levels dimensions and alignment of all parts of the Works, and
- (c) the provision of all necessary instruments, appliances and labour in connection with the foregoing responsibilities.

If, at any time during the execution of the Works, any error appears in the position, levels, dimensions or alignment of any part of the Works, the Contractor, on being required so to do by the Engineer, shall, at his own cost, rectify such error to the satisfaction of the Engineer, unless such error is based on incorrect data supplied in writing by the Engineer, in which case the Engineer shall determine an addition to the Contract Price in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer.

The checking of any setting-out or of any line or level by the Engineer shall not in any way relieve the Contractor of his responsibility for the accuracy thereof and the Contractor shall carefully protect and preserve all bench-marks, sight-rails, pegs and other things used in setting-out the Works.

## **18.1 Boreholes and Exploratory Excavation**

If, at any time during the execution of the Works, the Engineer requires the Contractor to make boreholes or to carry out exploratory excavation, such requirement shall be the subject of an instruction in accordance with Clause 51, unless an item or a Provisional Sum in respect of such work is included in the Bill of Quantities.

### **19.1 Safety, Security and Protection of the Environment**

The Contractor shall, throughout the execution and completion of the Works and the remedying of any defects therein:

- (a) have full regard for the safety of all persons entitled to be upon the Site and keep the Site (so far as the same is under his control) and the Works (so far as the same are not completed or occupied by the Employer) in an orderly state appropriate to the avoidance of danger to such persons,
- (b) provide and maintain at his own cost all lights, guards, fencing, warning signs and watching, when and where necessary or required by the Engineer or by any duly constituted authority, for the protection of the Works or for the safety and convenience of the public or others, and
- (c) take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation.

### **19.2 Employer's Responsibilities**

If under Clause 31 the Employer shall carry out work on the Site with his own workmen he shall, in respect of such work:

- (a) have full regard to the safety of all persons entitled to be upon the Site, and
- (b) keep the Site in an orderly state appropriate to the avoidance of danger to such persons.

If under Clause 31 the Employer shall employ other contractors on the Site he shall require them to have the same regard for safety and avoidance of danger.

### **20.1 Care of Works**

The Contractor shall take full responsibility for the care of the Works and materials and Plant for incorporation therein from the Commencement Date until the date of issue of the Taking-Over Certificate for the whole of the Works, when the responsibility for the said care shall pass to the Employer. Provided that:

- (a) if the Engineer issues a Taking-Over Certificate for any Section or part of the Permanent Works the Contractor shall cease to be liable for the care of that Section or part from the date of issue of the Taking-Over Certificate, when the

responsibility for the care of that Section or part shall pass to the Employer, and

- (b) the Contractor shall take full responsibility for the care of any outstanding Works and materials and Plant for incorporation therein which he undertakes to finish during the Defects Liability Period until such outstanding Works have been completed pursuant to Clause 49.

## **20.2 Responsibility to Rectify Loss or Damage**

If any loss or damage happens to the Works, or any part thereof, or materials or Plant for incorporation therein, during the period for which the Contractor is responsible for the care thereof, from any cause whatsoever, other than the risks defined in Sub-Clause 20.4, the Contractor shall, at his own cost, rectify such loss or damage so that the Permanent Works conform in every respect with the provisions of the Contract to the satisfaction of the Engineer. The Contractor shall also be liable for any loss or damage to the Works occasioned by him in the course of any operations carried out by him for the purpose of complying with his obligations under Clauses 49 and 50.

## **20.3 Loss or Damage Due to Employer's Risks**

In the event of any such loss or damage happening from any of the risks defined in Sub-Clause 20.4, or in combination with other risks, the Contractor shall, if and to the extent required by the Engineer, rectify the loss or damage and the Engineer shall determine an addition to the Contract Price in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer. In the case of a combination of risks causing loss or damage any such determination shall take into account the proportional responsibility of the Contractor and the Employer.

## **20.4 Employer's Risks**

The Employer's risks are:

- (a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,
- (b) rebellion, revolution, insurrection, or military or usurped power, or civil war,
- (c) ionising radiations, or contamination by radio-activity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosive, or other hazardous properties of any explosive nuclear assembly or nuclear component thereof,
- (d) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds,
- (e) riot, commotion or disorder, unless solely restricted to employees of the Contractor or of his Subcontractor and arising from the conduct of the Works,

- (f) loss or damage due to the use or occupation by the Employer of any Section or part of the Permanent Works, except as may be provided for in the Contract,
- (g) loss or damage to the extent that it is due to the design of the Works, other than any part of the design provided by the Contractor or for which the Contractor is responsible, and
- (h) any operation of the forces of nature against which an experienced contractor could not reasonably have been expected to take precautions.

### **21.1 Insurance of Works and Contractor's Equipment**

The Contractor shall, without limiting his or the Employer's obligations and responsibilities under Clause 20, insure:

- (a) the Works, together with materials and Plant for incorporation therein, to the full replacement cost (the term "cost" in this context shall include profit),
- (b) an additional sum of 15 per cent of such replacement cost, or as may be specified in Part II of these Conditions, to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature, and
- (c) the Contractor's Equipment and other things brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.

### **21.2 Scope of Cover**

The insurance in paragraphs (a) and (b) of Sub-Clause 21.1 shall be in the joint names of the Contractor and the Employer and shall cover:

- (a) the Employer and the Contractor against all loss or damage from whatsoever cause arising, other than as provided in Sub-Clause 21.4, from the start of work at the Site until the date of issue of the relevant Taking-Over Certificate in respect of the Works or any Section or part thereof as the case may be, and
- (b) the Contractor for his liability:
  - (i) during the Defects Liability Period for loss or damage arising from a cause occurring prior to the commencement of the Defects Liability Periods, and
  - (ii) for loss or damage occasioned by the Contractor in the course of any operations carried out by him for the purpose of complying with his obligations under Clauses 49 and 50.

### **21.3 Responsibility for Amounts not Recovered**

Any amounts not insured or not recovered from the insurers shall be borne by the Employer or the Contractor in accordance with their responsibilities under Clause 20.

#### **21.4 Exclusions**

There shall be no obligation for the insurances in Sub-Clause 21.1 to include loss or damage caused by:

- (a) war, hostilities (where war be declared or not), invasion, act of foreign enemies,
- (b) rebellion, revolution, insurrection, or military or usurped power, or civil war,
- (c) ionising, radiations, or contamination by radio-activity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosive or other hazardous properties of any explosive nuclear assembly or nuclear component thereof, or
- (d) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds.

#### **22.1 Damage to Persons and Property**

The Contractor shall, except if and so far as the Contract provides otherwise, indemnify the Employer against all losses and claims in respect of:

- (a) death of or injury to any person, or
- (b) loss of or damage to any property (other than the Works),

which may arise out of or in consequence of the execution and completion of the Works and the remedying of any defects therein, and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto, subject to the exceptions defined in Sub-Clause 22.2.

#### **22.2 Exceptions**

The "exceptions" referred to in Sub-Clause 22.1 are:

- (a) the permanent use or occupation of land by the Works, or any part thereof,
- (b) the right of the Employer to execute the Works, or any part thereof, on, over, under, is or through any land,
- (c) damage to property which is the unavoidable result of the execution and completion of the Works, or the remedying of any defects therein, in accordance with the Contract, and

- (d) death of or injury to persons or loss of or damage to property resulting from any act or neglect of the Employer, his agents servants or other contractors, not being employed by the Contractor, or in respect of any claims, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto or, where the injury or damage was contributed to by the Contractor, his servants or agents, such part of the said injury or damage as may be just and equitable having regard to the extent of the responsibility of the Employer, his servants or agents or other contractors for the injury or damage.

### **22.3 Indemnity by Employer**

The Employer shall indemnify the Contractor against all claims, proceedings, damages, costs, charges and expenses in respect of the matters referred to in the exceptions defined in Sub-Clause 22.2

### **23.1 Third Party Insurance (including Employer's Property)**

The Contractor shall, without limiting his or the Employer's obligation and responsibilities under Clause 22, insure, in the joint names of the Contractor and the Employer, against liabilities for death of or injury to any person (other than as provided in Clause 24) or loss of or damage to any property (other than the Works) arising out of the performance of the Contract, other than the exceptions defined in paragraphs (a), (b) and (c) of Sub-Clause 22.2.

### **23.2 Minimum Amount of Insurance**

Such insurance shall be for at least the amount stated in the Appendix to Tender.

### **23.3 Cross Liabilities**

The insurance policy shall include a cross liability clause such that the insurance shall apply to the Contractor and to the Employer as separate insureds.

### **24.1 Accident or Injury to Workmen**

The Employer shall not be liable for or in respect of any damages or compensation payable to any workman or other person in the employment of the Contractor or any Subcontractor, other than death or injury resulting from any act or default of the Employer, his agents or servants. The Contractor shall indemnify and keep indemnified the Employer against all such damages and compensation, other than those for which the Employer is liable as aforesaid, and against all claims, proceedings, damages, costs, charges, and expenses whatsoever in respect thereof or in relation thereto.

### **24.2 Insurance Against Accident to Workmen**

The Contractor shall insure against such liability and shall continue such insurance during the whole of the time that any persons are employed by him on the Works.

Provided that, in respect of any persons employed by any Subcontractor, the Contractor's obligations to insure as aforesaid under the Sub-Clause shall be satisfied if the Subcontractor shall have insured against the liability in respect of such persons in such manner that the Employer is indemnified under the policy, but the Contractor shall require such Subcontractor to produce to the Employer, when required, such policy of insurance and the receipt for the payment of the current premium.

#### **25.1 Evidence and Terms of Insurances**

The Contractor shall provide evidence to the Employer prior to the start of work at the Site that the insurances required under the Contract have been effected and shall, within 84 days of the Commencement Date, provide the insurance policies to the Employer. When providing such evidence and such policies to the Employer, the Contractor shall notify the Engineer of so doing. Such insurance policies shall be consistent with the general terms agreed prior to the issue of the Letter of Acceptance. The Contractor shall effect all insurances for which he is responsible with insurers and in terms approved by the Employer.

#### **25.2 Adequacy of Insurances**

The Contractor shall notify the insurers of changes in the nature, extent or programme for the execution of the Works and ensure the adequacy of the insurances at all times in accordance with the terms of the Contract and shall, when required, produce to the Employer the insurance policies in force and the receipts for payment of the current premiums.

#### **25.3 Remedy on Contractor's Failure to Insure**

If the Contractor fails to effect and keep in force any of the insurances required under the Contract, or fails to provide the policies to the Employer within the period required by Sub-Clause 25.1, then and in any such case the Employer may effect and keep in force any such insurances and pay any premium as may be necessary for that purpose and from time to time deduct the amount so paid from any monies due or to become due to the Contractor, or recover the same as a debt due from the Contractor.

#### **25.4 Compliance with Policy Conditions**

In the event that the Contractor or the Employer fails to comply with conditions imposed by the insurance policies effected pursuant to the Contract, each shall indemnify the other against all losses and claims arising from such failure.

#### **26.1 Compliance with Statutes, Regulations**

The Contractor shall conform in all respects, including by the giving of all notices and the paying of all fees, with the provisions of:

- (a) any National or State Statute, Ordinance, or other Law, or any regulation, or bye-law of any local or other duly constituted authority in relation to the



execution and completion of the Works and the remedying of any defects therein, and

- (b) the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Works,

and the Contractor shall keep the Employer indemnified against all penalties and liability of every kind for breach of any such provisions. Provided always that the Employer shall be responsible for obtaining any planning, zoning or other similar permission required for the Works to proceed and shall indemnify the Contractor in accordance with Sub-Clause 22.3.

#### **27.1 Fossil**

All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the Site shall, as between the Employer and the Contractor, be deemed to be the absolute property of the Employer. The Contractor shall take reasonable precautions to prevent his workmen or any other persons from removing or damaging any such article or thing and shall, immediately upon discovery thereof and before removal, acquaint the Engineer of such discovery and carry out the Engineer's instructions for dealing with the same. If, by reason of such instructions, the Contractor suffers delay and/or incurs costs then the Engineer shall, after due consultation with the Employer and the Contractor, determine:

- (a) any extension of time to which the Contractor is entitled under Clause 44, and
- (b) the amount of such costs, which shall be added to the Contract Price, and shall notify the Contractor accordingly, with a copy to the Employer.

#### **28.1 Patent Rights**

The Contractor shall save harmless and indemnify the Employer from and against all claims and proceedings for or on account of infringement of any patent rights, design trademark or name or other protected rights in respect of any Contractor's Equipment, materials or Plant used for or in connection with or for incorporation in the Works and from and against all damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto, except where such infringement results from compliance with the design or Specification provided by the Engineer.

#### **28.2 Royalties**

Except where otherwise stated, the Contractor shall pay all tonnage and other royalties, rent and other payments or compensation, if any, for getting stone, sand, gravel, clay or other materials required for the Works.

#### **29.1 Interference with Traffic and Adjoining Properties**

All operations necessary for the execution and completion of the Works and the remedying of any defects therein shall, so far as compliance with the requirements

of the Contract permits, be carried on so as not to interfere unnecessarily or improperly with:

- (a) the convenience of the public, or
- (b) the access to, use and occupation of public or private roads and footpaths to or of properties whether in the possession of the Employer or of any other person.

The Contractor shall save harmless and indemnify the Employer in respect of all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of, or in relation to, any such matters insofar as the Contractor is responsible therefore.

### **30.1 Avoidance of Damage to Roads**

The Contractor shall use every reasonable means to prevent any of the roads or bridges communicating with or on the routes to the Site from being damaged or injured by any traffic of the Contractor or any of his Subcontractors and, in particular, shall select routes, choose and use vehicles and restrict and distribute loads so that any such extraordinary traffic as will inevitably arise from the moving of materials, Plant, Contractor's Equipment or Temporary Works from and to the Site shall be limited, as far as reasonably possible, and so that no unnecessary damage or injury may be occasioned to such roads and bridges.

### **30.2 Transport of Contractor's Equipment or Temporary Works**

Save insofar as the Contract otherwise provides, the Contractor shall be responsible for and shall pay the cost of strengthening any bridges or altering or improving any road communicating with or on the routes to the Site to facilitate the movement of Contractor's Equipment or Temporary Works and the Contractor shall indemnify and keep indemnified the Employer against all claims for damage to any such road or bridge caused by such movement, including such claims as may be made directly against the Employer, and shall negotiate and pay all claims arising solely out of such damage.

### **30.3 Transport of Materials or Plant**

If, notwithstanding Sub-Clause 30.1, any damage occurs to any bridge or road communicating with or on the routes to the Site arising from the transport of materials or Plant, the Contractor shall notify the Engineer with a copy to the Employer, as soon as he becomes aware of such damage or as soon as he receives any claim from the authority entitled to make such claim. Where under any law or regulation the haulier of such materials or Plant is required to indemnify the road authority against damage the Employer shall not be liable for any costs, charges or expenses in respect thereof or in relation thereto. In other cases the Employer shall negotiate the settlement of and pay all sums due in respect of such claim and shall indemnify the Contractor in respect thereof and in respect of all claims, proceedings damages, costs, charges and expenses in relation thereto. Provided that if and so far as any such claim or part thereof is, in the opinion of the

Engineer, due to any failure on the part of the Contractor to observe and perform his obligations under Sub-Clause 30.1, then the amount determined by the Engineer, after due consultation with the Employer and the Contractor, to be due to such failure shall be recoverable from the Contractor by the Employer and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer. Provided also that the Employer shall notify the Contractor whenever a settlement is to be negotiated and, where any amount may be due from the Contractor, the Employer shall consult with the Contractor before such settlement is agreed.

#### **30.4 Waterborne Traffic**

Where the nature of the Works is such as to require the use by the Contractor of waterborne transport the foregoing provisions of this Clause shall be construed as though "road" included a lock, dock, sea wall or other structure related to a waterway and "vehicle" included craft, and shall have effect accordingly.

#### **31.1 Opportunities for Other Contractors**

The Contractor shall, in accordance with the requirements of the Engineer, afford all reasonable opportunities for carrying out their work to:

- (a) any other contractors employed by the Employer and their workmen,
- (b) the workmen of the Employer, and
- (c) the workmen of any duly constituted authorities who may be employed in the execution on or near the Site of any work not included in the Contract or of any contract which the Employer may enter into in connection with or ancillary to the Works.

#### **31.2 Facilities for Other Contractors**

If, however, pursuant to Sub-Clause 31.1 the Contractor shall, on the written request of the Engineer:

- (a) make available to any other contractor, or to the Employer or any such authority, any roads or ways for the maintenance of which the Contractor is responsible,
- (b) permit the use, by any such, of Temporary Works or Contractor's Equipment on the Site, or
- (c) provide any other service of whatsoever nature for any such,

the Engineer shall determine an addition to the Contract Price in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer.

#### **32.1 Contractor to Keep Site Clear**

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

### **33.1 Clearance of Site on Completion**

Upon the issue of any Taking-Over Certificate the Contractor shall clear away and remove from that part of the Site to which such Taking-Over Certificate relates all Contractor's Equipment, surplus materials, rubbish and Temporary Works of every kind, and leave such part of the Site and Works clean and in a workmanlike condition to the satisfaction of the Engineer. Provided that the Contractor shall be entitled to retain on Site, until the end of the Defects Liability Period, such materials, Contractor's Equipment and Temporary Works as are required by him for the purpose of fulfilling his obligations during the Defects Liability Period.

## **Labour**

### **34.1 Engagement of Staffs and Labour**

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

### **35.1 Returns of Labour and Contractor's Equipment**

The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such information respecting Contractor's Equipment as the Engineer may require.

## **Materials, Plant and Workmanship**

### **36.1 Quality of Materials, Plant and Workmanship**

All materials, Plant and workmanship shall be:

- (a) of the respective kinds described in the Contract and in accordance with the Engineer's instructions, and
- (b) subjected from time to time to such tests as the Engineer may require at the place of manufacture, fabrication or preparation, or on the Site or at such other place or places as may be specified in the Contract, or at all or any of such places.

The Contractor shall provide such assistance, labour, electricity, fuels, stores, apparatus and instruments as are normally required for examining, measuring and testing any materials or Plant and shall supply samples of materials, before

incorporation in the Works, for testing as may be selected and required by the Engineer.

### **36.2 Cost of Samples**

All samples shall be supplied by the Contractor at his own cost if the supply thereof is clearly intended by or provided for in the Contract.

### **36.3 Cost of Tests**

The cost of making any test shall be borne by the Contractor if such test is:

- (a) clearly intended by or provided for in the Contract, or
- (b) particularised in the Contract (in cases only for a test under load or of a test to ascertain whether the design of any finished or partially finished work is appropriate for the purposes which it was intended to fulfil) in sufficient detail to enable the Contractor to price or allow for the same in his Tender.

### **36.4 Cost of Tests not Provided for**

If any test required by the Engineer which is:

- (a) not intended by or provided for,
- (b) (in the cases above mentioned) not so particularised, or
- (c) (though so intended or provided for) required by the Engineer to be carried out at any place other than the Site or the place of manufacture, fabrication or preparation of the materials or Plant tested,

shows the materials, Plant or workmanship not to be in accordance with the provisions of the Contract to the satisfaction of the Engineer, then the cost of such test shall be borne by the Contractor, but in any other case Sub-Clause 36.5 shall apply.

### **36.5 Engineer's Determination where Tests not Provided for**

Where, pursuant to Sub-Clause 36.4, this Sub-Clause applies the Engineer shall, after due consultation with the Employer and the Contractor, determine:

- (a) any extension of time of which the Contractor is entitled under Clause 44, and
- (b) the amount of such costs, which shall be added to the Contract Price,

and shall notify the Contractor accordingly, with a copy to the Employer.

### **37.1 Inspection of Operations**

The Engineer, and any person authorised by him, shall at all reasonable times have access to the Site and to all workshops and places where materials or Plant are being manufactured, fabricated or prepared for the Works and the Contractor shall afford every facility for and every assistance in obtaining the right to such access.

### **37.2 Inspection and Testing**

The Engineer shall be entitled, during manufacture, fabrication or preparation to inspect and test the materials and Plant to be supplied under the Contract. If materials or Plant are being manufactured, fabricated or prepared in workshops or places other than those of the Contractor, the Contractor shall obtain permission for the Engineer to carry out such inspection and testing in those workshops or places. Such inspection or testing shall not release the Contractor from any obligation under the Contract.

### **37.3 Dates for Inspection and Testing**

The Contractor shall agree with the Engineer on the time and place for the inspection or testing of any materials or Plant as provided in the Contract. The Engineer shall give the Contractor not less than 24 hours notice of his intention to carry out the inspection or to attend the tests. If the Engineer, or his duly authorised representative, does not attend on the date agreed, the Contractor may, unless otherwise instructed by the Engineer, proceed with the tests, which shall be deemed to have been made in the presence of the Engineer. The Contractor shall forthwith forward to the Engineer duly certified copies of the tests readings. If the Engineer has not attended the tests, he shall accept the said readings as accurate.

### **37.4 Rejection**

If, at the time and place agreed in accordance with Sub-Clause 37.3, the materials or Plant are not ready for inspection or testing or if, as a result of the inspection or testing referred to in this Clause, the Engineer determines that the materials or Plant are defective or otherwise not in accordance with the Contract, he may reject the materials or Plant and shall notify the Contractor thereof immediately. The notice shall state the Engineer's objections with reasons. The Contractor shall then promptly make good the defect or ensure that rejected materials or Plant comply with the Contract. If the Engineer so requests, the tests of rejected materials or Plant shall be made or repeated under the same terms and conditions. All costs incurred by the Employer by the repetition of the test shall after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer and may be deducted from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

### **37.5 Independent Inspection**

The Engineer may delegate inspection and testing of materials or Plant to an independent inspector. Any such delegation shall be effected in accordance with

Sub-Clause 2.4 and for this purpose such independent inspector shall be considered as an assistant of the Engineer. Notice of such appointment (not being less than 14 days) shall be given by the Engineer to the Contractor.

### **38.1 Examination of Work before Covering up**

No part of the works shall be covered up or put out of view without the approval of the Engineer and the Contractor shall afford full opportunity for the Engineer to examine and measure any such part of the Works which is about to be covered up or put out of view and to examine foundations before any part of the Works is placed thereon. The Contractor shall give notice to the Engineer whenever any such part of the Works or foundations is or are ready or about to be ready for examination and the Engineer shall, without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such part of the Works or of examining such foundations.

### **38.2 Uncovering and Making Openings**

The Contractor shall uncover any part of the Works or make openings in or through the same as the Engineer may from time to time instruct and shall reinstate and make good such part. If any such part has been covered up or put out of view after compliance with the requirement of Sub-Clause 38.1 and is found to be executed in accordance with the Contract, the Engineer shall, after due consultation with the Employer and the Contractor, determine the amount the Contractor's costs in respect of such of uncovering, making openings in or through, reinstating and making good the same, which shall be added to the Contract Price, and shall notify the Contractor accordingly, with a copy to the Employer. In any other case all costs shall be borne by the Contractor.

### **39.1 Removal of Improper Work, Materials or Plant**

The Engineer shall have authority to issue instructions from time to time, for:

(a) the removal from the Site, within such time or times as may be specified in the instruction, of any materials or Plant which, in the opinion of the Engineer, are not in accordance with the Contract,

(b) the substitution of proper and suitable materials or Plant, and

(c) the removal and proper re-execution, notwithstanding any previous test thereof or interim payment therefore, of any work which, in respect of

(i) materials, Plant or workmanship, or

(ii) design by the Contractor or for which he is responsible,

is not, in the opinion of the Engineer, in accordance with the Contract.

## **39.2 Default of Contractor in Compliance**

In case of default on the part of Contractor in carrying out such instruction within the time specified therein or, if none, within a reasonable time, the Employer shall be entitled to employ and pay other persons to carry out the same and all costs consequent thereon or incidental thereto shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

## **Suspension**

### **40.1 Suspension of Work**

The Contractor shall, on the instructions of the Engineer, suspend the progress of the Works or any part thereof for such time and in such manner as the Engineer may consider necessary and shall, during such suspension, properly protect and secure the Works or such part thereof so far as is necessary in the opinion of the Engineer. Unless such suspension is:

- (a) otherwise provided for in the Contract,
- (b) necessary by reason of some default of or breach of contract by the Contractor or for which he is responsible,
- (c) necessary by reason of climatic conditions of the Site, or
- (d) necessary for the proper execution of the Works or for the safety of the Works or any part thereof (save to the extent that such necessity arises from any act or default by the Engineer or the Employer or from any of the risks defined in Sub-Clause 20.4), Sub-Clause 40.2 shall apply.

### **40.2 Engineer's Determination following Suspension**

Where, pursuant to Sub-Clause 40.1, this Sub-Clause applies the Engineer shall, after due consultation with the Employer and the Contractor, determine:

- (a) any extension of time to which the Contractor is entitled under Clause 44, and
- (b) the amount, which shall be added to the Contract Price, in respect of the cost incurred by the Contractor by reason of such suspension,

and shall notify the Contractor accordingly, with a copy to the Employer.

### **40.3 Suspension lasting more than 84 Days**

If the progress of the Works or any part thereof is suspended on the written instructions of the Engineer and if permission to resume work is not given by the



Engineer within a period for 84 days from the date of suspension then, unless such suspension is within paragraph (a), (b), (c) or (d) of Sub-Clause 40.1, the Contractor may give notice to the Engineer requiring permission, within 28 days from the receipt thereof, to proceed with the Works or that part thereof in regard to which progress is suspended. If, within the said time, such permission is not granted, the Contractor may, but is not bound to, elect to treat the suspension, where it affects part only of the Works, as an omission of such part under Clause 51 by giving a further notice to the Engineer to that effect, or, where it affects the whole of the Works, treat the suspension as an event of default by the Employer and terminates his employment under the Contract in accordance with the provisions of Sub-Clause 69.1, whereupon the provisions of Sub-Clause 69.2 and 69.3 shall apply.

## **Commencement and Delays**

### **41.1 Commencement of Works**

The Contractor shall commence the Works as soon as is reasonably possible after the receipt by him of notice to this effect from the Engineer, which notice shall be issued within the time stated in the Appendix to Tender after the date of the Letter of Acceptance. Thereafter, the Contractor shall proceed with the Works with due expedition and without delay.

### **42.1 Possession of Site and Access Thereto**

Save insofar as the Contract may prescribe:

(a) the extent of portions of the Site of which the Contractor is to be given possession from time to time,

(b) the order in which such portions shall be made available to the Contractor,

and, subject to any requirement in the Contract as to the order in which the Works shall be executed, the Employer will, with the Engineer's notice to commence the Works, give to the Contractor possession of

(c) so much of the Site, and

(d) such access as, in accordance with the Contract, is to be provided by the Employer as may be required to enable the Contractor to commence and proceed with the execution of the Works in accordance with the programme referred to in Clause 14, if any, and otherwise in accordance with such reasonable proposals as the Contractor shall, by notice to the Engineer with a copy to the Employer, make. The Employer will, from time to time as the Works proceed, give to the Contractor possession of such further portions of the Site as may be required to enable the Contractor to proceed with the execution of the Works with due dispatch in accordance with such programme or proposals, as the case may be.

## **42.2 Failure to Give Possession**

If the Contractor suffers delay and/or incurs costs from failure on the part of the Employer to give possession in accordance with the terms of Sub-Clause 42.1, the Engineer shall, after due consultation with the Employer and the Contractor, determine:

- (a) any extension of time to which the Contractor is entitled under Clause 44, and
  - (b) the amount of such costs, which shall be added to the Contract Price,
- and shall notify the Contractor accordingly, with a copy to the Employer.

## **42.3 Rights of Way and Facilities**

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

## **43.1 Time for Completion**

The whole of the Works and, if applicable, any Section required to be completed within a particular time as stated in the Appendix to Tender, shall be completed, in accordance with the provisions of Clause 48, within the time stated in the Appendix to Tender for the whole of the Works or the Section (as the case may be), calculated from the Commencement Date, or such extended time as may be allowed under Clause 44.

## **44.1 Extension of Time for Completion**

In the event of:

- (a) the amount or nature of extra or additional work,
- (b) any cause of delay referred to in these Conditions,
- (c) exceptionally adverse climatic conditions,
- (d) any delay, impediment or prevention by the Employer, or
- (e) other special circumstances which may occur, other than through a default of or breach of contract by the Contractor or for which he is responsible,

Being such as fairly to entitle the Contractor to an extension of the Time for Completion of the Works, or any Section or part thereof, the Engineer shall, after due consultation with the Employer and the Contractor, determine the amount of such extension and shall notify the Contractor accordingly, with a copy to the Employer.

#### **44.2 Contractor to Provide Notification and Detailed Particulars**

Provided that the Engineer is not bound to make any determination unless the Contractor has

- (a) within 28 days after such event has first arisen notified the Engineer with a copy to the Employer, and
- (b) within 28 days or such other reasonable time as may be agreed by the Engineer, after such notification submitted to the Engineer detailed particulars of any extension of time to which he may consider himself entitled in order that such submission may be investigated at the time.

#### **44.3 Interim Determination of Extension**

Provided also that where an event has a continuing effect such that it is not practicable for the Contractor to submit detailed particulars within the period of 28 days referred to in Sub-Clause 44.2(b), he shall nevertheless be entitled to an extension of time provided that he has submitted to the Engineer interim particulars at intervals of not more than 28 days and final particulars within 28 days of the end of the effects resulting from the event. On receipt of such interim particulars, the Engineer shall, without undue delay, make an interim determination of extension of time and, on receipt of the final particulars, the Engineer shall review all the circumstances and shall determine an overall extension of time in regard to the event. In both such cases the Engineer shall make his determination after due consultation with the Employer and the Contractor and shall notify the Contractor of the determination, with a copy to the Employer. No final review shall result in a decrease of any extension of time already determined by the Engineer.

#### **45.1 Restriction on Working Hours**

Subject to any provision to the contrary contained in the Contract, none of the Works shall, save as hereinafter provided, be carried on during the night or on locally recognised days of rest without the consent of the Engineer, except when work is unavoidable or absolutely necessary for the saving of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer. Provided that the provisions of this Clause shall not be applicable in the case of any work which it is customary to carry out by multiple shifts.

#### **46.1 Rate of Progress**

If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the Works or any Section is at any time, in the opinion of the Engineer, too slow to comply with the Time for Completion, the Engineer shall so notify the Contractor who shall thereupon take such steps as are necessary, subject to the consent of the Engineer, to expedite progress so as to comply with the Time for Completion. The Contractor shall not be entitled to any additional payment for taking such steps. If, as a result of any notice given by the Engineer under this

Clause, the Contractor considers that it is necessary to do any work at night or on locally recognised days of rest, he shall be entitled to seek the consent of the Engineer so to do. Provided that if any steps, taken by the Contractor in meeting his obligations under this Clause, involve the Employer in additional supervision costs, such cost shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

#### **47.1 Liquidated Damages for Delay**

If the Contractor fails to comply with the Time for Completion in accordance with Clause 48, for the whole of the Works or, if applicable, any Section within the relevant time prescribed by Clause 43, then the Contractor shall pay to the Employer the relevant sum stated in the Appendix to Tender as liquidated damages for such default and not as a penalty (which sum shall be the only monies due from the Contractor for such default) for every day or part of a day which shall elapse between the relevant Time for Completion and the date stated in a Taking-Over Certificate of the whole of the Works or the relevant Section, subject to the applicable limit stated in the Appendix to Tender. The Employer may, without prejudice to any other method of recovery, deduct the amount of such damages from any monies due or to become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works, or from any other of his obligations and liabilities under the Contract.

#### **47.2 Reduction of Liquidated Damages**

If, before the Time for Completion of the whole of the Works or, if applicable, any Section, a Taking-Over Certificate has been issued for any part of the Works or of a Section, the liquidated damages for delay in completion of the remainder of the Works or of that Section shall, for any period of delay after the date stated in such Taking-Over Certificate, and in the absence of Alternative provisions in the Contract, be reduced in the proportion which the value of the part so certified bears to the value of the whole of the Works or Section, as applicable. The provisions of this Sub-Clause shall only apply to the rate of liquidated damages and shall not affect the limit thereof.

#### **48.1 Taking-Over Certificate**

When the whole of the Works have been substantially completed and have satisfactorily passed any Tests on Completion prescribed by the Contract, the Contractor may give a notice to that effect to the Engineer with a copy to the Employer, accompanied by a written undertaking to finish with due expedition any outstanding work during the Defects Liability Period. Such notice and undertaking shall be deemed to be a request by the Contractor for the Engineer to issue a Taking-Over Certificate in respect of the Works. The Engineer shall within 21 days of the date of delivery of such notice, either issue to the Contractor, with a copy to the Employer, a Taking-Over Certificate, stating the date on which, in his opinion,

the Works were substantially completed in accordance with the Contract, or give instructions in writing to the Contractor specifying all the work which, in the Engineer's opinion, is required to be done by the Contractor before the issue of such Certificate. The Engineer shall also notify the Contractor of any defects in the Works affecting substantial completion that may appear after such instructions and before completion of the Works specified therein. The Contractor shall be entitled to receive such Taking-Over Certificate within 21 days of completion, to the satisfaction of the Engineer, of the Works so specified and remedying any defects so notified.

#### **48.2 Taking Over of Sections or Parts**

Similarly, in accordance with the procedure set out in Sub-Clause 48.1, the Contractor may request and the Engineer shall issue a Taking-Over Certificate in respect of:

- (a) any Section in respect of which a separate Time for Completion is provided in the Appendix to Tender,
- (b) any substantial part of the Permanent Works which has been both completed to the satisfaction of the Engineer and, otherwise than as provided for in the Contract, occupied or used by the Employer, or
- (c) any part of the Permanent Works which the Employer has elected to occupy or use prior to completion (where such prior occupation or use is not provided for in the Contract or has not been agreed by the Contractor as a temporary measure).

#### **48.3 Substantial Completion of Parts**

If any part of the Permanent Works has been substantially completed and has satisfactorily passed any Tests on Completion prescribed by the Contractor, the Engineer may issue a Taking-Over Certificate in respect of that part of the Permanent Works before completion of the whole of the Works and, upon the issue of such Certificate, the Contractor shall be deemed to have undertaken to complete with due expedition any outstanding work in that part of the Permanent Works during the Defects Liability Period.

#### **48.4 Surfaces Requiring Reinstatement**

Provided that a Taking-Over Certificate given in respect of any Section or part of the Permanent Works before completion of the whole of the Works shall not be deemed to certify completion of any ground or surfaces requiring reinstatement, unless such Taking-Over Certificate shall expressly so state.

### **Defects Liability**

#### **49.1 Defects Liability Period**

In these Conditions the expression "Defects Liability Period" shall mean the defects liability period named in the Appendix to Tender, calculated from:

- (a) the date of completion of the Works certified by the Engineer in accordance with Clause 48, or
- (b) in the event of more than one certificate having issued by the Engineer under Clause 48, the respective dates so certified,

and in relation to the Defects Liability Period the expression "the Works" shall be construed accordingly.

#### **49.2 Completion of Outstanding Work and Remedying Defects**

To the intent that the Works shall, at or as soon as practicable after the expiration of the Defects Liability Period, be delivered to the Employer in the condition required by the Contract, fair wear and tear excepted, to the satisfaction of the Engineer, the Contractor shall:

- (a) complete the work, if any, outstanding on the date stated in the Taking-Over Certificate as soon as practicable after such date, and
- (b) execute all such work of amendment, reconstruction, and remedying defects, shrinkages or other faults as the Engineer may, during the Defects Liability Period or within 14 days after its expiration, as a result of an inspection made by or on behalf of the Engineer prior to its expiration, instruct the Contractor to execute.

#### **49.3 Cost of Remedying Defects**

All work referred to in Sub-Clause 49.2(b) shall be executed by the Contractor at his own cost if the necessity thereof is, in the opinion of the Engineer, due to:

- (a) the use of materials, Plant or workmanship not in accordance with the Contract,
- (b) where the Contractor is responsible for the design of part of the Permanent Works, any fault in such design, or
- (c) the neglect or failure on the part of the Contractor to comply with any obligation, expressed or implied, on the Contractor's part under the Contract.

If, in the opinion of the Engineer, such necessity is due to any other cause, he shall determine an addition to the Contract Price in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer.

#### **49.4 Contractor's Failure to Carry Out Instructions**

In case of default on the part of the Contractor in carrying out such instruction within a reasonable time, the Employer shall be entitled to employ and pay other persons to carry out the same and if such work is work which, in the opinion of the

Engineer, the Contractor was liable to do at his own cost under the Contract, then all cost consequent thereon or incidental thereto shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

#### **50.1 Contractor to Search**

If any defect, shrinkage or other fault in the Works appears at any time prior to the end of the Defects Liability Period, the Engineer may instruct the Contractor, with a copy to the Employer, to search under the directions of the Engineer for the cause thereof. Unless such defect, shrinkage or other fault is one for which the Contractor is liable under the Contract, the Engineer shall, after due consultation with the Employer and the Contractor, determine the amount in respect of the costs of such search incurred by the Contractor, which shall be added to the Contract Price and shall notify the Contractor accordingly, with a copy to the Employer. If such defect, shrinkage or other fault is one for which the Contractor is liable, the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case remedy such defect, shrinkage or other fault at his own cost in accordance with the provisions of Clause 49.

### **Alterations, Additions and Omissions**

#### **51.1 Variations**

The Engineer shall make any variation of the form, quality or quantity of the Works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion, be appropriate, he shall have the authority to instruct the Contractor to do and the Contractor shall do any of the following:

- (a) increase or decrease the quantity of any work included in the Contract,
- (b) omit any such work (but not if the omitted work is to be carried out by the Employer or by another contractor),
- (c) change the character or quality or kind of any such work,
- (d) change the levels, lines, position and dimensions of any part of the Works,
- (e) execute additional work of any kind necessary for the completion of the Works, or
- (f) change any specified sequence or timing of construction of any part of the Works.

No such variation shall in any way vitiate or invalidate the Contract, but the effect, if any, of all such variations shall be valued in accordance with Clause 52. Provided that where the issue of an instruction to vary the Works is necessitated by some default of or breach of contract by the Contractor or for which he is responsible, any additional cost attributable to such default shall be borne by the Contractor.

## **51.2 Instructions for Variations**

The Contractor shall not make any such variation without an instruction of the Engineer. Provided that no instruction shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an instruction given under this Clause, but is the result of the quantities exceeding or being less than those stated in the Bill of Quantities.

## **52.1 Valuation of Variations**

All variations referred to in Clause 51 and any additions to the Contract Price which are required to be determined in accordance with Clause 52 (for the purposes of this Clause referred to as "varied work"), shall be valued at the rates and prices set out in the Contract if, in the opinion of the Engineer, the same shall be applicable. If the Contract does not contain any rates or prices applicable to the varied work, the rates and prices in the Contract shall be used as the basis for valuation so far as may be reasonable, failing which, after due consultation by the Engineer with the Employer and the Contractor, suitable rates or prices shall be agreed upon between the Engineer and the Contractor. In the event of disagreement the Engineer shall fix such rates or prices as are, in his opinion, appropriate and shall notify the Contractor accordingly, with a copy to the Employer. Until such time as rates or prices are agreed or fixed, the Engineer shall determine provisional rates or prices to enable on-account payments to be included in certificates issued in accordance with Clause 60.

## **52.2 Power of Engineer to Fix Rates**

Provided that if the nature or amount of any varied work relative to the nature or amount of the whole of the Works or to any part thereof, is such that, in the opinion of the Engineer, the rate or price contained in the Contract for any item of the Works is, by reason of such varied work, rendered inappropriate or inapplicable, then, after due consultation by the Engineer with the Employer and the Contractor, a suitable rate or price shall be agreed upon between the Engineer and the Contractor. In the event of disagreement the Engineer shall fix such other rate or price as is, in his opinion, appropriate and shall notify the Contractor accordingly, with a copy to the Employer. Until such time as rates or prices are agreed or fixed, the Engineer shall determine provisional rates or prices to enable on-account payments to be included in certificates issued in accordance with Clause 60.

Provided also that no varied work instructed to be done by the Engineer pursuant to Clause 51 shall be valued under Sub-Clause 52.1 or under this Sub-Clause unless, within 14 days of the date of such instruction and, other than in the case of omitted work, before the commencement of the varied work, notice shall have been given either:

- (a) by the Contractor to the Engineer of his intention to claim extra payment or a varied rate or price, or
- (b) by the Engineer to the Contractor of his intention to vary a rate or price.



### **52.3 Variations Exceeding 15 per cent**

If, on the issue of the Taking-Over Certificate for the whole of the Works, it is found that as a result of:

- (a) all varied work valued under Sub-Clauses 52.1 and 52.2, and
- (b) all adjustments upon measurement of the estimated quantities set out in the Bill of Quantities, excluding Provisional Sums, dayworks and adjustment of price made under Clause 70.

but not from any other cause, there have been additions to or deductions from the Contract Price which taken together are in excess of 15 per cent of the "Effective Contract Price" (which for the purposes of this Sub-Clause shall mean the Contract Price, excluding Provisional Sums and allowance for dayworks, if any) then and in such event (subject to any action already taken under any other Sub-Clause of this Clause), after due consultation by the Engineer with the Employer and the Contractor, there shall be added to or deducted from the Contract Price such further sums as may be agreed between the Contractor and the Engineer or, failing agreement, determined by the Engineer having regard to the Contractor's Site and general overhead costs of the Contract. The Engineer shall notify the Contractor of any determination made under this Sub-Clause, with a copy to the Employer. Such sum shall be based only on the amount by which such additions or deductions shall be in excess of 15 per cent of the Effective Contract Price.

### **52.4 Daywork**

The Engineer may, if in his opinion it is necessary or desirable, issue an instruction that any varied work shall be executed on a daywork basis. The Contractor shall then be paid for such varied work under the terms set out in the daywork schedule included in the Contract and at the rates and prices affixed thereto by him in the Tender.

The Contractor shall furnish to the Engineer such receipts or other vouchers as may be necessary to provide the amounts paid and, before ordering material, shall submit to the Engineer quotations for the same for his approval.

In respect of such of the Works executed on a daywork basis, the Contractor shall during the continuance of such work, deliver each day to the Engineer an exact list in duplicate of the names, occupation and time of all workmen employed on such work and a statement, also in duplicate, showing the description and quantity of all materials and Contractor's Equipment used thereon or therefore other than Contractor's Equipment which is included in the percentage addition in accordance with such daywork schedule. One copy of each list and statement will, if correct, or when agreed, be signed by the Engineer and returned to the Contractor.

At the end of each month the Contractor shall deliver to the Engineer a priced statement of the labour, materials and Contractor's Equipment, except as aforesaid, used and the Contractor shall not be entitled to any payment unless such lists and statements have been fully and punctually rendered. Provided always that if the Engineer considers that for any reason the sending of such lists or statements by

the Contractor, in accordance with the foregoing provision, was impracticable he shall nevertheless be entitled to authorise payment for such work, either as daywork, on being satisfied as to the time employed and the labour, materials and Contractor's Equipment used on such work, or at such value therefore as shall, in his opinion, be fair and reasonable.

## **Procedure for Claims**

### **53.1 Notice of Claims**

Notwithstanding any other provision of the Contract, if the Contractor intends to claim any additional payment pursuant to any Clause of these Conditions or otherwise, he shall give notice of his intention to the Engineer with a copy to the Employer, within 28 days after the event giving rise to the claim has first arisen.

### **53.2 Contemporary Records**

Upon the happening of the event referred to in Sub-Clause 53.1, the Contractor shall keep such contemporary records as may reasonably be necessary to support any claim he may subsequently wish to make. Without necessarily admitting the Employer's liability, the Engineer shall, on receipt of a notice under Sub-Clause 53.1, inspect such contemporary records and may instruct the Contractor to keep any further contemporary records as are reasonable and may be material to the claim of which notice has been given. The Contractor shall permit the Engineer to inspect all records kept pursuant to this Sub-Clause and shall supply him with copies thereof as and when the Engineer so instructs.

### **53.3 Substantiation of Claims**

Within 28 days, or such other reasonable time as may be agreed by the Engineer, of giving notice under Sub-Clause 53.1, the Contractor shall send to the Engineer an account giving detailed particulars of the amount claimed and the grounds upon which the claim is based. Where the event giving rise to the claim has a continuing effect, such account shall be considered to be an interim account and the Contractor shall, at such intervals as the Engineer may reasonably require, send further interim accounts giving the accumulated amount of the claim and any further grounds upon which it is based. In cases where interim accounts are sent to the Engineer, the Contractor shall send a final account within 28 days of the end of the effects resulting from the event. The Contractor shall, if required by the Engineer so to do, copy to the Employer all accounts sent to the Engineer pursuant to this Sub-Clause.

### **53.4 Failure to Comply**

If the Contractor fails to comply with any of the provisions of this Clause in respect of any claim which he seeks to make, his entitlement to payment in respect thereof shall not exceed such amount as the Engineer or any arbitrator or arbitrators appointed pursuant to Sub-Clause 67.3 assessing the claim considers to be verified by contemporary records (whether or not such records were brought to the Engineer's notice as required under Sub-Clause 53.2 and 53.3).

### **53.5 Payment of Claims**

The Contractor shall be entitled to have included in any interim payment certified by the Engineer pursuant to Clause 60 such amount in respect of any claim as the Engineer, after due consultation with the Employer and the Contractor, may consider due to the Contractor provided that the Contractor has supplied sufficient particulars to enable the Engineer to determine the amount due. If such particulars are insufficient to substantiate the whole of the claim, the Contractor shall be entitled to payment in respect of such part of the claim as such particulars may substantiate to the satisfaction of the Engineer. The Engineer shall notify the Contractor of any determination made under this Sub-Clause, with a copy to the Employer.

### **Contractor's Equipment, Temporary Works and Materials**

#### **54.1 Contractor's Equipment, Temporary Works and Materials; Exclusive Use for the Works**

All Contractor's Equipment, Temporary Works and materials provided by the Contractor shall, when brought on to the Site, be deemed to be exclusively intended for the execution of the Works and the Contractor shall not remove the same or any part thereof, except for the purpose of moving it from one part of the Site to another, without the consent of the Engineer. Provided that consent shall not be required for vehicles engaged in transporting any staff, labour, Contractor's Equipment, Temporary Works, Plant or materials to or from the Site.

#### **54.2 Employer not Liable for Damage**

The Employer shall not at any time be liable, save as mentioned in Clauses 20 and 65, for the loss of or damage to any of the said Contractor's Equipment, Temporary Works or materials.

#### **54.3 Customs Clearance**

The Employer will use his best endeavours in assisting the Contractor, where required, in obtaining clearance through the Customs of Contractor's Equipment, materials and other things required for the Works.

#### **54.4 Re-export of Contractor's Equipment**

In respect of any Contractor's Equipment which the Contractor has imported for the purposes of the Works, the Employer will use his best endeavours to assist the Contractor, where required, in procuring any necessary Government consent to the re-export of such Contractor's Equipment by the Contractor upon the removal thereof pursuant to the terms of Contract.

#### **54.5 Conditions of Hire of Contractor's Equipment**

With a view to securing, in the event of termination under Clause 63, the continued availability, for the purpose of executing the Works, of any hired Contractor's Equipment, the Contractor shall not bring on to the Site any hired Contractor's Equipment unless there is an agreement for hire thereof (which agreement shall be deemed not to include an agreement for hire purchase) which contains a provision that the owner thereof will, on request in writing made by the Employer within 7 days after the date on which any termination has become effective, and on the Employer undertaking to pay all hire charges in respect thereof from such date, hire such Contractor's Equipment to the Employer on the same terms in all respect as the same was hired to the Contractor save that the Employer shall be entitled to permit the use thereof by any other contractor employed by him for the purpose of execution and completing the Works and remedying any defects therein, under the terms of the said Clause 63.

#### **54.6 Costs for the Purpose of Clause 63**

In the event of the Employer entering into any agreement for the hire of Contractor's Equipment pursuant to Sub-Clause 54.5, all sums properly paid by the Employer under the provision of any such agreement and all costs incurred by him (including stamp duties) in entering into such agreement shall be deemed, for the purpose of Clause 63, to be part of the cost of executing and completing the Works and the remedying of any defects therein.

#### **54.7 Incorporation of Clause in Subcontracts**

The Contractor shall, where entering into any subcontract for the execution of any part of the Works, incorporate in such subcontract (by reference or otherwise) the provisions of this Clause in relation to Contractor's Equipment, Temporary Works or materials brought on to the Site by the Subcontractor.

#### **54.8 Approval of Materials not Implied**

The operation of this Clause shall not be deemed to imply any approval by the Engineer of the materials or other matters referred to therein nor shall it prevent the rejection of any such materials at any time by the Engineer.

### **Measurement**

#### **55.1 Quantities**

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

## **56.1 Works to be Measured**

The Engineer shall, except as otherwise stated, ascertain and determine by measurement the value of the Works in accordance with the Contract and the Contractor shall be paid that value in accordance with Clause 60. The Engineer shall, when he requires any part of the Works to be measured, give reasonable notice to the Contractor's authorised agent, who shall:

- (a) forthwith attend or send a qualified representative to assist the Engineer in making such measurement, and
- (b) supply all particulars required by the Engineer.

Should the Contractor not attend, or neglect or omit to send such representative, then the measurement made by the Engineer or approved by him shall be taken to be the correct measurement of such part of the Works. For the purpose of measuring such Permanent Works as are to be measured by records and drawings, the Engineer shall prepare records and drawings as the work proceeds and the Contractor, as and when called upon to do so in writing, shall, within 14 days, attend to examine and agree such records and drawings with the Engineer and shall sign the same when so agreed. If the Contractor does not attend to examine and agree such records and drawings, they shall be taken to be correct. If, after examination of such records and drawings, the Contractor does not agree the same or does not sign the same as agreed, they shall nevertheless be taken to be correct, unless the Contractor, within 14 days of such examination, lodges with the Engineer notice of the respects in which such records and drawings are claimed by him to be incorrect. On receipt of such notice, the Engineer shall review the records and drawings and either confirm or vary them.

## **57.1 Method of Measurement**

The Works shall be measured net, notwithstanding any general or local custom, except where otherwise provided for in the Contract.

## **57.2 Breakdown of Lump Sum Items**

For the purposes of statements submitted in accordance with Sub-Clause 60.1, the Contractor shall submit to the Engineer, within 28 days after the receipt of the Letter of Acceptance, a breakdown for each of the lump sum items contained in the Tender. Such breakdowns shall be subject to the approval of the Engineer.

## **Provisional Sums**

### **58.1 Definition of "Provisional Sum"**

"Provisional Sum" means a sum included in the Contract and so designated in the Bill of Quantities for the execution of any part of the Works or for the supply of goods, materials, Plant or services, or for contingencies, which sum may be used, in whole or in part, or not at all, on the instructions of the Engineer. The Contractor shall be entitled to only such amounts in respect of the work, supply

or contingencies to which such Provisional Sums relate as the Engineer shall determine in accordance with this Clause. The Engineer shall notify the Contractor of any determination made under this Sub-Clause, with a copy to the Employer.

## **58.2 Use of Provisional Sums**

In respect of every Provisional Sum the Engineer shall have authority to issue instructions for the execution of work or for the supply of goods, material, Plant or services by:

- (a) the Contractor, in which case the Contractor shall be entitled to an amount equal to the value thereof determined in accordance with Clause 52, and
- (b) a nominated Subcontractor, as hereinafter defined, in which case the sum to be paid to the Contractor therefore shall be determined and paid in accordance with Sub-Clause 59.4.

## **58.3 Production of Vouchers**

The Contractor shall produce to the Engineer all quotations, invoices, vouchers and accounts or receipts in connection with expenditure in respect of Provisional Sums, except where work is valued in accordance with rates or prices set out in the Tender.

## **Nominated Subcontractors**

### **59.1 Definition of "Nominated Subcontractors"**

All specialists, merchants, tradesmen and others executing any work or supplying any goods, materials, Plant or services for which Provisional Sums are included in the Contract, who may have been or be nominated or selected or approved by the Employer or the Engineer, and all persons to whom by virtue of the provisions of the Contract the Contractor is required to subcontract shall, in the execution of such work or the supply of such goods, materials, Plant or services, be deemed to be subcontractors to the Contractor and are referred to in this Contract as "nominated Subcontractors".

### **59.2 Nominated Subcontractors; Objection to Nomination**

The Contractor shall not be required by the Employer or the Engineer, or be deemed to be under any obligation, to employ any nominated Subcontractor against whom the Contractor may raise reasonable objection, or who declines to enter into subcontract with the Contractor containing provisions:

- (a) that in respect of the work, goods, materials, Plant or services the subject of the subcontract, the nominated Subcontractor will undertake towards the Contractor such obligations and liabilities as will enable the Contractor to discharge his own obligations and liabilities towards the Employer under the

terms of the Contract and will save harmless and indemnify the Contractor from and against the same and from all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of or in connection therewith, or arising out of or in connection with any failure to perform such obligations or to fulfill such liabilities, and

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

### **59.3 Design Requirements to be Expressly Stated**

If in connection with any Provisional Sum the services to be provided include any matter of design or specification of any part of the Permanent Works or of any Plant to be incorporated therein, such requirement shall be expressly stated in the Contract and shall be included in any nominated Subcontract. The nominated Subcontract shall specify that the nominated Subcontractor providing such services will save harmless and indemnify the Contractor from and against the same and from all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of or in connection with any failure to perform such obligations or to fulfill such liabilities.

### **59.4 Payments to Nominated Subcontractors**

For all work executed or goods, materials, Plant or services supplied by any nominated Subcontractor, the Contractor shall be entitled to:

- (a) the actual price paid or due to be paid by the Contractor, on the instructions of the Engineer, and in accordance with the subcontract;
- (b) in respect of labour supplied by the Contractor, the sum, if any, entered in the Bill of Quantities or, if instructed by the Engineer pursuant to paragraph (a) of Sub-Clause 58.2, as may be determined in accordance with Clause 52; and
- (c) in respect of all other charges and profit, a sum being a percentage rate of the actual price paid or due to be paid calculated, where provision has been made in the Bill of Quantities for a rate to be set against the relevant Provisional Sum, at the rate inserted by the Contractor against that item or, where no such provision has been made, at the rate inserted by the Contractor in the Appendix to Tender and repeated where provision for such is made in a special item provided in the Bill of Quantities for such purpose.

### **59.5 Certification of Payments to Nominated Subcontractors**

Before issuing, under Clause 60 any certificate, which includes any payment in respect of work done or goods, materials, Plant or services supplied by any nominated Subcontractor, the Engineer shall be entitled to demand from the

Contractor reasonable proof that all payments, less retentions, included in previous certificates in respect of the work or goods, materials, Plant or services of such nominated Subcontractor have been paid or discharged by the Contractor. If the Contractor fails to supply such proof then, unless the Contractor:

- (a) satisfies the Engineer in writing that he has reasonable cause for withholding or refusing to make such payment, and
- (b) produces to the Engineer reasonable proof that he has so informed such nominated Subcontractor in writing,

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

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

## **Certificates and Payment**

### **60.1 Monthly Statements**

The Contractor shall submit to the Engineer after the end of each month six copies, each signed by the Contractor's representative approved by the Engineer in accordance with the Sub-Clause 15.1, of a statement, in such form as the Engineer may from time to time prescribe, showing the amounts to which the Contractor considers himself to be entitled up to the end of the month in respect of:

- (a) the value of the Permanent Works executed,
- (b) any other items in the Bill of Quantities including those for Contractor's Equipment, Temporary Works, dayworks and the like,
- (c) the percentage of the invoice value of listed materials, all as stated in the Appendix to Tender, and Plant delivered by the Contractor on the Site for incorporation in the Permanent Works but not incorporated in such Works,
- (d) adjustments under Clause 70, and
- (e) any other sum to which the Contractor may be entitled under the Contract or otherwise.



## **60.2 Monthly Payments**

The Engineer shall, within 28 days of receiving such statement, certify to the Employer the amount of payment to the Contractor which he considers due and payable in respect thereof, subject:

- (a) firstly, to the retention of the account calculated by applying the Percentage of Retention stated in the Appendix to Tender, to the amount to which the Contractor is entitled under paragraph (a), (b), (c) and (e) of Sub-Clause 60.1 until the amount so retained reaches the Limit of Retention Money stated in the Appendix to Tender, and
- (b) secondly, to the deduction, other than pursuant to Clause 47, of any sums which may have become due and payable by the Contractor to the Employer.

Provided that the Engineer shall not be bound to certify any payment under this Sub-Clause if the net amount thereof, after all retentions and deductions, would be less than the Minimum Amount of Interim Payment Certificates stated in the Appendix to Tender.

Notwithstanding the terms of this Clause or any other Clause of the Contract no amount will be certified by the Engineer for payment until the performance security, if required under the Contract, has been provided by the Contractor and approved by the Employer.

## **60.3 Payment of Retention Money**

- (a) Upon the issue of the Taking-Over Certificate with respect to the whole of the Works, one half of the Retention Money, or upon the issue of a Taking-Over Certificate with respect to a Section or part of the Permanent

Works only such proportion thereof as the Engineer determines having regard to the relative value of such Section or part of the Permanent Works, shall be certified by the Engineer for payment to the Contractor.

- (b) Upon the expiration of the Defects Liability Period for the Works the other half of the Retention Money shall be certified by the Engineer for payment to the Contractor. Provided that, in the event of different Defects Liability Periods having become applicable to different Sections or part of the Permanent Works pursuant to Clause 48, the expression "expiration of the Defects Liability Period" shall, for the purposes of this Sub-Clause, be deemed to mean the expiration of the latest of such periods. Provided also that if at such time, there shall remain to be executed by the Contractor any work instructed, pursuant to Clause 49 and 50, in respect of the Works, the Engineer shall be entitled to withhold certification until completion of such work of so much of the balance of the Retention Money as shall, in the opinion of the Engineer, represent the cost of the work remaining to be executed.

#### **60.4 Correction of Certificates**

The Engineer may by any Interim Payment Certificate make any correction or modification in any previous certificate which shall have been issued by him and shall have authority, if any work is not being carried out to his satisfaction, to omit or reduce the value of such work in any Interim Payment Certificate.

#### **60.5 Statement at Completion**

Not later than 84 days after the issue of the Taking-Over Certificate in respect of the whole of the Works, the Contractor shall submit to the Engineer a Statement at Completion with supporting documents showing in detail, in the form approved by the Engineer:

- (a) the final value of all work done in accordance with the Contract up to the date stated in such Taking-Over Certificate,
- (b) any further sums which the Contractor considers to be due, and
- (c) an estimate of amounts which the Contractor considers will become due to him under the Contract.

The estimated amounts shall be shown separately in such Statement at Completion. The Engineer shall verify payment in accordance with Sub-Clause 60.2.

#### **60.6 Final Statement**

Not later than 56 days after the issue of the Defects Liability Certificate pursuant to Sub-Clause 62.1, the Contractor shall submit to the Engineer for consideration a draft final statement with supporting documents showing in detail, in the form approved by the Engineer:

- (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.

If the Engineer disagrees with or cannot verify any part of the draft final statement, the Contractor shall submit such further information as the Engineer 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 Engineer the final statement as agreed (for the purposes of these Conditions referred to as the "Final Statement").

If, following discussions between the Engineer and the Contractor and any changes to the draft final statement which may be agreed between them, it becomes evident that a dispute exists, the Engineer shall deliver to the Employer an Interim Payment Certificate for those parts of the draft final statement, if any, which are not in dispute. The dispute may then be settled in accordance with Clause 67.

#### **60.7 Discharge**

Upon submission of the Final Statement, the Contractor shall give to the Employer, with a copy to the Engineer, a written discharge confirming that the total of the Final Statement represents full and final settlement of all monies due to the Contractor arising out of or in respect of the Contract. Provided that such discharge shall become effective only after payment due under the Final Payment Certificate issued pursuant to Sub-Clause 60.8 has been made and the performance security referred to in Sub-Clause 10.1, if any, has been returned to the Contractor.

#### **60.8 Final Payment Certificate**

Within 28 days after receipt of the Final Statement, and the written discharge, the Engineer shall issue to the Employer (with a copy to the Contractor) a Final Payment Certificate stating:

(a) the amount which, in the opinion of the Engineer, is finally due under the Contract or otherwise, and

(b) after giving credit to the Employer for all amounts previously paid by the Employer and for all sums to which the Employer is entitled other than under Clause 47, the balance, if any, due from the Employer to the Contractor or from the Contractor to the Employer as the case may be.

#### **60.9 Cessation of Employer's Liability**

The Employer shall not be liable to the Contractor for any matter or thing arising out of or in connection with the Contract or execution of the Works, unless the Contractor shall have included a claim in respect thereof in his Final Statement and (except in respect of matters or things arising after the issue of the Taking-Over Certificate in respect of the whole of the Works) in the Statement at Completion referred to in Sub-Clause 60.5.

#### **60.10 Time for Payment**

The amount due to the Contractor under any Interim Payment Certificate issued by the Engineer pursuant to this Clause, or to any other term of the Contract, shall, subject to Clause 47, be paid by the Employer to the Contractor within 28 days after such Interim Payment Certificate has been delivered to the Employer, or, in the case of the Final Payment Certificate referred to in Sub-Clause 60.8, within 56 days, after such Final Payment Certificate has been delivered to the Employer. In the event of the failure of the Employer to make payment within the times stated, the Employer shall pay to the Contractor interest at the rate stated in the Appendix to Tender upon all sums unpaid from the date by which the same should have been paid. The provisions of this Sub-Clause are without prejudice to the Contractor's entitlement under Clause 69 or otherwise.

#### **61.1 Approval only by Defects Liability Certificate**

Only the Defects Liability Certificate, referred to in Clause 62, shall be deemed to constitute approval of the Works.

#### **62.1 Defects Liability Certificate**

The Contract shall not be considered as completed until a Defects Liability Certificate shall have been signed by the Engineer and delivered to the Employer, with a copy to the Contractor, stating the date on which the Contractor shall have completed his obligations to execute and complete the Works and remedy any defects therein to the Engineer's satisfaction. The Defects Liability Certificate shall be given by the Engineer within 28 days after the expiration of the Defects Liability Period, or, if different defects liability periods shall become applicable to different Sections or parts of the Permanent Works, the expiration of the latest such period, or as soon thereafter as any works instructed, pursuant to Clause 49 and 50, have been completed to the satisfaction of the Engineer. Provided that the issue of the Defects Liability Certificate shall not be a condition precedent to payment to the Contractor of the second portion of the Retention Money in accordance with the conditions set out in Sub-Clause 60.3.

#### **62.2 Unfulfilled Obligations**

Notwithstanding the issue of the Defects Liability Certificate the Contractor and the Employer shall remain liable for the fulfillment of any obligation incurred under the provisions of the Contract prior to the issue of the Defects Liability Certificate which remains unperformed at the time of such Defects Liability Certificate is issued and, for the purposes of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force between the parties to the Contract.

### **Remedies**

#### **63.1 Default of Contractor**

If the Contractor is deemed by law unable to pay his debts as they fall due, or enters into voluntary or involuntary bankruptcy, liquidation or dissolution (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), or becomes insolvent, or makes an arrangement with, or assignment in favour of, his creditors, or agrees to carry out the Contract under a committee of inspection of his creditors, or if a receiver, administrator, trustee or liquidator is appointed over any substantial part of his assets, or if, under any law or regulation relating to reorganization, arrangement or readjustment of debts, proceedings are commenced against the Contractor or resolutions passed in connection with dissolution or liquidation or if any steps are taken to enforce any security interest over a substantial part of the assets of the Contractor, or if any act is done or event occurs with respect to the Contractor or his assets which, under any applicable law has a substantially similar effect to any of the foregoing acts or events, or if the Contractor has contravened Sub-Clause 3.1, or has an execution

levied on his goods, or Contract, if the Engineer certifies to the Employer, with a copy to the Contractor, that, in his opinion, the Contractor:

- (a) has repudiated the Contract, or
  - (b) without reasonable excuse has failed
    - (i) to commence the Works in accordance with Sub-Clause 41.1,
    - (ii) to proceed with the Works, or any Section thereof, within 28 days after receiving notice pursuant to Sub-Clause 46.1,
  - (c) has failed to comply with a notice issued pursuant to Sub-Clause 37.4 or an instruction issued pursuant to Sub-Clause 39.1 within 28 days after having received it
  - (d) despite previous warning from the Engineer, in writing, is otherwise persistently or flagrantly neglecting to comply with any of his obligations under the Contract, or
  - (e) has contravened Sub-Clause 4.1,
- then the Employer may, after giving 14 days' notice to the Contractor, enter upon the Site and the Works and terminate the employment of the Contractor without thereby releasing the Contractor from any of his obligations or liabilities under the Contract, or affecting the rights and authorities conferred on the Employer or the Engineer by the Contract, and may himself complete the Works or may employ any other contractor to complete the Works. The Employer or such other contractor may use for such completion so much of the Contractor's Equipment, Temporary Works and materials as he or they may think proper.

### **63.2 Valuation at Date of Termination**

The Engineer shall, as soon as may be practicable after any such entry and termination by the Employer, fix and determine ex parte, or by or after reference to the parties or after such investigation or enquiries as he may think fit to make or institute, and shall certify:

- (a) what amount (if any) had, at the time of such entry and termination, been reasonably earned by or would reasonably accrue to the Contractor in respect of work then actually done by him under the Contract, and
- (b) the value of any of the said unused or partially used materials, any Contractor's Equipment and any Temporary Works.

### **63.3 Payment after Termination**

If the Employer terminates the Contractor's employment under this Clause, he shall not be liable to pay to the Contractor any further amount (including damages) in respect of the Contract until the expiration of the Defects Liability Period and thereafter until the costs of execution, completion and remedying of any defects, damages for delay in completion (if any) and all other expenses incurred by the Employer have been ascertained and the amount thereof certified

by the Engineer. The Contractor shall then be entitled to receive only such sum (if any) as the Engineer may certify would have been payable to him upon due completion by him after deducting the said amount. If such amount exceeds the sum which would have been payable to the Contractor on due completion by him, then the Contractor shall, upon demand, pay to the Employer the amount of such excess and it shall be deemed a debt due by the Contractor to the Employer and shall be recoverable accordingly.

#### **63.4 Assignment of Benefit of Agreement**

Unless prohibited by law, the Contractor shall, if so instructed by the Engineer within 14 days of such entry and termination referred to in Sub-Clause 63.1, assign to the Employer the benefit of any agreement for the supply of any goods or materials or services and/or for the execution of any work for the purposes of the Contract, which the Contractor may have entered into.

#### **64.1 Urgent Remedial Work**

If, by reason of any accident, or failure, or other event occurring to, in, or in connection with the Works, or any part thereof, either during the execution of the Works, or during the Defects Liability Period, any remedial or other work is, in the opinion of the Engineer, urgently necessary for the safety of the Works and the Contractor is unable or unwilling at once to do such work, the Employer shall be entitled to employ and pay other persons to carry out such work as the Engineer may consider necessary. If the work or repair so done by the Employer is work which, in the opinion of the Engineer, the Contractor was liable to do at his own cost under the Contract, then all costs consequent thereon or incidental thereto shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer. Provided that the Engineer shall, as soon after the occurrence of any such emergency as may be reasonably practicable, notify the Contractor thereof.

### **Special Risks**

#### **65.1 No Liability for Special Risks**

The Contractor shall be under no liability whatsoever in consequence of any of the special risks referred to in Sub-Clause 65.2, whether by way of indemnity or otherwise, for or in respect of:

- (a) destruction of or damage to the Works, save to work condemned under the provisions of Clause 39 prior to the occurrence of any of the said special risks,
- (b) destruction of or damage to property, whether of the Employer or third parties, or
- (c) injury or loss of life.

## **65.2 Special Risks**

The Special Risks are:

- (a) the risks defined under paragraphs (a), (c), (d) and (e) of Sub-Clause 20.4, and
- (b) the risks defined under paragraph (b) of Sub-Clause 20.4 insofar as these relate to the country in which the Works are to be executed.

## **65.3 Damage to Works by Special Risks**

If the Works or any materials or Plant on or near or in transit to the Site, or any of the Contractor's Equipment, sustain destruction or damage by reason of any of the said special risks, the Contractor shall be entitled to payment in accordance with the Contract for any Permanent Works duly executed and for any materials or Plant so destroyed or damaged and, so far as may be required by the Engineer or as may be necessary for the completion of the Works, to payment for:

- (a) rectifying any such destruction or damage to the Works, and
- (b) replacing or rectifying such materials or Contractor's Equipment,

and the Engineer shall determine an addition to the Contract Price in accordance with Clause 52 (which shall in the case of the cost of replacement of Contractor's Equipment include the fair market value thereof as determined by the Engineer) and shall notify the Contractor accordingly, with a copy to the Employer.

## **65.4 Projectile, Missile**

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

## **65.5 Increased Costs arising from Special Risks**

Save to the extent that the Contractor is entitled to payment under any other provision of the Contract, the Employer shall repay to the Contractor any costs of the execution of the Work (other than such as may be attributable to the cost of reconstructing work condemned under the provisions of Clause 39 prior to the occurrence of any special risk) which are howsoever attributable to or consequent on or the result of or in any way whatsoever connected with the said special risks, subject however to the provisions in this Clause hereinafter contained in regard to outbreak of war, but the Contractor shall, as soon as any such cost comes to his knowledge, forthwith notify the Engineer thereof. The Engineer shall, after due consultation with the Employer and the Contractor, determine the amount of the Contractor's costs in respect thereof which shall be added to the Contract Price and shall notify the Contractor accordingly, with a copy to the Employer.

## **65.6 Outbreak of War**

If, during the currency of the Contract, there is an outbreak of war, whether war is declared or not, in any part of the world which, whether financially or otherwise, materially affects the execution of the Works, the Contractor shall, unless and until the Contract is terminated under the provisions of this Clause, continue to use his best endeavour to complete the execution of the Works. Provided that the Employer shall be entitled, at any time after such outbreak of war, to terminate the Contract by giving notice to the Contractor and, upon such notice being given, the Contract shall, except as to the rights of the parties under this clause and Clause 67, terminate, but without prejudice to the rights of either party in respect of any antecedent breach thereof.

#### **65.7 Removal of Contractor's Equipment on Termination**

If the Contract is terminated under the provisions of Sub-Clause 65.6, the Contractor shall, with all reasonable dispatch, remove from the Site all Contractor's Equipment and shall give similar facilities to his Subcontractors to do so.

#### **65.8 Payment if Contract Terminated**

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

- (a) the amounts payable in respect of any preliminary items referred to in the Bill of Quantities, so far as the work or service comprised therein has been carried out or performed, and a proper portion of any such items which have been partially carried out or performed;
- (b) the cost of materials, Plant or goods reasonably ordered for the Works which have been delivered to the Contractor or of which the Contractor is legally liable to accept delivery, such materials, Plant or goods becoming the property of the Employer upon such payments being made by him;
- (c) a sum being the amount of any expenditure reasonably incurred by the Contractor in the expectation of completing the whole of the Works insofar as such expenditure has not been covered by any other payments referred to in this Sub-Clause;
- (d) any additional sum payable under the provisions of Sub-Clauses 65.3 and 65.5;
- (e) such proportion of the cost as may be reasonable, taking into account payments made or to be made for work executed, of removal of Contractor's Equipment under Sub-Clause 65.7 and, if required by the Contractor, return thereof to the Contractor's main plant yard in his country of registration or to other destination, at no greater cost; and



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

Provided that against any payment due from the Employer under this Sub-Clause, the Employer shall be entitled to be credited with any outstanding balances due from the Contractor for advances in respect of Contractor's Equipment, materials and Plant and any other sums which, at the date of termination, were recoverable by the Employer from the Contractor under the terms of Contract. Any sums payable under this Sub-Clause shall, after due consultation with the Employer and the Contractor, be determined by the Engineer who shall notify the Contractor accordingly, with a copy to the Employer.

## **Release from Performance**

### **66.1 Payment in Event of Release from Performance**

If any circumstance outside the control of both parties arises after the issue of the Letter of Acceptance which renders it impossible or unlawful for either party to fulfill his or their contractual obligations, or under the law governing the Contract the parties are released from further performance, then the parties shall be discharged from the Contract, except as to their rights under this Clause and Clause 67 and without prejudice to the rights of either party in respect of any antecedent breach of the Contract, and the sum payable by the Employer to the Contractor in respect of the work executed shall be the same as that which would have been payable under Clause 65 if the Contract had been terminated under the provisions of Clause 65.

## **Settlement of Disputes**

### **67.1 Engineer's Decision**

If a dispute of any kind whatsoever arises between the Employer and the Contractor in connection with, or arising out of, the Contract or the execution of the Works, whether during the execution of the Works or after their completion and whether before or after repudiation or other termination of the Contract, including any dispute as to any opinion, instruction, determination, certificate or valuation of the Engineer, the matter in dispute shall, in the first place, be referred in writing to the Engineer, with a copy to the other party. Such reference shall state that it is made pursuant to this Clause. No later than the eighty-fourth day after the day on which he received such reference the Engineer shall give notice of his decision to the Employer and the Contractor. Such decision shall state that it is made pursuant to this Clause.

Unless the Contract has already been repudiated or terminated, the Contractor shall, in every case, continue to proceed with the Works with all due diligence and the Contractor and the Employer shall give effect forthwith to every such

decision of the Engineer unless and until the same shall be revised, as hereinafter provided, in an amicable settlement or an arbitral award.

If either the Employer or the Contractor be dissatisfied with any decision of the Engineer, or if the Engineer fails to give notice of his decision on or before

the eighty-fourth day on which he received the reference, then either the Employer or the Contractor may, on or before the seventieth day after the day on which he received notice of such decision, or on or before the seventieth day after the day on which the said period of 84 days expired, as the case may be, give notice to the other party, with a copy for information to the Engineer, of his intention to commence arbitration, as hereinafter provided, as to the matter in dispute. Such notice shall establish the entitlement of the party giving the same to commence arbitration, as hereinafter provided, as to such dispute and, subject to Sub-Clause 67.4, no arbitration in respect thereof may be commenced unless such notice is given.

If the Engineer has given notice of his decision as to a matter in dispute to the Employer and the Contractor and no notice of intention to commence arbitration as to such dispute has been given by either the Employer or the Contractor on or before the seventieth day after the day on which the parties received notice as to such decision from the Engineer, the said decision shall become final and binding upon the Employer and the Contractor.

## **67.2 Amicable Settlement**

Where notice of intention to commence arbitration as to a dispute has been given in accordance with Sub-Clause 67.1, the parties shall attempt to settle such dispute amicably before the commencement of arbitration. Provided that, unless the parties otherwise agree, arbitration may be commenced on or after the fifty-sixth day after the day on which notice of intention to commence arbitration of such dispute was given, even if no attempt at amicable settlement thereof has been made.

## **67.3 Arbitration**

Any dispute in respect of which:

- (a) the decision, if any, of the Engineer has not become final and binding pursuant to Sub-Clause 67.1, and
- (b) amicable settlement has not been reached within the period stated in Sub-Clause 67.2,

shall be finally settled, unless otherwise specified in the Contract, under the Rules of Conciliation and Arbitration of the International Chamber of Commerce by one or more arbitrators appointed under such Rules. The said arbitrator/s shall have full power to open up, review and revise any decision, opinion, instruction, determination, certificate or valuation of the Engineer related to the dispute.

Neither party shall be limited in the proceedings before such arbitrator/s to the evidence or arguments put before the Engineer for the purpose of obtaining his said decision pursuant to Sub-Clause 67.1. No such decision shall disqualify the Engineer from being called as a witness and giving evidence before the arbitrator/s on any matter whatsoever relevant to the dispute.

Arbitration may be commenced prior to or after completion of the Works, provided that the obligations of the Employer, the Engineer and the Contractor shall not be altered by reason of the arbitration being conducted during the progress of the Works.

#### **67.4 Failure to Comply with Engineer's Decision**

Where neither the Employer nor the Contractor has given notice of intention to commence arbitration of a dispute within the period stated in Sub-Clause 67.1 and the related decision has become final and binding, either party may, if the other party fails to comply with such decision, and without prejudice to any other rights it may have, refer the failure to arbitration in accordance with Sub-Clause 67.3. The provisions of Sub-Clause 67.1 and 67.2 shall not apply to any such reference.

### **Notices**

#### **68.1 Notice to Contractor**

All certificates, notices or instructions to be given to the Contractor by the Employer or the Engineer under the terms of the Contract shall be sent by post, cable, telex or facsimile transmission to or left at the Contractor's principal place of business or such other address as the Contractor shall nominate for that purpose.

#### **68.2 Notice to Employer and Engineer**

Any notice to be given to the Employer or to the Engineer under the terms of the Contract shall be sent by post, cable, telex or facsimile transmission to or left at the respective addresses nominated for that purpose in Part II of these Conditions.

#### **68.3 Change of Address**

Either party may change a nominated address to another address in the country, where the Works are being executed by prior notice to the other party, with a copy to the Engineer, and the Engineer may do so by prior notice to both parties.

### **Default of Employer**

#### **69.1 Default of Employer**

In the event of the Employer:

(a) failing to pay to the Contractor the amount due under any certificate of the Engineer within 28 days after the expiry of the time stated in Sub-Clause 60.10

within which payment is to be made, subject to any deduction that the Employer is entitled to make under the Contract,

(b) interfering with or obstructing or refusing any required approval to the issue of any such certificate,

(c) becoming bankrupt or, being a company, going into liquidation, other than for the purpose of a scheme of reconstruction or amalgamation, or

(d) giving notice to the Contractor that for economic reasons it is impossible for him to continue to meet his contractual obligations,

the Contractor shall be entitled to terminate his employment under the Contract by giving notice to the Employer, with a copy to the Engineer. Such termination shall take effect 14 days after the giving of the notice.

## **69.2 Removal of Contractor's Equipment**

Upon the expiry of the 14 days' notice referred to in Sub-Clause 69.1, the Contractor shall, notwithstanding the provisions of Sub-Clause 54.1, with all reasonable despatch, remove from the Site all Contractor's Equipment brought by him thereon.

## **69.3 Payment on Termination**

In the event of such termination the Employer shall be under the same obligations to the Contractor in regard to payment as if the Contract had been terminated under the provisions of Clause 65, but, in addition to the payments specified in Sub-Clause 65.8, the Employer shall pay to the Contractor the amount of any loss or damage to the Contractor arising out of or in connection with or by consequence of such termination.

## **69.4 Contractor's Entitlement to Suspend Work**

Without prejudice to the Contractor's entitlement to interest under Sub-Clause 60.10 and to terminate under Sub-Clause 69.1, the Contractor may, if the Employer fails to pay the Contractor the amount due under any certificate of the Engineer within 28 days after the expiry of the time stated in Sub-Clause 60.10 within which payment is to be made, subject to any deduction that the Employer is entitled to make under the Contract, after giving 28 days' prior notice to the Employer, with a copy to the Engineer, suspend work or reduce the rate of work.

If the Contractor suspends work or reduces the rate of work in accordance with the provisions of this Sub-Clause and thereby suffers delay or incurs costs the Engineer shall, after due consultation with the Employer and the Contractor, determine:

- (a) any extension of time to which the Contractor is entitled under Clause 44, and
- (b) the amount of such costs, which shall be added to the Contract Price,

and shall notify the Contractor accordingly, with a copy to the Employer.

## **69.5 Resumption of Work**

Where the Contractor suspends work or reduces the rate of work, having given notice in accordance with Sub-Clause 69.4, and the Employer subsequently pays the amount due, including interest pursuant to Sub-Clause 60.10, the Contractor's entitlement under Sub-Clause 69.1 shall, if notice of termination has not been given, lapse and the Contractor shall resume normal working as soon as is reasonably possible.

## **Changes in Cost and Legislation**

### **70.1 Increase or Decrease of Cost**

There shall be added to or deducted from the Contract Price such sums in respect of rise or fall in the cost of labour and/or materials or any other matters affecting the cost of the execution of the Works as may be determined in accordance with part II of these Conditions.

### **70.2 Subsequent Legislation**

If, after the date 28 days prior to the latest date for submission of tenders for the Contract there occur in the country in which the Works are being or are to be executed changes to any National or State Statute, Ordinance, Decree or other Law or any regulation or bye-law of any local or other duly constituted authority, or the introduction of any such State Statute, Ordinance, Decree, Law, regulation or bye-law which causes additional or reduced cost to the Contractor, other than under Sub-Clause 70.1, in the execution of the Contract, such additional or reduced cost shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be added to or deducted from the Contract Price and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

## **Currency and Rates of Exchange**

### **71.1 Currency Restrictions**

If, after the date 28 days prior to the latest date for submission of tenders for the Contract, the Government or authorized agency of the Government of the country in which the Works are being or are to be executed imposes currency restrictions and/or transfer of currency restrictions in relation to the currency or currencies in which the Contract Price is to be paid, the Employer shall reimburse any loss or damage to the Contractor arising therefrom, without prejudice to the right of the Contractor to exercise any other rights or remedies to which he is entitled in such event.

### **72.1 Rates of Exchange**

Where the Contract provides for payment in whole or in part to be made to the Contractor in foreign currency or currencies, such payment shall not be subject to

variations in the rate or rates of exchange between such specified foreign currency or currencies and the currency of the country in which the Works are to be executed.

## **72.2 Currency Proportions**

Where the Employer has required the Tender to be expressed in a single currency but with payment to be made in more than one currency and the Contractor has stated the proportions or amounts of other currency or currencies in which he requires payment to be made, the rate or rates of exchange applicable for calculating the payment of such proportions or amounts shall, unless otherwise stated in Part II of these Conditions, be those prevailing, as determined by the Central Bank of the country in which the Works are to be executed, on the date 28 days prior to the latest date for the submission of tenders for the Contract, as has been notified to the Contractor by the Employer prior to the submission of tenders or as provided for in the Tender.

## **72.3 Currencies of Payment for Provisional Sums**

Where the Contract provides for payment in more than one currency, the proportions or amounts to be paid in foreign currencies in respect of Provisional Sums shall be determined in accordance with the principles set forth in Sub-Clauses 72.1 and 72.2 as and when these sums are utilised in whole or in part in accordance with the provisions of Clauses 58 and 59.

## **REFERENCE TO PART II**

## INDEX

### PART I GENERAL CONDITIONS

| INDEX  | Clause |
|--|--------|
| Access to Site   | 42.1   |
| Access to Works, Engineer  | 37.1   |
| Access, Contractor to Satisfy Himself                                      | 11.1   |
| Accident or Injury to Workmen - Insurance Against                          | 24.2   |
| Accident or Injury to Workmen - Liability for                              | 24.1   |
| Address, Change of   | 68.3   |
| Adequacy of Insurance  | 25.2   |
| Adjustment of Contract Price if Variations Exceed 15 percent of Tender Sum | 52.3   |
| Agreement  | 9.1    |
| Alterations, Additions and Omissions                                       | 51&52  |
| Ambiguities in Contract Documents  | 5.2    |
| Amicable Settlement of Disputes  | 67.2   |
| Appointment of Assistants to Engineer                                      | 2.4    |
| Approval by the Engineer   | 7.3    |
| Approval of Materials not Implied  | 54.8   |
| Approval Only by Defects Liability Certificate                             | 61.1   |
| Arbitration  | 67.3   |
| Assignment of Contract   | 3.1    |
| Avoidance of Damage to Roads   | 30.1   |
| Bills of Quantities – Estimated Only                                       | 55.1   |
| Boreholes and Exploratory Excavation                                       | 18.1   |
| Breakdown of Lump Sum items  | 57.2   |
| Care of works  | 20.1   |
| Cash Flow Estimate to be Submitted   | 14.3   |
| Certificate, Final   | 60.8   |
| Certificate and Payment, Monthly Statements                                | 60.1   |
| Certificates, Correction of  | 60.4   |
| Certificate, Taking-Over   | 48.1   |
| Certification of Completion of Works                                       | 48.1   |
| Certification of Completion of Sections or Parts                           | 48.2   |
| Cessation of Employer's Liability  | 60.9   |
| Change of Address, Notice of   | 68.3   |
| Claims, Contemporary Records   | 53.2   |
| Claims, Notice of  | 53.1   |
| Claims, Payment of   | 53.5   |
| Claims, Substantiation of  | 53.3   |
| Claims Under Performance Security  | 10.3   |
| Clearance of Site on Completion  | 33.1   |
| Commencement of Works  | 41.1   |
| Completion of Works, Time for  | 43.1   |
| Completion of Works, Time for, Extension of                                | 44.1   |
| Completion, Statement at   | 60.5   |
| Compliance with Insurance Policy Conditions                                | 25.4   |

## INDEX

## Clause

|   |      |
|---|------|
| Compliance with Statutes and Regulations  | 26.1 |
| Contemporary Records for Claims   | 53.2 |
| Contract Agreement  | 9.1  |
| Contract Not Relieved of Duties or Responsibilities                               | 14.4 |
| Contractor's Employees  | 16.1 |
| Contractor's Employees, Engineer at Liberty to Object                             | 16.2 |
| Contractor's Entitlement to Suspend Work for Employer's Default                   | 69.4 |
| Contractor's Equipment, Conditions of Hire  | 54.5 |
| Contractor's Equipment, Employer not Liable for Damage                            | 54.2 |
| Contractor's Equipment, Insurance of  | 21.1 |
| Contractor's Equipment, Reference in Subcontracts                                 | 54.7 |
| Contractor's Equipment, Temporary Works and Material; Exclusive Use for the Works | 54.1 |
| Contractor's Equipment, Transport of  | 30.2 |
| Contractor's Failure to Carry Out Instructions                                    | 49.4 |
| Contractor's Failure to Insure, Remedy  | 25.3 |
| Contractor's General Responsibilities   | 8.1  |
| Contractor's Superintendence  | 15.1 |
| Contractor to Keep Site Clear   | 32.1 |
| Contractor to Search  | 50.1 |
| Correction of Certificates  | 60.4 |
| Cost of Remedying Defects   | 49.3 |
| Cost of Samples   | 36.2 |
| Cost of Tests   | 35.3 |
| Cost of Tests not Provided for  | 36.4 |
| Covering up Work, Examination Before  | 38.1 |
| Cross Liabilities   | 23.3 |
| Currencies of Payment for Provisional Sums  | 72.3 |
| Currencies, Rates of Exchange   | 72.1 |
| Currency Restrictions   | 71.1 |
| Custody and Supply of Drawings and Documents                                      | 6.1  |
| Customs Clearance   | 54.3 |
| Damage to Persons and Property  | 22.1 |
| Damage to Roads, Avoidance of   | 30.1 |
| Damage to Works, Special Risks  | 65.3 |
| Damages, Liquidated   | 47.1 |
| Dates for Inspection and Testing  | 37.3 |
| Daywork   | 52.4 |
| Decrease or Increase of Costs   | 70.1 |
| Default of Contractor in Compliance with Instructions on Improper Work            | 39.2 |
| Default of Contractor, Remedies for   | 63.1 |
| Default of Employer   | 69.1 |
| Defective Materials and Work  | 39.1 |
| Defects, Cost of Remedying  | 49.3 |
| Defects Liability Certificate   | 62.1 |



## INDEX

## Clause

|   |      |
|---|------|
| Defects Liability Period  | 49.1 |
| Defects, Remedying of   | 49.2 |
| Definitions   | 1.1  |
| Delay, Liquidated Damages for   | 47.1 |
| Delays and Cost of Delay of Drawings                                    | 6.4  |
| Design by Nominated Subcontractors                                      | 59.3 |
| Discharge   | 60.7 |
| Discrepancies in Documents  | 5.2  |
| Dismissal of Contractor's Employees                                     | 16.2 |
| Disorderly Conduct, etc.  | 34.1 |
| Dispute, Engineer's Decision  | 67.1 |
| Disruption of Progress  | 6.3  |
| Documents Mutually Explanatory  | 5.2  |
| Drawings  | 6&7  |
| Drawings and Documents - Custody and Supply of                          | 6.1  |
| Drawings and Instructions – Supplementary                               | 7.1  |
| Drawing, Copy to be Kept on Site  | 6.2  |
| Drawings, Delays and Cost of Delay of Drawings                          | 6.4  |
| Drawings, Failure by Contractor to submit                               | 6.5  |
| Employer not liable for Damage to Contractor's Equipment etc.           | 54.2 |
| Employer's Liability, Cession of  | 60.9 |
| Employer's Responsibilities   | 19.2 |
| Employer's Risks  | 20.4 |
| Engagement of Staff and Labour  | 34.1 |
| Engineer's Authority to Delegate  | 2.3  |
| Engineer's Determination Where Tests not Provided for                   | 36.5 |
| Engineer's Duties and Authority   | 2.1  |
| Engineer to Act Impartially   | 2.6  |
| Environment – Protection of   | 19.1 |
| Errors in Setting Out   | 17.1 |
| Evidence and Terms of Insurance   | 25.1 |
| Examination of Work before Covering Up                                  | 38.1 |
| Exceptions  | 22.2 |
| Exchange, Rates of  | 72.1 |
| Exclusions  | 21.4 |
| Extension of Time, due to Engineer's Failure to give Possession of Site | 42.2 |
| Extension of Time for Completion  | 44.1 |
| Extension of Time for Completion, Contractor's Claims                   | 44.2 |
| Extension of Time for Completion, Engineer's Determination              | 44.3 |
| Extraordinary Traffic   | 30.0 |
| Facilities for Other Contractors  | 31.2 |
| Facilities - Rights of Way and  | 42.3 |
| Failure by Contractor to Submit Drawings                                | 6.5  |
| Failure to Comply with Claims Procedure                                 | 53.4 |
| Failure to Comply with Engineer's Decision                              | 67.4 |
| Failure to give Possession of Site                                      | 42.2 |
| Faulty Work, Removal of   | 39.1 |

## INDEX

## Clause

|   |      |
|---|------|
| Fees and Notices                                    |      |
| Fencing, Watching, Lighting, etc.                   |      |
| Final Payment Certificate                           | 26.1 |
| Final Statement                                     | 19.1 |
| Foreign Currencies, Payment in                      | 60.8 |
| Fossils   | 60.6 |
| Foundations, Examination of                         | 72.0 |
| General Responsibilities of Contractor              | 27.1 |
| Giving of Notices – Payment of Fees                 | 38.1 |
| Headings and Marginal Notes                         | 8.1  |
| Improper Work and Materials, Removal of             | 26.1 |
| Increase or Decrease of Costs                       | 1.2  |
| Indemnity by Contractor                             | 39.1 |
| Indemnity by Employer                               | 70.1 |
| Independent Inspection                              | 22.1 |
| Injury to Persons – Damage to Property              | 24.1 |
| Injury to Workmen                                   | 37.2 |
| Inspection and Testing                              | 37.3 |
| Inspection of Testing , Dates for                   | 38.1 |
| Inspection of Foundations, etc.                     | 37.1 |
| Inspection of Operations                            | 11.1 |
| Inspection of Site by Contractor                    | 51.2 |
| Instructions for Variations                         | 2.5  |
| Instructions in Writing                             | 7.1  |
| Instructions, Supplementary                         | 25.2 |
| Insurance, Adequacy of                              | 25.1 |
| Insurance, Evidence and Terms of                    | 23.2 |
| Insurance, Minimum Amount of                        | 21.1 |
| Insurance of Works and Contractor's Equipment       | 25.3 |
| Insurance, Remedy on Failure to Insurance           | 21.3 |
| Insurance, responsibility for Amounts not Recovered | 21.2 |
| Insurance, Scope of Cover                           | 23.1 |
| Insurance, Workmen                                  | 24.2 |
| Interference with Traffic and Adjoining Properties  | 29.1 |
| Interim Determination of Extension                  | 44.3 |
| Interpretations                                     | 1.3  |
| Labour, Engagements of                              | 34.1 |
| Language/s and Law                                  | 5.1  |
| Law to which Contract Subject                       | 70.2 |
| Legislation, Subsequent                             | 19.1 |
| Lighting, Fencing, Watching, etc.                   | 47.1 |
| Liquidated Damages for Delay                        | 47.2 |
| Liquidated Damages, Reduction of                    | 20.3 |
| Loss or Damage due to Employer's Risks              | 20.2 |
| Loss or Damage – Responsibility to Rectify          | 57.2 |
| Lump-Sum Items – Breakdown of                       | 30.3 |
| Materials and Plant, Transport of                   | 54.8 |

## INDEX

## Clause

|   |      |
|---|------|
| Materials, Improper – Removal of                              | 39.1 |
| Materials, Quality of   | 36.1 |
| Materials, Supply of  | 8.1  |
| Measurement by Engineer                                       | 56.1 |
| Measurement, Method of  | 57.1 |
| Measurement, Quantities Estimated Only                        | 55.1 |
| Methods of Construction                                       | 8.2  |
| Minimum Amount of Insurance                                   | 23.2 |
| Monthly Payments  | 60.2 |
| Nominated Subcontractors, Certification of Payments to        | 59.5 |
| Nominated Subcontractors, Definition                          | 59.1 |
| Nominated Subcontractors, Design by                           | 59.3 |
| Nominated Subcontractors, Objection to Nomination             | 59.2 |
| Nominated Subcontractors, Payment of                          | 59.4 |
| Not Foreseeable Physical Obstructions or Conditions           | 12.2 |
| Notice of Claims  | 53.1 |
| Notices and Fees, Payment of                                  | 26.1 |
| Notices, Consents and Approvals                               | 1.5  |
| Notice to Contractor  | 68.1 |
| Notice to Employer and Engineer                               | 68.2 |
| Objections to Contractor's Employees                          | 16.2 |
| Obstructions or Conditions - Not Foreseeable Physical         | 12.2 |
| Omissions, Alterations and Additions                          | 59.0 |
| Openings, Uncovering and Making                               | 38.2 |
| Operations, Inspection of                                     | 37.1 |
| Order of Work, Contractor to Furnish Programme                | 14.1 |
| Other Contractors, Opportunities for                          | 31.1 |
| Patent Rights   | 28.1 |
| Payment if Contract Terminated for Contractor's Default       | 63.3 |
| Payment if Contract Terminated for Employer's Default         | 69.3 |
| Payment of Claims   | 53.5 |
| Payment, Time for   | 60.1 |
| Performance Security  | 10.1 |
| Performance Security – Claims Under                           | 10.3 |
| Performance Security – Period of Validity                     | 10.2 |
| Period of Defects Liability                                   | 49.1 |
| Permanent Works Designed by Contractor                        | 7.2  |
| Physical Obstruction or Conditions – Not Foreseeable          | 12.2 |
| Physical Obstruction or Conditions – Engineer's Determination | 12.3 |
| Plant and Materials, Transport of                             | 30.3 |
| Plant, Conditions of Hire                                     | 54.5 |
| Plant, Customs Clearance                                      | 54.3 |
| Plant, Employer not Liable for Damage to                      | 54.2 |
| Plant, etc. – Exclusive Use for the Works                     | 54.1 |
| Plant, Quality of   | 36.1 |
| Plant, Re-export of   | 54.4 |
| Plant, Removal of   | 39.1 |

## INDEX

## Clause

|  |      |
|--|------|
| Possession of Site                                 | 42.1 |
| Possession of Site, Failure to Give                | 42.2 |
| Power of Engineer to Fix rates                     | 52.2 |
| Priority of Contract Documents                     | 5.2  |
| Programme to be Submitted                          | 14.1 |
| Progress – Disruption of                           | 6.3  |
| Progress-Rate of                                   | 46.1 |
| Protection of Environment                          | 19.1 |
| Provision to Indemnify Contractor                  | 22.3 |
| Provision to Indemnify Employer                    | 22.2 |
| Provisional Sums, Currencies of Payment            | 72.3 |
| Provisional Sums, Definition                       | 58.1 |
| Provisional Sums, Production of Vouchers           | 58.3 |
| Provisional Sums, Use of                           | 58.2 |
| Quality of Materials and Workmanship               | 36.1 |
| Quantities   | 55.1 |
| Rate of Progress                                   | 46.1 |
| Rates of Exchange                                  | 72.1 |
| Rates, Power of Engineer to Fix                    | 52.2 |
| Rectification of Loss or Damage                    | 20.2 |
| Reduction of Liquidated Damages                    | 47.2 |
| Re-export of Plant                                 | 54.4 |
| Regulations, Status etc. Compliance with           | 26.1 |
| Rejection  | 37.4 |
| Release from Performance                           | 66.1 |
| Remedies for Default of Contractor                 | 63.1 |
| Remedying of Defects,                              | 49.2 |
| Remedying of Defects, Cost of                      | 49.3 |
| Remedy on Contractor's Failure                     | 25.3 |
| Removal of Contractor's Employees                  | 16.2 |
| Removal of Contractor's Equipment                  | 69.2 |
| Removal of Plant, etc.                             | 65.7 |
| Responsibility to Rectify Loss or Damage           | 20.2 |
| Responsibility Un-affected by Approval             | 7.3  |
| Restriction on Working Hours                       | 45.1 |
| Resumption of Work                                 | 69.5 |
| Retention Money, Payment of                        | 50.3 |
| Returns of Labour and Contractor's Equipment       | 35.1 |
| Revised Programme                                  | 14.2 |
| Rights of Way and Facilities                       | 42.3 |
| Risks, Employer's                                  | 20.4 |
| Risks, Special                                     | 65.0 |
| Roads, etc. - Damage by Extraordinary Traffic      | 30.1 |
| Roads, Interference with Access to                 | 29.1 |
| Royalties  | 28.2 |
| Safety, Security and Protection of the Environment | 19.1 |
| Samples, Cost of                                   | 36.2 |

## INDEX

## Clause

|  |      |
|--|------|
| Security, Safety and Protection of the Environment                       | 19.1 |
| Setting-Out  | 17.1 |
| Singular and Plural  | 1.4  |
| Site, Clearance on Completion  | 33.1 |
| Site, Contractor to Keep Clear   | 32.1 |
| Site Inspection by Contractor  | 11.1 |
| Site Operations and Methods of Construction                              | 8.2  |
| Site, Possession of  | 42.1 |
| Special Risks  | 65.0 |
| Staff, Engagement of   | 34.1 |
| Statement at Completion  | 60.5 |
| Statement, Final   | 60.6 |
| Statutes, Regulations, etc. – Compliance with                            | 26.1 |
| Subcontracting   | 4.1  |
| Subcontractors, Nominated  | 59.0 |
| Subcontractors, Responsibility of the Contractor for Acts and Default of | 4.1  |
| Subsequent Legislation   | 70.2 |
| Substantial Completion of Sections or Parts                              | 48.3 |
| Sufficiency of Tender  | 12.1 |
| Supply of Plant, Materials and Labour                                    | 8.1  |
| Surfaces Requiring Reinstatement   | 48.4 |
| Supervision, Engineer's Determination                                    | 40.2 |
| Suspension lasting more than 84 days                                     | 40.3 |
| Suspension of Work   | 40.1 |
| Taking Over Certificate  | 48.1 |
| Taking Over of Sections or Parts   | 48.2 |
| Tender Documents   | 11.1 |
| Tender, Sufficiency of   | 12.1 |
| Termination of Contract by Employer, Assignment of Benefit               | 63.4 |
| Terms of Insurance   | 25.1 |
| Tests, Cost of   | 36.3 |
| Test not Provide for – Cost of   | 36.4 |
| Third Part Insurance   | 23.1 |
| Time for Completion  | 43.1 |
| Time for Completion, Extension of  | 44.1 |
| Time for Payment   | 60.1 |
| Traffic, Extraordinary   | 30.1 |
| Traffic Interference with  | 29.1 |
| Traffic Waterborne   | 30.4 |
| Transport of Contractor's Equipment and Temporary Works                  | 30.2 |
| Transport of Materials and Plant   | 30.3 |
| Uncovering Work and Making Openings                                      | 38.2 |
| Unfulfilled Obligations  | 62.2 |
| Urgent Remedial Work   | 64.1 |
| Valuation at Date of Termination by the Employer                         | 63.2 |
| Variations   | 51.1 |

## INDEX

|  | Clause |
|--|--------|
| Variations, Exceeding 15 percent                     | 52.3   |
| Variations, Instructions for                         | 51.2   |
| Variations, Power of the Engineer to Fix Rates       | 52.2   |
| Variations, Valuation of                             | 51.3   |
| Vouchers Production of                               | 58.3   |
| War, Outbreak of                                     | 20.4   |
| Watching and Lighting, etc.                          | 19.1   |
| Waterborne Traffic                                   | 30.4   |
| Work, Examination of Before Covering Up              | 38.1   |
| Work, Improper, Removal of                           | 39.1   |
| Working Hours, Restriction of                        | 45.1   |
| Workmanship, Quality of                              | 36.1   |
| Workmen, Accident or Injury to                       | 24.1   |
| Works, Care of                                       | 20.1   |
| Works, Completion of (Defects Liability Certificate) | 62.1   |
| Works Commencement of                                | 41.1   |
| Works Insurance of                                   | 21.1   |
| Works Remedying of Defects                           | 49.2   |
| Works, Time for Completion of                        | 43.1   |
| Works to be Measured                                 | 56.1   |
| Works, Suspension of                                 | 40.1   |
| Work to be in Accordance with the Contract           | 13.1   |

## **TABLE OF CONTENTS**

### **PART II - PARTICULAR CONDITIONS OF CONTRACT**

| <b>Clause</b> | <b>Title</b>   | <b>Page</b> |
|---------------|--|-------------|
| 1.1           | Definitions  | 164         |
| 2.1           | Engineer's Duties and Authority                        | 164         |
| 2.2           | Engineer's Representative                              | 166         |
| 2.7           | Engineer Not Liable                                    | 166         |
| 2.8           | Replacement of the Engineer                            | 166         |
| 4.3           | Approval of Sub-Contractors                            | 166         |
| 5.1           | Language(s) and Law                                    | 166         |
| 5.2           | Priority of Contract Documents                         | 166         |
| 6.6           | Shop Drawings  | 167         |
| 6.7           | As-Built Drawings                                      | 167         |
| 10.1          | Performance Security                                   | 167         |
| 10.4          | Performance Security Binding on Variations and Changes | 167         |
| 14.1          | Programme to be Submitted                              | 167         |
| 14.3          | Cash Flow Estimate to be Submitted                     | 168         |
| 14.5          | Detailed Programme and Monthly Progress Report         | 168         |
| 15.2          | Language Ability of Contractor's Representative        | 168         |
| 15.3          | Contractor's Representative                            | 169         |
| 16.3          | Language Ability of Superintending Staff of Contractor | 169         |
| 16.4          | Employment of Local Personnel                          | 169         |
| 18.1          | Boreholes and Exploratory Excavation                   | 169         |
| 19.3          | Safety Precautions                                     | 169         |
| 19.4          | Lighting Works at Night                                | 169         |
| 20.4          | Employer's Risks                                       | 169         |
| 21.1          | Insurance of Works and Contractor's Equipment          | 170         |
| 21.4          | Exclusions   | 170         |
| 25.5          | Insurance Company                                      | 170         |
| 31.3          | Co-operation with Other Contractors                    | 171         |
| 34.2          | Rates of Wages and Conditions of Labour                | 171         |
| 34.3          | Employment of Persons in the Service of Others         | 171         |
| 34.4          | Housing for Labour                                     | 171         |
| 34.5          | Health and Safety                                      | 171         |
| 34.6          | Epidemics  | 172         |
| 34.7          | Supply of Water  | 172         |
| 34.8          | Alcoholic Liquor or Drugs                              | 172         |
| 34.9          | Arms and Ammunition                                    | 172         |
| 34.10         | Festivals and Religious Customs                        | 172         |
| 34.11         | Disorderly Conduct                                     | 172         |
| 34.12         | Compliance by Subcontractors                           | 172         |
| 35.2          | Records of Safety and Health                           | 173         |

## **TABLE OF CONTENTS**

### **PART II - PARTICULAR CONDITIONS OF CONTRACT**

| <b>Clause</b> | <b>Title</b>   | <b>Page</b> |
|---------------|--|-------------|
| 35.3          | Reporting of Accidents                               | 173         |
| 36.6          | Use of Pakistani Materials and Services              | 173         |
| 41.1          | Commencement of Works                                | 173         |
| 47.3          | Bonus for Early Completion of Works                  | 173         |
| 48.2          | Taking Over of Sections or Parts                     | 173         |
| 51.2          | Instructions for Variations                          | 173         |
| 52.1          | Valuation of Variations                              | 174         |
| 52.3          | Variations Exceeding 15 per cent                     | 174         |
| 53.4          | Failure to Comply                                    | 174         |
| 54.3          | Customs Clearance                                    | 174         |
| 54.5          | Conditions of Hire of Contractor's Equipment         | 174         |
| 59.4          | Payments to Nominated Sub-contractors                | 174         |
| 59.5          | Certification of Payments & Nominated Subcontractors | 174         |
| 60.1          | Monthly Statements                                   | 175         |
| 60.2          | Monthly Payments                                     | 175         |
| 60.10         | Time for Payment                                     | 175         |
| 60.11         | Secured Advance on Materials                         | 175         |
| 60.12         | Financial Assistance to Contractor                   | 176         |
| 63.1          | Default of Contractor                                | 178         |
| 65.2          | Special Risks  | 178         |
| 67.3          | Arbitration  | 178         |
| 68.1          | Notice to Contractor                                 | 179         |
| 68.2          | Notice to Employer and Engineer                      | 179         |
| 70.1          | Increase or Decrease of Cost                         | 179         |
| 73.1          | Payment of Income Tax                                | 181         |
| 73.2          | Customs Duty & Taxes                                 | 181         |
| 74.1          | Integrity Pact                                       | 181         |
| 75.1          | Termination of Contract for Employer's Convenience   | 182         |
| 76.1          | Liability of Contractor                              | 182         |
| 77.1          | Joint and Several Liability                          | 182         |
| 78.1          | Details to be Confidential                           | 182         |



**PART II - PARTICULAR CONDITIONS OF CONTRACT**  
**(Mandatory Provisions not to be Amended / Substituted except as instructed by PEC)**

**1.1 Definitions**

- (a) (i) The Employer is **Director Procurement, NED University of Engineering & Technology**
- (a) (iv) The Engineer is **ESS-I-AAR Planning, Engineering and Services Consultant.**

The following paragraph is added:

- (a) (vi) “Bidder or Tenderer” means any person or persons, company, corporation, firm or Joint venture submitting a Bid or Tender.
- (b) (v) The following is added at the end of the paragraph:

The word “Tender” is synonymous with “Bid” and the word “Tender Documents” with “Bidding Documents”.

The following paragraph is added:

- (b) (ix) “Programme” means the programme to be submitted by the Contractor in Accordance  
Accordance with Sub-Clause 14.1 and any approved revisions thereto.
- (e) (i) The text is deleted and substituted with the following:

“Contract Price” means the sum stated in the Letter of Acceptance as payable to the Contractor for the execution and completion of the Works subject to such additions thereto or deductions there from as may be made and remedying of any defects therein in accordance with the provisions of the Contract.

**2.1 Engineer's Duties and Authority**

With reference to Sub-Clause 2.1(b), the following provisions shall also apply:  
The Engineer shall obtain the specific approval of the Employer before carrying out his duties in accordance with the following Clauses. The Employer may further vary according to need of the project;

- (i) Consenting to the sub-letting of any part of the Works under Sub-Clause 4.1 “Subcontracting”.
- (ii) Certifying additional cost determined under Sub-Clauses 12.2 “Not Foreseeable Physical Obstructions or conditions”
- (iii) Any action under Clause 10 “Performance Security” and Clauses 21,23,24 & 25 “ Insurance” of sorts.
- (iv) Any action under Clause 40 “Suspension”
- (v) Any action under Clause 44 “Extension of Time for Completion”
- (vi) Any action under Clause 47 “Liquidated Damages for Delay” or payment of Bonus for Early Completion of Works (PCC Sub-Clause 47.3)
- (vii) Issuance of “Taking over Certificate” under Clause 48.
- (viii) Issuing a Variation Order under Clause 51 except:
  - a) in an emergency\* situation, as stated here below, or
  - b) if such variation would increase the Contract Price by the amount stated in the Appendix-A to Bid.
- (ix) Fixing rates or prices under Clause 52.
- (x) Extra payment as a result of Contractor’s claims Clause
- (xi) Release of Retention Money to the Contractor under Sub-Clause 60.3 “Payment of Retention Money”.
- (xii) Issuance of “Final Payment Certificate” under Sub-Clause 60.8.
- (xiii) Issuance of “Defect Liability Certificate” under Sub-Clause 62.1.
- (xiv) Any change in the ratios of Contract currency proportions and payments thereof under clause 72 “Currency and Rate of Exchange”.

(Note: Employer may further vary according to need of the project)

\* (If in the opinion of the Engineer an emergency occurs affecting the safety of life or of the Works or of adjoining property, the Engineer may, without relieving the Contractor of any of his duties and responsibilities under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer.)

## **2.2 Engineer's Representative**

Add the following paragraph:

The Employer shall ensure that the Engineer's Representative is a professional engineer as defined in the Pakistan Engineering Council Act 1975 (V of 1976).

The following Sub-Clauses 2.7 and 2.8 are added:

## **2.7 Engineer Not Liable**

Approval, reviews and inspection by the Engineer of any part of the Works does not relieve the Contractor from his sole responsibility and liability for the supply of materials, plant and equipment for construction of the Works and their parts in accordance with the Contract and neither the Engineer's authority to act nor any decision made by him in good faith as provided for under the Contract whether to exercise or not to exercise such authority shall give rise to any duty or responsibility of the Engineer to the Contractor, any Subcontractor, any of their representatives or employees or any other person performing any portion of the Works.

## **2.8 Replacement of the Engineer**

"If the Employer intends to replace the Engineer, the Employer shall, not less than 14 days before the intended date of replacement, give notice to the Contractor, of the name, address and relevant experience of the intended replacement Engineer. The Employer shall not replace the Engineer with a person against whom the Contractor raises reasonable objection by notice to the Employer, with supporting particulars."

## **5.1 Language(s) and Law**

- (a) The Contract Documents shall be drawn up in the English language.
- (b) The Contract shall be subjected to the Laws of Islamic Republic of Pakistan

## **5.2 Priority of Contract Documents**

The documents listed at (1) to (6) of the Sub-Clause are deleted and substituted with the following:

- (1) The Contract Agreement (if completed);
- (2) The Letter of Acceptance;
- (3) The completed Form of Bid;
- (4) Special Stipulations (Appendix-A to Bid);
- (5) The Particular Conditions of Contract – Part II;
- (6) The General Conditions – Part I;
- (7) The priced Bill of Quantities (Appendix-D to Bid);
- (8) The completed Appendices to Bid (B, C, E to L);
- (9) The Drawings;
- (10) The Specifications; and
- (11)\_\_\_\_(any other).

In case of discrepancies between drawings, those of larger scale shall govern unless they are superseded by a drawing of later date regardless of scale. All Drawings and Specifications shall be interpreted in conformity with the Contract and these

Conditions. Addendum, if any, shall be deemed to have been incorporated at the appropriate places in the documents forming the Contract.

The following Sub-Clauses 6.6 and 6.7 are added

#### **6.6 Shop Drawings**

The Contractor shall submit to the Engineer for review 3 copies of all shop and erection drawings applicable to this Contract as per provision of relevant Sub-Clause of the Contract.

Review and approval by the Engineer shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory and that the Engineer's review or approval shall not relieve the Contractor of any of his responsibilities under the Contract.

#### **6.7 As-Built Drawings**

At the completion of the Works under the Contract, the Contractor shall furnish to the Engineer 6 copies and one reproducible of all drawings amended to conform with the Works as built. The price of such Drawings shall be deemed to be included in the Contract Price.

#### **10.1 Performance Security**

The text is deleted and substituted with the following:

The Contractor shall provide Performance Security to the Employer in the prescribed form. The said Security shall be furnished or caused to be furnished by the Contractor within 28 days after the receipt of the Letter of Acceptance. The Performance Security shall be of an amount equal to 10% of the Contract Price stated in the Letter of Acceptance. Such Security shall, at the option of the bidder, be in the form of either (a) bank guarantee from any Scheduled Bank in Pakistan or (b) bank guarantee from a bank located outside Pakistan duly counter-guaranteed by a Scheduled Bank in Pakistan or (c) an insurance company having atleast AA rating from PACRA/JCR.

The cost of complying with requirements of this Sub-Clause shall be borne by the Contractor.

The following Sub-Clause 10.4 is added:

#### **10.4 Performance Security Binding on Variations and Changes**

The Performance Security shall be binding irrespective of changes in the quantities or variations in the Works or extensions in Time for Completion of the Works which are granted or agreed upon under the provisions of the Contract.

#### **14.1 Programme to be submitted**

The programme shall be submitted within 42 days from the date of receipt of Letter of Acceptance, which shall be in the form of:

- i) a Bar Chart identifying the critical activities.
- ii) a CPM identifying the critical path/activities.

*(Employer to select appropriate one)*

#### **14.3 Cash Flow Estimate to be submitted**

The detailed Cash Flow Estimate shall be submitted within 21 days from the date of receipt of Letter of Acceptance

The following Sub-Clause 14.5 is added:

#### **14.5 Detailed Programme and Monthly Progress Report**

- a) For purposes of Sub-Clause 14.1, the Contractor shall submit to the Engineer detailed programme for the following:
  - (1) Execution of Works;
  - (2) Labour Employment;
  - (3) Local Material Procurement;
  - (4) Material Imports, if any; and
  - (5) Other details as required by the Engineer.
- (b) During the period of the Contract, the Contractor shall submit to the Engineer not later than the 8<sup>th</sup> day of the following month, 10 copies each of Monthly Progress Reports covering:
  - (1) A Construction Schedule indicating the monthly progress in percentage;
  - (2) Description of all work carried out since the last report;
  - (3) Description of the work planned for the next 56 days sufficiently detailed to enable the Engineer to determine his programme of inspection and testing;
  - (4) Monthly summary of daily job record;
  - (5) Photographs to illustrate progress; and
  - (6) Information about problems and difficulties encountered, if any, and proposals to overcome the same.
- (c) During the period of the Contract, the Contractor shall keep a daily record of the work progress, which shall be made available to the Engineer as and when requested. The daily record shall include particulars of weather conditions, number of men working, deliveries of materials, quantity, location and assignment of Contractor's equipment.

The following Sub-Clauses 15.2 and 15.3 are added:

#### **15.2 Language Ability of Contractor's Representative**

The Contractor's authorised representative shall be fluent in the English language. Alternately an interpreter with ability of English language shall be provided by the Contractor on full time basis.

### **15.3 Contractor's Representative**

The Contractor's authorised representative and his other professional engineers working at Site shall register themselves with the Pakistan Engineering Council.

The Contractor's authorised representative at Site shall be authorised to exercise adequate administrative and financial powers on behalf of the Contractor so as to achieve completion of the Works as per the Contract.

The following Sub-Clauses 16.3 and 16.4 are added:

### **16.3 Language Ability of Superintending Staff of Contractor**

A reasonable proportion of the Contractor's superintending staff shall have a working knowledge of the English language. If the Contractor's superintending staff are not fluent in English language, the Contractor shall make competent interpreters available during all working hours in a number deemed sufficient by the Engineer.

### **16.4 Employment of Local Personnel**

The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labour from sources within Pakistan.

The following Sub-Clauses 19.3 and 19.4 are added:

### **19.3 Safety Precautions**

In order to provide for the safety, health and welfare of persons, and for prevention of damage of any kind, all operations for the purposes of or in connection with the Contract shall be carried out in compliance with the Safety Requirements of the Government of Pakistan with such modifications thereto as the Engineer may authorise or direct and the Contractor shall take or cause to be taken such further measures and comply with such further requirements as the Engineer may determine to be reasonably necessary for such purpose.

The Contractor shall make, maintain and submit reports to the Engineer concerning safety, health and welfare of persons and damage to property, as the Engineer may from time to time prescribe.

### **19.4 Lighting Work at Night**

In the event of work being carried out at night, the Contractor shall at his own cost, provide and maintain such good and sufficient light as will enable the work to proceed satisfactorily and without danger. The approaches to the Site and the Works where the night-work is being carried out shall be sufficiently lighted. All arrangement adopted for such lighting shall be to the satisfaction of the Engineer's Representative.

### **20.4 Employer's Risks**

The Employer's risks are:

Delete the text and substitute with the following:

- (a) insofar as they directly affect the execution of the Works in Pakistan:
  - (i) war and hostilities (whether war be declared or not), invasion, act of foreign enemies,
  - (ii) rebellion, revolution, insurrection, or military or usurped power, or civil war,
  - (iii) ionizing radiations, or contamination by radioactivity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radioactive toxic explosive or other hazardous properties of any explosive nuclear assembly or nuclear component thereof,
  - (iv) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds,
  - (v) riot, commotion or disorder, unless solely restricted to the employees of the Contractor or of his Subcontractors and arising from the conduct of the Works;
- (b) loss or damage due to the use or occupation by the Employer of any Section or part of the Permanent Works, except as may be provided for in the Contract;
- (c) loss or damage to the extent that it is due to the design of the Works, other than any part of the design provided by the Contractor or for which the Contractor is responsible; and
- (d) any operation of the forces of nature (insofar as it occurs on the Site) which an experienced contractor:
  - (i) could not have reasonably foreseen, or
  - (ii) could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures:
    - (a) prevent loss or damage to physical property from occurring by taking appropriate measures, or
    - (b) insure against.

#### **21.1 Insurance of Works and Contractor's Equipment**

(Employer may vary this Sub-Clause 21.1 (b))

#### **21.4 Exclusions**

The text is deleted and substituted with the following:

There shall be no obligation for the insurances in Sub-Clause 21.1 to include loss or damage caused by the risks listed under Sub-Clause 20.4 paras (a) (i) to (iv).

The following Sub-Clause 25.5 is added:

#### **25.5 Insurance Company**

The Contractor shall be obliged to place all insurances relating to the Contract (including, but not limited to, the insurances referred to in Clauses 21, 23 and 24) with either National Insurance Company of Pakistan or any other insurance company operating in Pakistan and acceptable to the Employer.

Costs of such insurances shall be borne by the Contractor.

The following Sub-Clause 31.3 is added:

### **31.3 Co-operation with other Contractors**

During the execution of the Works, the Contractor shall co-operate fully with other contractors working for the Employer at and in the vicinity of the Site and also shall provide adequate precautionary facilities not to make himself a nuisance to local residents and other contractors.

The following Sub-Clauses 34.2 to 34.12 are added:

### **34.2 Rates of Wages and Conditions of Labour**

The Contractor shall pay rates of wages and observe conditions of labour not less favourable than those established for the trade or industry where the work is carried out. In the absence of any rates of wages or conditions of labour so established, the Contractor shall pay rates of wages and observe conditions of labour which are not less favourable than the general level of wages and conditions observed by other employers whose general circumstances in the trade or in industry in which the Contractor is engaged are similar.

### **34.3 Employment of Persons in the Service of Others**

The Contractor shall not recruit his staff and labour from amongst the persons in the services of the Employer or the Engineer; except with the prior written consent of the Employer or the Engineer, as the case may be.

### **34.4 Housing for Labour**

Save insofar as the Contract otherwise provides, the Contractor shall provide and maintain such housing accommodation and amenities as he may consider necessary for all his supervisory staff and labour, employed for the purposes of or in connection with the Contract including all fencing, electricity supply, sanitation, cookhouses, fire prevention, water supply and other requirements in connection with such housing accommodation or amenities. On completion of the Contract, these facilities shall be handed over to the Employer or if the Employer so desires, the temporary camps or housing provided by the Contractor shall be removed and the Site reinstated to its original condition, all to the approval of the Engineer.

### **34.5 Health and Safety**

Due precautions shall be taken by the Contractor, and at his own cost, to ensure the safety of his staff and labour at all times throughout the period of the Contract. The



Contractor shall further ensure that suitable arrangements are made for the prevention of epidemics and for all necessary welfare and hygiene requirements.

#### **34.6 Epidemics**

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

#### **34.7 Supply of Water**

The Contractor shall, so far as is reasonably practicable, having regard to local conditions, provide on the Site, to the satisfaction of the Engineer or his representative, adequate supply of drinking and other water for the use of his staff and labour.

#### **34.8 Alcoholic Liquor or Drugs**

The Contractor shall not, otherwise than in accordance with the Statutes, Ordinances and Government Regulations or Orders for the time being in force, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or suffer any such importation, sale, gift, barter or disposal by his Subcontractors, agents, staff or labour.

#### **34.9 Arms and Ammunition**

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

#### **34.10 Festivals and Religious Customs**

The Contractor shall in all dealings with his staff and labour have due regard to all recognised festivals, days of rest and religious and other customs.

#### **34.11 Disorderly Conduct**

The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst staff and labour and for the preservation of peace and protection of persons and property in the neighbourhood of the Works against the same.

#### **34.12 Compliance by Subcontractors**

The Contractor shall be responsible for compliance by his Subcontractors of the provisions of this Clause.

The following Sub-Clauses 35.2 and 35.3 are added:

### **35.2 Records of Safety and Health**

The Contractor shall maintain such records and make such reports concerning safety, health and welfare of persons and damage to property as the Engineer may from time to time prescribe.

### **35.3 Reporting of Accidents**

The Contractor shall report to the Engineer details of any accident as soon as possible after its occurrence. In the case of any fatality or serious accident, the Contractor shall, in addition, notify the Engineer immediately by the quickest available means.

The following Sub-Clause 36.6 is added:

### **36.6 Use of Pakistani Materials and Services**

The Contractor shall, so far as may be consistent with the Contract, make the maximum use of materials, supplies, plant and equipment indigenous to or produced or fabricated in Pakistan and services, available in Pakistan provided such materials, supplies, plant, equipment and services shall be of required standard.

### **41.1 Commencement of Works**

The text is deleted and substituted with the following:

The Contractor shall commence the Works on Site within the period named in Appendix-A to Bid from the date of receipt by him from the Engineer of a written Notice to Commence. Thereafter, the Contractor shall proceed with the Works with due expedition and without delay.

The following Sub-Clause 47.3 is added:

### **47.3 Bonus for Early Completion of Works**

The Contractor shall in case of earlier completion for either whole or part(s) of the Works pursuant to Sub-Clauses 48.1 and 48.2(a) respectively of the General Conditions of Contract, be paid bonus up-to a limit and at a rate equivalent to 50% of the relevant limit and rate of liquidated damages prescribed in Appendix-A to Bid "Special Stipulations".

### **48.2 Taking Over of Sections or Parts**

For the purposes of para (a) of this Sub-Clause, separate Times for Completion shall be provided in the Appendix-A to Bid "Special Stipulations".

### **51.2 Instructions for Variations**

At the end of the first sentence, after the word "Engineer", the words "in writing" are added.

#### **52.1 Valuation of Variations**

In the tenth line, after the words "Engineer shall" the following is added:

Within a period not exceeding one-eighth of the completion time subject to a minimum of 56 days from the date of disagreement whichever is later.

#### **53.4 Failure to Comply**

This Sub-Clause is deleted in its entirety.

#### **54.3 Customs Clearance**

(Employer may vary this Sub-Clause)

#### **54.5 Conditions of Hire of Contractor's Equipment**

The following paragraph is added:

The Contractor shall, upon request by the Engineer at any time in relation to any item of hired Contractor's Equipment, forthwith notify the Engineer in writing the name and address of the Owner of the equipment and shall certify that the agreement for the hire thereof contains a provision in accordance with the requirements set forth above.

The following Sub-Clauses 59.4 & 59.5 are added:

#### **59.4 Payments to Nominated Subcontractors**

The Contractor shall pay to the nominated Subcontractor the amounts which the Engineer certifies to be due in accordance with the subcontract. These amounts plus other charges shall be included in the Contract Price in accordance with Clause 58 [Provisional Sums], except as stated in Sub-Clause 59.5 [Certification of Payments].

#### **59.5 Certification of Payments & Nominated Subcontractors**

Before issuing a Payment Certificate which includes an amount payable to a nominated Subcontractor, the Engineer may request the Contractor to supply reasonable evidence that the nominated Subcontractor has received all amounts due in accordance with previous Payment Certificates, less applicable deductions for retention or otherwise. Unless the Contractor:

- a) submits reasonable evidence to the Engineer, or
- b)
  - i) satisfies the Engineer in writing that the Contractor is reasonably entitled to withhold or refuse to pay these amounts, and
  - ii) submits to the Engineer reasonable evidence that the nominated Subcontractor has been notified of the Contractor's entitlement,

then the Employer may (at his sole discretion) pay direct to the nominated Subcontractor, part or all of such amounts previously certified (less applicable deductions) as are due to the nominated Subcontractor and for which the Contractor has failed to submit the evidence described in sub-paragraphs (a) or (b) above. The Contractor shall then repay, to the Employer, the amount which the nominated Subcontractor was directly paid by the Employer.

#### **60.1 Monthly Statements**

In the first line after the word “shall”, the following is added:

“on the basis of the joint measurement of work done under Clause 56.1,”

In Para (c) the words “the Appendix to Tender” are deleted and substituted with the words “Sub-Clause 60.11 (a)(6) hereof”.

(in case Clause 60.11 is applicable)

#### **60.2 Monthly Payments**

In the first line, “28” is substituted by “14”.

#### **60.10 Time for Payment**

The text is deleted and substituted with the following:

The amount due to the Contractor under any Interim Payment Certificate issued by the Engineer pursuant to this Clause, or to any other terms of the Contract, shall , subject to Clause 47, be paid by the Employer to the Contractor within 30 days after such Interim Payment Certificate has been jointly verified by Employer and Contractor, or, in the case of the Final Certificate referred to in Sub Clause 60.8, within 60 days after such Final Payment Certificate has been jointly verified by Employer and Contractor; Provided that the Interim Payment shall be caused in 42 days and Final Payment in 60 days in case of foreign funded project. In the event of the failure of the Employer to make payment within the times stated, the Employer shall pay to the Contractor compensation at the 28 days rate of KIBOR+2% per annum for local currency and LIBOR+1% for foreign currency, upon all sums unpaid from the date by which the same should have been paid. The provisions of this Sub-Clause are without prejudice to the Contractor’s entitlement under Clause 69.

The following Sub-Clause 60.11 is added:

#### **60.11 Secured Advance on Materials**

- a) The Contractor shall be entitled to receive from the Employer Secured Advance against an indemnity bond acceptable to the Employer of such sum

as the Engineer may consider proper in respect of non-perishable materials brought at the Site but not yet incorporated in the Permanent Works provided that:

- (1) The materials are in accordance with the Specifications for the Permanent Works;
  - (2) Such materials have been delivered to the Site and are properly stored and protected against loss or damage or deterioration to the satisfaction of the Engineer but at the risk and cost of the Contractor;
  - (3) The Contractor's records of the requirements, orders, receipts and use of materials are kept in a form approved by the Engineer, and such records shall be available for inspection by the Engineer;
  - (4) The Contractor shall submit with his monthly statement the estimated value of the materials on Site together with such documents as may be required by the Engineer for the purpose of valuation of materials and providing evidence of ownership and payment therefor;
  - (5) Ownership of such materials shall be deemed to vest in the Employer and these materials shall not be removed from the Site or otherwise disposed of without written permission of the Employer; and
  - (6) The sum payable for such materials on Site shall not exceed 75 % of the (i) landed cost of imported materials, or (ii) ex-factory / ex-warehouse price of locally manufactured or produced materials, or (iii) market price of other materials.
- (b) The recovery of Secured Advance paid to the Contractor under the above provisions shall be effected from the monthly payments on actual consumption basis.

#### **60.12 Financial Assistance to Contractor**

Financial assistance shall be made available to the Contractor by the Employer by adopting any one of the following three Alternatives:

*(Appropriate alternative only to be retained)*

#### Alternative One: Mobilization Advance

- (a) An interest-free Mobilization Advance up to 10 % of the Contract Price stated in the Letter of Acceptance shall be paid by the Employer to the Contractor in two equal parts upon submission by the Contractor of a Mobilization Advance Guarantee/Bond for the full amount of the Advance in the specified form from a Scheduled Bank in Pakistan or an insurance company acceptable to the Employer:
  - (1) First part within 14 days after signing of the Contract Agreement or date of receipt of Engineer's Notice to Commence, whichever is earlier; and
  - (2) Second part within 42 days from the date of payment of the first part, subject to the satisfaction of the Engineer as to the state of mobilization of the Contractor.
- (b) This Advance shall be recovered in equal installments; first installment at the expiry of third month after the date of payment of first part of Advance and the last installment two months before the date of completion of the Works as per Clause 43 hereof.

#### Alternative Two: Mobilization/ Demobilization Cost

Mobilization Cost shall be paid to the Contractor as a part of the priced Bill of Quantities. This cost shall not exceed 10 % of the Tender Price and shall be paid to the Contractor as follows:

- (i) 80 % of the Mobilization Cost shall be paid for mobilization at Site. This payment shall be in three stages as follows:
  - Stage I: 20 % of Mobilization Cost upon obtaining and furnishing of Performance Security and insurance policies and construction of camp and housing facilities as required under the Contract;
  - Stage II: 30 % of Mobilization Cost upon providing & installing preliminary requirements of Contractor's Equipment, materials and temporary structures for the commencement of Works to the satisfaction of the Engineer and achieving 3 % value of the Works (excluding payment under Stage-I);

Stage III: 30 % of Mobilization Cost upon providing balance Contractor's Equipment to complete full requirement for the entire work and after achievement of progress to the extent of 6 % value of the Works (excluding payments under Stages I and II); and

- (ii) 20 % of Mobilization Cost shall be paid for operation and maintenance of the constructed facilities and for demobilization as per schedule of payment to be submitted by the Contractor in accordance with Clause 57.2 and approved by the Engineer.

#### Alternative Three: Materials Supplied by Employer

The Employer shall supply to the Contractor materials, like cement, steel, bitumen or any other material whichever deemed necessary to complete the project; and the cost thereof shall be recovered from the Contractor through monthly statements on the basis of actual consumption.

The list of materials, quantities and rates to be charged to the Contractor shall be provided alongwith Appendix-A to Bid "Special Stipulations".

(Employer may opt either "Secured Advance on Materials" or "Financial Assistance to Contractor")

### **63.1 Default of Contractor**

The following para is added at the end of the Sub-Clause:

Provided further that in addition to the action taken by the Employer against the Contractor under this Clause, the Employer may also refer the case of default of the Contractor to Pakistan Engineering Council for punitive action under the Construction and Operation of Engineering Works Bye-Laws 1987, as amended from time to time.

### **65.2 Special Risks**

The text is deleted and substituted with the following:

The Special Risks are the risks defined under Sub-Clause 20.4 sub paragraphs (a) (i) to (a) (v).

### **67. 3 Arbitration**

In the sixth to eight lines, the words "shall be finally settled ..... appointed under such Rules" are deleted and substituted with the following:

shall be finally settled under the provisions of the Arbitration Act, 1940 as amended or any statutory modification or re-enactment thereof for the time being in force.

The following paragraph is added:

The place of arbitration shall be..... , Pakistan.

**68.1 Notice to Contractor**

The following paragraph is added:

For the purposes of this Sub-Clause, the Contractor shall, immediately after receipt of Letter of Acceptance, intimate in writing to the Employer and the Engineer by registered post, the address of his principal place of business or any change in such address during the period of the Contract.

**68.2 Notice to Employer and Engineer**

For the purposes of this Sub-Clause, the respective addresses are:

- a) The Employer :  
.....  
(to be filled in by the Employer as appropriate)
- b) The Engineer:  
.....  
(to be filled in by the Employer as appropriate)

**70.1 Increase or Decrease of Cost**

Sub-Clause 70.1 is deleted in its entirety, and substituted with the following:

The amounts payable to the Contractor, pursuant to Sub-Clause 60.1, shall be adjusted in respect of the rise or fall in the cost of labor, materials, and other inputs to the Works, by applying to such amount the formula prescribed in this Sub-Clause.

**(a) Other Changes in Cost**

To the extent that full compensation for any rise or fall in costs to the Contractor is not covered by the provisions of this or other Clauses in the Contract, the unit rates and prices included in the Contract shall be deemed to include amounts to cover the contingency of such other rise or fall of costs.

**(b) Adjustment Formula**



The adjustment to the monthly statements in respect of changes in cost shall be determined from the following formula:-

$$P_n = A + b \frac{L_n}{L_o} + c \frac{M_n}{M_o} + d \frac{E_n}{E_o} + \dots$$

Where:

$P_n$  is a price adjustment factor to be applied to the amount for the payment of the work carried out in the subject month, determined in accordance with Paragraph 60.1 (a), and with Paragraphs 60.1 (b) and (e), where any variations and daywork are not otherwise subject to adjustment;

$A$  is a constant, specified in Appendix-C to Bid, representing the nonadjustable portion in contractual payments;

$b, c, d$ , etc., are weightages or coefficients representing the estimated proportion of each cost element (labour, cement and reinforcing steel etc.) in the Works or Sections thereof, net of Provisional Sums and Prime Cost; the sum of  $A, b, c, d$ , etc., shall be one;

$L_n, M_n, E_n$ , etc., are the current cost indices or reference prices of the cost elements for month “n”, determined pursuant to Sub-Clause 70.1(d), applicable to each cost element; and

$L_o, M_o, E_o$ , etc., are the base cost indices or reference prices corresponding to the above cost elements at the date specified in Sub-Clause 70.1(d).

#### **(c) Sources of Indices and Weightages**

The sources of indices shall be those listed in Appendix-C to Bid, as approved by the Engineer. As the proposed basis for price adjustment, the Contractor shall have submitted with his bid the tabulation of Weightages and Source of Indices if different than those given in Appendix-C to Bid, which shall be subject to approval by the Engineer.

#### **(d) Base, Current, and Provisional Indices**

The base cost indices or prices shall be those prevailing on the day 28 days prior to the latest date for submission of bids. Current indices or prices shall be those prevailing on the day 28 days prior to the last day of the period to which a particular monthly statement is related. If at any time the current indices are not available, Provisional indices as determined by the Engineer will be used, subject to subsequent correction of the amounts paid to the Contractor when the current indices become available.

#### **(e) Adjustment after Completion**

If the Contractor fails to complete the Works within the Time for Completion prescribed under Clause 43, adjustment of prices thereafter until the date of

completion of the Works shall be made using either the indices or prices relating to the prescribed time for completion, or the current indices or prices, whichever is more favorable to the Employer, provided that if an extension of time is granted pursuant to Clause 44, the above provision shall apply only to adjustments made after the expiry of such extension of time.

**(f) Weightages**

The weightages for each of the factors of cost given in Appendix-C to Bid shall be adjusted if, in the opinion of the Engineer, they have been rendered unreasonable, unbalanced, or inapplicable as a result of varied or additional work executed or instructed under Clause 51. Such adjustment(s) shall have to be agreed in the variation order.

The following Sub-Clauses 73.1, 73.2, 74.1, 75.1, 76.1, 77.1 and 78.1 are added:

**73.1 Payment of Income Tax**

The Contractor, Subcontractors and their employees shall be responsible for payment of all their income tax, super tax and other taxes on income arising out of the Contract and the rates and prices stated in the Contract shall be deemed to cover all such taxes.

**73.2 Customs Duty & Taxes**

(Employer may incorporate provisions where applicable)

**74.1 Integrity Pact**

If the Contractor or any of his Subcontractors, agents or servants is found to have violated or involved in violation of the Integrity Pact signed by the Contractor as Appendix-L to his Bid, then the Employer shall be entitled to:

- (a) recover from the Contractor an amount equivalent to ten times the sum of any commission, gratification, bribe, finder's fee or kickback given by the Contractor or any of his Subcontractors, agents or servants;
- (b) terminate the Contract; and
- (c) recover from the Contractor any loss or damage to the Employer as a result of such termination or of any other corrupt business practices of the Contractor or any of his Subcontractors, agents or servants.

The termination under Sub-Para (b) of this Sub-Clause shall proceed in the manner prescribed under Sub-Clauses 63.1 to 63.4 and the payment under Sub-Clause 63.3 shall be made after having deducted the amounts due to the Employer under Sub-Para (a) and (c) of this Sub-Clause.

#### **75.1 Termination of Contract for Employer's Convenience**

The Employer shall be entitled to terminate the Contract at any time for the Employer's convenience after giving 56 days prior notice to the Contractor, with a copy to the Engineer. In the event of such termination, the Contractor :

- (a) shall proceed as provided in Sub-Clause 65.7 hereof; and
- (b) shall be paid by the Employer as provided in Sub-Clause 65.8 hereof.

#### **76.1 Liability of Contractor**

The Contractor or his Subcontractors or assigns shall follow strictly, all relevant labour laws including the Workmen's Compensation Act and the Employer shall be fully indemnified for all claims, damages etc. arising out of any dispute between the Contractor, his Subcontractors or assigns and the labour employed by them.

#### **77.1 Joint and Several Liability**

If the Contractor is a joint venture of two or more persons, all such persons shall be jointly and severally bound to the Employer for the fulfilment of the terms of the Contract and shall designate one of such persons to act as leader with authority to bind the joint venture. The composition or the constitution of the joint venture shall not be altered without the prior consent of the Employer.

#### **78.1 Details to be Confidential**

The Contractor shall treat the details of the Contract as private and confidential, save in so far as may be necessary for the purposes thereof, and shall not publish or disclose the same or any particulars thereof in any trade or technical paper or elsewhere without the prior consent in writing of the Employer or the Engineer. If any dispute arises as to the necessity of any publication or disclosure for the purpose of the Contract, the same shall be referred to the decision of the Engineer whose award shall be final.

## **PART II –PARTICULAR CONDITIONS OF CONTRACT**

| <b>Index</b>   | <b>Clause</b> |
|--|---------------|
| Alcoholic Liquor or Drugs                              | 34.8          |
| Arbitration  | 67.3          |
| Arms and Ammunition                                    | 34.9          |
| As-Built Drawings                                      | 6.7           |
| Bonus for Early Completion of Works                    | 47.3          |
| Cash Flow Estimate to be Submitted                     | 14.3          |
| Commencement of Works                                  | 41.1          |
| Compliance by Sub-Contractors                          | 34.12         |
| Conditions of Hire of Contractor's Equipment           | 54.5          |
| Contractor's Representative                            | 15.3          |
| Co-operation with Other Contractors                    | 31.3          |
| Customs Clearance                                      | 54.3          |
| Customs Duty and Taxes                                 | 73.2          |
| Default of Contractor                                  | 63.1          |
| Definitions  | 1.1           |
| Detailed Programme and Monthly Progress Report         | 14.5          |
| Details to be Confidential                             | 78.1          |
| Disorderly Conduct                                     | 34.11         |
| Employer's Risks                                       | 20.4          |
| Employment of Local Personnel                          | 16.4          |
| Employment of Persons in the Service of Others         | 34.3          |
| Engineer Not Liable                                    | 2.7           |
| Engineer's Duties and Authority                        | 2.1           |
| Engineer's Representative                              | 2.2           |
| Epidemics  | 34.6          |
| Exclusions   | 21.4          |
| Failure to Comply                                      | 53.4          |
| Festivals and Religious Customs                        | 34.10         |
| Financial Assistance to Contractor                     | 60.11         |
| Health and Safety                                      | 34.5          |
| Housing for Labour                                     | 34.4          |
| Increase or Decrease of Cost                           | 70.1          |
| Instructions for Variations                            | 51.2          |
| Insurance of Works and Contractor's Equipment          | 21.1          |
| Insurance Company                                      | 25.5          |
| Integrity Pact   | 74.1          |
| Joint and Several Liability                            | 77.1          |
| Language Ability of Contractor's Representative        | 15.2          |
| Language Ability of Superintending Staff of Contractor | 16.3          |
| Language(s) and Law                                    | 5.1           |
| Liability of Contractor                                | 76.1          |

| <b>Index</b>  | <b>Clause</b> |
|---|---------------|
| Lighting Work at Night                                | 19.4          |
| Monthly Payments                                      | 60.2          |
| Monthly Statements                                    | 60.1          |
| Notice to Contractor                                  | 68.1          |
| Notice to Employer and Engineer                       | 68.2          |
| Payment of Income Tax                                 | 73.1          |
| Payments of Nominated Subcontractors                  | 59.4          |
| Performance Security                                  | 10.1          |
| Performance Security Binding on Variation and Changes | 10.4          |
| Priority of Contract Documents                        | 5.2           |
| Programme to be Submitted                             | 14.1          |
| Rates of Wages and Conditions of Labour               | 34.2          |
| Records of Safety and Health                          | 35.2          |
| Replacement of the Engineer                           | 2.8           |
| Reporting of Accidents                                | 35.3          |
| Safety Precautions                                    | 19.3          |
| Secured Advance on Materials                          | 60.11         |
| Shop Drawings   | 6.6           |
| Special Risks   | 65.2          |
| Supply of Water                                       | 34.7          |
| Taking Over of Sections or Parts                      | 48.2          |
| Termination of Contract for Employer's Convenience    | 75.1          |
| Time for Payment                                      | 60.10         |
| Use of Pakistani Materials and Services               | 36.6          |
| Valuation of Variations                               | 52.1          |



**NED UNIVERSITY OF  
ENGINEERING & TECHNOLOGY  
KARACHI**



**Establishment of Thar Institute of Engineering, Sciences  
and Technology-TIEST, Islamkot  
(Constituent College of NED University)**

**TECHNICAL SPECIFICATIONS**

**Relocation of Village Link Road at Thar Institute of  
Engineering, Sciences & Technology Tharparkar**

**MARCH, 2022**



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## **ITEM 101: CLEARING AND GRUBBING**

### **101.1 DESCRIPTION**

This work shall consist of removal to the specified depth, grubbing and disposal of all surface objects, as and where directed in writing by the Engineer, stumps, roots, bushes and trees with less than 150 mm girth, vegetation, logs, rubbish and other objectionable material except such objects as are designated to remain or are to be removed in accordance with other section of specification.

### **101.2 CONSTRUCTION REQUIREMENTS**

#### **101.2.1 Clearing/Grubbing**

In roadway cut areas, all surface objects or any object to the depth of 30 Cm below subgrade level such as stumps, roots, vegetation, bushes, logs, rubbish shall be cleared and/or grubbed as directed by the Engineer. In roadway fill areas where clearing and grubbing is required, same shall be carried out to the depth of 30 Cm below natural surface level as described above.

Operation of clearing and grubbing shall in no way be deemed to effect any level or volume change of the area.

After clearing and grubbing, the compaction of the area will be restored to its original value without any extra payment. However Engineer may direct in writing to the Contractor for stripping (if so required) under item 103 or for compaction under item 104, Compaction of Natural Ground, if the original compaction is less than the required for respective zone. Payment of these items will be made separately under the relative items used for such purpose.

Before bottom layer of embankment is placed, contractor will grub up and remove without extra payment, any vegetation that may, in the meantime have grown on surface previously cleared and grubbed.

All trees having girth less than 150 mm measured at (600) mm above ground and falling within the construction limits shall be felled & removed by the contractor. The excavation and removal of trees, roots and stumps including backfilling and compacting of holes and restoring the natural ground to the original condition shall be responsibility of the contractor for which no extra payment shall be made to him. The trees, stumps & roots remains the property of the Employer, which shall be delivered at designated place as directed by the Engineer.

#### **101.2.2 Protection and Restoration**

The Contractor shall prevent damage to all pipes, conduits, wires, cables or structure above or below ground. No land monuments, property markers, or official datum points shall be damaged or removed until the Employer/Engineer has witnessed or otherwise referenced their locations and approved their removal. The Contractor shall so control his operations as to prevent damage to shrubs, which are to be preserved. Protection may include fences and boards latched to shrubs, to

prevent damage from machine operations. Any damage as a result of contractor's operation shall immediately be rectified by him at his own expense.

### **101.3      MEASUREMENT AND PAYMENT**

#### **101.3.1      Measurement**

Clearing and grubbing will be measured for payment only on areas so designated in writing by the Engineer or shown on the drawings. The quantity to be paid for shall be the number of square meters satisfactorily cleared and grubbed. Any tree having girth of less than 150 mm (measured 600 mm above ground level) shall be measured to be under this item.

Engineer shall ensure that a minimum of 500 SM area is designated for clearing and grubbing in any stretch of roadway for the sake of ease to construction activities.

Clearing and grubbing carried out by the Contractor in roadway cut areas and borrow pits shall not be measured for payment.

#### **101.3.2      Payment**

The quantities determined as provided above will be paid for at the contract unit price for the pay item mentioned below and shown in the Bill of Quantities, which price and payment shall be full compensation for clearing and grubbing and restoration of area, to its original condition.

| <b>Pay Item<br/>No.</b> | <b>Description</b>     | <b>Unit of<br/>Measurement</b> |
|-------------------------|------------------------|--------------------------------|
| 101                     | Clearing and Grubbing. | SM                             |

-----End of Section-----



## **ITEM 104: COMPACTION OF NATURAL GROUND**

### **104.1      DESCRIPTION**

The natural ground or surface ready for construction purposes after clearing and grubbing or stripping, (if required) will be considered as (natural) Ground for the purpose of this item. The compaction of natural ground shall be carried out through a written order by the Engineer.

### **104.2      CONSTRUCTION REQUIREMENTS**

Up to a depth of twenty (20) cm below the natural ground, all sods and vegetable matters shall be removed and clear surface shall be broken up by ploughing and scarifying to compact to the degree as defined below:-

| <b>For Height of Embankment<br/>Below Subgrade Level</b> | <b>Percent of Maximum Dry Density<br/>as determined by AASHTO T-180</b> |
|--|---|
| 0 to 30 cm   | 95  |
| 30 to 75 cm  | 93  |
| Over 75 cm   | 90  |
| Below the foundation of<br>structures                    | 95  |

#### **104.2.1      Compaction of original ground surface in areas of high water levels and salinity.**

Compaction of the natural ground surface in such areas will be difficult if not impossible. See Items 108, etc. under Formation of Embankment for construction requirements under these conditions, where compaction of Natural Ground shall not be carried out.

### **104.3      MEASUREMENT AND PAYMENT**

#### **104.3.1      Measurement**

The measurement shall be made by multiplying the length and breadth of the area approved in writing by the Engineer to be paid under this item. The measurement of the item shall be in Square meter.

Any subsidence of levels of Natural Ground due to compaction under this item shall not be measured for payment, the contractor is expected to take care of such factors while bidding.

#### **104.3.2      Payment**

The payment under this item shall be made for at the contract unit price for Square meter of compaction of (natural) ground measured as above and shall be deemed to include cost of scarification, watering, mixing, leveling, rolling, labour, equipment, tools, and incidentals necessary to complete this item.

| <b>Pay Item<br/>No.</b> | <b>Description</b>           | <b>Unit of<br/>Measurement</b> |
|-------------------------|------------------------------|--------------------------------|
| 104                     | Compaction of Natural Ground | SM                             |

-----End of Section-----

## **ITEM 106: EXCAVATION OF UNSUITABLE OR SURPLUS MATERIAL**

### **106.1 DESCRIPTION**

The work shall consist of excavation and disposal of unsuitable or surplus material arising from roadway excavation, which is declared in writing by the Engineer to be unsuitable for use or surplus to the requirements of the project. When excavation of unsuitable material requires special attention for a known condition on a specific project then construction requirements and payment shall be covered under relevant Provisions.

### **106.2 CONSTRUCTION REQUIREMENTS**

All suitable material excavated within the limits and scope of the project shall be used in the most effective manner for the formation of the embankment, for widening of roadway, for backfill, or for other work included in the contract.

Any material surplus to these requirement or any material declared in writing by the Engineer to be unsuitable shall be disposed of and leveled in thin layers by the Contractor outside the right of way within 7 Km of excavation. The Engineer shall decide regarding the unsuitability of the material by conducting appropriate laboratory tests.

When unsuitable materials are ordered to be removed and replaced, the soil left in place shall be compacted to a depth of twenty (20) cm to the density prescribed under Item 108.3.1. Payment for such compaction shall be included in the contract prices for the excavation materials.

If the unsuitable material, which is to be removed, is below standing water level and the replacement material is gravel or a similar self-draining material of at least thirty (30) cm in depth, the compaction may be dispensed with if approved by the Engineer.

Rock excavation shall be classified as under:

#### **a) Hard Rock**

Any rock which can not be removed with Ripper of a 200 H.P. Bulldozer and constitutes a firm and continuous bed of rock only.

#### **b) Medium Rock**

Any rock which can not be removed with the blade of 200 H.P. Bulldozer but can be removed by the ripper, will be termed as Medium Rock, irrespective of the fact that it is removed by blasting.

#### **c) Soft Rock**

Any rock which can be removed with the blade of a 200 H.P. Bulldozer. This item will be termed as Soft Rock, irrespective of the fact that it is removed by blasting.

### **106.3            MEASUREMENT AND PAYMENT**

#### **106.3.1        Measurement**

When the contractor is directed to excavate unsuitable material below the surface of original ground in fill areas, the depth to which these unsuitable materials are to be removed will be determined by the Engineer. The contractor shall schedule his work in such a way that authorized cross sections can be taken before and after the material has been removed. Only material which is surplus to the requirements of the project or is declared in writing by the Engineer to be unsuitable will qualify for payments under pay Item No. 106 a, 106 b, 106 c, and 106 d as the case may be.

The cost of excavation of material which is used anywhere in the project shall be deemed to be included in the pay Item relating to the part of the work where the material is used.

The under mentioned Pay Item Nos. 106 a, 106 b, 106 c, and 106 d shall include the cost of obtaining the consent of the owner or tenant of the land where the disposal of surplus or unsuitable material is made.

Unsuitable or surplus material shall be measured in its original position and its volume shall be calculated in cubic meters using end area method.

#### **106.3.2        Payment**

The quantities determined as provided above shall be paid for at the contract unit price respectively for each of the particular pay Items listed below and shown in the Bill of Quantities which prices and payment shall constitute full compensation for all costs involved in the proper completion of the work prescribed in this item.

| <b>Pay Item<br/>No.</b> | <b>Description</b>                     | <b>Unit of<br/>Measurement</b> |
|-------------------------|--|--------------------------------|
| 106a                    | Excavate Unsuitable Common<br>Material | CM                             |
| 106b                    | Excavate Unsuitable Rock<br>Material   |                                |
|                         | i. Hard Rock                           | CM                             |
|                         | ii. Medium Rock                        | CM                             |
|                         | iii. Soft Rock                         | CM                             |
| 106c                    | Excavate Surplus Common<br>Material    | CM                             |
| 106d                    | Excavate Surplus Rock<br>Material      |                                |
|                         | i. Hard Rock                           | CM                             |
|                         | ii. Medium Rock                        | CM                             |
|                         | iii. Soft Rock                         | CM                             |

-----End of Section-----

## **ITEM 108: FORMATION OF EMBANKMENT**

### **108.1 DESCRIPTION**

This work shall consist of formation of embankment, including preparation of area for placing and compaction of embankment material in layers and in holes, pits and other depressions within the roadway area in accordance with the specifications and in conformity with the lines, grades, thickness and typical cross-section shown on the plans or established by the Engineer.

### **108.2 MATERIAL REQUIREMENTS**

Material for embankment shall consist of suitable material excavated from borrow, roadway excavation or structural excavation and shall include all lead and lift. Borrow material will be used only when material obtained from roadway or structural excavation is not suitable or is deficient for embankment formation and shall include all lead and lift.

The material under this item shall conform to the following specification.

- a) Contractor shall use AASHTO Class A-1, A-2, A-3, A-4 or A-5 soil as specified in AASHTO M-145 or other material approved by the Engineer.
- b) CBR of the material shall not be less than five (5) percent, determined in accordance with AASHTO T-193. CBR value shall be obtained at a density corresponding to the degree of compaction required for the corresponding layer.
- c) Swell value of the material for embankment formation shall not exceed five tenth (0.5) percent. However, while establishing the swell value, surcharge weights representing the overburden will be used. In case sandy material is used for embankment formation, it shall be properly confined at no extra payment with a material and to the extent as approved by the Engineer and sandy material shall not be used on slopes of embankment.
- d) In areas subject to flood and prolonged inundation of the embankment, such as at bridge sites, the material used in embankment, unless rock, shall be AASHTO Class A1 (a), A1 (b) and A-2-4, soils. Other soils may be used only with the written consent of Engineer.

### **108.3 CONSTRUCTION REQUIREMENTS**

#### **108.3.1 Formation of Embankment with Borrow Common Material**

Material for embankment, obtained and approved as provided above, shall be placed in horizontal layers of uniform thickness and in conformity with the lines, grades, sections and dimensions shown on the Drawings or as required by the Engineer. The layers of loose material other than rock shall be not more than 20 cm. thick, unless otherwise allowed by the Engineer after a trial section is prepared and approved.

The material placed in layers and that scarified to the designated depth for formation of embankment shall be compacted to the density specified below:

| <b>Depth in Centimeters Below<br/>Subgrade Level</b> | <b>Percent of Maximum Dry Density<br/>as determined by AASHTO T-180</b> |
|--|---|
| 0 to 30 cm   | 95  |
| 30 to 75 cm  | 93  |
| Over 75 cm   | 90  |

Method 'B' or 'D' whichever is applicable, or corresponding Relative Density in case of sand fill.

In-place density determinations of the compacted layers shall be made in accordance with AASHTO T-191 or other approved methods. For all soils, with the exception of rock fill materials, containing more than 10% oversize particles (retained on 3/4 inch/ 19 mm sieve), the in-place density thus obtained shall be adjusted to account for such oversize particles or as directed by the Engineer. Subsequent layers shall not be placed and compacted unless the previous layer has been properly compacted and accepted by the Engineer.

Material for embankment at locations inaccessible to normal compacting equipment shall be placed in horizontal layers of loose material not more than 15 centimeters thick and compacted to the densities specified above by the use of mechanical tampers, or other appropriate equipment.

The compaction of the embankment shall be carried out at the designated moisture content consistent with the available compacting equipment.

Embankment material that does not contain sufficient moisture to obtain the required compaction shall be given additional moisture by means of approved sprinklers and mixing. Material containing more than the optimum moisture may not, without written approval of the Engineer, be incorporated in the embankment until it has been sufficiently dried out. The drying of wet material may be expedited by scarification, disking or other approved methods.

When materials of widely divergent characteristics, such as clay and chalk or sand, drawn from different sources, are to be used in the embankment they shall be deposited in alternate layers of the same material over the full width of the embankment to depths approved by the Engineer. Rock, clay or other material shall be broken up, and no accumulation of lumps or boulders in the embankment will be permitted. No surplus material shall be permitted to be left at the toe of embankment or at the top of cut sections.

Side slopes shall be neatly trimmed to the lines and slopes shown on the drawings or as directed by the Engineer, and the finished work shall be left in a neat and acceptable condition.

### 108.3.2

#### Formation of Embankment with Rock Material

Embankment formed of material consisting predominantly of rock fragment of such size that the material cannot be placed in layers of the thickness prescribed without crushing, pulverizing or further breaking down the pieces, such material may be placed in layers not exceeding in thickness than the approximate average size of the rocks except that no layer shall exceed eighty (80) centimeters of loose measurement and compacted by a vibratory roller with the minimum mass as shown in the following table.

| <b>Mass per metre width<br/>of vibrating roll<br/>(Kg/M)</b> | <b>Depth of fill<br/>layer (mm)</b> | <b>Number of passes of<br/>the roller on each<br/>layer</b> |
|--|-------------------------------------|---|
| 2300 – 2900  | 400                                 | 5   |
| 2900 – 3600  | 500                                 | 5   |
| 2600 – 4300  | 600                                 | 5   |
| 4300 – 5000  | 700                                 | 5   |
| >5000  | 800                                 | 5   |

The material shall be carefully placed in layers, so that all larger stones will be well distributed and voids completely filled with smaller stones, clean small shells, shale, earth, sand, gravel, to form a solid mass. After placing rock material, surface shall be covered with a layer of fine material having thickness less than twenty (20) centimeters. Such fine material shall be reserved from roadway excavation by the Contractor. Should such material be available but not reserved, Contractor will supply and place borrow material for forming smooth grade without extra payment.

Each layer shall be bladed or leveled with motor grader, bulldozer or similar equipment capable of shifting and forming the layer into a neat and orderly condition. No rock larger than eight (8) centimeters in any dimension shall be placed in the top fifteen (15) centimeters of embankment unless otherwise allowed by the Engineer.

Material for each layer should be consolidated with heavy weight vibratory roller until settlement as checked between two consecutive passes of roller is less than one (1) percent of the layer thickness. In evaluation of settlement, survey points should be established and rolling continued until difference of levels as checked after two consecutive passes is less than one (1) percent of the total layer thickness. More over initial rolling of overlaid fine material shall be done without watering to ensure their intrusion in voids of rock layer beneath. Watering shall be done when voids are properly filled.

Embankments, which are formed of material that contain rock but also contain sufficient compactable material other than rock or other hard material to make rolling feasible, shall be placed and compacted in the manner prescribed above and to the point when settlement is within above mentioned requirement. Compaction test will be made whenever the Engineer determines they are feasible and

necessary. Each layer must be approved by the Engineer before the next layer is placed.

When rock to be incorporated in fill is composed largely of weak or friable material, the rock shall be reduced to a maximum size not exceeding fifty (50) percent of the thickness of the layer being placed.

#### **108.3.3 Formation of Embankment on Steep Slopes**

Where embankments are to be constructed on steep slope, hill sides or where new fill is to be placed and compacted against existing pavement or where embankment is to be built along one half the width at a time, the original slope of the hill side, of existing pavement or adjacent to half width of embankment shall be cut in steps of twenty (20) centimeters depth. Benching shall be of sufficient width to permit operation of equipment possible during placing and compaction of material.

Cut material shall be incorporated with the new embankment material and compacted in horizontal layers. No extra payment will be allowed for such an operation.

#### **108.3.4 Formation of Embankment on Existing Roads**

Before fill is placed and compacted on an existing roadway, the existing embankment and/or pavement may be leveled by cutting, rooting or scarifying by approved mechanical means to a level to be determined by the Engineer. The earth, old asphalt or other material arising as a result of this operation will be declared either suitable or unsuitable, for use in the embankment or other items, by the Engineer. If the material is declared suitable it will be measured under relative item and if it is declared unsuitable, it will be measured under item 106a.

#### **108.3.5 Formation of Embankment in Water Logged Areas**

Where embankments are to be placed in water logged areas and which are inaccessible to heavy construction equipment, a special working platform shall be first established, consisting of a blanket of fill material placed on top of the soft layer. The material of the working table shall consist of normal or processed granular fill, obtained from borrow excavation. This material shall conform to the following specifications:

| <b><u>Sieve Description</u></b> | <b><u>Percentage of Weight Passing<br/>Mesh Sieve, AASHTO T-27</u></b> |
|---------------------------------|--|
| 3 inch (75 mm)                  | 100  |

The remaining grading shall be such as to avoid intrusion into the working platform material of subgrade or natural ground surface material. For this condition to be met it will be required that the ratio.



D15(Working Platform Material)

----- is less than 5.

D85 (Natural Ground Material)

D85 and D15 mean the particle diameters corresponding to 85% and 15%, respectively, passing (by weight) in a grain size analysis.

Construction of this working table shall proceed from one edge of the soft area by using the fill as a ramp for further material transport.

The thickness of the working table as prescribed above shall be approximately 0.5 meter unless directed otherwise by the Engineer, and the width shall be that of the embankment. The placement and compaction of the working table shall be carried out by use of light equipment, as directed by the Engineer.

No density requirements are specified for the working platform, however, subsequent layers above it shall be compacted to the densities specified in Item 108.3.1.

#### **108.3.6 General Requirements**

To avoid interference with the construction of bridge abutments and wing walls, the Contractor shall at points determined by the Engineer, suspend work on embankments and/or in cuts forming the approaches to any such structure until such time as the construction of the later is sufficiently advanced to permit the completion of the approaches without the risk of interference or damage to the bridge works. The cost of such suspension of work shall be included in the contract unit prices for embankment. In carrying embankments up to or over bridges, culverts or pipe drainage, care shall be taken by the Contractor to have the embankments brought to equally on both sides and over the top of any such structure. Contractor shall make special arrangements to ensure proper compaction in restricted spaces and around structures. No compensation shall be made to the Contractor for working in narrow or otherwise restricted areas.

When as a result of settlement, an embankment requires the addition of material up to 30 cm in thickness to bring it up to the required grade level, the top of the embankment shall be thoroughly scarified before the additional material is being placed, without extra payment to Contractor for the scarification.

The Contractor shall be responsible for the stability of all embankments and shall replace any portions that in the opinion of the Engineer have been damaged or displaced due to carelessness or neglect on the part of the Contractor. Embankment material which may be lost or displaced as a result of natural causes such as storms, cloud-burst or as a result of unavoidable movement or settlement of the ground or foundation upon which the embankment is constructed shall be replaced by the Contractor with acceptable material from excavation or borrow. No additional compensation will be allowed for the replacement.

During construction, the roadway shall be kept in shape and drained out at all times. When unsuitable material has been placed in the embankment by the Contractor, he

shall remove it without extra payment.

## **108.4            MEASUREMENT AND PAYMENT**

### **108.4.1        Measurement**

The quantities to be paid for shall be the number of cubic meters calculated on theoretical designed lines and grades and the ground levels as established under clause 100.9, compacted in place, accepted by the Engineer formed with material resulting from:

#### **a) Formation of Embankment from Borrow Excavation**

Measurement shall be made as under:-

Formation from Borrow =            Total Embankment Quantity (minus)  
   Roadway excavation Quantity (minus)  
   Structural excavation Quantity

#### **b) Formation from structural Excavation**

This quantity shall be the same as calculated for structural excavation irrespective of its haulage distance except that declared unsuitable by the Engineer.

#### **c) Formation from Roadway Excavation.**

This quantity shall be the same as calculated for Roadway Excavation. The contractor will be supposed to use material from Roadway Excavation irrespective of haulage distance. However if contractor, for his own convenience, uses the material from borrow, the payment will still be made under this item 108 (a) & 108 (b).

In the measurement of "Formation of Embankment on steep slopes" no allowance will be made for the benching or volume of material cut out from the hill side or from the first half width fill to accommodate the compacting equipment but will be calculated only on the net volume of fill placed against the original hill sides, the old embankment or the first half width fill.

### **108.4.2        Payment**

#### **a) Formation from Borrow Excavation**

The quantity to be paid for shall be the number of cubic meters placed in embankment, measured as provided above for material from borrow excavation and such a payment will be deemed to include cost of excavation, payment of royalty, levies and taxes of Local, Provincial and Federal Government, cost of hauling including all lead and lift, spreading, watering, rolling, labour, equipment, tools and incidental necessary to complete this item.

**b) Formation from Structural Excavation.**

The quantity to be paid for shall be the number of cubic meters placed in embankment and measured as provided above for material from structural excavation and such payment will be deemed to include cost of hauling, dumping, spreading, watering, rolling, labour, equipment, tools and incidental necessary to complete this item.

**c) Formation from Roadway Excavation**

The quantity to be paid for shall be the number of cubic meters placed in embankment and measured as provided above for material from roadway excavation and such payment will be deemed to include cost of excavation, hauling, dumping, spreading, watering, rolling, labour, equipment, tools and incidental necessary to complete this item.

| <b>Pay Item<br/>No.</b> | <b>Description</b>   | <b>Unit of<br/>Measurement</b> |
|-------------------------|--|--------------------------------|
| 108a                    | Formation of Embankment<br>from Roadway Excavation in<br>Common Material     | CM                             |
| 108b                    | Formation of Embankment<br>from Roadway Excavation in<br>Rock Material.      |                                |
|                         | i. Hard Rock   | CM                             |
|                         | ii. Medium Rock  | CM                             |
|                         | iii. Soft Rock   | CM                             |
| 108c                    | Formation of Embankment<br>from Borrow Excavation in<br>Common Material.     | CM                             |
| 108d                    | Formation of Embankment<br>from Structural Excavation in<br>Common Material. | CM                             |
| 108e                    | Formation of Embankment<br>from Structural Excavation in<br>Rock Material    |                                |
|                         | iv. Hard Rock  | CM                             |
|                         | v. Medium Rock   | CM                             |
|                         | vi. Soft Rock  | CM                             |

-----End of Section-----

## **ITEM 201: GRANULAR SUB-BASE**

### **201.1 DESCRIPTION**

This item shall consist of furnishing, spreading in one or more layers and compacting granular subbase according to the specifications and drawings and/or as directed by the Engineer.

### **201.2 MATERIAL REQUIREMENTS**

Granular subbase material shall consist of natural or processed aggregates such as gravel, sand or stone fragment and shall be clean and free from dirt, organic matter and other deleterious substances, and shall be of such nature that it can be compacted readily under watering and rolling to form a firm, stable subbase.

The material shall comply to the following grading and quality requirements:

- a) The subbase material shall have a gradation curve within the limits for grading A, B, and C given below. However grading A may be allowed by the Engineer in special circumstances.

| <b>Grading Requirements for Sub base Material</b> |             |                                     |          |
|---|-------------|-------------------------------------|----------|
| <b>Sieve Designation</b>                          |             | <b>Mass Percent Passing Grading</b> |          |
| <b>mm</b>   | <b>Inch</b> | <b>A</b>                            | <b>B</b> |
| 60.0  | (2.1/2)     | 100                                 | --       |
| 50.0  | (2)         | 90-100                              | 100      |
| 25.0  | (1)         | 50-80                               | 55-85    |
| 9.5   | (3/8)       | --                                  | 40-70    |
| 4.75  | No. 4       | 35-70                               | 30-60    |
| 2.0   | No. 10      | --                                  | 20-50    |
| 0.425   | No. 40      | --                                  | 10-30    |
| 0.075   | No. 200     | 2-8                                 | 5-15     |

The Coefficient of Uniformity D60/D10 shall be not less than 3, where D60 and D10 are the particle diameters corresponding to 60% and 10%, respectively, passing (by weight) in a grain size analysis, curve.

- b) The Material shall have a CBR value of at least 50%, determined according to AASHTO T-193. The CBR value shall be obtained at a density corresponding to Ninety eight (98) percent of the maximum dry density determined according to AASHTO T-180 Method-D.
- c) The coarse aggregate material retained on sieve No. 4 shall have a percentage of wear by the Los Angeles Abrasion (AASHTO T-96) of not more than fifty (50) percent.

- d) In order to avoid intrusion of silty and clayey material from the subgrade in the subbase, the ratio D15 (Subbase)/D85 (Subgrade) should be less than 5.

Where D85 and D15 are the particle diameters corresponding to eighty five (85) % and fifteen (15) %, respectively, passing (by weight) in a grain size analysis, curve.

- e) The fraction passing the 0.075 mm (No. 200) sieve shall not be greater than two third of the fraction passing the 0.425 mm (No. 40) sieve. The fraction passing the 0.425 mm sieve shall have a liquid limit of not greater than 25 and a plasticity index of 6 or less.
- f) If over-size is encountered, screening of material at source, shall invariably be done, no hand picking shall be allowed, however hand picking may be allowed by the Engineer, if over-size quantity is less than 5% of the total mass.
- g) Sand equivalent for all classes shall be 25 min.

### **201.3 CONSTRUCTION REQUIREMENTS**

#### **201.3.1 Spreading**

Granular sub base shall be spread on approved subgrade layer as a uniform mixture. Segregation shall be avoided during spreading and the final compacted layer shall be free from concentration of coarse or fine materials.

Granular sub base shall be deposited on the roadbed or shoulders in a quantity which will provide the required compacted thickness without resorting to spotting, picking up or otherwise shifting the sub base material. In case any material is to be added to compensate for levels, the same shall be done after scarifying the existing material, to ensure proper bonding of additional material.

When the required thickness is fifteen (15) cm or less, the aggregates may be spread and compacted as one layer, but in no case shall a layer be less than seven and one half (7.5) centimeters thick. Where the required thickness is more than 15 cm, the aggregates shall be spread and compacted in 2 or more layers of approximately equal thickness, but in any case the maximum compacted thickness of one layer shall not exceed 15 cm. All subsequent layers shall be spread and compacted in a similar manner.

Granular subbase shall be spread with equipment that will provide a uniform layer conforming to the specified item both transversely and longitudinally within the tolerances as specified in "Table for Allowable Tolerances" in these specifications. No hauling or placement of material will be permitted when, in the judgment of the Engineer, the weather or road conditions are such that the hauling operation will cause cutting or rutting of subgrade or contamination of sub base material.

#### **201.3.2 Compaction Trials**

Prior to commencement of granular subbase operation, contractor shall construct a

trial length, not to exceed, five hundred (500) meters and not less than two hundred (200) meters with the approved subbase material as will be used during construction to determine the adequacy of the contractor's equipment, loose depth measurement necessary to result in the specified compacted layer depths, the field moisture content, and the relationship between the number of compaction passes and the resulting density of the material. For details, refer to clause 1.20 (General) of these specifications.

### **201.3.3      Compaction**

The moisture content of subbase material shall be adjusted prior to compaction, by watering with approved sprinklers mounted on trucks or by drying out, as required, in order to obtain the specified compaction.

The subbase material shall be compacted by means of approved vibrating rollers or steel wheel rollers (rubber tyred rollers may be used as a supplement), progressing gradually from the outside towards the centre, except on superelevated curves, where the rolling shall begin at the low side and progress to the high side. Each succeeding pass shall overlap the previous pass by at least one third of the roller width. While the rolling progresses, the entire surface of each layer shall be properly shaped and dressed with a motor grader, to attain a smooth surface free from ruts or ridges and having proper section and crown. Rolling shall continue until entire thickness of each layer is thoroughly and uniformly compacted to the specified density.

Any area inaccessible to rolling equipment shall be compacted by means of hand guided rollers, plate compactors or mechanical tampers, where the thickness in loose layer shall not be more than 10 cm.

If the layer of subbase material, or part thereof does not conform to the required finish, the Contractor shall, at his own expense, rework, water, and recompact the material before succeeding layer of the pavement structure is constructed.

Immediately prior to the placing of first layer of base course the subbase layer (both under the traveled way and the shoulders) shall conform to the required level and shape. Prior to placing the succeeding layers of the material, the top surface of each layer shall be made sufficiently moist to ensure bond between the layers. The edges or edge slopes shall be bladed or otherwise dressed to conform to the lines and dimensions shown on the plans.

No material for construction of the base shall be placed until the subbase has been approved by the Engineer.

### **201.3.4      Compaction requirements**

The relative compaction of each layer of the compacted subbase shall not be less than Ninety eight (98) percent of the maximum dry density determined according to AASHTO T-180 Method-D. The field density shall be determined according to AASHTO T-191 or other approved method. For all materials, the field density thus obtained shall be adjusted to account for oversize particles (retained on 19 mm

sieve) as directed by the Engineer. Also for adjustment of any material retained on 4.75 mm sieve, AASHTO Method T-224 shall be used.

#### **201.3.5 Moisture Content Determination**

As it is customary in the project laboratories that small samples of materials are placed in ovens for moisture determination for proctor, following precautions are necessary to ensure proper compaction results.

- a) Same size of sample is placed in oven for moisture determination in case of laboratory density (Proctor) and field density.
- b) Moisture content for calculation of field density and proctor shall be observed on material passing 4.75 mm sieve.

#### **201.3.6 Tolerance**

The subbase shall be compacted to the desired level and cross slopes as shown on the drawings. The allowable tolerance shall be according to the "Table for Allowable Tolerances" in these specifications.

### **201.4 MEASUREMENT AND PAYMENT**

#### **201.4.1 Measurement**

The quantity of sub base to be paid for shall be measured in cubic meters by the theoretical volume in place as shown on the drawings or as directed and approved for construction by the Engineer, placed and accepted in the completed granular sub base course. No allowance will be given for materials placed outside the theoretical limits as shown on the cross-sections.

#### **201.4.2 Payment**

The accepted quantities measured as provided above shall be paid for at the contract unit price per cubic meter of granular subbase, for the Pay Item listed below and shown in the Bill of Quantities, which price and payment shall constitute full compensation for furnishing all materials, hauling, placing, watering, rolling, labour, equipment, tools and incidentals necessary to complete the item.

| <b>Pay Item<br/>No.</b> | <b>Description</b> | <b>Unit of<br/>Measurement</b> |
|-------------------------|--------------------|--------------------------------|
| 201                     | Granular Sub Base  | CM                             |

-----End of Section-----

## **ITEM 202: AGGREGATE BASE COURSE**

### **202.1      DESCRIPTION**

This item shall consist of furnishing, spreading and compacting one (1) or more layers of aggregate base on a prepared subgrade, subbase, or existing road surface, in accordance with the specifications and the drawings and/or as directed by the Engineer.

### **202.2      MATERIAL REQUIREMENTS**

Material for aggregate base course shall consist of crushed hard durable gravel, rock or stone fragments. It shall be clean and free from organic matters, lumps of clay and other deleterious substances. The material shall be of such a nature that it can be compacted readily under watering and rolling to form a firm, stable base for both flexible and rigid pavements.

The aggregate base shall comply to the following grading and quality requirements.

- a) The gradation curve of the material shall be smooth and within the envelope limits for Grading A or B given below.

| <b>Grading Requirements for Aggregate Base Material</b> |             |                                     |          |
|---|-------------|-------------------------------------|----------|
| <b>Sieve Designation</b>                                |             | <b>Mass Percent Passing Grading</b> |          |
| <b>mm</b>   | <b>Inch</b> | <b>A</b>                            | <b>B</b> |
| 50.0  | 2           | 100                                 | 100      |
| 25.0  | 1           | 70-95                               | 75-95    |
| 9.5   | 3/8         | 30-65                               | 40-75    |
| 4.75  | No. 4       | 25-55                               | 30-60    |
| 2.00  | No. 10      | 15-40                               | 20-50    |
| 0.425   | No. 40      | 8-20                                | 12-25    |
| 0.075   | No. 200     | 2-8                                 | 5-10     |

The material shall be well graded such that the coefficient of Uniformity D<sub>60</sub>/D<sub>10</sub> shall be greater than four (4).

- b) Crushed Aggregate (material retained on sieve NO. 4) shall consist of material of which at least ninety (90) percent by weight shall be crushed particles, having a minimum of two (2) fractured faces.
- c) The Coarse aggregate shall have a percentage of wear by the Loss Angeles Abrasion test (AASHTO T-96) of not more than forty (40).
- d) The material shall have a loss of less than twelve (12) percent when subjected to five cycles of Sodium Sulphate Soundness test according to AASHTO T-104.



- e) The sand equivalent determined according to AASHTO T-176 shall not be less than 45 and the material shall have a Liquid limit of not more than twenty five (25) and a plasticity Index of not more than 6 as determined by AASHTO T-89 and T-90.
- f) The material passing the 19 mm sieve shall have a CBR value of minimum eighty (80) percent, tested according to the AASHTO T 193. The CBR value shall be obtained at the maximum dry density determined according to AASHTO T 180, Method D.
- g) Laminated material shall not exceed 15% of total volume of Aggregate Base Course.

### **202.2.1 Filler for Blending**

If filler, in addition to that naturally present in the aggregate base material is necessary for meeting the grading requirement or for satisfactory bonding of the material, it shall be uniformly blended with the base course material at the crushing plant or in a pugmill unless otherwise approved. The material for such purpose shall be obtained from sources approved by the Engineer. The material shall be free from organic matter, dirt, shale, clay and clay lump or other deleterious matter and shall conform to following requirement.

| <b>AASHTO Sieve</b>            | <b>Percent Passing</b> |
|--------------------------------|------------------------|
| 3/8 inch                       | 100                    |
| 4                              | 85-100                 |
| 100                            | 10-30                  |
| Plasticity Index (AASHTO T-90) | 6 maximum              |
| Sand Equivalent (AASHTO T-176) | 30 minimum             |

However the combined aggregates prepared by mixing the coarse material and filler shall satisfy the requirements as mentioned in clause 202.2 above.

## **202.3 CONSTRUCTION REQUIREMENTS**

### **202.3.1 Preparation of surface for Aggregate base course**

In case crushed aggregate base is to be laid over prepared sub base course, the sub base course shall not have loose material or moisture in excess to optimum moisture content.

Spreading shall conform in all respects to the requirements specified under this heading in Item 201 - Subbase (201.3.1).

### **202.3.2 Compaction**

Compaction process shall conform in all respect to the requirements specified under this heading in Item 201 (201.3.3).

### **202.3.3      Compaction Requirement**

The relative compaction of each layer of the compacted base shall not be less than 100 percent to the maximum dry density determined according to AASHTO T-180, Method D (Modified). The field density shall be determined according to AASHTO T-191 or other approved method. For all materials, the field density thus obtained shall be adjusted to account for oversize particles (retained on 19 mm sieve) as directed by the Engineer. Also for adjustment of any material retained on 4.75 mm sieve, AASHTO Method T-224 shall be used

Completed base course shall be maintained in an acceptable condition at all times until prime coat is applied. When base course is to carry traffic for an indefinite length of time before receiving surfacing, the contractor shall maintain the surface until final acceptance and shall prevent reveling by wetting, blading, rolling and addition of fines as may be required to keep the base tightly bound and leave a slight excess of material over the entire surface which must be removed and the surface finish restored before application of prime coat.

### **202.3.4      Moisture Content Determination**

Moisture content determination shall conform in all respects to the requirements specified under clause 201.3.5 for sub base.

### **202.3.5      Trial Sections**

Prior to commencement of aggregate base course operations, a trial section of two hundred (200) meters minimum, but not to exceed five hundred (500) meters shall be prepared by the contractor using same material and equipment as will be used at site to determine the adequacy of equipment, loose depth measurement necessary to result in the specified compacted layer depths, field moisture content, and relationship between the number of compaction passes and the resulting density of material. For details refer to clause 1.20 (General) of these specifications.

### **202.3.6      Tolerance**

The completed base course shall be tested for required thickness and smoothness before acceptance. Any area having waves, irregularities in excess of one (1) cm in three (3) M or two (2) cm in fifteen (15) M shall be corrected by scarifying the surface, adding approved material, reshaping, re-compacting and finishing as specified. Skin patching of an area without scarifying the surface to permit proper bonding of added material shall not be permitted. The allowable tolerances shall be according to the "Table for Allowable Tolerances" in these specifications.

### **202.3.7      Acceptance, Sampling and Testing**

Acceptance of sampling and testing with respect to materials and construction requirements shall be governed by the relevant, "Table for Sampling and Testing Frequency" or as approved by the Engineer.

## **202.4        MEASUREMENT AND PAYMENT**

### **202.4.1        Measurement**

The quantity of aggregate base to be paid for, shall be measured by the theoretical volume in place as shown on the drawings or as directed and approved for construction by the Engineer, placed and accepted in the completed crushed aggregate base course. No allowance will be given for materials placed outside the theoretical limits as shown on the cross sections.

### **202.4.2        Payment**

The accepted quantities measured as above shall be paid for at the contract unit price per cubic meter of aggregate base, for the item listed below and shown in the Bill of Quantities, which price and payment shall constitute full compensation for furnishing all materials, hauling, placing, watering, rolling, labour, equipment, tools and incidentals necessary to complete this item.

| <b>Pay Item<br/>No.</b> | <b>Description</b>    | <b>Unit of<br/>Measurement</b> |
|-------------------------|-----------------------|--------------------------------|
| 202                     | Aggregate Base Course | CM                             |

-----End of Section-----

## **ITEM 401: CONCRETE**

### **401.1 DESCRIPTION**

This work consists of furnishing placing, curing, finishing including transport of cement concrete made from approved type of Cement, water, fine and coarse aggregates all in accordance with the requirements in these specifications and conforming to the lines, grades, and typical sections shown on the Drawings or called for in the special Provisions and to the approval of the Engineer.

#### **401.1.1 Classes of Concrete**

The classes of concrete recognized in these specifications shall be designated: A,B,C,D1,D2,D3,Y and Lean Concrete. The Class of concrete to be used shall be as called for on the Drawings or as directed by the Engineer or specified in the Special Provisions. The following requirements shall govern unless otherwise shown on the Drawings.

Class A1 Concrete shall be used everywhere, for non-reinforced and reinforced concrete structures, except as noted below or directed by the Engineer. Concrete placed under water shall be Class A2 with a minimum cement content of three hundred fifty (350) kg per cubic meter of concrete with a slump between ten (10) and fifteen (15) cm. Concrete placed for piles shall be class A3 with a minimum cement content of four hundred (400) Kg per cubic meter.

Class B Concrete shall be used only where specified.

Class C Concrete shall be used for cribbing, or as otherwise directed by the Engineer or specified in the Special Provisions or on the Drawings.

Class D1,D2 or D3, concrete shall be used for pre-stressed and post-tensioned elements, as indicated on drawings.

Class Y concrete shall be used as a filler in steel grid bridge floors, in thin reinforced sections, or as otherwise specified in the Special Provisions.

Lean Concrete shall be used in thin layers underneath footings and when called for on the Drawings or directed by the Engineer.

The concrete of the various classes shall satisfy the requirements shown in Table 401-1

**TABLE 401-1**  
**Portland Cement Concrete Requirements**

| Class of Concrete | Min. Cement Kg/Cubic Meter | Max. Size of Coarse Aggregate (mm) | 28 days Compressive Strength (Min) (Cylinder) (Kg/Sq. cm.) | Consistency                       | Maximum Permissible Water - Cement Ratio |
|-------------------|----------------------------|------------------------------------|--|-----------------------------------|--|
|                   |                            |                                    |  | (Range in Slump)<br>Vibrated (mm) |  |

|                |     |    |     |         |      |
|----------------|-----|----|-----|---------|------|
| A <sub>1</sub> | 300 | 20 | 210 | 25-75   | 0.58 |
| A <sub>2</sub> | 350 | 25 | 245 | 100-150 | 0.58 |
| A <sub>3</sub> | 400 | 38 | 280 | 100-150 | 0.58 |
| B              | 250 | 51 | 170 | 25-75   | 0.65 |
| C              | 275 | 38 | 210 | 25-75   | 0.58 |
| D <sub>1</sub> | 450 | 25 | 350 | 50-100  | 0.40 |
| D <sub>2</sub> | 500 | 25 | 425 | 50-100  | 0.40 |
| D <sub>3</sub> | 550 | 25 | 500 | 50-100  | 0.40 |
| Y              | 400 | 13 | 210 | 25-75   | 0.58 |
| Lean Concrete  | 175 | 51 | 100 | —       | —    |

## 401.1.2 Types of Concrete Works

### Under Ground Concrete

Concrete poured below Natural Surface Level with or without shuttering and shoring.

### On Ground Concrete

Concrete poured by erecting formwork with necessary bracings on ground.

### Elevated Concrete

Concrete poured by erecting props, bracing and towers to support the formwork at higher levels.

## 401.2 MATERIAL REQUIREMENTS

### 401.2.1 Portland Cement

Cement remaining in bulk storage at the mill, prior to shipment, for more than six (6) months or cement stored in local storage by contractor for more than three (3) months after shipment from the factory may be retested before use and shall be rejected if it fails to meet any of the specification requirements.

Portland cement shall conform to the requirements of the Standard Specifications for Portland cement, AASHTO Designation M85 (ASTM Designation C150). The type of the cement to be used, unless otherwise shown on the Drawings, shall be type I.

Sampling of cement shall be in accordance with AASHTO Designation T-127.

Mill certificates shall accompany delivery of the material to the work.

Cement shall be delivered in sufficient quantities to ensure that there is no suspension of the work of concreting at any time. Different brand or different types of cement from the same mill, or the same brand or type from different mills shall not be mixed or used alternately in the same item of construction unless authorized by the Engineer, after preparing new mix design.

#### 401.2.2

#### Fine Aggregate

The fine aggregate shall consist of sand, stone screenings or other approved inert materials with similar characteristics, or a combination thereof, having clean, hard, strong, sound, durable, uncoated grains free from injurious amount of dust, lumps, soft or flaky particles, shale alkali, organic matter, material reactive with alkalis in the cement loam or other deleterious substances, and shall not contain more than three (3) percent of material passing the No.200 sieve by washing nor more than one percent of clay lumps or one (1) percent of shale. The use of beach sand is prohibited without the written consent of the Engineer.

For exposed work, the fine aggregate shall be free from any substance that will discolour the concrete surface.

The fine aggregate shall be uniformly graded and when tested in accordance with AASHTO Designation T-11 and T-27 shall meet the following grading requirements:

#### **GRADING OF FINE AGGREGATES**

| <b>Sieve Designation</b> | <b>Percentage Passing by Weight.</b> |
|--------------------------|--------------------------------------|
| 3/8 inch                 | 100                                  |
| No. 4                    | 95-100                               |
| No. 16                   | 45-85                                |
| No. 50                   | 10-30                                |
| No. 100                  | 2-10                                 |
| No. 200                  | 0-3                                  |

In case if fine aggregates fail under Fineness Modulus or Gradation however material passing No. 4 in combined aggregate, qualifies for these requirements, then the material can be accepted.

Fine aggregates shall be of such quality that mortar specimens, prepared with standard Portland cement and tested in accordance with AASHTO Designation T-71, shall develop a compressive strength at 7 days of not less than 90 percent of the strength developed by a mortar prepared in the same manner with the same cement and graded sand having a fineness modulus of 2.3 to 3.1. Natural aggregates if required shall be thoroughly and uniformly washed before use. Sand equivalent (T-176) shall be 75 min.

For the purpose of determining the degree of uniformity, a fineness modulus determination shall be made upon representative samples submitted by the Contractor from such sources as he proposes to use. Fine aggregate from any one source having a variation in fineness modulus of greater than 0.20 either way from the fineness modulus of mix design samples submitted by the Contractor may be rejected till new trial mixes are prepared and tested by the contractor.

Testing of the aggregate is specified under Item 401.3.9 of these specifications.

### 401.2.3 Coarse Aggregate

The coarse aggregate shall consist of crushed or broken stone, gravel or other approved inert materials with similar characteristics, or a combination thereof, having clean, hard, strong, sound, durable uncoated particles, free from injurious amount of soft, friable, thin elongated, or laminated pieces, alkali, organic or other deleterious matter and conforming to the requirements of these Specifications.

The coarse aggregate shall be of uniform grading with maximum sizes as required for the various classes of concrete as shown in Table 401-2 and when tested in accordance with AASHTO Designation T-11 & T-27 shall meet the following grading requirements.

**TABLE 401.2**  
**GRADING OF COURSE AGGREGATES**

| Designated<br>Sizes | Percentage by Weight Passing Laboratory Sieves<br>Having Square Openings, in Inches |        |        |        |        |        |       |       |
|---------------------|---|--------|--------|--------|--------|--------|-------|-------|
|                     | 2 1/2   | 2      | 1 1/2  | 1      | 3/4    | 1/2    | 3/8   | No. 4 |
| 1/2-in. to No. 4    | —   | —      | —      | —      | 100    | 90-100 | 40-70 | 0-15* |
| 3/4-in. to No. 4    | —   | —      | —      | 100    | 90-100 | —      | 20-55 | 0-10* |
| 1 -in. to No. 4     | —   | —      | 100    | 95-100 | —      | 25-60  | --    | 0-10* |
| 1 1/2 -in. to No. 4 | —   | 100    | 95-100 | —      | 35-70  | —      | 10-30 | 0-5   |
| 2 -in. to No. 4     | 100   | 95-100 | —      | 35-70  | —      | 10-30  | —     | 0-5   |
| 1 1/2-in. 3/4 -in.  | —   | 100    | 90-100 | 20-55  | 0-15   | —      | 0-5   | —     |
| 2 -in. to 1-in.     | 100   | 90-100 | 35-70  | 0-15   | —      | 0-5    | —     | —     |

\* Not more than five 5 percent shall pass No.8 sieve.

Coarse aggregate shall contain not more than one (1) percent by weight of material passing the No.200 sieve by washing and not more than five (5) percent of soft fragments.

It shall have an abrasion loss of not more than forty (40) percent at five hundred (500) revolutions, when tested in accordance with AASHTO T-96.

When tested in accordance with AASHTO T-104, for five cycle, the loss with the sodium sulphate soundness test shall be not more than 12 percent.

Natural aggregates shall be thoroughly washed before use. Testing of coarse aggregate is specified under Item 401.3.9 of these Specifications.

The aggregate shall be non-alkali/silica reactive where the concrete is to be poured under water or exposed to humid conditions. In case the Contractor proposes to use the aggregate having the alkaline/siliceous characteristics with the intention to use it with Blast Furnace Slag Cement, he will under take to carry out the job with out any extra cost and shall arrange to conduct the necessary tests as directed by the Engineer.

#### **401.2.4 Combined Aggregate**

The coarse and fine aggregate shall be combined in the proportions according to the approved trial mixes for each class of concrete.

#### **401.2.5 Rubble or Cyclopean Concrete**

Rubble or cyclopean concrete shall consist of tough, sound, and durable rock. The stone shall be free from coatings, seams, or flaws of any character. In general, the percentage of wear shall not exceed fifty (50) when tested in accordance with the Standard Method of Testing for Abrasion of Coarse Aggregate by the use of the "Los Angeles Machine", ASTM C535.

#### **401.2.6 Storage of Cement and Aggregates**

a) All cement shall be stored, immediately upon arrival on the site of the work, in weather-proof building, which will protect the cement from dampness. The floor shall be raised from the ground. The buildings shall be placed in locations approved by the Engineer. Provisions for storage shall be ample, and the shipments of cement as received shall be separately stored in such a manner as to provide easy access for identification and inspection of each shipment. Storage buildings shall have capacity of a sufficient quantity of cement for at least thirty (30) days use. Bulk cement, if used, shall be transferred to elevated air tight and weather-proof bins. However, if approved, sacked cement on small jobs may be stored in the open, upon a raised platform provided that ample waterproof covering is ensured. Stored cement shall meet the test requirements at any time after storage when retest is ordered by the Engineer. At the time of use all cement shall be free flowing and free of lumps. Cement bags shall be weighed at random to check for variation.

Copies of cement records shall be furnished to the Engineer showing such detail as, the quantity used during the day run or at each part of the work. Cement held in storage for a period of over sixty (60) days, or cement which, for any reason the Engineer may suspect of being damaged, shall be subject to a retest before being used in the work.

b) The handling and storing of concrete aggregates shall be such as to prevent segregation or the inclusion of foreign materials. The Engineer may require that aggregates be stored on separate platforms at satisfactory locations.

In order to secure greater uniformity of the concrete mix, the Engineer may require that the coarse aggregate be separated into two or more sizes. Different sizes of aggregate shall be stored in separate bins or in separate stock piles to prevent the material at the edges of the piles from becoming intermixed.



If aggregates are stored on the ground the bottom layer of aggregate shall not be disturbed or used without recleaning and as approved by the Engineer.

#### **401.2.7 Water**

The water for curing, for washing aggregates and for mixing shall be subject to the approval of the Engineer. It shall be free from oil and shall contain not more than one thousand (1,000) parts per million of chlorides nor more than one thousand three hundreds (1,300) parts per million of sulfates (SO<sub>4</sub>). In no case shall the water contain an amount of impurities that will cause a change in the setting time of Portland cement of more than twenty five (25) percent nor a reduction in the compressive strength of mortar at fourteen (14) days of more than five (5) percent when compared to the result obtained with distilled water.

In non-reinforced concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than two thousands (2,000) parts per million of chlorides nor more than one thousand five hundreds (1,500) parts per million of sulfates as SO<sub>4</sub>.

In addition to the above requirements, water for curing concrete shall not contain any impurities in a sufficient amount to cause discolouration of the concrete or produce etching of the surface.

When required by the Engineer, the quality of the mixing water shall be determined by the Standard Method of Test for Quality of Water to be used in concrete, AASHTO Methods of Sampling and Testing, Designation: T 26.

#### **401.2.8 Admixtures**

Admixtures shall only be allowed to be used with written permission from the Engineer. If air-entraining agents, water reducing agents, set retarders or strength accelerators are permitted to be used, they shall not be used in greater dosages than those recommended by the manufacturer, or permitted by the Engineer, and shall conform to the requirements for each of the agents specified by the manufacturer.

### **401.3 CONSTRUCTION REQUIREMENTS**

The manufacturing, transport, handling and placing of concrete shall conform with the requirements given hereinafter.

Unless otherwise specified, ordinary Portland cement shall be used for all types of concrete. When sulphate resisting cement or other type of cement is required, it will be specified on the Drawings/or in BOQ or ordered by the Engineer.

#### **401.3.1 Proportioning of Concrete**

All concrete shall be proportioned by weighing, except as specified herein. The proportions by weight of cement, fine aggregates, coarse aggregates and water necessary to produce concrete of the required strength and consistency shall be approved by the Engineer. Such approval may be withdrawn at any time, and

changes in the proportions may be required for the purpose of required workability, density, impermeability, durability and strength.

Based on the approved mix proportions, the Contractor shall prepare lists showing the number of kilograms of the various material to be used in the batch size adopted. The required consistency shall also be shown. Such lists are subject to approval by the Engineer, and shall be posted at the mixer. The amount of water in the mix is the total amount of free water, including the free water held by the aggregates.

No concrete shall be placed in the works until the results of the twenty eight (28) days test indicate that the design proportions are satisfactory as per requirements under Item 401.3.10 "Testing of Compressive Strength". Adjustment of the proportions shall be subject to the following provisions:

- a) Adjustment for variation in workability - If it is found impossible to obtain concrete of the desired workability with the proportions originally approved, the Engineer shall make such changes as are necessary.
- b) Adjustment for new materials - No change in the source or character of the material shall be made without due notice to the Engineer and no new materials shall be used until the Engineer has accepted such materials and has approved new proportions based on trial mixes.

The Contractor's attention is drawn to the time required to prepare and test trial batches and the Contractor shall be responsible for production of trial batches at a sufficiently early date so that the progress of the work is not delayed.

#### **401.3.2 Consistency**

Concrete shall have a consistency such that it will be workable in the required position. It shall be of such a consistency that it will flow around reinforcement steel but individual particles of the coarse aggregate when isolated shall show a coating of mortar containing its proportionate amount of sand. The consistency of concrete shall be determined to be as dry as it is practicable to satisfy the requirements for transportation and placing of the concrete as described hereinafter.

Consistency of concrete shall be determined as specified in AASHTO T-119. The Consistency of concrete at the time of delivery shall be as shown in Table 401.1 or as designated by the Engineer.

#### **401.3.3 Mixing Concrete**

##### **a. Mixing General**

The concrete shall be mixed only in the quantity required for immediate use. Concrete that has developed an initial set shall be rejected.

Concrete shall be thoroughly mixed in a mixer of an approved size and type that will ensure a uniform distribution of the materials throughout the mass.

All concrete shall be mixed in mechanically operated mixers. Mixing plant and equipment for transporting and placing concrete should be arranged with an ample auxiliary installation to provide a minimum supply of concrete in case of breakdown of machinery or in case the normal supply of concrete should be disrupted. The auxiliary supply of concrete shall be sufficient to complete the casting of a section up to a construction joint .

Equipment having components made of aluminum or magnesium alloys, which would have contacted with plastic concrete during mixing, transporting or pumping of Portland cement concrete, shall not be used.

Concrete mixers shall be equipped with adequate water storage and a device for accurately measuring and automatically controlling the quantity of water used.

Materials shall be measured by weighing, except as otherwise specified or where other methods are specifically authorized by the Engineer. The apparatus provided for weighing the aggregates and cement shall ensure accurate measurement of each ingredient.

The accuracy of all weighing devices except that for water shall be such that successive quantities can be measured to within one (1) percent of the desired value. Cement in standard packages (bags) approved by the Engineer need not be weighed. The water measuring device shall be accurate to plus or minus half percent  $\pm 0.50\%$ . All measuring devices shall be subject to the approval of the Engineer. Scales and measuring devices shall be tested at the expense of the Contractor as frequently as the Engineer may deem necessary to ensure their accuracy.

Weighing equipment shall be isolated so that vibration or movement of other operating equipment do not effect the accuracy of reading. When the entire plant is running, the scale reading at cut-off shall not vary from the weight designated by the Engineer more than one (1) percent for cement, one and half (1.1/2) percent for any size of aggregate, or one (1) percent for the total aggregates in any batch.

Where volumetric measurements are authorized by the Engineer, the weight proportions shall be converted to equivalent volumetric proportions. In such cases, suitable allowances shall be made for variations in the moisture condition of the aggregates, including the bulking effect in the fine aggregates. Boxes or similar containers of the exact volume required shall be filled and struck off. Measurement by wheel barrow volumes will not be permitted.

**b. Mixing at Site**

Concrete mixers may be of the revolving drum or the revolving blade type

and the mixing drum or blades shall be operated uniformly at the mixing speed recommended by the manufacturer. The pick-up and throw-over blades of mixer shall be restored or replaced when any part or sections is worn two and half (2.5) cms. or below than the original height of the manufacturer's design. Mixers and agitators, which have an accumulation of hard concrete or mortar, shall not be used.

When bulk cement is used and volume of the batch is one cubic meter or more, the scale and weigh hopper for Portland cement shall be separate and distinct from the aggregate hopper or hoppers. The discharge mechanism of bulk cement weigh hopper shall be interlocked against opening before the full amount of cement is in the hopper. The discharging mechanism shall also be interlocked against opening when the amount of cement in the hopper is underweight by more than one percent or overweight by more than three (3) percent of the amount specified.

When the aggregates contain more water than the quantity necessary to produce a saturated surface-dry condition, representative samples shall be taken and the moisture content determined for each kind of aggregate.

The temperature of mixed concrete, immediately before placing, shall be not more than thirty two (32) degree C. Aggregates and water shall be cooled as necessary to produce concrete within this temperatures limit. If ice is used to cool the concrete, discharge of the mixer will not be permitted until all ice is melted.

The batch shall be so charged into the mixer that some water will enter in advance of cement and aggregates. All water shall be in the drum by the end of the first quarter of the specified mixing time.

Cement shall be batched and charged into the mixer by means that will not result in loss due to the effect of wind, or in accumulation of cement on surfaces of conveyors or hoppers, or in other conditions which reduce or vary the required quantity of cement in the concrete mixture.

The entire contents of a batch mixer shall be removed from the drum before materials for a succeeding batch are placed therein. The materials composing a batch except water shall be deposited simultaneously into the mixer.

All concrete shall be mixed for a period of not less than one and half (1.1/2) minutes after all materials, including water, are in the mixer. During the period of mixing, the mixer shall operate at the speed for which it has been designed.

Mixers shall be operated with an automatic timing device that can be locked by the Engineer. The time device and discharge mechanism shall be so interlocked that during normal operation no part of the batch will be discharged until the specified mixing time has elapsed. In case of failure of the timing device, the Contractor will be permitted to operate while it is being

repaired, provided he furnishes an approved timepiece equipped with minute and second hands. If the timing device is not repaired within twenty four (24) hours, further use of the mixer will be prohibited until repairs are made.

The first batch of concrete material placed in the mixer shall contain cement, sand, and water in excess to the requirement of mix, to ensure that the drum does not extract mortar from the mix changing its design characteristics. When mixing is to stop for a period of one hour or more, the mixer shall be thoroughly cleaned.

**c. Plant Mixing**

At central mixing plant, batches shall be discharged from the weighing hopper into the mixer either directly by gravity or by an elevating container large enough to contain the batch. The plant shall be arranged to ensure that there is no loss of cement during transfer from weighing hopper to the mixer drum. The mixing time shall neither be less than fifty (50) second, nor more than ninety (90) seconds.

The plastisizer, accelerator or retarder or water reducing admixture, if required, shall be fed separately at the rate recommended by the manufacture, or as established by laboratory trials.

**d. Transit Mixing**

Truck mixers, unless otherwise authorized by the Engineer, shall be of the revolving drum type, watertight, and so constructed that the concrete can be mixed to ensure a uniform distribution of materials throughout the mass. All solid materials for the concrete shall be accurately measured and charged into the drum at the proportioning plant. The truck mixer shall be equipped with a device by which the quantity of water added can be readily verified. The mixing water may be added directly to the batch, in case the concrete batch is poured within twenty five (25) minutes of adding water.

The maximum size of batch in truck mixers shall not exceed the maximum rated capacity of the mixer as stated by the manufacturer, and stamped in metal on the mixer. Truck mixing shall be continued for not less than fifty (50) revolutions after all ingredients, including water, are in the drum. The mixing speed shall not be less than six (6) rpm, nor more than ten (10) rpm.

Mixing shall begin within thirty (30) minutes after the cement has been added either to the water or aggregate, but when cement is charged into a mixer drum containing water or surface-wet aggregate and when the temperature is above thirty two (32) degree C, this limit shall be reduced to fifteen (15) minutes. The limitation in time between the introduction of the cement to the aggregate and the beginning of the mixing may be waived when, in the judgment of the Engineer, the aggregate is sufficiently free from moisture, so that there will be no harmful effects on the cement.

e. **Partial Mixing at the Central Plant**

When a truck mixer, or an agitator provided with adequate mixing blades, is used for transportation, the mixing time at the stationary plant mixer may be reduced to thirty (30) seconds and the mixing completed in a truck mixer/agitator. The mixing time in the truck mixer or agitator equipped with adequate mixing blades shall be as specified for truck mixing.

f. **Stiff Concrete Mix**

For mixing concrete of zero slump to be laid by pavers, gravity mixer shall not be used. Only force mixer of moving blades shall be allowed to ensure homogenous mix.

g. **Hand Mixing**

Hand mixing of materials shall not be allowed in any case.

**401.3.4 Hauling and Delivery of Mixed Concrete**

a. **Hauling**

Mixed concrete may be transported to the delivery point in truck agitators or truck mixers operating at the speed designated by the manufacturer, provided the consistency and workability of the mixed concrete upon discharge at the delivery point is suitable for adequate placement and consolidation in place.

Truck agitators shall be loaded not to exceed the manufacturer's rated capacity. They shall maintain the mixed concrete in a thoroughly mixed and uniform mass during hauling.

Bodies of non-agitating hauling equipment shall be so constructed that leakage of the concrete mix, or any part thereof, will not occur at any time, and they shall be self-cleaning during discharge.

For zero slump concrete to be laid by paver, concrete will be allowed to be hauled in open trucks. However concrete hauled in open-top vehicles shall be protected during hauling against rain, or exposure to the sun for more than twenty (20) minutes when the ambient temperature exceeds twenty five (25) degree C.

No additional water shall be incorporated into the concrete during hauling or after arrival at the delivery point.

The rate of discharge of mixed concrete from truck mixer agitators shall be controlled by the speed of rotation of the drum in the discharge direction with the discharge gate fully open.

When a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be completed within one hour, or before two

hundred fifty (250) revolutions of the drum or blades, whichever comes first, after the introduction of cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is thirty (30) degree C or above, a time less than one hour will be required except when retarder is used in which case it shall be one (1) hour.

When non-agitating hauling equipment is used for transporting concrete to the delivery point, discharge shall be completed within one hour after the addition of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is thirty (30) degree C or above, the time between the introduction of cement to the aggregates and discharge shall not exceed forty five (45) minutes.

**b. Delivery**

The organization supplying concrete shall have sufficient plant capacity and transportation vehicles to ensure continuous delivery at the rate required. The rate of the delivery of concrete during concreting operations shall be such as to provide for the proper handling, placing, and finishing of the concrete. The rate shall be such that the interval between batches shall not exceed twenty (20) minutes. The methods of delivering and handling the concrete shall be such as will facilitate placing with the minimum rehandling and without damage to the structure of the concrete.

**c. Retempering**

The concrete shall be mixed only in such quantities as are required for immediate use and any concrete that has developed initial set shall not be used. Concrete that has partially hardened shall not be retempered or remixed.

**401.3.5 Handling and Placing Concrete**

**a. General**

In preparation for the placing of concrete all sawdust, chips and other construction debris and extraneous matter shall be removed from inside the formwork, and struts, stays and braces serving temporarily to hold the forms in correct shape and alignment, pending the placing of concrete at their locations, shall be removed when the concrete placing has reached an elevation rendering their services unnecessary. These temporary members shall be entirely removed from the forms and not buried in the concrete.

No concrete shall be used that does not reach its final position in the forms within the time stipulated above under Item 401.3.4 "Hauling and Delivery of Mixed Concrete".

Concrete shall be placed so as to avoid segregation of the materials and the displacement of the reinforcement. The use of long troughs, chutes, and pipes for conveying concrete to the forms shall be permitted only on written

authorization of the Engineer. In any case the Engineer will reject the use of equipment for concrete transportation that will allow segregation, loss of fines, or in any other way will have a deteriorating effect on the concrete quality.

Open troughs and chutes shall be of metal or metal lined; where steep slopes are required, the chutes shall be equipped with baffles or be in short lengths that reverse the direction of movement.

All chutes, troughs and pipes shall be kept clean and free from coatings of hardened concrete by thoroughly flushing with water after each run; water used for flushing shall be discharged clear off the structure.

When placing operations would involve dropping the concrete more than one and half (1.1/2) meters, it shall be conveyed through sheet metal or other approved pipes. As far as practicable, the pipe shall be kept buried in the newly placed concrete. After initial set of the concrete the forms shall not be jarred and no loading of any kind shall be placed on the ends of projecting reinforcement bars.

The concrete shall be placed as nearly as possible to its final position and the use of vibrators for extensive shifting of the mass of fresh concrete will not be permitted.

**b. Pneumatic Placing**

Pneumatic placing of concrete will be permitted only if authorized by the Engineer. The equipment shall be so arranged that no vibration will occur that might damage freshly placed concrete.

Where concrete is conveyed and placed by pneumatic means, the equipment shall be suitable in kind and adequate in capacity for the work. The machine shall be located as close as practicable to the work. The discharge lines shall be horizontal or inclined upwards from the machine.

At the conclusion of placing the concrete, the entire equipment shall be thoroughly cleaned.

**c. Pumping**

The placing of concrete by pumping will be permitted only if specified in the Special Provisions or if authorized by the Engineer. The equipment shall be so arranged that no vibration will occur that might damage freshly placed concrete.

Where concrete is conveyed and placed by mechanically applied pressure the equipment shall be suitable in kind and adequate in capacity for the work. The operation of the pump shall be such that a continuous stream of concrete without air pockets is obtained. When pumping is completed, the concrete remaining in the pipeline, if it is to be used, shall be ejected in such a manner



that there will be no contamination of the concrete or separation of the ingredients. After this operation, the entire equipment shall be thoroughly cleaned.

**d. Placing Concrete Under Water**

Concrete shall not be placed under water except where inevitable in which case approval must be sought from the Engineer and the work carried out under his immediate supervision. In this case the method of placing shall be as hereinafter specified.

Concrete deposited under water shall be class A concrete with a minimum cement content of three hundred fifty (350) Kg per cubic meter of concrete.

The slump of concrete shall be maintained between ten (10) and fifteen (15) cm. To prevent segregation, it shall be carefully placed in a compact mass, in its final position, by means of a tremie, a bottom-dump bucket, or other approved means, and it shall not be disturbed after being placed. Water must not be allowed to flow past the fresh concrete surface.

A tremie shall consist of a tube having a diameter of not less than 25 cm constructed in sections having flanged couplings fitted with gaskets with a hopper at the top. The tremie shall be supported so as to permit free movement of the discharge end over the entire top surface of the work and so as to permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end shall be closed at the start of work so as to prevent water entering the tube and shall be completely submerged in concrete at all times; the tremie tube shall be kept full to the bottom of the hopper. When a batch is dumped into the hopper, the flow of concrete shall be induced by slightly raising the discharge end, but always keeping it in the placed concrete. The flow shall be continuous until the work is completed.

When the concrete is placed with a bottom-dump bucket, the top of the bucket shall be open. The bottom doors shall open freely downward and outward when tripped. The bucket shall be completely filled and slowly lowered to avoid backwash. It shall not be dumped until it rests on the surface upon which the concrete is to be deposited and when discharged shall be withdrawn slowly until well above the concrete.

Dewatering may proceed when the concrete seal is sufficiently hard and strong. All laitance or other unsatisfactory material shall be removed from the exposed surface by scraping, chipping or other means, which will not injure the surface of the concrete.

**e. Compaction**

Concrete, during and immediately after placing shall be thoroughly compacted, except lean concrete under footings and concrete deposited under water. Concrete in walls, beams, columns, etc. shall be placed in horizontal layers not more than thirty (30) centimeters thick except as hereinafter

provided. When less than a complete layer is placed in one operation, it shall be terminated in a vertical bulkhead. Each layer shall be placed and compacted before the preceding layer has taken initial set to prevent injury to the green concrete and avoid surfaces of separation between the layers. Each layer shall be compacted so as to avoid the formation of a construction joint with a preceding layer, which has not taken an initial set.

The compaction shall be done by mechanical vibration. The concrete shall be vibrated internally unless special authorization of other methods is given by the Engineer or is provided herein. Vibrators shall be of a type, design, and frequency approved by the Engineer. The intensity of vibration shall be such as visibly to affect a mass of concrete with a 3 cm slump over a radius of at least half a meter. The Contractor shall provide a sufficient number of vibrators to properly compact each batch immediately after it is placed in the forms. Vibrators shall be manipulated so as to thoroughly work the concrete around the reinforcement and embedded fixtures and into the corners and angles of the forms and shall be applied at the point of placing and in the area of freshly placed concrete. The vibrators shall be inserted into and withdrawn from the concrete slowly. The vibration shall be of sufficient duration and intensity to compact the concrete thoroughly but shall not be continued at any one point to the extent that localized areas of grout are formed. Application of vibrators shall be at points uniformly spaced and not farther apart than twice the radius over which the vibration is visibly effective. Vibration shall not be applied directly to the reinforcement or to sections or layers of concrete that have hardened to the degree that the concrete ceases to be plastic under vibration. It shall not be used to make concrete flow in the forms over distances so great as to cause segregation and vibrators shall not be used to transport concrete neither in the forms nor in troughs or chutes.

Vibration shall be supplemented by such external vibrator as is necessary to ensure smooth surfaces and dense concrete along form surfaces and in corners and locations impossible to reach with the normal vibrators.

#### **401.3.6 Casting Sections and Construction Joints**

##### **a. General**

The concrete in each integral part of a structure shall be placed continuously, and the Contractor will not be allowed to commence work on any such part unless sufficiently inspected and approved material for the concrete is at hand, and manpower and equipment are sufficient to complete the part without interruption in the placing of the concrete.

Construction joints shall be allowed only where specified on the plans or otherwise approved. If not detailed on the plans, or in the case of emergency, construction joints shall be placed as directed. Shear keys or inclined reinforcement shall be used where necessary to transmit shear or bond the two sections together. When shear keys or inclined reinforcement are not provided, the concrete shall be roughened as directed. Joints in the concrete

due to discontinuity of work shall be avoided as far as possible. Such joints, when necessary, shall be constructed to meet the approval of the Engineer.

When the placing of concrete is temporarily discontinued, the concrete after becoming firm enough to retain its shape, shall be cleaned of laitance and other objectionable material to a sufficient depth to expose sound concrete. Where a "feathered edge" might be produced at a construction joint, as in the sloped top surface of a wing wall, an inset formwork shall be used to produce an edge thickness of not less than 15 centimeters in the succeeding layer. Work shall not be discontinued within fifty (50) centimeters of the top of any face, unless provision has been made for a coping less than 50 centimeters thick, in which case, if permitted by the Engineer, the construction joint may be made at the underside of coping.

Immediately following the discontinuance of placing concrete all accumulations of mortar splashed upon the reinforcing steel and the surfaces of forms shall be removed. Dried mortar chips and dust shall not be puddled into the unset concrete. Care shall be exercised, during the cleaning of the reinforcing steel, not to injure or break the concrete steel bond near the surface of the concrete.

**b. Slab Culverts**

In general, the lean concrete below the foundation shall be placed and allowed to set before the reinforced concrete is started.

After the construction of masonry abutment walls, as specified in Special Provisions, the concrete bed plate and curtain walls shall be constructed monolithically. Construction joints in wing walls where unavoidable shall be horizontal and so located that no joint will be visible in the exposed face of the wing wall above the ground line.

**c. Box Culverts**

Vertical construction joints shall be at right angles to the axis of the culvert.

In general, the base slab or footings of box culverts shall be placed and allowed to set before the remainder of the culvert is constructed. In this case, suitable provision shall be made for bonding the sidewalls to the culvert base, preferably by means of raised longitudinal keys so constructed as to prevent, as far as possible, the percolation of water through the construction joint.

In the construction of box culverts one and quarter (1.1/4) meters or less in height, the sidewalls and top slab may be constructed as a monolithic unit. When this method of construction is used, necessary construction joints shall be vertical and at right angles to the axis of the culvert.

In the construction of box culverts more than one and quarter (1.1/4) meters in height the concrete in the walls shall be placed and allowed to set before the top slab is placed. In this case, appropriate keys shall be left in the sidewalls

for anchoring the cover slab.

If possible, each wingwall shall be constructed as a monolithic unit. Construction joints, where unavoidable, shall be horizontal and so located that no joint will be visible in the exposed face of the wingwall above the ground line.

**d. Girders, Slabs, and Columns**

For simple spans, concrete shall preferably be deposited by beginning at the center of the span and working from the center toward the ends. Concrete in girders shall be deposited uniformly for the full length of the girder and brought up evenly in horizontal layers. For continuous spans, where required by design considerations, the concrete placing sequence shall be shown on the plans or in the Special Provisions.

Concrete in girder haunches less than one (1) meter in height shall be placed at the same time as that in the girder stem, and the column or abutment tops shall be cut back to form seats for the haunches. Whenever any haunch or fillet has a vertical height of one (1) meter or more, the abutment or columns, the haunch, and the girder shall be placed in three successive stages; first, to lower side of haunch; second, to the lower side of the girder; and third to completion.

For haunched continuous girders, the girder stem (including haunch) shall be placed to the top of stem. Where the size of the pour is such that it cannot be made in one continuous operation, vertical construction joints shall preferably be located within the area of contraflexure.

Concrete in slab spans shall be placed in one continuous operation for each span unless otherwise provided. The floors and girders of through girder superstructures shall be placed in one continuous operation unless otherwise specified, in which case a special shear anchorage shall be provided to ensure monolithic action between girder and floor.

Concrete in T-beam or deck girder spans may be placed on one continuous operation or may be placed in two separate operations; each of which shall be continuous; first, to the top of the girder stems and second, to completion. In the latter case, the bond between stem and slab shall be provided by suitable shear keys or by artificially roughening the surface of the top of the girder stem. In general, suitable keys may be formed by the use of timber blocks approximately five (5) by ten (10) cm in cross-section and having a length of ten (10) cms less than the width of the girder stem. These key blocks shall be spaced along the girder stems as required, but the spacing shall be not greater than thirty (30) cms center to center. The blocks shall be removed as soon as the concrete has set sufficient to retain its shape.

Concrete in box girders may be placed in two or three separate operations. In either case the bottom slab shall be placed first. Bond between the bottom

slab and stem shall be positive and mechanical. If the webs are placed separately from the top slab, bond between the top slab and webs shall be secured in the same manner as for T-beams. Requirements for shear keys for T-beams shall also apply to box girders, except that keys need not be deeper than the depth to the top of bottom slab reinforcement.

Concrete in columns shall be placed in one continuous operation, unless otherwise directed. The concrete shall be allowed to set at least 24 hours before the caps are placed.

When friction collars are used to support cap forms, the concrete of columns shall have been poured at least seven (7) days earlier.

Unless otherwise permitted, no concrete shall be placed in the superstructure until the column forms have been stripped sufficiently to determine the character of the concrete in the columns. The load of the superstructure shall not be allowed to come upon the bents until the test cylinders representing the bents have obtained the minimum compressive strength but in no case in less than seven (7) days.

**e. Construction Joints**

Construction joints shall be made only where shown on the Drawings or called for in the pouring schedule, unless otherwise approved by the Engineer. If not detailed on the Drawings, construction joints, also in cases of emergency shall be placed to meet the approval of the Engineer. Shear keys or reinforcement shall be used, unless otherwise specified, to transmit shear or to bond the two sections together.

Before depositing new concrete on or against concrete, which has hardened, the forms shall be re-tightened. The surface of the hardened concrete shall be roughened as required by the Engineer, in a manner that will not leave loose particles of aggregate or damage concrete at the surface. It shall be thoroughly cleaned of foreign matter and laitance. When directed by the Engineer, the surface of the hardened concrete which will be in contact with new concrete shall be washed with water to ensure an excess of mortar at the juncture of the hardened and the newly deposited concrete, the cleaned and watered surfaces, including vertical and inclined surface, shall first be thoroughly covered with a coating of mortar of the same proportion of sand and cement as the class of concrete used against which the new concrete shall be placed before the grout or mortar has attained its final set.

The placing of concrete shall be carried out continuously from joint to joint. The face edges of all joints, which are exposed, to view shall be carefully finished true to line and elevation.

**f. Rubble or Cyclopean Concrete**

Rubble or cyclopean concrete shall consist of Class B concrete containing large embedded stones. The stone for this class of work shall be placed carefully so as to avoid damage to the forms or to the partially set adjacent concrete. Stratified stone shall be placed upon its natural bed. Stone shall be washed and saturated with water before placing.

The total volume of the stone shall not be greater than one third of the total volume of the portion of the work in which it is placed. For walls of piers greater than sixty (60) cms in thickness, stone of such size that one man can handle it, shall be used. Each stone shall be surrounded by at least fifteen (15) cms of concrete and no stone shall be closer than thirty (30) cms to any top surface nor any closer than fifteen (15) cms to any coping. For walls or piers greater than one (1) meter in thickness, larger stone (50 Kg or more) may be used. Each stone shall be surrounded by at least thirty (30) cms of concrete, and no stone shall be closer than sixty (60) cms to any top surface nor closer than twenty (20) cms to any coping.

**g. Concrete Exposed to Sea Water**

Unless otherwise specifically provided, concrete for structures exposed to sea water shall be Class A. The clear distance from the face of the concrete to the nearest face of reinforcement steel shall be not less than 10 cms. The concrete shall be mixed for a period of not less than 2 minutes and the water content of the mixture shall be carefully controlled and regulated so as to produce concrete of maximum impermeability. The concrete shall be thoroughly compacted and air pockets shall be avoided. No construction joints shall be formed between levels of extreme low water and extreme high water as determined by the Engineer. Between these levels sea water shall not come in contact with the concrete for a period of not less than thirty (30) days. The original surface, as the concrete comes from the forms, shall be left undisturbed.

**h. Concrete Exposed to Alkali Soils or Alkali Water**

Where Concrete may be exposed to the action of alkaline water or soils, special care shall be taken to place it in accordance with specifications herein. Wherever possible, placing shall be continuous until completion of the section or until the concrete is at least fifty (50) cms, above ground or water level. Alkaline water or soils shall not be in contact with the concrete during placement and for a period of at least seventy two (72) hours thereafter.

**i. Protection of Concrete from Environmental Conditions**

**1. General**

Precautions shall be taken as needed to protect concrete from damage due to weather or other environmental conditions during placing and curing operations.

Any concrete placed during hot weather or during cold weather shall be at the Contractor's risk and any damaged concrete shall be removed and replaced at the Contractor's expense.

## **ii. Rain Protection**

Under conditions of rain, the placing of concrete shall not commence or shall be stopped unless adequate protection is provided to prevent damage to the surface mortar or damaging flow or wash of the concrete surface.

## **iii. Work in Hot Weather**

The temperature of concrete shall not exceed thirty two (32) degree C at the time of laying, unless the Contractor incorporates in the mix a plasticiser, of a make and in proportion which he has shown by laboratory tests and full scale trial to be satisfactory, to eliminate detrimental effects of high temperature without introducing any other detrimental effect on quality.

The following may be used to keep the temperature of concrete below the above limitations:

- i) Chilling of concrete water by heat exchange coils or by addition of broken ice, provided that the water shall be free from ice at the time of entry into the mixer.
- ii) Cooling of coarse aggregate by watering, provided that the water content of the aggregate so cooled shall be uniform.
- iii) Reclaiming of aggregate from stock piles by the tunnel method to avoid using the surface layer of the stockpile with shade and wind protection of conveyor elevating to batching plant.
- iv) Night work provided that (i), (ii) and (iii) are proved inadequate or unsatisfactory in their results and providing also that the Engineer has no other reason for refusing permission for night work.

The Engineer shall have power to order the suspension of concrete production in case of not taking precautionary measures by the Contractor as mentioned above. Under no circumstances will the Contractor be entitled to receive any additional payment for complying with the requirements of this clause.

## **iv. Work in Cold Weather**

Except by written approval of the Engineer, concreting operations shall not be continued when a descending air temperature in the shade and away from artificial heat falls below five (5) degree C, nor resumed until an ascending air temperature in the shade and away from artificial heat reaches two (2) degree C. In such cases, the mixing water and/or aggregates shall be heated to not

less than twenty one (21) degree C nor more than sixty six (66) degree C, prior to being placed in the mixer by an approved type of heating device so that the temperature of the concrete shall not be less than ten (10) degree C, nor more than twenty seven (27) degree C, at the time of placing. No materials containing frost shall be used. Cement or fine aggregates containing lumps or crusts of hardened materials shall not be used.

#### **401.3.7 Concrete Surface Finishing/Rendering**

##### **a. General**

Concrete surface finishes shall be classified as follows:

Bridge Deck Surface Finish

Sidewalk Surface Finish

Ordinary Surface Form Finish

Class 1 Surface Form Finish

The bridge deck surface finish shall be given to the surface of the bottom slabs of all box type underpass structures.

The requirements for sidewalk surface finish apply to the surface of the bottom slabs in box culverts, except that the acceptable variation from a three-meter straightedge shall be 10 mm, and brooming shall be omitted.

The ordinary surface form finish shall be the final finish applied to all surfaces after removal of forms, unless otherwise specified or called for on the drawings.

The Class 1 surface form finish shall be applied only where specified, or as required by the Engineer when the ordinary surface finish did not produce the required smooth, even surface of uniform texture and appearances.

##### **b. Bridge Deck Surface Finish**

A smooth riding surface of uniform texture, true to the required grade and cross-section, shall be obtained on all bridge roadway decks. The Contractor may use hand tools, or finishing machines or a combination of both, conforming to the requirements specified herein for finishing bridge roadway deck concrete.

Finishing of concrete placed in bridge decks shall consist essentially of compacting and striking off the surface of the concrete as placed and floating with longitudinal floats the surface so struck off.

The placing of concrete in bridge roadway decks will not be permitted until the Engineer is satisfied that the rate of producing concrete will be sufficient



to complete the proposed placing and finishing operations within the schedule time, that experienced finishing machine operators and concrete finishers are employed to finish the deck, that fogging equipment and all necessary finishing tools and equipment are on hand at the site of the work and in satisfactory condition for use. Finishing machines shall be set up sufficiently in advance of use to permit inspection by the Engineer during the daylight hours before each pour.

The adjustment and operation of deck finishing machines shall be verified by moving the machine over the full length of the deck section to be placed and traversing the float completely across all end bulkheads before placement of concrete is begun.

Unless adequate lighting facilities are provided by the Contractor, the placing of concrete in bridge decks shall cease at such time that finishing operations can be completed during daylight hours.

Rails for the support and operation of finishing machines and headers for hand-operated strick-off devices shall be completely in place and firmly secured for the scheduled length for concrete placement before placing of concrete. Rails for finishing machines shall extend beyond both ends of the scheduled length for concrete placement to a sufficient distance that will permit the float of the finishing machine to fully clear the concrete to be placed. Rails or headers shall be adjustable for elevation and shall be set to elevations, with allowance for anticipated settlement, camber, and deflection of false work, as required to obtain a bridge roadway deck true to the required grade and cross-section. Rails or headers shall be of a type and shall be so installed that no springing or deflection will occur under the weight of the finishing equipment and shall be so located that finishing equipment may operate without interruption over the entire bridge roadway deck to be finished.

Rails or headers shall be adjusted as necessary to correct for unanticipated settlement or deflection, which may occur during finishing operations.

Should settlement or other unanticipated events occur, which in the opinion of the Engineer would prevent pouring of bridge deck conforming to the requirements of these specifications, placing of deck concrete shall be discontinued until corrective measures satisfactory to the Engineer are provided. In the event satisfactory measures are not provided prior to initial set of the concrete in the effected area, the placing of concrete shall be discontinued and a bulkhead installed at a location determined by the Engineer. All concrete in place beyond the bulkhead shall be removed.

Unless otherwise permitted by the Engineer, bridge deck concrete shall be placed in a uniform heading approximately parallel to the bridge pier or bent caps. The rate of placing concrete shall be limited to that which can be finished before the beginning of initial set except that concrete for the deck surface shall not be placed more than three (3) meters ahead of strick off.

After the concrete has been placed, compacted, and consolidated, the surface of the concrete shall be carefully struck off by means of a hand-operated strick board operating on headers, or by a finishing machine operating on rails. A uniform deck surface true to the required grade and cross-section shall be obtained.

Following strike off, the surface of the concrete shall be floated longitudinally. In the event strike-off is performed by means of a hand-operated strike board, two (2) separate hand-operated float boards for longitudinal floating shall be provided. The first float shall be placed in operation as soon as the condition of the concrete will permit and the second float shall be operated as far back of the first float as the workability of the concrete will permit.

In the event the strike off is performed with a finishing machine, longitudinal floating of the concrete shall be performed by means of a hand-operated float board or a finishing machine equipped with a longitudinal wooden float. The longitudinal wooden float on the finishing machine shall have a length of not less than two and half (2.5) meters nor more than three and half (3.5) meters. When both strike off and longitudinal floating are to be performed by finishing machines, one machine, with operator, shall be used for strike off and a second machine, with a second operator, shall be used for longitudinal floating. Longitudinal floating may be performed with the same finishing machine that is used for strike off provided that the length of deck unit being placed is not more than 10 meters and the strike off operation is completed for said deck unit before the condition of the concrete requires that longitudinal floating be started.

Finishing machines used for strike off having a wheel base 1.8 meters or less shall be followed by 2 separate hand-operated float boards for longitudinal floating. All the provisions in this Item pertaining to hand-operated float boards shall apply to the 2 separate float boards for longitudinal floating.

Longitudinal floats, either hand-operated or machine-operated, shall be used with the long axis of the float parallel to the center line of the bridge roadway. The float shall be operated with a combined longitudinal and transverse motion planing off the high areas and floating the material removed into the low areas. Each pass of the float shall lap the previous pass by one-half the length of the float. Floating shall be continued until a smooth riding surface is obtained.

In advance of curing operations, the surface of the concrete shall be textured by brooming with a stiff bristled broom or by other suitable devices, which will result in uniform scouring. The operation shall be performed at a time and in a manner to produce a hardened surface having a uniform texture.

Hand-operated float boards shall be from three and half (3.5) to five (5) meters long, ribbed and trussed as necessary to provide a rigid float and shall be equipped with an adjustable handle at each end. The float shall be wood,

not less than two and half (2.5) cms thick and from ten (10) cm to twenty (20) cm wide. Adjusting screws spaced as not to exceed 60 cms on centers shall be provided between the float and the rib. The float board shall be maintained free of twist and true at all times.

Hand-operated float boards shall be operated from transverse finishing bridges. The finishing bridges shall span completely the roadway area being floated & a sufficient number of finishing bridges shall be provided to permit operation of the floats without undue delay. Not less than two (2) transverse finishing bridges shall be provided when hand-operated float boards are used. When a finishing machine is used for longitudinal floating, one finishing bridge equivalent to the transverse finishing bridge specified herein shall be furnished for use by the Engineer.

All finishing bridges shall be of rigid construction and shall be free of excessive wobble and springing when used by the operators of longitudinal floats and shall be easily moved.

Immediate following completion of the deck finishing operations, the concrete in the deck shall be cured as specified in Item 401.3.8 "Curing Concrete" hereinafter.

The finished surface of the concrete shall be tested by means of a straightedge three (3.0) meters long. The surface shall not vary more than three (3) mm from the lower edge of the straightedge. All high areas in the hardened surface in excess of three (3) mm as indicated by testing shall be removed by abrasive means. After grinding by abrasive mean has been performed, the surface of the concrete shall not be smooth or polished. Ground areas shall not be of uniform texture and shall present neat and approximately rectangular patterns.

Where the concrete of the bridge deck is to be covered by bituminous surfacing, earth, or other cover, two and half 2.5 cms or more in thickness, the surface of the concrete shall not vary more than nine (9) mm from the lower edge of the three (3) meter straightedge.

Bridge deck surfaces under the curbs, railings and sidewalk shall be struck off to the same plane as the roadway and left undisturbed when future widening is shown on the plans.

c. **Sidewalk Surface Finish**

After the concrete has been placed it shall be compacted and the concrete shall be struck off by means of a strike board, floated with a wooden or cork floating and finished with a broom. An approved edging tool shall be used on all edges and at all expansion joints. Brooming shall be transverse to the line of traffic and if water is necessary, it shall be applied to the surface immediately in advance of brooming. The surface shall not vary more than six (6) mm under a three-meter straightedge, and the finished surface shall be

free of blemishes.

**d. Ordinary Surface Form Finish**

Ordinary surface finish shall consist of filling holes or depressions in the surface of the concrete, repairing all rock pockets, removing stains and discolouration visible from traveled ways. Ordinary surface finish shall be applied to all concrete surfaces either as a final finish or preparatory to the Class 1 finish. On surfaces, which are to be buried underground or surface, which are enclosed, such as the cells of box girders; the removal of fins will not be required.

Except as provided herein, all form bolts and any metal placed for the convenience of the Contractor shall be removed to a depth of at least two and half (2.5) cms below the surface of the concrete. All rock pockets and other unsound concrete shall be removed. The resulting holes or depression shall be cleaned and filled with mortar. Form bolts projecting into the cells of box girders need not be removed unless permanent access is provided into the cells, in which case such bolts shall be removed flush with the surface of the concrete. Mortar used to fill bolt holes shall consist of one part cement and two parts sand. Other depressions and pockets shall be filled with either packed mortar or air blown mortar as directed by the Engineer. Mortar shall be cured in conformance with the requirements in Item 401.3.8 (c) "Curing Structures".

If rock pockets or holes in the opinion of the Engineer, are of such an extent or character as to affect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of the structure affected.

**e. Class 1 Surface Form Finish**

Class 1 surface finish shall consist of finishing the surfaces of the structure as necessary to produce even surfaces of uniform texture and appearance, free of unsightly bulges, depressions and other imperfections. The degree of care in building forms and character of materials used in form work will be a contributing factor in the amount of additional finishing required to produce even surfaces of uniform texture and appearance, free of unsightly bulges, depressions and other imperfections, and the Engineer shall be the sole judge in this respect.

After completion of the ordinary surface finish, areas which do not exhibit the required smooth, even surface of uniform texture and appearance shall be sanded with power sanders or other approved abrasive means until smooth, even surfaces of uniform texture and appearance are obtained. The use of power carborundum stones or disks will be required to remove bulges and other imperfections.

Class 1 surface finish shall not be applied until a uniform appearance can be obtained.

Class 1 surface finish may be required to be applied as the final finish for the following surfaces, unless otherwise directed by the Engineer:

- i) All form finish surfaces of bridge super-structures, except the under surfaces between girders and the inside vertical surfaces of T girders.
- ii) All surfaces of bridge piers, columns and abutments, and retaining walls above finished ground and to at least three tenth (0.3) meter below finished ground.
- iii) All surfaces of open spandrel arch rings, spandrel columns and abutment walls.
- iv) All surfaces of pedestrian undercrossings, except floors and surfaces to be covered with earth.
- v) Surface above finished ground of culvert headwalls, endwalls and retaining walls.
- vi) Surface inside of culvert barrels having a height of one and half (1.5) meters or more for a distance inside the barrel at least equal to the height of the culvert.
- vii) All surfaces of railings.

**f. Surface Rendering**

All faces of concrete which are to come in contact with back fill or pavement materials, shall be applied two coats of hot bitumen of approved quality, before placing any material around concrete.

**401.3.8 Curing Concrete**

**a. General**

All newly placed concrete shall be cured in accordance with these specifications, unless otherwise directed by the Engineer.

**b. Method of Curing**

The curing method shall be one or more of the following as described hereinafter.

Water Method

Curing compound Method

Reinforced Waterproof Paper Method if required by the Engineer.

Forms-in-Place Method

Steam Method

Polyethylene Sheeting Method

### **Water Method**

The concrete shall be kept continuously wet by the application of water for a minimum period of seven (7) days after the concrete has been placed.

Cotton mats, burlaps, rugs, carpets, or earth or sand blankets, may be used as a curing medium to retain the moisture, the entire surface of the concrete shall be kept damp by applying water with a nozzle that so atomizes the flow that a mist and not a spray is formed, until the surface of the concrete is covered with the curing medium. The moisture from the nozzle shall not be applied under pressure directly upon the concrete in a quantity sufficient to cause a flow or wash the surface. At the expiration of the curing period the concrete surface shall be cleared of all curing mediums.

When concrete bridge decks and flat slabs are to be cured without the use of a moisture retaining medium, the entire surface of the bridge deck or slab shall be kept damp by the application of water with an atomizing nozzle as specified in the preceding paragraph until the concrete has set, after which the entire surface of the concrete shall be sprinkled continuously with water for a period of not less than seven (7) days.

### **Curing Compound Method**

Surfaces exposed to the air may be cured by the application of an impervious membrane if approved by the Engineer.

The membrane-forming compound used shall consist of a practically colourless liquid. The use of any membrane forming compound that will alter the natural colour of the concrete or impart a slippery surface to any wearing surface shall be prohibited. The compound shall be applied with a pressure spray in such a manner as to cover the entire concrete surface with a uniform film, and shall be of such character that it will harden within 30 minutes after application. The amount of compound applied shall be ample to seal the surface of the concrete thoroughly. Power operated spraying equipment shall be equipped with an operational pressure gauge and means of controlling the pressure.

The curing compound shall be applied to the concrete following the surface finishing operation immediately after the moisture sheen begins to disappear from the surface, but before any drying shrinkage or craze cracks begin to appear. In the event of any delay in the application of curing compound, which results in any drying or cracking of the surface, application of water with an atomizing nozzle as specified under "Water Method", shall be started immediately and shall be continued until application of the compound which shall not be applied over any free standing water surface. Should the film of compound be damaged from any cause before the expiration of seven (7) days after the concrete is placed in the case of structures, the damaged portion shall

be repaired immediately with additional compound.

Curing compounds shall not hard settle in storage. They shall not be diluted or altered in any manner after manufacture. At the time of use, the compound shall be in a thoroughly mixed condition. If the compound has not been used within one hundred twenty (120) days after the date of manufacture, the Engineer may require additional testing before use to determine compliance to requirements.

An anti-settling agent or combination of anti-settling agents shall be incorporated in the curing compound to prevent caking.

The curing compound shall be packaged in clean barrels or steel containers or shall be supplied from a suitable storage tank located at the job-site. On-site storage tanks shall have a permanent system designed to completely re-disperse any settled material without introducing air or any other foreign substance. Containers shall be well sealed with ring seals and lug type crimp lids. The linings of the containers shall be of a character that will resist the solvent of the curing compound. Each container shall be labeled with the manufacturer's name, specification number, batch number, number of gallons, and date of manufacture, and shall have a label warning concerning flammability. The label shall also warn that the curing compound shall be well stirred before use. When the curing compound is shipped in tanks or tank trucks, a shipping invoice shall accompany each load. The invoice shall contain the same information as that required herein for container labels.

Curing compound may be sampled by the Engineer at the source of supply and at the job-site.

### **Reinforced Waterproof Paper Method**

The exposed finished surfaces of concrete shall be sprayed with water, using a nozzle that so atomizes the flow that a mist and not a spray is formed, until the concrete has set, after which the waterproof paper shall be placed. The paper shall remain in place for a period of not less than 72 hours.

Reinforced waterproof paper shall comply with ASTM C 171 specifications. It shall be composed of two sheets of Kraft paper cemented together with a bituminous adhesive and reinforced with fibre. The waterproof paper shall be formed into sheets of such width as to provide a complete cover of entire concrete surface.

All joints in the sheets shall be securely cemented together in such a manner as to provide a waterproof joint. The joint seams shall have minimum lap of ten (10) cm.

The sheets shall be securely weighted down by placing a bank of earth on the edges of the sheets or by other means satisfactory to the Engineer.

Should any portion of the sheets be broken or damaged within seventy two (72) hours after being placed, the broken or damaged portions shall be immediately repaired with new sheets properly cemented into place.

Sections of sheets, which have lost their waterproof qualities or have been damaged to such an extent as to render them unfit for curing the concrete shall not be used.

### **Forms-in-Place Method**

Formed surfaces of concrete may be cured by retaining the forms-in-place. The forms shall remain in place for a minimum period of seven (7) days after the concrete has been placed, except that for members over five (5) cms in least dimension, the forms shall be in place for a minimum period of five (5) days. Wooden forms shall be kept wet by watering during the curing period.

### **Steam Method**

After placing and vibrating, the concrete shall be allowed to attain its initial set before steam is applied. During the placing of concrete and application of steam, provision shall be made to prevent surface drying by means of a coating of approved material. The optimum curing temperature shall not exceed sixty five (65) degree C.

### **Polyethylene Sheeting Method**

The wet surface of fresh concrete shall be covered with white polyethylene sheeting as soon as possible without marring the surface and should cover all exposed surfaces of the concrete. The edges of the sheeting shall be weighted securely with a continuous windrow of earth or any other means satisfactory to the Engineer to provide an air-tight cover. Adjoining sheets shall overlap not less than thirty (30) cms. and the laps shall be securely weighted with earth, or any other means satisfactory to the Engineer to provide an air-tight cover.

## **c. Curing Structures**

All newly placed concrete for cast-in-place structures, other than highway bridge decks, shall be cured by the water method, the forms-in-place method, or, as permitted herein, by the curing compound method, all in accordance with the requirements in Item 401.3.8 (b), "Methods of Curing".

The curing compound method may be used on concrete surfaces which are to be buried underground, and surfaces where only Ordinary Surface Finish is to be applied and on which a uniform colour is not required and which will not be visible from any public traveled way.

The top surface of highway bridge decks shall be cured by both the curing compound method, and by the water method. The curing compound shall be applied progressively during the deck finishing operation immediately after



finishing operations are completed on each individual portion of the deck. The water cure shall be applied not later than four (4) hours after completion of the deck finishing or, for portions of the decks on which finishing is completed after normal working hours, the water cure be applied not later than 8.00 a.m. the following morning.

When deemed necessary by the Engineer during periods of hot weather, water shall be applied to concrete surfaces being cured by the curing compound method or by the forms-in-place method, until the Engineer determines that a cooling effect is no longer required.

**d. Curing Precast Concrete Members**

Precast concrete members shall be cured for not less than seven (7) days by the water method or by steam curing for a period in which 80% of strength achieved, at the option of the Contractor. Steam curing for precast members shall conform to the following provisions:

After placement of the concrete, members shall be held for a minimum four (4) hours precasting period.

To prevent moisture loss on exposed surfaces during the presteaming period, members shall be covered immediately after casting or the exposed surfaces shall be kept wet by fog spray or wet blankets.

Enclosures for steam curing shall allow free circulation of steam about the member and shall be constructed to contain the live steam with a minimum moisture loss. The use of the tarpaulins or similar flexible covers will be permitted, provided they are kept in good repair and secured in such a manner to prevent the loss of steam and moisture.

Steam at jets shall be low pressure and in a saturated condition. Steam at jets shall not impinge directly on the concrete, test cylinders, or forms. During application of the steam, the temperature rise within the enclosure shall not exceed twenty (20) degree C per hour. The curing temperature throughout the enclosure shall not exceed sixty five (65) degree C and shall be maintained at a constant level for a sufficient time necessary to develop the required compressive strength. Control cylinders shall be covered to prevent moisture loss and shall be placed in a location where temperature is representative of the average temperature of the enclosure.

Temperature recording devices that will provide an accurate continuous permanent record of the curing temperature shall be provided. A minimum of one temperature recording device per sixty (60) meters of continuous bed length will be required for checking temperature.

Curing of precast concrete will be considered completed after a termination of the steam curing cycle.

**e. Curing Precast Concrete Piles**

All newly placed concrete precast piles, both conventionally reinforced and prestressed shall be cured by the "Water Method" as described in Item 401.3.8(b) except that the concrete shall be kept under moisture for at least fourteen (14) days. At the option of the Contractor steam curing may be used in which case the steam curing provisions in Item 401.3.8(b) "Curing Precast Concrete Members" shall apply except that the concrete shall be kept wet for at least seven (7) days including the holding and steaming period.

**401.3.9 Testing of Aggregates**

Samples of fine and coarse aggregate to be used shall be selected by the Engineer. It shall be the responsibility of the Contractor to designate the source or sources of aggregate and to obtain the necessary samples and submit them for testing at least thirty (30) days before actual concreting operations are to begin.

Samples of aggregates shall be obtained and tested in accordance with the following standard AASHTO methods:-

|       |  |            |
|-------|--|------------|
| i)    | Sampling aggregates  | T-2        |
| ii)   | Sieve analysis   | T-27       |
| iii)  | Amount of material passing the No.200 sieve.   | T-11       |
| iv)   | Organic impurities   | T-21       |
| v)    | Mortar Strength  | T-71       |
| vi)   | Sodium sulphate soundness  | T-104      |
| vii)  | Friable particles  | T-112      |
| viii) | Abrasion loss  | T-96       |
| ix)   | Specific Gravity   | T-84       |
| x)    | Absorption.  | T-85       |
| xi)   | Production of Plastic Fines.   | T-210      |
| xii)  | Fineness Modulus   | T-27       |
| xiii) | Sand Equivalent  | T-17       |
| xiv)  | Potential Reactivity of Carbonate Rocks for Concrete Aggregate (Rock Cylinder Method). | ASTM C 586 |
| xv)   | Potential Alkali Reactivity of Cement -Aggregate Combinations (Morta-Bar Method).      | ASTM C 227 |
| xvi)  | Potential Reactivity of Aggregates (Chemical Methods)                                  | ASTM C 289 |

No aggregate for testing during the production of concrete shall be sampled at the discharge gates of the bins feeding the weight hopper. The Contractor, at his expense, shall provide safe and suitable facilities for obtaining the samples. No concreting work on the project will be permitted until the Engineer signifies in writing his approval, following the performance of the necessary tests, on all the materials involved in making concrete.

#### **401.3.10 Testing of Compressive Strength**

Concrete compressive strength requirements consist of a minimum strength at the age of twenty eight (28) days and the minimum strength which must be attained before various loads or stresses are applied to the concrete. The various strengths required are specified in Table 401-1.

The compressive strength of concrete will be determined from test cylinders, which have been fabricated from concrete sampled and tested in accordance with AASHTO T 23 and AASHTO T 22.

A set of six (6) cylinders shall be taken from each fifty (50) cubic meters of each class of concrete or fraction thereof placed each day, three (3) of the six (6) cylinders to be tested after seven (7) days and three (3) after twenty eight (28) days.

- a) The minimum average 28 days test result of all samples tested at any time shall be the specified twenty eight (28) days strength.
- b) No individual samples tested after 28 days shall show a test result lower than eighty five (85) percent of the required twenty eight (28) days.

Concrete represented by any single test cylinders that fails to comply with the requirement under (b) above will be rejected unless the Contractor at his expense, provides evidence that the strength and quality of the concrete placed in the work are acceptable. If such evidence consists of tests made on cores taken from the work, the cores shall be obtained and tested in accordance with the specifications of AASHTO T-24.

Test results of the cores shall meet the following requirements:-

- a) Average test result of the cores shall be less than the minimum required twenty eight (28) days strength.
- b) No individual core shall show a strength less than Ninety five (95) percent of the required twenty eight (28) days strength.

Should the above test results fail to comply with the requirements, concrete of that particular pour shall be rejected and removed as directed by the Engineer. Further more contractor shall redesign the concrete mix for approval of the Engineer.

In case, seven (7) days strength shows less than seventy (70) percent of the twenty eight (28) days strength (in case of type-I cement), Engineer may stop further work on that particular portion of concrete, unless twenty eight (28) days strength gives satisfactory results.

#### **Trial Batches for Mix Productions**

The placing of concrete shall not begin until trial batches of the mix design to be used have been produced by the Contractor and tested and approved by the Engineer. The trial mix proportions shall be such that the average strength of five

(5) consecutive test cylinders shall be 20% higher than the specified twenty eight (28) days strength and no individual test cylinder shall be below the specified strength.

When concrete compressive strength is specified as a prerequisite to applying loads or stresses to a concrete structure or member, test cylinders will be cured under conditions similar to those at the casting site. The compressive strength of concrete determined for such purposes will be evaluated on the basis of individual tests.

#### **401.4 MEASUREMENT AND PAYMENT**

##### **401.4.1 Measurement**

The quantity of concrete to be paid for shall be the number of cubic meters of concrete of the various classes complete in place and accepted.

In measuring the volume of concrete to be paid for, the dimension to be applied shall be those shown on the Drawings except where others ordered by the Engineer in writing.

Deductions from the theoretical volume of concrete shall be made for the volumes of draining holes, weep holes, pipes and conduits, etc., in case where their cross-sectional areas exceed 500 square centimeters.

The measurement shall not include any concrete used in the construction of cofferdams or falsework.

The volume involved in fillets, scorings, or chamfers ten square centimeters in cross-sectional area or less shall be disregarded when measuring the quantity of concrete to be paid for.

Concrete for railings, pipe culverts, etc., is not to be measured under this item, but under separate items.

##### **401.4.2 Payment**

The accepted quantity measured as provided above shall be paid for at the contract unit price respectively for the pay items listed below that as per shown in the Bill of Quantities which prices and payment shall be full compensation also for such works as curing, surface finishing and/or rendering as required, formation of construction joints and any such work and incidentals necessary to complete the item except works that are paid for under other pay items.

For all concrete structures or portions, thereof, no separate measurement or payment shall be made for false work, centering, formwork or any other temporary work to complete the concrete structure or portion thereof, payment for all such temporary works shall be deemed to be included in the contract price paid under various items of concrete work.

| <b>Pay Item<br/>No.</b> | <b>Description</b>                  | <b>Unit of<br/>Measurement</b> |
|-------------------------|-------------------------------------|--------------------------------|
| 401a                    | Concrete Class                      |                                |
|                         | (i) Underground                     | CM                             |
|                         | (ii) On Ground                      | CM                             |
|                         | (iii) Elevated                      | CM                             |
| 401b                    | Concrete Class B                    | CM                             |
| 401c                    | Concrete Class C                    |                                |
|                         | (i) Underground                     | CM                             |
|                         | (ii) On Ground                      | CM                             |
|                         | (iii) Elevated                      | CM                             |
| 401d                    | (i) Concrete Class D <sub>1</sub>   | CM                             |
|                         | (ii) Concrete Class D <sub>2</sub>  | CM                             |
|                         | (iii) Concrete Class D <sub>3</sub> | CM                             |
| 401e                    | Concrete Class Y                    | CM                             |
| 401f                    | Lean Concrete                       | CM                             |
| 401g                    | Precast Concrete, Class             | CM                             |

-----End of Section-----

## **NSI 1: CEMENT CONCRTE PAVING BLOCK**

### **NSI 1.1      DESCRIPTION**

The work covered under this section consist of providing and making items as per specifications laid down herein under, drawings and Bill of Quantities.

- CC Paving Stones as per finishes schedule and Bill of Quantities
- Kerb Stone as per finishes schedule and Bill of Quantities
- CC floor with grooves
- CC floor laid in panel

### **NSI 1.2      MATERIAL REQUIREMENTS**

**Cement, Sand, Aggregate:** Shall conform to specifications given in the relevant Section of this specification.

**Concrete Pavers / Tuff Tiles / Uni-block:** As per manufacturer's specifications

**Strength:** Min 28 days Cylinder Compressive strength for 50 mm thickness shall be 35 MPa (5000 psi) and for 60 / 80 mm thickness, it shall be 48 MPa (7000 psi).

**Thickness of Sub Base and Pavers:** Recommended thickness of sub base and pavers is shown in Table below:

| <b>Application</b>   | <b>Thickness of sub-base<br/>mm (in.)</b> |                        | <b>Thickness of<br/>paver<br/>(mm)</b> |
|--|---|------------------------|--|
|  | <b>Dry Area</b>                           | <b>Low Wet Area</b>    |  |
| <b>LIGHT DUTY</b><br>Residential, drive way, walk ways, parking patios etc.  | 0 to 76<br>(0 to 3)                       | 100 to 204<br>(4 to 8) | 50                                     |
| <b>MEDIUM DUTY</b><br>Residential, Streets, Public Parking, service road, maintenance area, canal lining, storage area, City petrol pumps etc. | 100 to 152<br>(4 to 6)                    | 254<br>(10)            | 60                                     |
| <b>HEAVY DUTY</b><br>City Streets, Loading deck Industrial floors, Highway petrol pumps etc.   | 204 (8)                                   | 305 (12)               | 80                                     |

**Shapes:** Pavers are available in Uni-Block, I-Section, Rectangle, Half Rectangle, Wavy, Heagon and Delta Shapes

**Quantity and thickness:** Quantity and thickness required per Square meter of different shape and size of pavers is shown in Table below:

### Specification for the Paving Stone

| S.No | Type           | Thickness (mm) | Area per Tile<br>Sq cm (Sq In.) | Nos. of<br>Tiles/Sqm<br>(Tiles/Sq Ft) |
|------|----------------|----------------|---------------------------------|---------------------------------------|
| 1.   | Uni-Block      | 50/60/80       | 249.74 (38.71)                  | 39.81 (3.70)                          |
| 2.   | I-Section      | 50/60          | 270.83 (41.98)                  | 36.90 (3.43)                          |
| 3.   | Rectangle      | 60/80          | 196.90 (30.52)                  | 50.67 (4.71)                          |
| 4.   | Half Rectangle | 60             | 128.12 (19.86)                  | 78.01 (7.25)                          |
| 5.   | Wavy           | 60             | 275.99 (42.78)                  | 35.83 (3.33)                          |
| 6.   | Hexagon        | 60             | 346.64 (53.73)                  | 28.83 (2.68)                          |
| 7.   | Delta          | 50             | 245.74 (38.09)                  | 40.67 (3.78)                          |

### NSI 1.3 CONSTRUCTION REQUIREMENTS

The entire area under external Paving shall be prepared by dressing earth, to a hard or graded surface where necessary, the prepared surface shall be made up to the required levels by filling and consolidating earth in accordance with the specifications for earth filling under floors.

#### **CC Paving Stones**

50mm thick cc paving stone in natural color shall be laid over 50mm thick sand over compacted earth for entrance foyer.

#### **Kerb Stone**

The kerb stone 350mm x 300mm x 150mm shall be joint in Cement Mortar 1:4 or as specified by Engineer.

#### **CC Floor**

CC Type "A," (1:2:4) with Power float Screed bed 50 mm thick in panel of 10'x10' where joint is filled with hot bitumen mixed with fine sand on bond breaking material as specified by Engineer.

### NSI 1.4 MEASUREMENT AND PAYMENT

Measurement for all the items covered under this section shall be made in Sq. ft/m of the actual surfaces completed and approved.

The rate quote from the work items covered in this Section shall constitute full compensation for all materials, labor equipment, plant and all incidentals to complete the works.

-----End of Section-----



**NED UNIVERSITY OF  
ENGINEERING & TECHNOLOGY  
KARACHI**



**Establishment of Thar Institute of Engineering, Sciences  
and Technology-TIEST, Islamkot  
(Constituent College of NED University)**

**SCHEDULE-B (BILL OF QUANTITIES)**

**Relocation of Village Link Road at Thar Institute of  
Engineering, Sciences & Technology Tharparkar**

**MARCH, 2022**



**Head Office (Karachi):** Suite No. 314, 3rd Floor, Mashriq Center, Gulshan-e-Iqbal Block-14, Karachi

**Ph:** 021-34941059 **Mob:** 0300-8251864 **Fax:** 021-34890770

**Multan Office:** House No. 1379, F Block, Wapda Town, Phase II, Multan.

**DI Khan Office:** Office No. 21, 1st Floor, Cantt Market, Dera Ismail Khan Tel No: 0966-715755 & Cell # 0336-0109883

**Website:** [www.ess-i-aar.com](http://www.ess-i-aar.com) **Email:** [info@ess-i-aar.com](mailto:info@ess-i-aar.com) & [cia1946@hotmail.com](mailto:cia1946@hotmail.com)



**BILL OF QUANTITIES  
FOR  
RELOCATION OF VILLAGE LINK ROAD  
AT  
THAR INSTITUTE OF ENGINEERING, SCIENCES & TECHNOLOGY THARPARKAR**

**COST SUMMARY**

| <b>S.No</b>                  | <b>DESCRIPTION</b>          | <b>SCHEDULE ITEM</b> | <b>NON SCHEDULE<br/>ITEM</b> | <b>TOTAL AMOUNT</b> |
|------------------------------|-----------------------------|----------------------|------------------------------|---------------------|
| 1                            | 45'-0" Wide Road (1200 Rft) |                      |                              |                     |
| <b>TOTAL AMOUNT</b>          |                             |                      |                              |                     |
| <b>Amount in Words</b> _____ |                             |                      |                              |                     |
|                              |                             |                      |                              |                     |

**BILL OF QUANTITIES  
FOR  
RELOCATION OF VILLAGE LINK ROAD  
AT**

**THAR INSTITUTE OF ENGINEERING SCIENCES & TECHNOLOGY  
THARPARKAR**

**SCHEDULE ITEM**

| S.No   | As Per<br>NHA 2021<br>CSR | Description   | Unit | Qty     | Rate     | Amount              |
|--|---------------------------|---|------|---------|----------|---------------------|
|  |                           |   |      |         | (Rs.)    |                     |
| 1  | 146-101                   | CLEARING AND GRUBBING   | Sq.m | 5016.60 | 27.53    | 138,107.00          |
| 2  | 146-106c                  | EXCAVATE SURPLUS COMMON MATERIAL  | Cu.m | 2407.87 | 410.33   | 988,020.62          |
| 3  | 146-104                   | COMPACTION OF NATURAL GROUND  | Sq.m | 5016.60 | 28.25    | 141,718.95          |
| 4  | 146-108c                  | FORMATION OF EMBANKMENT FROM BORROW EXCAVATION IN COMMON MATERIAL (A-2-4/A-4)   | Cu.m | 2119.89 | 491.14   | 1,041,161.76        |
| 5  | 146-201                   | GRANULAR SUBBASE  | Cu.m | 739.56  | 3514.86  | 2,599,449.19        |
| 6  | 146-202ii                 | AGGREGATE BASE COURSE (WITH GRADER)   | Cu.m | 305.86  | 3931.39  | 1,202,439.22        |
| 7  | 146-401gi                 | PRECAST CONCRETE CLASS "A1"(FOR CHANNEL )   | Cu.m | 46.49   | 17220.79 | 800,596.46          |
| <b>TOTAL SCHEDULE ITEMS</b>                      |                           |   |      |         |          | <b>6,911,493.19</b> |
| _____ % ABOVE/BELOW ON SCHEDULE ITEMS            |                           |   |      |         |          |                     |
| <b>GRAND TOTAL CARRY FORWARD TO COST SUMMARY</b> |                           |   |      |         |          |                     |
| <b>NON SCHEDULE ITEM</b>                         |                           |   |      |         |          |                     |
| 1  | NSI                       | Providing and laying, CC Paving blocks, 80 mm thick in natural colour, as in floors, drive-way, walk-way etc, any pattern and any shape laid on sand cushion filling of joint with sand and warring etc. complete as per direction of Engineer Incharge. (the cost of sand cushion is included) | Sq.m | 2006.64 |          |                     |
| <b>TOTAL NON SCHEDULE ITEMS</b>                  |                           |   |      |         |          |                     |



**NED UNIVERSITY OF  
ENGINEERING & TECHNOLOGY  
KARACHI**



**Establishment of Thar Institute of Engineering, Sciences  
and Technology-TIEST, Islamkot  
(Constituent College of NED University)**

**DRAWINGS**

**Relocation of Village Link Road at Thar Institute of  
Engineering, Sciences & Technology Tharparkar**

**MARCH, 2022**



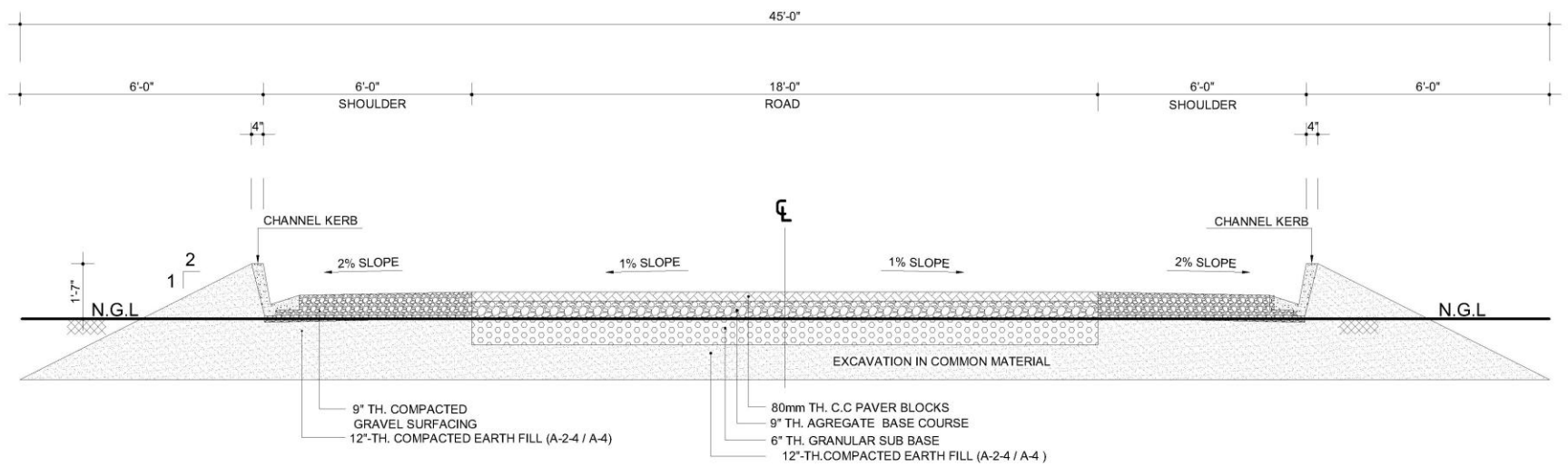
**Head Office (Karachi):** Suite No. 314, 3rd Floor, Mashriq Center, Gulshan-e-Iqbal Block-14, Karachi

**Ph:** 021-34941059 **Mob:** 0300-8251864 **Fax:** 021-34890770

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RELOCATION LENGTH = 1200 R.F.T

|   |   |       |   |            |               |            |
|---|---|-------|---|------------|---------------|------------|
| Client  | Project   | Job   | Consultant  | DATE       | COM. LOCATION | SHEET REF. |
| NED UNIVERSITY OF ENGINEERING & TECHNOLOGY  | THAR INSTITUTE OF ENGINEERING, SCIENCES & TECHNOLOGY-TIEST THARPARKAR | ROADS | ESS-I-AAR<br>PLANNING, ENGINEERING & SERVICES CONSULTANTS<br>SUITE NO. 314, 3-RD. FLOOR MASHROO CENTER SIR SHAH SULAIMAN ROAD - GULSHAN-E-JIBAL BLOCK NO. 14, KARACHI - P.O. BOX NO. 7008 | 05-03-2022 |               | ROAD       |
| TITLE<br>TYPICAL CROSS SECTION FOR RELOCATION OF MITHRIO BHATTI VILLAGE LINK ROAD (45'-0" WIDE) |   |       |   | ISSUE      | DESCRIPTION   | DATE       |
| DRAWN<br>IMRAN  |   |       |   | SCALE      | N.T.S.        |            |
|   |   |       |   | CHKD. BY   | JOB NO.       | LR-01      |

# NED UNIVERSITY OF ENGINEERING & TECHNOLOGY

No. DR (Estab)/(1003)/1990

Dated: 12/02/2016

## OFFICE ORDER

The University Administration has constituted the Procurement Committee comprising of the following officers for Construction, Renovation and Rehabilitation of work and Services

- |    |   |          |
|----|---|----------|
| 1. | <b>Prof. Dr. Abdul Jabbar Sangi</b><br>Professor<br>Dept. of Civil Engg.                          | Convener |
| 2. | <b>Engr. Khurshid Akhtar</b><br>Deputy Director of Services (Civil)<br>Services Department        | Member   |
| 3. | <b>Engr. Sadia Jabeen</b> <i>Asm.</i><br>Senior Civil Engineer (HFJ)<br><i>University Karachi</i> | Member   |

*12/2/16*  
Ag. REGISTRAR

To:

The Convener & all members

Copy for information to:

1. Dean (CEA)
2. Chairman, Dept. of Civil Engg.
3. Director of Services
4. Director Finance
5. Resident Auditor

*Saleem*

# NED UNIVERSITY OF ENGINEERING & TECHNOLOGY

No. DR (Estab)/(1003)/5730

Dated: 27/05/2016

## OFFICE ORDER

In supersession of this office order No. DR (Estab)/(1003)/11418 dated 02-11-2015, the University Administration has constituted the Complaint Redressal Standing Committee comprising of the following officers to address complaints regarding all procurement issues in the University in pursuance of Clause 31(1) of the SPPRA rules:

- |    |   |          |
|----|---|----------|
| 1. | <b>Prof. Dr. Saad Ahmed Qazi</b><br>Dean (ECE)          | Convener |
| 2. | <b>Independent Professional from the relevant field</b> | Member   |
| 3. | <b>Nominee of Accountant General Sindh</b>              | Member   |

  
Ag. REGISTRAR 27/5/2016

To:

**The Convener & all members**

Copy for information to:

- 1 Dean (ECE)
- 2 Director Planning & Projects
- 3 Director Finance
- 4 Director, Procurement Cell
- 5 Ag. Resident Auditor





**NED UNIVERSITY OF ENGINEERING & TECHNOLOGY  
PROCUREMENT CELL**

Ph # 99261261-2291, (Ext. 2471) Fax # 99261255, E-mail: [dp@neduet.edu.pk](mailto:dp@neduet.edu.pk)



Director Procurement

"Say NO to Corruption"

No. DP/NED/152585/8103/

Dated: 18-04-2022

**MOST URGENT**

The Director Information Advertisement  
Government of Sindh,  
Information Department  
Directorate of Advertisement  
Karachi.

**SUBJECT: PUBLICATION OF NOTICE INVITING TENDER**

Enclosed kindly find herewith the Notice Inviting Tender (NIT) for publication in three newspapers for job mentioned below:

|          |   |
|----------|---|
| Notice   | Relocation of Village Link Road at Thar Institute of Engineering Sciences & |
| Inviting | Technology Tharparkar.  |
| Tender   | Tender No. PC/NED/RG/Link Road / 8103/2022                                  |

Kindly ensure the publication of the aforementioned NIT in three widely circulated leading dailies of English, Urdu and Sindhi Languages, as per SPP Rule 17(2).

The aforesaid NIT please be published on or before 21-04-2022. The bill along-with tear sheet of newspapers may be sent to Director Finance of this University for payment.

Copy to DF

R&I Incharge  
Advertisement Section  
Information Department  
Govt. of Sindh  
18/4/22

Director Procurement  
18.04.2022  
9/C





**NED UNIVERSITY OF ENGINEERING & TECHNOLOGY**

University Road, Karachi-75270. Ph: 9926 1261-68 Ext 2471 & 2501

Fax: 9926 1255 Email: dp@neduet.edu.pk Web: www.neduet.edu.pk



Director Procurement

**“ Say No to Corruption”**

# **CORRIGENDUM**

Tender # PC / NED / RG /  
Link Road / 8103 / 2022

Relocation of Village Link Road at Thar  
Institute of Engineering Sciences &  
Technology Tharparkar.

With reference to above Tender Notice published in Newspapers on 21-04-2022 with INF/KRY-2001/2022, all bidders & concerned are informed that the following corrections have been made in the said tender.

| S # | Earlier                      | Corrected                    |
|-----|------------------------------|------------------------------|
| 1.  | Time of Completion 12 Months | Time of Completion 03 Months |
| 2.  | Tender Fee<br>Rs. 3,000/-    | Tender Fee<br>Rs. 2,000/-    |

However, all other terms & conditions of the tender will remain the same.

**INF-KRY 2102/22**

**Director Procurement**





# این ای ڈی یونیورسٹی آف انجینئرنگ و ٹیکنالوجی

## پروکیورمنٹ سیل

فون نمبر 99261261-68، (ایکسٹینشن 2471 و 2501) فیکس نمبر 99261255، ای میل dp@neduet.edu.pk

نمبر۔ ڈی پی/آر جی۔ 238/8103/152585

ڈائریکٹر پروکیورمنٹ

مورخہ۔ 18 اپریل 2022

## نوٹس برائے طلبی ٹینڈر

این ای ڈی یونیورسٹی آف انجینئرنگ و ٹیکنالوجی کو درج ذیل امور کی تکمیل کیلئے تجربہ یافتہ بولی دہندگان سے سربراہ بولیاں درکار ہیں۔

| نمبر شمار | کام کا نام   | تخمینی لاگت<br>ملین روپے | مدت تکمیل |
|-----------|--|--------------------------|-----------|
| 1         | تھرانسٹٹیوٹ برائے انجینئرنگ سائنس و ٹیکنالوجی تھراپارکر،<br>گاؤں لنک روڈ کی ری لوکیشن۔ ٹینڈر نمبر پی سی/این ای ڈی/آر<br>جی/لنک روڈ/8103/2022 | 12.311                   | 12 ماہ    |

2۔ اہلیت:-

- \* پاکستان انجینئرنگ کونسل سے جون 2022 تک موثر رجسٹریشن، بمعہ زمرہ سی 6 یا اوپری اور متعلقہ شعبے کی رجسٹریشن سی ای 10، سی ای 01، سی ای 02۔
- \* ایف بی آر سے موثر این ٹی این اور لازماً ایکٹیو ٹیکس پیئر۔
- \* سندھ ریونیو بورڈ سے موثر سیلز ٹیکس رجسٹریشن۔

3۔ پروکیورمنٹ کا طریقہ:-

- سندھ پبلک پروکیورمنٹ رولز 46 (1) کے مطابق ایک مرحلہ ایک لفافہ، جس میں فنانشل و ٹیکنیکل معلومات ہو
- 4۔ ٹینڈر کاغذات کے اجراء کا شیڈول:-

- ٹینڈر کاغذات دفتر ای ڈی پی۔ 11، این ای ڈی یونیورسٹی آف انجینئرنگ و ٹیکنالوجی مین کیمپس، کراچی سے 25 اپریل 2022 تا 11 مئی 2022 تک دوران اوقات کار بعوض ادائیگی فیس مبلغ 3000 ہزار (ناقابل واپسی) بشکل پے آرڈر بنام ڈائریکٹر فنانس، این ای ڈی یو ای ٹی، کراچی حاصل کیئے جاسکتے ہیں۔
- 5۔ ٹینڈر کاغذات واپس جمع کرانے کا شیڈول:-

- تمام بولیوں کے ساتھ ضمانت بولی کی مالیت کا 2 فیصد بشکل پے آرڈر/بینک گارنٹی بنام ڈائریکٹر فنانس، این ای ڈی یو ای ٹی، کراچی لازماً منسلک ہو مکمل شدہ بولیاں 12 مئی 2022 بوقت 11.00 بجے صبح تک یا اس قبل دفتر ای ڈی پی۔ 11 میں جمع کرا سکتے ہیں۔ بولیاں اسی روز بوقت 11.30 بجے صبح اسی مقام پر یونیورسٹی پروکیورمنٹ کمیٹی اور بولی دہندگان کے مجاز نمائندوں کی موجودگی میں کھولی جائیں گی۔ اگر بولیاں کھلنے کے روز کسی بھی وجہ سے چھٹی ہوئی تو اگلے کام کے کھولی جائیں گی۔

- 6۔ این ای ڈی یو ای ٹی کو قانون کے مطابق یہ حق حاصل ہے کہ کوئی بھی یا تمام بولیاں منظور یا مسترد کر دے۔ مکمل بولی کے کاغذات سپر اکی ویب سائٹ ppms.pprasinidh.gov.pk یا این ای ڈی یو ای ٹی کی ویب سائٹ www.neduet.edu.pk سے ڈاؤن لوڈ کر سکتے ہیں۔

دستخط

ڈائریکٹر پروکیورمنٹ

کرپشن کو کہیں نہ

INF-KRY:2001/22

ماسک لگائیں۔ کرونا بھگائیں۔ ماسک لگائیں۔ محفوظ رہیں



THE DAILY JANG KARACHI

روزنامہ جنگ

جنگ سرسبز

بانی: میر غلیل الرحمن

جسٹس

86 جلد

جمعرات 19 رمضان المبارک 1443ھ 21 اپریل 2022ء نمبر 111

این ای ڈی یونیورسٹی آف انجینئرنگ اینڈ ٹیکنالوجی

پروکیورمنٹ سیل

Director Procurement

فون نمبر: 99261255، 99261261-68 (Ext. 2471 & 2501)، فیکس نمبر: 99261255

E-mail: dp@neduet.edu.pk

"Say No to Corruption"

No.DP/RG-152585/8103/238 Dated: 18-04-2022

## ٹینڈر طلبی نوٹس

1- NEDUET کو مندرجہ ذیل کام کیلئے دلچسپی رکھنے والے پیشکش دہندگان سے جوہی نوعیت کے پروپوزیشنس انہام دینے میں مناسب تجربہ رکھتے ہوں سربراہ پیشکشیں مطلوب ہیں۔

| نمبر | کام کا نام  | تخمینی لاگت        | مہلت تکمیل |
|------|---|--------------------|------------|
| 1    | ولج ٹنک روڈ کی ریلویشن بر مقام قمر اسٹیٹ آف انجینئرنگ سائنسز اینڈ ٹیکنالوجی قمر پارک ٹینڈر نمبر PC/NED/RG/Link Road/8103/2022 | 12.311 ملین (روپے) | 12 ماہ     |

کھٹنے کی تاریخ پر تاگزیر صورتحال یا سرکاری تعطیل کی صورت میں جو دفتر بند ہونے کا باعث ہوگا۔ پیشکش دینے کے وقت پر آئندہ عہدہ کار پر داخل کی اکھولی جائیں گی۔ مجموعی بڈ لاگت کی 2.5% کی شرح سے بڈ سیکورٹی بشکل پے آرڈر یا بینک گارنٹی حق ڈائریکٹر فنانس۔

2- **اہلیت:** جون 2022 تک پاکستان انجینئرنگ کونسل (PEC) کے پاس کارآمد رجسٹریشن حامل کنٹری C-6 یا بالا اور متعلقہ ڈسپلنر CE-01، CE-10، CE-02 میں رجسٹرڈ۔

● FBR سے کارآمد NTN اور لازماً فعال ٹیکس گزار ہو۔

● SRB سے کارآمد سیلز ٹیکس سرٹیفکیٹ۔

3- طریقہ حصول

SPP رولز (1) 46 کے تحت ایک مرحلہ ایک لفاظی طریقہ کار جہاں ہر ایک پیشکش ایک مستقل لفاظی نفل پروپوزل اور ٹیکنیکل معلومات پر مشتمل ہو۔

4- ٹینڈر دستاویزات اجراء کا شیڈول:

ٹینڈر دستاویزات دفتر ADP-II، NEDUET میں کیسپس کراچی سے 25 مارچ 2022 سے 11 مئی 2022 تک دوران دفتری اوقات -/3000 روپے (ناقابل واپسی) کی بشکل پے آرڈر حق ڈائریکٹر فنانس NEDUET کراچی ادائیگی پر حاصل کی جاسکتی ہیں۔

5- ٹینڈر دستاویزات جمع کرانے کا شیڈول:

تمام پیشکشوں کے ساتھ لازماً بڈ پرائس کی 2% مساوی بڈ سیکورٹی بشکل پے آرڈر یا بینک گارنٹی حق ڈائریکٹر فنانس NEDUET آنا چاہئے۔ پیشکش دہندگان کو ہدایت کی جاتی ہے کہ وہ اپنی مکمل کردہ بڈز 12 مئی 2022 دن کے 11:00 بجے یا قبل دفتر ADP-II میں پہنچا دیں۔ پیشکشیں اسی روز دن کے 11:30 بجے اسی مقام پر یونیورسٹی پروکیورمنٹ کمیٹی اور پیشکش دہندگان کے نمائندوں کی موجودگی میں کھولی جائیں گی۔ اگر کھٹنے کی تاریخ پر تعطیل کا اعلان کر دیا گیا تو پھر یہ پروپوزل آئندہ عہدہ کار پر اسی وقت اور مقام پر کھولی جائیں گی۔

6- NEDUET کا یہ حق محفوظ ہے کہ وہ SPP رولز کے تحت مندرجات کی تعمیل میں کوئی یا تمام پیشکشیں قبول کر لے یا مسترد کر دے۔ مکمل بڈنگ دستاویزات SPPRA ویب پورٹل www.ppms.pprasinidh.gov.pk نیز NEDUET کی آفیشل ویب سائٹ www.neduet.edu.pk پر بھی دستیاب ہے۔

(INF/KRY-2001/22)

و سنڈا... ڈائریکٹر پروکیورمنٹ

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