

# UJVN LIMITED

(A Govt. of Uttarakhand Enterprise)



## STANDARD BID DOCUMENT FOR ALL CIVIL O&M WORKS TENDER DOCUMENT

|    |                                                            |                                                                                                            |
|----|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 1  | Officer Inviting Tender                                    | EXECUTIVE ENGINEER PROJECT CIVIL MAINTENANCE, DHALIPUR, DISTT.- DEHRADUN -248142                           |
| 2  | Name of the Work                                           | <b>Demolishing 08 Non Residential store building of Asan Colony at Dhalipur, Dehradun.</b>                 |
| 3  | Completion Time of the Work                                | 1 Month                                                                                                    |
| 4  | Tender No                                                  | 23/EE/PCM/Dhalipur/2025-26                                                                                 |
| 5  | Recovery amount pay to UJVNL by Firm/Contractor            | Rs. 5,07,726.00 (Rupees Five Lakh Seven Thousand Seven Hundred Twenty Six Only )+ GST extra as applicable. |
| 6  | Cost of Tender Document                                    | <b>Rs. 590/- (including GST)</b> Transaction charges extra as applicable                                   |
| 7  | Earnest Money                                              | Rs 12,700 /- in favour of “Dy.G.M. (Civil Maintenance), Dhalipur”                                          |
| 8  | Last date of downloading of Tender                         | <b>17:00 hrs of 14.09.2025</b>                                                                             |
| 9  | Last Date of Submission of Tender                          | <b>13:00 hrs of 15.09.2025</b>                                                                             |
| 10 | Date of Opening of Tender                                  | <b>15:30 hrs of 15.09.2025</b>                                                                             |
| 11 | Name of Contractor/Firm Submitting the Tender with Address |                                                                                                            |

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## **SECTION-I**

- NOTICE INVITING TENDER
- PRESS NOTICE

### **NOTICE INVITING TENDER**

**Tenders** are invited for & on behalf of the UJVN Ltd ("the Employer") from the interested bidders in Single Stage two bid systems i.e "Techno-commercial Bid and Financial/Price Bid" for the work "**Demolishing 08 Non Residential store building of Asan Colony at Dhalipur, Dehradun.**"

**1. Completion Time**

The entire Works under the Contract shall have to be completed in all respects within 1 Month from the date of start of work/procurement.

**2. Availability of Tender Document**

The Tender documents may only be downloaded online from "[www.ujvn.com](http://www.ujvn.com)". Tender Documents are available online on "[www.ujvn.com](http://www.ujvn.com)" from **15:00 hrs of 01.09.2025 upto 17:00 hrs of 14.09.2025**

**3. Submission of Tenders**

**Only Sealed Tenders** super scribed "**Demolishing 08 Non Residential store building of Asan Colony at Dhalipur, Dehradun**" shall be submitted in two separate sealed envelopes.

**Part I:** Techno-Commercial Bid along with EMD/Tender Security and cost of Tender for downloaded tenders and shall comprise of all documents detailed in clause 10 of instructions to tenderer (ITT) in section –II .

**Part II: Price Bid**

The Tender document must reach in the following Office by **15.09.2025 up to 13:00 hrs.**

1. Office of the Executive Engineer, Project Civil Maintenance Dhalipur, Dehradun

If the due date of receipt of Tenders as aforesaid is declared holiday/strike/ bundh/ on any account, Tenders would be received on the next working day up to stipulated time.

Tenders received late on account of any reason whatsoever and telegraphic/fax Tenders & incomplete Tenders will not be entertained.

**4. EARNEST MONEY DEPOSIT**

**Part I:** Techno-Commercial Bid of the tender must be accompanied with Earnest Money **Rs 12,700 /-** valid up to **Six months** from the date of opening of tender, failing of which, tender shall not be considered. Earnest Money shall be deposited by the Bidder in form of FDR/CDR/TDR issued from any branch of nationalised bank/ scheduled bank & duly pledged in favor of "**Dy.G.M. (Civil Maintenance), Dhalipur**".

NO FIRM SHALL BE EXEMPTED FROM DEPOSITING EARNEST MONEY ON ANY GROUND WHATSOEVER.

**6. Opening of Tender**

Techno-Commercial Bid will be opened by the E.E, P.C.M. Dhalipur or his authorized representative on **15.09.2025 at 15:30 hrs** or on the next working day of last date of submission in the presence of authorized representative(s) of the Tenderers who choose to remain present.

**7. Tender Validity Period**

Tender shall be valid for a period of 120 days from the date of submission of Tender.

**8. Cost of Tender Document**

The cost of Tender document is **Rs. 590/-** only (GST as applicable on the date of submission will be extra) which is non-refundable and the payment against the cost of Tender document will be in the form of bank draft issued from a scheduled bank drawn in favor of '**UJVN, P.N.B A/c No 0639002100009390**' payable at **Dhakrani District Dehradun** accompanied with Part I : Techno-Commercial Bid of Tenders. In case issuing bank is other than PNB, transaction charge shall be borne by the bidder and value of DD shall be inclusive of such transaction charges.

**9. Whom to Contact**

For any further information on the Tender, the Bidder may contact **to the officer inviting tender (OIT), UJVN Ltd, Office Address :-**

**Executive- Engineer (PCM), UJVN, Dhalipur, Dehradun Ph No. – (Office): +91 94565 90204**

10. The undersigned shall have the right to reject all or any of the Tenders without assigning any reason and shall not be bound to accept the lowest or any other Tender or to give any reason for such decision.

11. Tenders for part of work shall not be accepted.

12. For e-Tendering please refer **Clause-32 of "Instructions To Bidders"**-Not applicable.

13. UJVN Ltd has no responsibility regarding failure of communication/ internet problem and consequent upon problems encountered by bidders

For & On behalf of UJVN Ltd

Sd/-

Designation of OIT with Address

EXECUTIVE ENGINEER

PROJECT CIVIL MAINTENANCE, DHALIPUR, DISTT.- DEHRADUN -248142

**NOTICE INVITING TENDER**  
(For publishing in News papers only)

|                                                                                                                                                                                                                                                                                                  |                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|  <p style="text-align: center;"><b>UJVNL Limited</b><br/>(An Uttarakhand Govt. Enterprise)<br/>H.O. "UJJWAL" Maharani Bagh, GMS Road, Dehradun.-248006<br/>Telephone-0135-2763508, 2763808 Fax 0135-2763507</p> |                                                                                                    |
| Short Term Tender Notice                                                                                                                                                                                                                                                                         |                                                                                                    |
| Office of the Executive Engineer PCM Dhalipur, Dehradun invites sealed tenders from interested parties. Brief summary of the tender is given below:                                                                                                                                              |                                                                                                    |
| Tender No<br>23/EE/PCM/Dhalipur/2025-26                                                                                                                                                                                                                                                          | Name of work<br>Demolishing 08 Non Residential store building of Asan Colony at Dhalipur, Dehradun |
| Recovery amount pay to UJVNL by Firm/Contractor                                                                                                                                                                                                                                                  | Rs. 5,07,726.00 (GST extra)                                                                        |
| Date & Time of availability of bid document on website                                                                                                                                                                                                                                           | : 01.09.2025 at 15:00 Hrs                                                                          |
| Last Date & Time for submission of tender                                                                                                                                                                                                                                                        | : 15.09.2025 up to 13:00 Hrs                                                                       |
| For fuller and further details, kindly visit our website. The tender documents can be downloaded from the Nigam's website <a href="http://www.ujvnl.com">www.ujvnl.com</a> .                                                                                                                     |                                                                                                    |
| Executive Engineer<br>PCM-Dhalipur, Dehradun                                                                                                                                                                                                                                                     |                                                                                                    |
| <b>"Avoid wasteful use of Electricity"</b>                                                                                                                                                                                                                                                       |                                                                                                    |

|                                                                                                                                                                                                                                                                                       |                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
|  <p style="text-align: center;"><b>यूजेवीएन लिमिटेड</b><br/>(उत्तराखण्ड सरकार का उपक्रम)<br/>मुख्यालय "उज्ज्वल" महारानी बाग, जी० एम० एस० रोड<br/>देहरादून-248006 दूरभाष: 0135-2763508, 2523100</p> |                                                                                          |
| अल्पकालीन निविदा आमन्त्रण सूचना                                                                                                                                                                                                                                                       |                                                                                          |
| कार्यालय अधिशासी अभियन्ता, परियोजना जानपद अनुरक्षण-ढालीपुर, द्वारा इच्छुक निविदादाताओं से मोहरबन्द निविदा आमन्त्रित की जाती हैं। निविदा का संक्षिप्त विवरण निम्नवत है:-                                                                                                               |                                                                                          |
| निविदा संख्या<br>23/EE/PCM/Dhalipur/2025-26                                                                                                                                                                                                                                           | कार्य का नाम<br>आसन कालोनी ढालीपुर स्थित 08 अनावासीय भवनों/स्टोर के ध्वस्तीकरण का कार्य। |
| Recovery amount pay to UJVNL by Firm/Contractor                                                                                                                                                                                                                                       | Rs. 5,07,726.00 (GST अतिरिक्त)                                                           |
| वेब साइट पर निविदा की उपलब्धता की तिथि एवं समय                                                                                                                                                                                                                                        | : 01.09.2025 को 15:00 बजे से                                                             |
| निविदा जमा करने की अन्तिम तिथि एवं समय                                                                                                                                                                                                                                                | : 15.09.2025 को 13:00 बजे तक                                                             |
| अन्य जानकारी हेतु कृपया हमारी वेबसाइट देखें। निविदा प्रपत्र निगम की वेबसाइट <a href="http://www.ujvnl.com">www.ujvnl.com</a> से डाउनलोड किये जा सकते हैं।                                                                                                                             |                                                                                          |
| अधिशासी अभियन्ता<br>परियोजना जानपद अनुरक्षण, ढालीपुर                                                                                                                                                                                                                                  |                                                                                          |
| <b>"बिजली का बरबादी पूर्ण उपयोग न करें"</b>                                                                                                                                                                                                                                           |                                                                                          |

## **Section-II**

### **Instructions to Bidder (ITB)**

Section-II

Instructions to Bidder (ITB)

A. General

1. Scope of Tender

- 1.1 The UJVN LTD. hereinafter referred to as Employer invites Tenders for the work as mentioned in Notice Inviting Tender "SECTION-I" and referred to as "the Works".
- 1.2 The successful Bidder will be required to complete the Works in the period as mentioned in Notice Inviting Tender "SECTION-I" for Completion specified in the Schedule-B in accordance with Conditions of Contract.
- 1.3 Throughout these documents, the terms "Tender" and "Bid" and their derivatives (Tenderer /Bidder, Tender/Bid, Tendering/bidding, etc.) are synonymous. (a bidder may be a individual person, Private Entity or a Government owned entity, a firm or a company fulfilling the Pre-Qualification Criteria.)

2. Eligible Bidder

- 2.1 The tenders are limited to those Firms, companies, Bidders who meet minimum qualification requirements as stipulated in the sub-clause 3 of this Section.
- 2.2 Bidders shall provide such evidence of their continued eligibility to the Employer as the latter shall reasonably request. Bidders should not be under a declaration of ineligibility for corrupt and fraudulent practices by the Employer, any Government institution or Public Sector Undertaking in India in accordance with Sub-clause 31.

3. Qualification of the Bidder

- 3.1 All Bidders shall include the following information and documents with their Tenders in Qualification Information unless otherwise stated in the ITB:
- (a) copies of original documents defining the constitution or legal status, place of registration, and principal place of business; Council of Architecture Registration Certificate, written power of attorney of the signatory of the Tender to commit the Bidder ( This is in the case of a registered firm or company)
- (b) Total monetary value of works performed for each of the last **seven financial years**;
- (c) Experience in works of a similar nature during last **seven financial years** and details of works in progress or contractually committed with certificates from the concerned officer not below the rank of Executive Engineer or equivalent
- (d) Evidence of ownership of major items of equipment or evidence of arrangement of possessing them on hire/lease/buying as defined therein.
- (e) Detail of man power resources.
- (f) Reports on the financial standing of the Bidder, such as Balance sheet and Profit & Loss statements duly certified by the Chartered Accountant for the past three years accompanied with auditor's reports;
- (g) Information regarding any litigation or arbitration during the last five years in which the Bidder is involved, the parties concerned, the disputed amount, and the matter;.
- 3.3.1. To qualify for award of the Contract, each Bidder should have minimum following Techno- Commercial eligibility:

**Commercial Eligibility:**

- i. Average Annual Financial turnover during the last 3 years, ending 31<sup>st</sup> March of the previous financial year, should be at least 30% of the estimated cost.
- ii. Financial standing should be established through ITR of last 3 years, Annual Reports (Balance Sheet & Profit & Loss account along with notes of accounts) of last three financial years duly certified by a Chartered Accountant. All certificates by a Chartered accountant must bear UDIN (Unique Document Identification Number)

### Technical Eligibility:

Experience of having successfully completed similar works as Prime contractor in Govt. department or Govt. Organization or PSU or PPP mode or Public Limited Company during last 7 years ending last day of month previous to the one in which tenders are invited should either be of the following-

- I. Three similar completed works each costing not less than the amount equal to 40% of the estimated cost  
OR
- II. Two similar completed works each cost less than the amount equal to 50% of the estimated cost  
OR
- III. One similar completed work costing not less than the amount equal to 80% of the estimated cost.

Here similar work means **“Civil Construction/Maintenance work/Demolishing work of residential or non residential buildings”**  
“

### 3.3.2. Following are the desired documents for consideration of prequalification criteria:

- (a) Without submission of following, Bid shall not be processed further:
    - i. Earnest money in desired shape
    - ii. Tender cost in form of Demand Draft
    - iii. Non- judicial stamp paper of Rs. 100/- with proper signature on revenue stamp by the Bidder for validity of tender in a prescribed Format-II “Form of Declaration” under section SECTION-VI FORMAT of tender document
    - iv. Duly signed Form of Application in a prescribed Format-I “Form of Application” under section SECTION-VI FORMAT of tender document
    - v. Declaration regarding litigation or Arbitration during last five years.
    - vi. Declaration regarding eligibility and not being blacklisted or debarred.
    - vii. Power of Attorney in favour of the individual/ person legally authorizes to sign the bid and contract.
    - viii Declaration affirming that information furnished in the bid is correct to the best of knowledge and belief of the bidder.
    - viii. The duly filled and signed original (as downloaded) application downloading form which has been used by the vender for downloading the tender document from the web site. If this “Application Form” is not submitted in original with the tender, it will be summarily rejected.
  - (b) Each Bidder must produce self attested copy of following documents for consideration of pre qualification criteria
    - i. The PAN Number of Bidder
    - ii. Valid GST certificate
    - iii. EPF registration
    - iv. Audited Balance sheet and Profit & Loss statements duly certified by the Chartered Accountant for the past three years ending 31<sup>st</sup> March of the previous financial year. Auditor’s reports in support of turnover must be enclosed, if applicable.
    - v. Documentary proof regarding positive net worth and profit before tax.(For high Value tender worth Rs One Crore and above).
    - vi. TDS certificates of last financial year issued from employers where bidder has performed the contracts (If bidder is unable to produce audited balance sheet of last financial years owing to under process, in that case TDS certificate shall be considered for turn-over purpose).
    - vii. Experience Certificates in support of past experience. Without producing experienced/ performance certificate technical eligibility shall not be considered. Also, it is the sole responsibility of bidder to establish ‘same nature of supply’ as stipulated in Clause 3.3.1
- 3.4** JV will be allowed for value of Tender more than Rs 1.00 Cr, In case of JV, Bidder shall submit all relevant documents desired for Bidding. For detail seen Appendix of ITB .each partner of Joint Venture should meet the qualification Criteria in proportion to his interest in the Joint Venture. However each partner of joint venture must have minimum share more than 26%.
- 3.5** Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:

- (i) made misleading or false representations in the forms, statements, declarations and attachments submitted in proof of the qualification requirements; and/or
- (ii) Record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.
- (iii) Participated in the previous Tendering for the same work and had quoted unreasonably high or low Tender prices and could not furnish rational justification for it to the Employer.

**3.6** The bidder or any individual member in case of JV must not be banned/delisted/ blacklisted/debarred from business by any PSU/Govt. Department on the date of submission of bid. If bidder submits false statement regarding banning/delisting/blacklisting/debarring, such bidders shall be debarred from the participation and no correspondence shall be entertained in this regard. In addition to this, the bidder shall be penalized/ debarred/blacklisted etc In the event of subsequent blacklisting of the bidders, work shall not be awarded to such bidders.

**3.7 Preference to Start-ups, Micro and Small Enterprises of Uttarakhand-** The preference to Start-ups, Micro and Small Enterprises of Uttarakhand / Other States for the work shall not be applicable.

#### **4. Cost of Tendering**

The bidder shall bear all costs associated with the preparation and submission of his Tender, and the Employer will, in no case, be responsible or liable for those costs.

#### **5. Site Visit/Familiarizations with Nature of Work**

**5.1** The Bidder, in his own interest and cost, should inspect and examine the site and get familiarize with nature of work and satisfy themselves, before submitting their tender, in respect of the site conditions which may influence or affect the work or cost thereof under the Contract. It is the responsibility of Bidder to visit the site along with site Engineers of UJVN Ltd and get familiarized with the site conditions.

Following information will be beneficial while bidding for financial bid

- a) Site conditions including access to the site, existing and required roads and other means of transport/ communication for use by him in connection with the works;
- b) The type of equipment and facilities needed, preliminary to, for and in the performance of the work
- c) All other information pertaining to and needed for the work including information as to the risks, contingencies and other circumstances which may influence or affect the work or the cost thereof under this contract.
- d) Source and extent of availability of suitable materials including water etc. and labour (skilled and un-skilled) required for work and Laws and Regulations governing their use and employment;
- e) Geological, meteorological, topographical and other general features of the site and its surroundings as are pertaining to and needed for the performance of the work;
- f) The limit and extent of surface and sub-surface water to be encountered during the performance of the work and the requirement of drainage and pumping;
- g) The type of equipment and facilities needed, preliminary to, for and in the performance of the work;
- h) All other information pertaining to and needed for the work including information as to the risks, contingencies and other circumstances which may influence or affect the work or the cost thereof under this contract.

**5.2** The Bidder should note and bear in mind that the Employer shall bear no responsibility for the lack of acquaintance of the site and other conditions or any information relating thereto, on their part. The consequences of the lack of any knowledge, as aforesaid, on the part of the Bidder shall be at their risk and cost and no charges or claims whatsoever consequent upon the lack of any information, knowledge or understanding shall be entertained or payable by the Employer.

#### **B. Tender Document**

##### **6. Contents of Tender Document**

**6.1** The set of Tender documents comprises the documents listed below and addendum issued in accordance with Clause 8 of ITB.

## Short Term Tender 23/EE/PCM/Dhalipur/2025-26

- SECTION-I Notice Inviting Tender  
SECTION-II Instructions to Bidder (ITB)  
SECTION-III General Conditions of Contract,  
SECTION-IV Special Conditions of Contract  
SECTION-V Schedules  
SECTION-VI Format  
SECTION-VII Bill of Quantity  
SECTION-VIII Technical Specifications  
SECTION-IX Safety Manual  
SECTION-X Tender Drawing, if any.

- 6.2 The Bidder is expected to examine carefully all instructions, Forms, Bill of Quantities, qualification information and other schedules, General and Special conditions of contract, technical specifications and drawings in the Tender Documents. Failure to comply with the requirements of Tender Documents shall be at the Bidder's own risk. Pursuant to clause 22 hereof, Bidders, which are not substantially responsive to the requirements of the Prequalification Documents, shall be rejected.

### 7. Clarification of Tender Documents

- 7.1 A prospective Bidder requiring any clarification of the Tender documents may notify the Employer in writing at the Employer's address indicated in the Notice Inviting Tender. The Employer will respond to any request for clarification received earlier than **7days** prior to the deadline for submission of Tenders
- 7.2 The Bidder is requested to submit any question in writing or by cable so as to reach the Employer not later than one week before the pre-bid meeting.
- 7.3 Any modifications in the Tender documents listed in Clause 6.1 of ITB, which may become necessary, shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 8 of ITB.

### 8. Amendment of Tender Documents

- 8.1 a. Before the deadline for submission of Tenders, the Employer may issue addendum/corrigendum/cancellation notice. All such notices shall be published in the website "[www.ujvnl.com](http://www.ujvnl.com)", Office notice boards and through News-Papers and such form the part of the bidding documents .  
b. The bidders who have already submitted, can modify their tenders before the deadline of the submission, if they wish.
- 8.2 Any addendum/corrigendum thus issued shall be part of the Tender documents.
- 8.3 To give prospective Bidder reasonable time in which to take an addendum into account in preparing their Tenders, the Employer shall extend, as necessary, the deadline for submission of Tenders, in accordance with Clause 18 of ITT.

### C. Preparation of Tenders

#### 9. Language of Tender

All documents relating to the Tender shall be in English language.

#### 10. Documents Comprising the Tender

- 10.1 The Tender submitted by the Bidder shall be in two separate parts:

**Part I** This shall be named "**Techno-Commercial Bid**" and shall comprise the following documents:

|    |                                                                                                                                                                                                                                                                         |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Earnest Money as mentioned in Point No 4 of NIT ( Hard copy in original shall be submitted before the online opening of tenders & by the due date & time)                                                                                                               |
| 2. | Tender Cost as mentioned in Point No 8 of NIT ( Hard copy in original shall be submitted before the online opening of tenders & by the due date & time)                                                                                                                 |
| 3  | Non- judicial stamp paper of Rs. 100/- with proper signature on revenue stamp by the Bidder in a prescribed Format-II "Form of Declaration" under section SECTION-VI FORMAT of tender uploaded document ( Original Hard copy shall be submitted by the due date & time) |
| 4  | Duly signed Form of Application in a prescribed Format-I "Form of Application" under section SECTION-VI FORMAT of uploaded tender document (Original Hard copy shall be submitted by the due date & time)                                                               |
| 5  | Self attested copy of GST Certificate                                                                                                                                                                                                                                   |

## Short Term Tender 23/EE/PCM/Dhalipur/2025-26

|     |                                                                                                                                                                           |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6   | Self attested copy of EPF Certificate                                                                                                                                     |
| 7   | Self attested copy PAN Number Certificate.                                                                                                                                |
| 8   | Self attested Documents regarding proof of requisite turn over as Para 3.3.1 of ITB                                                                                       |
| 9   | Self attested Documents regarding proof of past experience carried out by the Bidder in past in UJVNL and/ or in other organization                                       |
| 10  | Any other document which Bidder thinks to be submitted for his prequalification                                                                                           |
| 11. | Declaration regarding litigation or Arbitration during last five years. (Original Hard copy shall be submitted by the due date & time)                                    |
| 12. | Declaration regarding eligibility and not being blacklisted or debarred                                                                                                   |
| 13  | Power of Attorney in favour of the individual/ person legally authorizes to sign the bid and contract.                                                                    |
| 14  | The duly filled and signed original (as downloaded) application downloading form which has been used by the vender for downloading the tender document from the web site. |

**Part II.** It shall be named “**Financial Bid**” and shall comprise the **Priced Bill of Quantities** for items specified in Section-VII “Bill of Quantities”.

**10.2** Each part shall be separately sealed and marked in accordance with Sealing and Marking instructions in clause 17 of ITT.

**10.3** The following documents, which if not submitted with the Tender, will be deemed to be part of the Tender.

| Section | Particulars                            |
|---------|----------------------------------------|
| I       | Notice inviting tender                 |
| II      | Information and Instructions to Bidder |
| III     | General Condition of Contract          |
| IV      | Special Condition of Contract          |
| VIII    | Technical Specifications               |
| IX      | Safety manual                          |
| X       | Tender Drawings                        |

### **11. Tender Prices**

**11.1** The Contract shall be for the whole Work, as described in Clause 1.1 of ITB, based on the Priced Bill of Quantities submitted by the Bidder.

**11.2** The Tenderer shall adopt the Item Rate Method for Priced Bill of Quantities as specified in Section-VII.

**Item Rate Method** requires the Tenderer to quote rates and prices for all items of the works described in the Bill of Quantities. Corrections, if any, shall be made by crossing out, initialling, dating and rewriting.

**11.3** All duties, taxes, royalties and other levies payable by the Contractor under the Contract, shall herein be included in the rate prices and the total tender price submitted by the Tenderer. GST shall be paid extra by the successful bidder as applicable.

### **12. Currencies of Tender and Payment**

The rates and the prices shall be quoted by the Bidder entirely in Indian Rupees.

### **13. Tender Validity**

**13.1** Tenders shall remain valid for a period of 120 days after the deadline date for Tender submission specified in Clause 18 of ITB.

**13.2** In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the Bidder may extend the period of validity for a specified additional period. The request and the Bidder's responses shall be made in writing or by cable. A Bidder may refuse the request without forfeiting his Earnest Money. A Bidder agreeing to the request will not be required or permitted to modify his Tender, but will be required to extend the validity of his earnest money for a period of the extension, and in compliance with Clause 14 of ITB in all respects.

**14. Earnest Money Deposit (EMD)**

- 14.1** The Bidder shall furnish, as part of the Tender, Earnest Money, for the amount specified in the NIT.
- 14.2** Any Tender not accompanied by an acceptable Earnest Money shall be rejected by the Employer as non-responsive.
- 14.3** The Earnest Money of unsuccessful Bidder will usually be returned within 28 days of the award of works to the successful Bidder. But if not returned in due time, no claim from contractor's side shall be entertained.
- 14.4** The Earnest Money of the successful Bidder will be discharged when the Bidder has signed the Agreement and furnished the required Performance Security / initial security Deposit. EMD, in later stage may be converted into Performance Security / Initial Security Deposit; if so then contractor has to extend validity of EMD up to a period as specified for Performance Security Deposit / initial security Deposit
- 14.5** The Earnest Money may be forfeited:
- a) if the Bidder withdraws the Tender after Tender opening (techno-commercial Tender) during the period of Tender validity;
  - or**
  - b) If, the employer rejects the tender under corrupt and fraudulent practice as per Sub-Clause 31 of ITB.
  - or**
  - c) in the case of a successful Bidder, if the Bidder fails within the specified time limit to
    - i. Sign the Agreement; or
    - ii. Furnish the required Performance Security Deposit.

**15. Alternative Proposals by Bidder**

Bidder shall submit offers that comply with the requirements of the Tendering documents, including the Bill of Quantities and the basic technical design as indicated in the drawings and specifications. Alternative proposals will be rejected considering their proposal as non-responsive.

**16. Format and Signing of Tender**

- 16.1** The Bidder shall submit one set of the tender comprising of the documents as described in Clause 10 of ITB.
- 16.2** The Tender shall be typed or written in indelible ink and shall be signed on each page by a person or persons duly authorized to sign on behalf of the Bidder. All pages of the Tender where entries or amendments have been made shall be initialed by the person or persons signing the Tender. The unsigned Tender shall not be considered and shall liable to be rejected forthwith by Employer. To avoid any discrepancies Bidder should quote the rates in figure and words of English language also
- a) If the tender is submitted by an individual, it shall be signed by the proprietor above his full name and with its current business address.
  - b) If the tender is submitted by a proprietary firm, it shall be signed by the proprietor above his full name and full name of his firm with its name and current business address.
  - c) If the tender is submitted by a firm in partnership, it shall be signed by all the partners of the firm above their full names and current business addresses, or by a partner holding the power of attorney for the firm for signing the tender, in which case a certified copy of the power of attorney shall accompany the tender. A certified copy of the partnership deed duly registered and current business address of all the partners of the firm shall also accompany the tender.
  - d) If the tender is submitted by a limited company or a limited corporation, it shall be signed by a duly authorized person holding the power of attorney or any other legally valid document for signing the tender, in which case a certified copy of the power of attorney or any such legally valid document shall accompany the tender. Such limited company or corporation may be required to furnish satisfactory evidence of its existence before the contract is awarded.
  - e) If the tender is submitted by a Joint Venture/ consortium of firms, one of the partners shall be nominated as the lead Partner who shall submit complete information pertaining to each partners in the Joint Venture/ consortium and shall be authorized to receive instructions and incur liabilities for and on behalf of the Joint Venture/ consortium during pre-award/post award (if awarded) and this authorization shall be evidenced in the Joint Venture Agreement submitted with the tender

signed by legally authorized signatories of all the partners. The tender and in case of successful tender, the agreement shall be signed by all partners of the Joint Venture/ consortium so as to be legally binding on all partners. All partners of the Joint Venture/ consortium shall be liable jointly and severally for the execution of the contract in accordance with the contractual terms and a statement to this effect shall be included in the Joint Venture Agreement copy of which shall be submitted with the tender.

- f) All witnesses and sureties shall be persons of status and their full names, occupations and addresses shall be stated below their signatures. Each page of the Tender Documents shall be signed by the Bidder.

- 16.3** The Tender shall contain no overwriting, alterations or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the Bidder, in which case such corrections shall be made by scoring out the cancelled portion, writing the correction and initialling and dating it by the person or persons signing the Tender.

**D. Submission of Tenders (For e-tendering please see clause-32 of ITB)**

**17. Sealing and Marking of Tenders**

- 17.1** For offline submission of documents, the Bidder shall submit the documents required in an envelope, superscripted as **Part-I “Techno-commercial Bid” & Part-II “Financial Bid”**. The contents of the Techno-commercial & financial shall be as specified in clause 10.1 of ITB.

- 17.2** The envelope containing the Technical Tenders shall

- a) be addressed to the authority inviting tender
- b) bear the name and Tender No. of the Work as mentioned in Tender Notice

- 17.3** In addition to the identification required in Clause 17.1 and 17.2, the envelope shall indicate the name and address of the Bidder to enable the Tender to be returned unopened, in case it is declared late, pursuant to Clause 19 of ITB, or is declared non-responsive pursuant to Clause 20 of ITB.

**18. Deadline for Submission of Tenders**

- 18.1** Off line submission of documents must be received by the Employer/ Authority inviting tender at the address specified in the Tender Form not later than the date and time indicated in the Tender Form. In the event of the specified date for the submission of Tenders being declared a holiday for the Employer, the Tenders will be received up to the specified time on the next working day.

- 18.2** The Employer/ Authority inviting tender may, in the exceptional circumstances and at its discretion, extend the deadline for submission of Tenders by issuing an amendment in accordance with Clause 8 of ITT, in which case all rights and obligations of the Employer and the Bidder previously subject to the original deadline will then be subject to the new deadline.

**19. Late Tenders**

Any Tender received by the Employer after the deadline prescribed in Clause 18 of ITT will be returned unopened to the Bidder.

**E. Tender Opening and Evaluation**

**20. Tender Opening**

- 20.1** The Employer/ Authority inviting Tender will open the Tenders received (except those received late) in the presence of the Bidder/Bidder's representatives who choose to attend at the time, date and place specified in the Tender issue Form. In the event of the specified date for the opening of Tenders being declared a holiday for the Employer, the Tenders will be opened at the appointed time and venue on the next working day.

- 20.2** The envelope, superscripted as **Part-I “Techno-commercial Bid”** shall be opened first and if the cost of the Tendering documents and EMD is not there, or incomplete, the remaining Tender documents will not be processed, and Tender will be rejected.

- 20.3** In all other cases, the amount of Earnest Money, forms and validity shall be announced. Thereafter, the Bidder's names and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening.

- 20.4** Evaluation of the techno-commercial bid with respect to Tender security, qualification information and other information furnished in Part-I “Techno-commercial Bid” of the Tender pursuant to Clause 10.1 of ITB, shall be taken up and a list will be drawn up of the responsive Bidders whose financial Tenders are eligible for consideration.

- 20.5** For submission of documents for timely evaluation of tenders, 06 days time will be provided by UJVN Limited for furnishing of the document by the Tenderers.

If the desired document is not provided by the Tenderers within 06 days, 03 days additional period shall be provided. If the desired document still not provided by the Tenderers, after giving 06 days and 03 days additional time, then tender/tenders will be treated as non responsive and no further correspondence shall be entertained by UJVN Limited in this regard.

- 20.6** The Employer/ Authority inviting Tender shall inform the Bidder, whose techno-commercial Tenders are found responsive, date, time and place of opening of financial bid. In the event of the specified date being declared a holiday for the Employer/ Authority inviting Tender, the Tenders will be opened at the specified time and venue on the next working day. Bidder or their representative may choose to attend the meeting of opening of financial Tenders
- 20.7** The Employer/ Authority inviting tender at his discretion will open **Part-I “Techno-commercial Bid”** and evaluate the tender completely including checking for responsiveness. **Part-II “Financial Bid”** of Tender will be opened after evaluation of Part-I, the date of opening of **Part-II “Financial Bid”** shall be informed to the responsive bidder either by email or telephone.
- 20.8** At the time of the opening of the Part-II **“Financial Bid”**, the names of the Bidder whose Tenders were found responsive in accordance with clause 20.4 of ITB will be announced. The financial Tenders of only responsive Bidders whose financial Tenders are eligible for consideration, will be opened. The remaining Tenders of the bidders will not be opened. The responsive Bidder’ names, the Tender prices, the total amount of each Tender, and such other details as the Employer may consider appropriate will be announced by the Employer at the time of Tender opening. Any Tender price which is not read out and recorded, will not be taken into account in Tender Evaluation

**21. Process to be Confidential**

Information relating to the examination, clarification, evaluation, and comparison of Tenders and recommendations for the award of a contract shall not be disclosed to Bidder or any other persons not officially concerned with such process until the award to the successful Bidder has been announced. Any attempt by a Bidder to influence the Employer’s processing of Tenders or award decisions may result in the rejection of his Tender

**22. Examination of Tenders and Determination of Responsiveness**

- 22.1** During the detailed evaluation of “Techno-commercial Bid” of Tenders, the Employer will determine whether each Tender:
- (a) Meets the eligibility criteria defined in Clauses 2 and 3;
  - (b) Has been properly signed;
  - (c) Is accompanied by the required EMD and cost of tender document; and
  - (d) Is substantially responsive to the requirements of the Tendering documents. During the detailed evaluation of the ‘Financial Bid’ of Tenders, the responsiveness of the Tenders will be further determined with respect to the remaining Tender conditions, i.e., Price-Bid of bill of quantities, technical specifications and drawings.
- 22.2** A substantially responsive “Tender” is one which conforms to all the terms, conditions, and specifications of the Tendering documents, without material deviation or reservation. A material deviation or reservation is one:
- (a) which affects in any substantial way the scope, quality, or performance of the Works; or
  - (b) which limits in any substantial way, the Employer’s rights or the Bidders obligations under the Contract; or
  - (c) whose rectification would affect unfairly the competitive position of other Bidder presenting substantially responsive Tenders or
  - (d) which is inconsistent with the Tendering documents,
- 22.3** If a “Tender” is not substantially responsive, it will be rejected by the Employer/Authority inviting tender, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

**23. Correction of Errors**

- 23.1** In the Price-Bid of Bill of Quantities the rates shall be written both in words and in figures. Bidder shall also show the total on each page and the Grand Total of the whole Contract. Corrections, if any, shall be made by crossing out, initialing, dating and rewriting.

- 23.2** If on check, there are found to be differences between the rates given by the contractor in words and figures or in the amount worked out by him in the Bill of Quantities and General Summary, the same shall be adjusted in accordance with the following rules;.
- a) In the event of a discrepancy between description in words and figures quoted by a Bidder, the description in words shall prevail.
  - b) In the event of an error occurring in the amount column of Bill of Quantities as a result of wrong multiplication of unit price and quantity, the unit price shall be regarded as firm and multiplication shall be amended on the basis of the price.
  - c) All errors in totaling in the amount column and in carrying forward totals shall be corrected.
  - d) The totals of various sections of Bill of Quantities amended shall be carried over to the General Summary and the tendered sum amended accordingly. The tendered sum so altered shall, for the purpose of tender, be substituted for the sum originally tendered and considered for acceptance instead of the original sum quoted by the Bidder. Any rounding off of quantities in Price Bid of Bill of Quantities or in General Summary by the Bidder shall be ignored.

**24. Evaluation and Comparison of Tenders**

- 24.1** The Employer will evaluate and compare only the Tenders determined to be substantially responsive in accordance with Clause 22.
- 24.2** In evaluating the Price-Bid of Tenders, the Employer will determine for each Tender the Evaluated Tender Price by adjusting the Tender Price by Making any correction for errors pursuant to Sub-clause 23;
- 24.3** Tender rates quoted by Bidders in Priced BOQ shall remain unaltered.
- 24.4** If the Tender, which results in the lowest Evaluated Tender Price, is seriously unbalanced or front loaded in relation to the Engineer's estimate of the items of work to be performed under the contract, the Employer may ask the Bidder to produce detailed rate analysis for any or all items of the Bill of Quantities, as per standard norms giving breakup of number of Labour/material/machine hours; consumables etc. and rates for such components, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. The rate analysis furnished by such lowest Bidder shall be evaluated on various aspects such as technical and payment schedule. Taking into consideration the schedule of estimated contract payments, the Employer shall re-schedule the payment to protect the Employer against financial loss in the event of default of the successful Bidder under the contract. If the detailed rate analysis furnished by such lowest Bidder is not found technically sound enough, the employer/ authority inviting tender may reject such tender and proceed for next lowest tender.

**F. Award of Contract**

**26. Award Criteria**

Subject to Clause 28 of ITB, the Employer will award the Contract to the Bidder whose Tender has been determined:

- i. to be substantially responsive to the Tendering documents and who has offered the lowest evaluated Tender price, provided that such Bidder has been determined to be (a) eligible in accordance with the provisions of Clause 2 of ITB, and (b) qualified in accordance with the provisions of Clause 3 of ITB; and (c) the evaluated Tender Price is within a reasonable variation of the estimated amount of Work.

**27. Employer's Right to accept any Tender or Reject any or all Tenders**

Notwithstanding Clause 26 above, the Employer reserves the right to accept or reject any Tender, and to cancel the Tendering process and reject all Tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or any obligation to inform the affected Bidder or Bidder of the grounds for the Employer's action.

Employer/ Authority Inviting Tender reserve the right to relax the eligibility criteria for tenders for any or all the work as per requirement.

**28. Notification of Award and Signing of Agreement.**

- 28.1** The Bidder whose Tender has been accepted will be notified of the award by the Employer prior to expiration of the Tender validity period through the "Letter of Acceptance", which will state the sum that the Employer will pay to the Contractor in consideration of the execution, completion by the Contractor as prescribed by the Contract.

**28.2.** The notification of award will constitute the formation of the Contract until the Formal Agreement is signed pursuant to clause 28.3 of ITB and further subject only to the furnishing of a performance security deposit and additional performance security deposit, if any in accordance with the provisions of Clause 29 of ITB.

**28.3.** The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will be signed by the Employer and the successful Bidder after the performance security deposit is furnished.

**28.4** Upon furnishing by the successful Bidder of the Performance Security deposit, the Employer will return the Earnest Money of the other Bidder informing that their Tenders have been unsuccessful.

**29. Performance Security Deposit**

**29.1** Within maximum 28 days or as per time limit given by Engineer-in-charge after receipt of the Letter of Acceptance, the successful Bidder shall deliver to the Employer a Performance Security of 5% percent of the Contract Price, plus additional security for unbalanced Tenders in accordance with Clause 3 of General Conditions of Contract, valid till end of Defect Liability Period

**29.2** The performance security deposit and additional performance security deposit, if any shall be in **the form of a FDR/CDR/TDR** issued from any branch of nationalised bank/ scheduled **duly pledged in favour of Dy.G.M. (Civil Maintenance), Dhalipur.**

**29.3** Failure of the successful Bidder to comply with the requirements of Clause 29.1.shall constitutes sufficient grounds for cancellation of the award and forfeiture of the Earnest Money. He will also be debarred from participating in Tenders invited by the Project for one year or more.

**30. Advances**

See Clause 13 of General condition of Contract..

**31. Corrupt or Fraudulent Practices**

The Employer requires the Bidder/contractors under this contract observe the highest standard of ethics during the procurement and execution of this contract. In pursuance of this policy, the Employer:

(a) defines, for the purpose of these provisions, the terms set forth as follows:

(i) "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution; and

(ii) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to be detriment to the Employer, and includes collusive practice among Bidder (prior to or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition.

(b) will reject a proposal for award of work if he determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question.

(c) Will declare a Bidder ineligible, either indefinitely or for a stated period of time, to be awarded a contract/contracts if he at any time determines that the Bidder has engaged in corrupt or fraudulent practices in competing for, or in executing, the contract.

(d) Canvassing in any form is strictly prohibited and in case any Bidder is found doing the same his tender shall be summarily rejected.

(e) In case it is found that the tenderer has submitted false information, fabricated information or incorrect information related to pre-qualification criteria of the tender then the tender will be rejected and the tenderer will be debarred to participate in other tenders of UJVN Ltd:-

(i) First time for one year

(ii) and for seven years for repetition in submission of false information, fabricated information or incorrect information related to pre-qualification criteria in any tender of UJVN Ltd..

**32. Exclusive Clauses for E-Tendering**

**32.1. Guide Lines Regarding Participation In E-Tendering:**

**a. PORTAL REGISTRATION:** The contractor/bidder intending to participate in the bid is required to register in the portal using his/ her active personal/official email id as his /her Login id and attach his /her valid digital signature certificate(DSC) to his/her unique Login id. She/he will enter relevant information as asked for about the firm/ contractor.

This is a one-time activity for registering in the portal

**b. LOGIN TO THE PORTAL:** The contractor/ bidder is required to type his/ her Log-In id and password. The system will again ask to select DSC and confirm it with the password of DSC as a second stage authentication. For each Login, a user's DSC will be validated against its date of validity and also against the Certification Revocation List (CRL) of respective CA stored in system database. The system checks the unique Login ID, password & DSC combination and authentication the login process for use of the portal.

**c. DOWNLOADING OF BID:** The bidder can download the tender of his choice and save it in his system to undertake necessary preparatory work off-line and upload the complete tender at his convenience before the closing date and time of submission. The document downloaded from website should not be tempered, and if any such tempering is established before or after the opening of bids, the bidder shall be debarred for a minimum one (01) year from participating in the tenders issued by UJVN Ltd.

**d. CLARRIFICATION ON BID:** The bidder may ask question on-line in the e-procurement portal using his/her DSC, provided the questions are raised within the period of seeking clarification as mentioned in the tender call notice/ bid (refer clause 7.1 of "**Instructions To Bidder**").The Officer inviting the tender will clarify queries related to the tender.

**e. PREPARATION OF BID:**

i) The bids may consist of general arrangements, drawings or typical or any other drawings to the work for which bid has been invited. Bidder may down load these drawings and take out the print for detail study and preparation of his bid. Any other drawings and documents pertaining to the works available with the officer Inviting tender will be open for inspection by the bidders

ii) The bidder shall go through the bid carefully and list the documents those are asked for submission (refer clause 3.3.2 & 10.1 of "**Instructions To Bidder**"). He shall prepare all documents including cost of Tender document, EMD, Declaration Form, Price Bid etc and store in the system.

**f. PAYMENT OF EMD/ BID SECURITY AND COST OF BID DOCUMENTS:**

i) The bidder shall furnish, as part of his Bid, a Bid Security (Earnest Money Deposit) in the amount mentioned under NIT. The bidder shall scan all the written/ printed pages of the Bid Security (EMD) and upload the same in portable document format (PDF) to the system in designated place of the technical bid. Furnishing scanned copy of such documents is mandatory otherwise his/ her bid shall be declared as non responsive and liable to rejection.

ii) The validity period of the EMD or Bid Security shall be as mentioned in the bid document. Any bid not accompanied by due Bid Security and not secured as indicated in the bid document shall be rejected as non-responsive.

iii) The fixed Deposit Bank Guarantee or any other form as mentioned in detailed NIT in respect of **EMD / Bid Security** and the **Bank Draft** in respect of **Cost of Tender** are to be **scanned and uploaded in PDF format along with the bid.**

iv) The bidder shall provide the cost of bid and the Bid security in sealed cover superscripting the name of the work/Supply for which the instruments are intended and the Officer Inviting Tender (OIT). **The original FD's/& DD's towards EMD & Tender cost** respectively shall be **physically produced before the Officer Inviting the Bid** or the concerned authorized officer of the department by Registered Post/ Speed Post or any other delivery system **upto last date and time of submission as stipulated in Notice Inviting Tender.**

v) Officer Inviting the Tender (OIT) or other concerned officer authorized to receive the original Bid Security/EMD and Bid Cost shall not be responsible for any postal delay and/or non receipt of the original copy of the Bid Security on or before specified date and time. Non submission of Bid Security and Bid Cost within the designated period will sufficient to declare the bid as non-responsive and liable to rejection

**32.2 SUBMISSION OF BID:**

- a. The bidder shall carefully go through the tender condition and prepare the required documents accordingly.
- b. Bidders should not be permitted to alter and modify their bids after expiry of the deadline for receipt of bids.
- c. The Protected Bill of Quantities (BOQ) uploaded by Officer Inviting the Tender is the authentic BOQ. Any alteration/ deletion/ manipulation in BOQ shall lead to cancellation Bid.
- d. The Bidder shall upload the scanned copy/copies of document in support of eligibility criteria and qualification information in prescribed format in PDF to the portal in the designated locations of Technical Bid.
- e. The Bidder shall write his name in the space provided in the specified location in the Protected Bill of Quantities (BOQ) published by the Officer Inviting Tender. The Bidder shall type rates in figure only in rate column of respective items without leaving any blank cell in the rate column in case of item rate tender and type percentage excess or less up to one decimal place only in case of percentage rate tender.
- f. The Bidder shall log on to the portal with his/her DSC and move to the desired tender for uploading the documents in appropriate place one by one simultaneously checking the documents.
  - (i) Bids cannot be submitted after due date and time. The Bids once submitted cannot be viewed, retrieve or corrected. The bidder should ensure the correctness of the bid prior to uploading and take printout of the system generated summary of submission to confirm successful uploading of bid. The bids cannot be opened even by the OIT /Opener before the due date & time of opening.
  - (ii) Each process in the e-Procurement is time stamped and the system detect the time of login of each user including the Bidder.
  - (iii) The bidder should ensure clarity/ legibility of the document updated by him to the portal.
  - (iv) The system shall require all the mandatory forms and fields filled up by the contractor during the process of submission of the bid/tender.
  - (v) The bidder should check the system generated confirmation statement on the status of the submission.
  - (vi) The bidder should upload sufficiently ahead of the bid closure time to avoid traffic rush and failure in the network.
  - (vii) The Tender Inviting Officer is not responsible for any failure malfunction, or breakdown of the electronic system used during the e-procurement process.
  - (viii) The bidder is required to upload documents and Bill of Qualities duly filled in. It is not necessary on the part of the bidder to upload the drawings and other bid documents (after signing) while uploading his bid. It is assumed that the bidder has referred all the drawings and documents upload by the Officer Inviting the Bid.
  - (ix) Seeking any revision of rates or backing out of the bid claiming for not having referred to any or all the documents provided in the Bid by the Officer Inviting the Bid will be constructed as plea to disrupt the bidding process and in such cases the Bid Security shall be forfeited.
  - (x) The bidder will not be able to submit his bid after expiry of the date & time of submission of Bid (server time). The date & time of Bid Submission shall remain unaltered even if the specified date of submission of bids declared as a holiday for the Officer Inviting the Bid.

**32.3 SECURITY OF BID SUBMISSION:**

- a. All bid uploaded by the bidder to the portal will be encrypted.
- b. The encrypted bid can only be decrypted/opened by the authorized openers after the due date and time.

**32.4 RESUBMISSION AND WITHDRAWAL OF BIDS:**

- a. Resubmission of bid by the bidders for any number of times before the final date and time

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of submission is allowed.

- b. Resubmission of bid shall require uploading of all documents including price bid afresh.
- c. Bid submitted after the predefined times of receipt will not be considered. Which inbuilt in the system.
- d. The bidder should avoid submission of bid at the last moment to avoid system failure or malfunction of internet or traffic or power failure etc.
- e. The bidder can withdraw his bid before the closure date & time of receipt of the bid by uploading scanned copy of a letter addressing to the Officer Inviting Tender citing reasons for withdrawal. Bids once submitted not be allowed to withdraw after the closing *date & time*.

### 32.5 OPENING OF THE BID:

- a. Bid opening date & time is specified during tender creation or can be extended through corrigendum. Bids cannot be opened before the specified date & time.
- b. All bid openers have to log on to the portal to decrypt the bid submitted by the bidders.
- c. The bidders and guest users can view the summary of opening of bids from any system. Contractor are not required to be present during the bid opening at the opening location if they so desire.
- d. In the event of the specified date of bid opening being declared a holiday for the Officer Inviting the Bid, the bids will be opened at the specified time on the next working day.
- e. In case bids are invited for more than one package the order for opening of the "Bid" shall be that in which they appear in the "Invitation for Bid".
- f. During bid opening the covers containing original financial instruments towards Cost of Bid Security in the form specified in the NIT/ ITT valid for the period stated in the bid, received after last date of receipt of bid and before opening of the bids shall be opened and declared. The OIT/Opener shall continue opening of other documents if he is satisfied about the appropriateness of the Cost of Bid and Bid Security.
- g. Combined Bid Security for more than one work is not acceptable.
- h- Negotiation with bidder after bid opening must be severely discouraged. However, in exceptional circumstances may be sorted to only with the lowest evaluated responsive bidder.
- i- On transfer of a Bid opening Officer, he may be allowed to open the bid from his new location. Further action on bid document shall be taken by the new incumbent of the post.

### 32.6 EVALUATION OF BIDS:

- a. All the opened bids shall be downloaded and printed for taking up evaluation. The OIT/Openers shall on each page of the documents downloaded and furnish a certificate that the documents as available in the portal for the tender have been downloaded.
- b. The OIT/Evaluators shall take up evaluation of bids with respect to the qualification information and other information furnished subject to confirmation of the Bid Security, the issuing institutions.
- c. After receipt of confirmation of the Bid Security, the bidder may be asked in writing to clarify on the document provided in the Technical Bid, if necessary, with respect to any doubts or illegible documents. The Officer Inviting Tender may ask for any other document of historical nature during Technical evaluation of the tender. Provided in all such cases, furnishing of any documents in no way alters the Bidder's price Bid. Non submission of legible documents may render the bid non responsive.
- d. The bidders will respond in not more than seven days of issue of the clarification letter, failing which the bid of the bidder will be evaluated on its own merit.
- e. Technical evaluation of all bids shall be carried out as per information furnished by bidders. But evaluation of Bids does not exonerate bidders from checking their original documents at later date. If the bidder is found to have misled the evaluation through wrong information, action as per relevant clause of NIT/ITT shall be taken against the Bidder/Contractor.

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- f. The OIT/Evaluators will evaluate bids and finalize list of responsive bidders.
- g. The Financial bids of the technically qualified bidders shall be opened on the due date of opening. The OIT/Openers shall log on to the system in sequence and open the financial bids
  - i) The Financial Bid will be opened on the notified date & time in the presence of bidders or their authorized representative who wish to be present.
  - ii) At the time of opening of "Financial Bid", bidders whose technical bids were found responsive will be opened.
  - iii) The qualified bidder's name, bid prices, item wise rates, total amount of each item in case of item rate and percentage above or less in case of percentage rate tenders will be announced.
  - iv) Procurement Officer-Openers shall sign on each page of the downloaded BOQ and the Comparative Statement and furnish a certificate to that respect.
  - v) Bidder can witness principal activities and view the documents/summary reports for that particular work by logging on to the portal with the DSC from anywhere.
- h. Name of Successful bidder and contract amount shall be mentioned in the departmental notice board / bulletin / website.

Office Inviting Tender (OIT)  
EXECUTIVE ENGINEER  
PROJECT CIVIL MAINTENANCE, DHALIPUR,  
DISTT.- DEHRADUN -248142

**APPENDIX TO ITB**

**Clause: 3.4: JOINT VENTURE: (Applicable for the work of more than Rs 1.00 Cr)**

**1. Guidelines for Participation of Joint Venture Firms in Bidding**

- A. Separate identity/name shall be given to the Joint Venture firm.
- B. Number of members in a JV firm shall not be more than **two**.
- C. A member of JV firm shall not be permitted to participate either in individual capacity or as a member of another JV firm in the same tender.
- D. The tender form shall be purchased and submitted only in the name of JV firm and not in the name of any constituent member.
- E. The joint venture firm shall be required to submit Earnest Money Deposit (EMD) along with the tender in terms of the provisions contained in NIT
- F. One of the members of the JV firm shall be its Lead Member who shall have a majority (**at least 51%**) share of interest in the JV firm. The other members shall have a share of not less than 26%. In case of JV firm with foreign member (s), the lead member has to be an Indian firm with a minimum share of **51%**. A copy of Memorandum of Understanding (MOU) executed by the JV members shall be submitted by the JV firm along with the tender. The complete details of the members of the JV firm, their share and responsibility in the JV firm etc. particularly with reference to financial, technical and other obligations shall be furnished in the MOU. Format for MOU for JV is placed at SECTION VI: FORMATS- JV-1, JV-2 & JV-3
- G. Once the tender is submitted, the MOU shall not be modified/alterd/terminated during the validity of the tender. In case the Bidder fails to observe/comply with this stipulation, the full Earnest Money Deposit (EMD) shall liable to be forfeited.
- H. Approval for change of constitution of JV firm shall be at the sole discretion of the UJVN Ltd. The constitution of the JV firm shall not be allowed to be modified after submission of the tender/ bid by the JV firm except when modification becomes inevitable due to succession laws and in any case the minimum eligibility criteria should not get vitiated. However, the Lead Member shall continue to be the Lead Member of the JV firm. Failure to observe this requirement would render the offer invalid.
- I. Similarly, after the contract is awarded, the constitution of JV firm shall not be allowed to be altered during the currency of contract except when modification become inevitable due to succession laws etc. and in any case the minimum eligibility criteria should not get vitiated. Failure to observe the stipulation shall be deemed to be breach of contract with all consequential penal action as per contract condition.
- J. On award of contract to a JV firm, a single Performance Guarantee shall be required to be submitted by the JV firm as per tender conditions. All the Guarantees like Performance Guarantee, Bank Guarantee for Mobilization Advance, Machinery Advance etc., shall be accepted only in the name of the JV firm and no splitting of guarantees amongst the members of the JV firm shall be permitted.
- K. On issue of LOA (Letter of acceptance) an agreement among the members of the JV firm (to whom the work has been awarded) shall be executed This JV agreement shall be submitted by the JV firm to the UJVN Ltd before signing the contract agreement for the work. In case the Bidder fails to observe/comply with this stipulation, the full Earnest Money Deposit (EMD) shall be forfeited and other penal actions due shall be taken against partners of the JV and the JV. This joint Venture Agreement shall have, inter-alia following clauses:
  - i. *Joint and Several Liability: Members of the JV firm to which the contract is awarded, shall be jointly and severally liable to the UJVN Ltd for execution of the project in accordance with General Conditions, Special Conditions and Technical Specifications of the Contract,. The JV members shall also be liable jointly and separately for loss, damages caused to the UJVN Ltd during the course of execution of the contract or due to non-execution of the contract or part thereof.*
  - ii. *Duration of the joint Venture Agreement: It shall be valid during the entire currency of the contract including the period of extension if any and the defect liability period after the work is completed.*
  - iii. *Governing Laws: The Joint Venture Agreement shall in all respect be governed by and interpreted in accordance with Indian Laws.*

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L. Authorized Member: Joint venture members shall authorize one of the members on behalf of the Joint Venture Firm to deal with the tender, sign the agreement or enter into contract in respect of the said tender, to receive payment, to witness joint measurement of work done, to sign measurement books and similar such action in respect of the said tender/contract. All notices/correspondences with respect to the contract would be sent only to this authorized member of the JV Firm.

M. No member of the Joint Venture Firm shall have the right to assign or transfer the interest right or liability in the contract without the written consent of the other members and that of the UJVN Ltd in respect of the said tender/contract.

N. Documents to be enclosed by the JV firm along with the tender.

- i. In case one or more of the members of the JV Firm is/are partnership firm(s), following documents shall be submitted:
  - a. Notary certified copy of the Partnership Deed
  - b. Consent of all the partners to enter into the Joint Venture Agreement on a stamp paper of appropriate value (in original)
  - c. Power of Attorney (duly registered as per prevailing law) in favour of one of the partners of partnership firm to sign the JV Agreement on behalf of the partnership firm and create liability against the firm.
- ii. In case of one or more members is/are Proprietary Firm or HUF, the following documents shall be enclosed:

Affidavit on Stamp Paper of appropriate value declaring that his/her Concern is a Proprietary Concern and he/she is sole proprietor of the Concern OR he/she is in position of 'KARTA' of Hindu Undivided Family (HUF) and he/she has the authority, power and consent given by other partners to act on behalf of HUF.
- iii. In case one or more members is/are limited companies, the following documents shall be submitted:
  - a. Notary certified copy of resolutions of the Directors of the Company, permitting the company to enter into a JV agreement, authorizing MD or one of the Directors or Managers of the Company to sign MOU. JV Agreement, such other documents required to be signed on behalf of the Company and enter into liability against the company and/or do any other and on behalf of the company.
  - b. Copy of Memorandum and Articles of Association of the Company authorizing the person to do/act mentioned in the para (a) above. 3 Signature of the Tenderer c. Power of Attorney (duly registered as per prevailing Law) by the Company authorizing the person to do/act mentioned in the Para (a) above.
- iv. All the members of the JV shall certify that they have not been black listed or debarred by UJVN Ltd or any other Ministry/Department/PSU of the Govt. of India/State Government from participation in tenders/contract on the date of opening of bids either in their individual capacity or as members of the JV or the JV firm in which they were/are members.

O. **Credentials & Qualifying criteria:** Technical and financial eligibility of the JV firm shall be adjudged based on satisfactory fulfillment of the following criteria:

**a. Technical Eligibility criteria:**

Value of a completed work done by a Member in JV Firm shall be reckoned only to the extent of the concerned member's share in that JV Firm for the purpose of satisfying his/her compliance to the technical eligibility criteria in the tender under consideration.

**b. Commercial Eligibility Criterion:**

Financial capacity of a Member in JV Firm shall be reckoned only to the extent of the concerned member's share in that JV Firm for the purpose of satisfying his/her compliance of the commercial eligibility criteria in the tender under consideration.

**2. FILLING AND SUBMISSION OF JV FIRM:**

In case of Joint Venture:

(a) Number of members in a JV firm shall not be more than two partners.

(b) Submit MoU or Joint Venture Agreement, as per Form given in **FORMAT JV-3**

(c) The JV shall nominate a Representative through Power of Attorney as per FORMAT JV-1 who shall have the authority to conduct all business for and on behalf of and all the Parties of the JV during the bidding process and, in the event of JV is awarded the contract, during

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contract execution. Submit Power of Attorney by individual partners to lead partner as per **FORMAT JV-2**.

3. In case the Joint Venture is the successful Bidder, contract shall be executed by JV partner agreed **FORMAT JV-3**

### **SECTION-III**

## **GENERAL CONDITIONS OF CONTRACT**

SECTION -III

GENERAL CONDITIONS OF CONTRACT

**CLAUSE-1: DEFINITIONS:**

In the contract, the following expression shall, unless the context otherwise requires, have the meanings thereby respectively assigned to them:

- (i) **Contract:** means the document forming the tender, acceptance thereof and the formal agreement executed between the UJVN LTD and the Contractor, together with documents referred to therein.
- (ii) **Contract Price:** means the amount arrived at by multiplying the quantities shown in the Bill of Quantities by the respective item rates as allowed and included in the Letter of Acceptance.
- (iii) **Contractor:** means the successful Bidder who is awarded contract to perform the work covered under these tender documents and shall be deemed to include the contractor's successors, executors, representatives or assigns.
- (iv) **Employer:** means the UJVN LTD. having its registered office at "Ujjwal", GMS Road, Maharani Bagh, Dehradun, Pin-248006 and includes therein legal representatives, successors and assignees.
- (v) **Day:** means a calendar day beginning and ending at midnight.
- (vi) **Tender Drawings:** means the drawings referred to in the Specifications and/or appended with the tender document.
- (vii) **Construction Drawing:** means such drawings approved in writing by the Engineer-in-Charge/ Employer and issued for actual construction of the Works from time to time by the Engineer-in-Charge.
- (viii) **Tender:** means the Letter of Tender and all other documents which the Contractor submitted with the Letter of Tender, as included in the Contract.
- (ix) **Drawing:** means and shall include Tender drawing and Construction Drawing.
- (x) **Engineer-in-Charge/Engineer:** means the Engineering Officer nominated by the Employer or its duly authorized representative to direct, supervise and be In-charge of the works for the purpose of this contract.
- (xi) **Letter of Award or Acceptance:** means a letter from the Employer/Engineer-in-Charge conveying the acceptance of the tender/offer subject to such reservations as may have been stated therein.
- (xii) **Specifications:** means the Technical specification of the Works included in the Contract and any modification thereof or addition thereto made under Clause 18 or submitted by the Contractor and approved by the Engineer.
- (xiii) **Schedules:** means the document(s) entitled schedules, completed by the Contractor and submitted with the Letter of Tender, as included in the Contract. Such document may include the Bill of Quantities, data, lists and schedules of rates and /or prices.
- (xiv) **Sub-Contractor:** 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 Employer and the legal successors in title to such person, but not any assignee of any such person.
- (xv) **Contractor's Representative:** means the person named by the Contractor in the Contract or appointed from time to time by the contractor (Contractor Representative) who act on behalf of the Contractor.
- (xvi) **Contractor's Personnel:** means Contractor's representative and all personnel whom the Contractor utilizes on Site, who may include the staff, labour and other employees of the contractor and of each Subcontractor; and any other personnel assisting the Contractor in execution of the Works.
- (xvii) **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.
- (xviii) **Bill of Quantities or Schedule of Quantities & Price:** means the price and complete bill of quantities forming part of the Contract.
- (xix) **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 39) calculated from the Commencement Date.
- (xx) **Plant:** means machinery, apparatus and like intended to form or forming part of Works.

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- (xxi) **Permanent works:** means the permanent works to be executed (including Plant) in accordance with the Contract.
- (xxii) **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.
- (xxiii) **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.
- (xxiv) **Site:** means the land and/or other places, on or through which the works are to be executed including any other lands or places which may be allotted for the purpose of the contract.
- (xxv) **Urgent Works:** means any urgent measures, which in the opinion of the Engineer-in-Charge, become necessary at the time of execution and/or during the progress of work to obviate any risk of accident or failure or to obviate any risk of damage to the structure, or required to accelerate the progress of work or which become necessary for security or for any other reason the Engineer-in-Charge may deem expedient.
- (xxvi) **Week:** means seven consecutive calendar days.
- (xxvii) **Work or Works:** means Permanent Works and/or Temporary Works to be executed in accordance with the Contract.
- (xxviii) **Date of Start:** means the date to commence work at site.
- (xxix) **Tests on Completion:** means the tests which are specified in the Contract or agreed by both Parties and to be carried out before the Work or a section (as the case may be) is taken over by the Employer.
- (xxx) **Defects Notification Period and Unfulfilled Obligations:** means the period for notifying defects in the Works or a Section (as the case may be) under Sub-Clause 43 (Defects Liability Period), with any extension under Sub-Clause 42.1. Further, unfulfilled obligation means, contractor shall have to complete the work and rectifying the defects, if any, under clause 56.
- (xxxi) **Final Payment Certificate:** means the payment certificate issued under Sub -Clause 42.1
- (xxxii) **Interim Payment Certificate:** means a payment certificate issued under Clause 45, other than Final Payment Certificate.
- (xxxiii) **Retention Money:** means the accumulated retention moneys which the Employer retains under Sub- Clause 45.2
- (xxxiv) **Employer's Equipment:** means the apparatus, machinery and vehicles (if any) made available by the Employer for the use of the Contractor in the execution of the Works, as stated in the Specification; but does not include Plant which has not been taken over the Employer.
- (xxxv) **Force Majeure:** is defined in Clause 32 [Force Majeure].
- (xxxvi) **Performance Security:** means the security ( or securities, if any) Clause 3 [Performance Security]

### CLAUSE-2: INTERPRETATIONS:

- 2.1 Words imparting the singular only shall also include the plural; he includes she and vice versa unless this is repugnant to the context. Unless specifically defined, words shall have normal meaning under the language of Contract.
- 2.2 Heading and marginal notes in these General Conditions shall not be deemed to form part thereof or be taken into consideration in the interpretation or construction thereof of the Contract.
- 2.3 Any error in description, quantity or price in Bill of Quantities or any omission there from shall not vitiate the Contract or release the Contractor from execution of the whole or any part of the Works comprised therein according to drawings and Specifications or from any of his obligations under the Contract.
- 2.4 Relevant and Important pre-contract documents shall form the part of the Contract. Pre Contract document shall include bidding document such as Notice Inviting Tenders, Instruction to Bidders, Bid Data Sheet, Qualification Criteria, etc. These documents will also include communications in the form of letters, communications in form of letters, minutes of meetings, and e-mails between the bidders and the Employer seeking clarifications about the Project/bid conditions.
- 2.5 Detailed drawings shall be followed in preference to small scale drawings (sketch drawings) and figured dimensions in preference to scaled dimensions. In the case of discrepancy between the Letter of acceptance issued by Employer, Special Conditions of Contract, Technical Specifications, General

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Conditions of Contract, the Tender Drawings and/or Bill of Quantities and other documents of Contract the following order of precedence shall prevail:

- a) Agreement
- b) Letter of acceptance issued by Employer;
- c) Price Bid
- d) Special Conditions of Contract
- e) Technical Specifications
- f) General Conditions of Contracts
- g) Tender Drawings;
- h) Safety Manual.
- i) Any other document forming part of the Contract

### CLAUSE-3: SECURITY DEPOSIT:

The Security Deposit shall comprise of following

- (i) **Performance Security:** Initial Security Deposit to be furnished by the Contractor at the time of entering in agreement towards performance Guarantee.
- (ii) **Security Deposit/Retention Money:** Retention Money to be recovered from Interim bills/ final bills of the Contractor towards security deposit for defect liability period

The Contractor within 28 days from the date of issue of Letter of Acceptance (LOA) or a period stipulated in LOA, shall furnish a **initial security deposit for performance** as per **clause 3.2** in form of **FDR/CDR/TDR** of any nationalised bank or any other form demanded by Employer/authority entering in agreement, **duly pledged in favour of "Dy.G.M. (Civil Maintenance), Dhalipur"**. and valid during concurrency of contract period and shall only be released after successful completion of work.

#### 3.1 Performance security shall be deposited as per following formulae:

**(i)Percentage Rate Contracts:** The performance Security shall be provided by the contractor to the Employer not later than the date specified in the letter of acceptance and shall be issued for an amount of 5% of the Contract Price or the estimated cost of the work, whichever is higher, in the form of **FDR/CDR/TDR** acceptable to the Employer issued from any branch of nationalised bank/ scheduled bank duly pledged in favour of **"Dy.G.M. (Civil Maintenance), Dhalipur"**. The performance security shall be valid till the defect liability period. The Employer may increase the Performance Security to a level sufficient to protect it against the possibility of financial loss, if the lowest evaluated bid is below the estimated cost of the work. The additional performance security shall be valid till the completion period of the work. The amount of additional performance security shall be worked out as follows

- a. Up to 5% below the Estimated Cost: No Additional Performance Security.
- b. From 5% below to 15% below the Estimated Cost, an Additional Performance Security of 0.5% of the estimated cost for every 1% below the estimated cost,
- a. For more than 15% below the estimated cost, an Additional Performance Security of 1% of the estimated amount for every 1% below the estimated cost.

#### **Note:**

1. If the percentage below is not a whole number, any percentage above 0.5% shall be rounded off to next higher whole number and any percentage below 0.5% shall be rounded off to immediate lower whole number.
2. The Performance Security as applicable shall be refunded to the contractor after defect liability period and Additional Performance Security as applicable shall be refunded to the contractor after issuance of completion certificate.

**(ii) Item Rate Contracts:** The performance Security shall be provided by the contractor to the Employer not later than the date specified in the letter of acceptance and shall be issued for an amount of 5% of the contract price or the estimated cost of the work, whichever is higher, in the form acceptable to the Employer from reputable local banks including scheduled banks or nationalized banks acceptable to the Employer. The performance security shall be valid till the defect liability period. The Employer may increase the Performance Security to a level sufficient to protect it against the possibility of financial loss, if the lowest evaluated bid is below the estimated cost of the work. The additional performance security shall be valid till the completion period of the work. The amount of additional performance security shall be worked out as follows

- a. No Additional performance security for Item Rates up to 5% below the Estimated Item rate,

- b. An Additional performance security of 10% of the estimated cost of items, for Item Rates from 5% to 15% below the estimated rate,
- c. An Additional performance security of 15% of the estimated cost of items, for Item Rates more than 15% below the estimated rate.

**Note:**

*The Performance Security as applicable shall be refunded to the contractor after defect liability period and Additional Performance Security as applicable shall be refunded to the contractor after issuance of completion certificate*

- 3.2 **Security Deposit/Retention Money** shall be deducted by the Engineer-in-Charge from the all interim bills/final bill of the Contractor @ 5% (five percent) of the total value of each bill of the work done (including those of price variation) towards security deposit. Security deposit thus retained shall only be released after expiry of defects liability period and the Engineer I/C has certified that all Defects notified by the Engineer I/C to the contractor before the end of this period have been corrected.
- 3.4 If the Contractor expressly requests in writing, he will be permitted to convert the amount of Security/Retention Money deducted from his interim bills/final Bill into CDR/FDR/TDR but shall be pledged in favour of “**Dy.G.M. (Civil Maintenance), Dhalipur**”.
- 3.5 All compensation or other sums of money payable by the Contractor to the Employer under the terms of this Contract or any other contract or on any other account whatsoever, may be deducted from Security Deposit .Also in the event of the contractor's Security Deposit being reduced by reasons of such deductions, as aforesaid, the Contractor shall, within 14 days of receipt of notice of demand from the Engineer-in-Charge, make good the deficit in Security Deposit.
- 3.6 If any occasion arises under the Contract due to which the periods of validities of **FDR/CDR/TDR** as may have been furnished by the Contractor from time to time, are required to be extended/renewed, the Contractor shall get the validity periods of such guarantees extended/renewed, and furnish these to the Engineer- in- Charge one month before the expiry date of the aforesaid Guarantees originally furnished, failing which the existing **FDR/CDR/TDR** shall be invoked by the Engineer – in – charge. Also in case of any deficit in securities on any account as might occur or is noticed, the Contractor shall forthwith recoupe/replace the same with acceptable Security Deposit.
- 3.7 **FDR/CDR/TDR** as aforesaid shall be valid till the date of expiry of Defects Liability Period under the Contract (Clause 43).

**CLAUSE-4: REFUND OF SECURITY DEPOSIT:**

The Security Deposit amount shall, on demand, shall be returned to the contractor after expiry of Defects Liability Period (Clause 43).

**CLAUSE-5: SUFFICIENCY OF TENDER:**

- 5.1 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 and all matters and things necessary for the proper execution and completion of the Works and the remedying of any defects therein.
- 5.2 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-in-Charge. On receipt of such notice, the Engineer-in-Charge shall, if in his opinion such obstructions or conditions could not have been reasonably foreseen by an experienced contractor shall determine, and shall notify the Contractor accordingly, with approval of the Employer. Such determination shall take account of any instruction which the Engineer-in-Charge may issue to the Contractor in connection therewith, and any proper and reasonable measures acceptable to the Engineer-in-Charge which the Contractor may take in the absence of specific instructions from the Engineer-in-Charge.

**CLAUSE-6: CONTRACT DOCUMENTS:**

- 6.1 The Contract shall be signed in one original and attested photocopy shall be issued to contractor. The language of the contract shall be English.
- 6.2 The Contractor shall furnish free of charge, 10 true copies of the Contract to the Employer.

- 6.3 One copy of Contract shall be kept by the contractor on the Site in good order and the same shall at all reasonable time be available for inspection and use by the Engineer-in-Charge, his representatives or by other Inspecting Officers.
- 6.4 None of these Documents shall be used by the Contractor for any purpose other than that of this contract.

**Clause 7: LIFE-SAVING APPLIANCES AND FIRST-AID EQUIPMENT:**

The Contractor shall provide and maintain upon the works sufficient, proper and efficient life-saving appliances and first-aid equipment in accordance with the requirement of ILO Convention No.62. The appliances and equipment shall be available for use at all time.

**CLAUSE-8: DUTIES AND POWERS OF ENGINEER-IN-CHARGE'S REPRESENTATIVE:**

- 8.1 The duties of the representative of the Engineer-in-Charge are to watch and supervise the works/supply and to test and examine any materials to be used or workmanship employed in connection with the works/supply.
- 8.2 The Engineer-in-Charge may, from time to time in writing, delegate to his representative any of the powers and authorities, vested in the Engineer-in-Charge and shall furnish to the contractor a copy of all such written delegation of powers and authorities. Any written instruction or written approval given by the representative of the Engineer-in-Charge to the contractor within the terms of such delegation shall bind the contractor and the Employer as though it has been given by the Engineer-in-Charge.
- 8.3 Failure of the representative of the Engineer-in-Charge to disapprove any work or materials shall be without prejudice to the power of the Engineer-in-Charge thereafter to disapprove such work or materials and to order the pulling down, removal or breaking up thereof. The Contractor shall, at his own expense, again carry out such works as directed by the Engineer-in-Charge.
- 8.4 If the Contractor is dissatisfied with any decision of the representative of the Engineer-in-Charge, he will be entitled to refer the matter to the Engineer-in-Charge who shall thereupon confirm, reverse or vary such decision and the decision of the Engineer-in-Charge in this regard shall be final and binding on the contractor.

**CLAUSE-9: ASSIGNMENT AND SUB- Contracting:**

- 9.1 The Contractor shall not sub-contract, transfer or assigns the whole or any part of the work/trade under the Contract. Provided that the Engineer-in-Charge may, at his discretion, approve and authorize the Contractor to sub-let any part of the Work/trade, which, in his opinion, is not substantial, after the Contractor submits to him in writing the details of the part of the work(s) or trade proposed to be sublet, the name of the sub-contractor thereof together with his past experience in the said work/trade and the form of the proposed sub-contract. Nevertheless any such approval or authorization by the Engineer-in-Charge shall not relieve the Contractor from his any or all liabilities, obligations, duties and responsibilities under the Contract. The Contractor shall also be fully responsible to the Employer for all the acts and omissions of the sub-contractor, his employees and agents or persons directly employed by the Contractor. However, the employment of piece rate workers and purchase of material shall not be construed as sub-letting. Request for sub- contracting shall contain.
- a) Contractor's certification regarding the financial soundness of the proposed Sub-contractor for the work/trade;
  - b) its scope and estimated value in relation to the Contract Price;
  - c) experience of the Sub-contractor, in the related areas of work/trade;
  - d) the manpower, equipment, material and other resources available with the Sub-contractor for the work/trade;
  - e) domicile of the Sub-contractor and particulars of its other existing operations or contracts if any, in India.
- 9.2 The subcontracting of the entire work will be treated as assignment, and subcontracting entire work or part of it without prior-approval shall be treated as breach of the contract.
- 9.3 The assigning of complete work to other agency without permission from Engineer-In Charge will be strictly prohibited.
- 9.4 The Engineer-in-charge at his discretion may withdraw the permission even after issuance of approval for assigning the work from contractor. Once an approval is so withdrawn, the contractor will immediately remove the subcontractor.
- 9.5 Direct payment to the sub contractor, if any shall be solely on the discretion of Engineer In Charge which shall be final & binding to all parties.

**CLAUSE-10: FACILITIES TO OTHER CONTRACTORS:**

- 10.1 The Contractor shall, in accordance with the requirements of the work as decided by the Engineer-in-Charge, afford all reasonable facilities to other contractors engaged contemporaneously on separate contracts and for departmental labour and labour of any other properly authorized authority or statutory body which may be employed at the site for execution 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. In all matters of conflict of interest, the Engineer-in-Charge shall direct what compromise should be made and his decision shall be final and binding on the parties.
- 10.2 If, however, pursuant to Sub-Clause 10.1 the Contractor shall, on the written request of the Engineer-in-Charge:
- (a) make available to any such other contractor, or to the Employer or any such authority, any roads or ways the maintenance of which is the responsibility of the Contractor ,
  - (b) permit the use, by any such, of Temporary facilities or Contractor's Equipment on the Site, or
  - (c) provide any other service of whatsoever nature for any such,
- the Engineer-in-Charge shall determine the payment admissible to the Contractor at the cost of other contractors or Employer as the case may be.

**CLAUSE-11: CHANGES IN CONSTITUTION:**

Where the Contractor is a partnership firm, prior approval in writing of the Engineer-in-Charge shall be obtained before any change is made in the constitution of the firm. Where the Contractor is an individual or a Hindu undivided family business concern, such approval, as aforesaid, shall likewise be obtained before the Contractor enters into any partnership firm which would have the right to carry out the work undertaken by the Contractor. If prior approval as aforesaid is not obtained, the Contract shall be deemed to have been assigned in contravention of Clause 38 thereof and the same action will be taken and the same consequences shall ensure as provided for in the said Clause 38.

**CLAUSE-12: POSSESSION AND USE OF SITE:**

- 12.1 Save in so far 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 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. 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 in accordance with such programme or proposals, as the case may be.
- 12.2 If the Contractor suffers delay from failure on the part of the Employer to give possession in accordance with the terms of Sub-Clause 12. 1, the Engineer-in-Charge shall, determine any extension of time to which the Contractor is entitled under Clause 39. The contractor shall be responsible to arrange the land for Contractor's infrastructure works namely field office(s), colony, workshop(s), stores, magazines for explosives in isolated locations, assembly yard, and access thereto over routes as may be required for execution of the Works at his own cost and Employer shall not be responsible for making available the same.
- 12.3 The Contractor shall provide at his own cost all temporary pathways/roads required at site or to quarries or borrow areas and shall alter, adopt and maintain the same as required from time to time and shall bear all expenses and charges for special or temporary way leaves required by him in connection with access to the site and shall take up and clear them away and make good all damages done to the site as and when no longer required and as and when ordered by the Engineer-in-Charge.

**CLAUSE-13: ADVANCES AND RECOVERY THEREOF:**

- 13.1.1 **Advances for Initial Mobilization, Preliminary, Enabling and Ancillary Works**  
No advance for initial mobilization etc shall be paid by the Nigam.

No mobilization advance shall be given by Employer to contractor for the contract.

**13.1.2 Recoveries**

Department will have full power to recover the any type of due/all the dues of contractors from retained money, RA bills/FDRS's of same contractor available with the department irrespective of the purpose of taking FDR'S or retaining money from the contractor. If the security for the contract fails to suffice, then recovery from the other contracts of the same contractor may be made.

**13.1.3. ADVANCE FOR CONSTRUCTION EQUIPMENT:**

No advance for construction equipment shall be paid by the Nigam.

**CLAUSE-14: COMMENCEMENT OF WORK:**

- 14.1 The Contractor shall commence the Work(s) immediately after the issue of Letter of Acceptance and shall proceed with the same with the expedition and without delay as may be expressly sanctioned or ordered by the Engineer in- charge. If the Contractor commits default in the commencement of work as stipulated in the Letter of Acceptance, the Engineer-in-Charge shall without prejudice to any other right or remedy be at liberty to cancel the Contract and forfeit the earnest money.
- 14.2 Contractor shall follow a mutually agreed planning & scheduling to complete the work/trade within stipulated time frame. However, it shall not relieve the Contractor of any of his duties, obligations or responsibilities under the Contract.

**CLAUSE-15: WORKS TO BE CARRIED OUT IN ACCORDANCE WITH SPECIFICATIONS, DRAWINGS AND ORDERS, ETC:**

- 15.1 The Contractor shall execute the Works/trade in the most substantial and workmanlike manner and both as regards material and otherwise in every respect in strict conformity with the Specification. The Contractor shall also conform exactly, fully and faithfully to the designs, drawings, Specifications and instructions in writing in respect of the work, duly signed by the Engineer-in-Charge issued from time to time. The Contractor shall take full responsibility for the adequacy of all the site operations and methods of construction.

The Contractor shall give prompt notice to the Engineer-in-Charge, with a copy to the Employer, of any error, omission, fault or other defect in the design of or Specifications for the Works which he discovers when reviewing the Contract or executing the Works.

- 15.2 The Contractor shall be entitled to receive, the documents set forth herein during the performance of the Contract:

- |                                                                                                               |        |
|---------------------------------------------------------------------------------------------------------------|--------|
| a. Construction drawings and revisions thereto                                                                | 1 sets |
| b. Specifications or revisions thereof other than Standard printed Specifications/available in Nigam website. | 1 sets |
| c. Explanations, instructions etc.                                                                            | 1 copy |

Such further drawings, explanations, modifications and instructions, as the Engineer-in-Charge may issue to the Contractor from time to time in respect of the Work, shall be deemed to form integral part of the Contract and the Contractor shall to carry out the Work accordingly.

- 15.3 The Contractor shall give notice to the Engineer-in-Charge, whenever planning or execution of the Works/Trade is likely to be delayed or disrupted unless any further drawing or instruction is issued by the Engineer-in-Charge 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.
- 15.4 If, by reason of any failure or inability of the Engineer-in-Charge 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 15.3, the Contractor suffers delay then the Engineer-in-Charge shall, after approval of the Employer determine any extension of time to which the Contractor is entitled under Clause 39.
- 15.5 In the case of any class of work for which there is no specification in the contract such work/Trade shall be carried out in accordance with the detailed specification (latest) published I. S. I. New Delhi and in the

event of there being no detailed specifications for the same, the work shall be carried out in all respects in accordance with the instruction and requirements of the Engineer-in-charge / Engineer of the Contract.

**CLAUSE-16: SETTING-OUT THE WORKS:**

- 16.1 The Engineer-in-Charge shall establish/indicate the Bench Marks and convey the same in writing to Contractor immediately after Letter of Acceptance. Engineer in-charge shall be responsible for correctness of such data / bench marks conveyed to the Contractor.
- 16.2 The Contractor shall be responsible for the true and proper setting out of all the work (in relation to the afore-mentioned Bench Marks) for the correctness of the location, grades, dimensions and alignment of all components of the work; and for the provisions of all instruments, appliances, materials and labour required in connection therewith. If at any time during the progress of work, any error shall appear or arise in the location, grades, dimensions, or alignment of any part of the Work, the Contractor on being required to do so by the Engineer-in-Charge shall, subject to Clause 16.1 hereof, at his own expense, rectify such error to the satisfaction of the Engineer-in-Charge.
- 16.3 The Contractor shall afford all reasonable facilities and assistance to the Engineer-in-Charge for checking the setting out and lines and grades established by the Contractor. The checking of any setting out or of any line and grade by the Engineer-in-Charge shall not in any way relieve the contractor of his responsibility for the correctness thereof.

**CLAUSE-17: URGENT WORKS:**

If any part of work/ trade (in respect whereof the decision of the Engineer-in-Charge shall be final and binding) becomes necessary, the contractor shall execute the same as may be directed.

**CLAUSE-18: DEVIATIONS:**

- 18.1 The Engineer-in-Charge shall have powers to make any deviations in the original specifications or drawings or designs of the works or any part thereof that are, in his opinion, necessary at the time of or during the course of execution of the Works. For the aforesaid purpose or for any other reason, if it shall, in the opinion of the Engineer-in-Charge, be desirable, he shall also have the powers to make Deviations, such as (i) Variations (ii) Extra Item (iii) Additions/Omissions and (iv) Alterations or Substitutions of any kind. No such Deviations in the specifications or drawings or designs or Bill of Quantities, as aforesaid, shall in any way vitiate or invalidate the Contract and any such Deviations which the Contractor may be directed to do shall form integral part of the Contract as if originally provided therein and the Contractor shall carry out the same on the same terms & conditions in all respects on which he agreed to do the works under the contract subject to clause 18.2.1.i and ii

**18.2.1 Variation in Quantities:**

The rates for such items of work as are required to be executed due to Deviations, as stated in sub clause 18.1 above shall be payable in the manner as stated hereunder

- i) If the rates for the additional, altered or substituted item of work are specified in the Bill of Quantities of contract of the work, the contractor is bound to carry out the additional, altered or substituted item of work at the same rates as specified in the Bill of Quantities of contract of the work.
- ii) However, the quoted rates hold good for all plus or minus variation in any item of work upto any extent.

**18.2.2 Extra Item:**

- i) If the rates for the additions, altered or substituted item of work are not specifically provided in the Bill of quantities of contract for the work, the rates of such items of work as far as practicable shall be derived from the quoted rates of analogous item(s) in the Bill of Quantities.
- ii) In case, where analogous items are not available in the bill of quantities then such items of work shall be carried out at the rates approved in the current PWD SoR/ CPWD DSR with minus or plus percentage which the total tendered amount bears to the estimated cost of entire work put to tender.
- (iii) If the rates for altered, additional or substituted item of work cannot be determined in the manner specified in para (i) & (ii) above, then the contractor shall submit analysis of rates on the basis of prevailing market rates. The Engineer-in-Charge shall examine the rate analysis submitted by the Contractor and fix the rates accordingly whose decision shall be conclusive, final and binding on the Contractor and which shall be approved by competent authority of employer and pay to the contractor accordingly. But under no circumstances, the contractor shall suspend the work on the plea of no settlement of rates of items, falling under this clause.

- iv) Over and above the cost of labour, material arranged by the Contractor and ownership & operational cost of plant and machinery, an element to cover the Contractor's overheads, profits, and supervision charges shall be as per prevailing rates of CPWD/SOR-Uttarakhand.

The rates under sub-clause (i), (ii) & (iii) shall be worked out by the Engineer-in-charge and the contractor and after approval of employer shall be payable to contractor.

- 18.3 Provided further that if Additions/Omissions and Alterations or Substitutions of any kind to the work shall have the effect of increasing or decreasing the total value of this contract work upto any extend for minus or plus variation then no price adjustment shall be applicable
- 18.4 If requested by the Contractor, the Time for Completion of the Works shall, in the event of any deviation resulting in additional cost over the Contract Price, be extended in the proportion which the altered, additional or substituted work bears to the original Contract Price plus such further additional time as may be considered reasonable by the Engineer-in-Charge.
- 18.5 Under no circumstances, the Contractor shall suspend the work on account of no settlement of rates of such Deviated items and time extension.
- 18.6 Provided that no deviation, instructed to be done by the Engineer – in – charge pursuant to Clause 18.1 shall be valid under Clause 18.2 unless within 15 days of the date of such instruction before the commencement of execution of deviated items, notice shall have been given either ;
- a) By the Contractor to the Engineer-in-charge of an intention to Claim extra payment or varied rate or price or
- b) By Engineer-in-charge to the Contractor of his intention to vary a rate or price for the deviated items.

**CLAUSE-19: CONTRACTOR'S SUPERVISION:**

- 19.1 The Contractor shall appoint at his own expense adequate number of personnel with sufficient experience to supervise the Works. The name of authorized site representative shall be intimated in writing to the Engineer-in-charge.

The contractor or his authorized representatives present at the site(s) shall superintend the execution of the works with such additional assistance in each trade, as the work involved shall require and considered reasonable by the Engineer-in-Charge. Directions/instructions given by the Engineer-in-Charge to the Contractor's authorized representatives shall be considered to have the same force as if these had been given to the Contractor himself.

**CLAUSE-20: INSTRUCTIONS AND NOTICES:**

- 20.1 Except as otherwise provided in this Contract, all notices to be given on behalf of the Employer and all other actions to be taken on its behalf may be given or taken by the Engineer-in-Charge or any officer for the time being entrusted with the functions, duties and powers of the Engineer-in-Charge.
- 20.2 All instructions, notices and communications etc. under the contract shall be given in writing and any such oral orders/instructions given shall be confirmed in writing and no such communication which is not given or confirmed in writing shall be valid.

Either party may change a nominated address to another address by prior notice to the other party.

- 20.4 The Engineer-in-Charge shall communicate or confirm the instructions to the Contractor in respect of the execution of work in a 'Work Site Order Book' maintained in the office of the Engineer-in-Charge or his representative and the Contractor or his authorized representative shall confirm receipt of such instructions by signing the relevant entries in this book. If required by the Contractor, he shall be furnished a certified true copy of such instruction(s).

**CLAUSE-21: CONSTRUCTION EQUIPMENT:**

- 21.1 The Contractor shall provide and install all necessary construction equipment and machinery required for the execution of the Works under the Contract, at his cost and shall use such methods and appliances for the purpose of all the operations connected with the Work covered by the Contract which shall ensure the completion of Work(s) within the specified Time for completion.
- 21.2 Schedule of construction equipments as per SECTION –V SCHEDULE: C
- 21.3 The Contractor shall not remove construction equipment, except for purpose of removing it from one part of the site to another, without written consent of the Engineer-in-charge.

Provided always that any such approval of Construction equipment schedule in 21.2 shall not absolve the Contractor of his obligations for due execution of the Works within the Time for Completion as per the Contract.

### CLAUSE-22: PATENT RIGHTS:

The Contractor shall indemnify the Employer, its representatives or its employees against any action, claim or proceedings relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties or other charges which may be payable in respect of any article or material or part thereof included in the Contract. In the event of any claim being made or action being brought against the Employer or any agent, servant or employee of the Employer in respect of any such matters as aforesaid, the Contractor shall immediately be notified thereof. Provided that such indemnity shall not apply when such infringement has taken place in complying with the specific directions issued by the Employer, but the Contractor shall pay any royalties or other charges payable in respect of any such use, the amount so paid being reimbursed to the Contractor only if the use was the result of any drawings and/or specifications issued after submission of the tender.

### CLAUSE-23: MATERIALS:

23.1.1 Contractor has to arrange all material, labour and T&P etc. required for proper completion of work in due time. Delay in arrangement of material shall not be excused and suitable penalty as per **Schedule-A** or as decided by Engineer-in-charge, shall be imposed against the contractor. All material shall be approved from Engineer –in-charge prior to its delivery at site.

23.2 Subject to clause 31.2, the Contractor shall at his own expense provide/arrange all materials required for the bonafide use on work under the Contract except those listed and specified in **Schedule 'A'** under **SECTION- V SCHEDULE**. The quantity of such materials as stipulated in the aforesaid **Schedule 'A'** to be issued by the Employer will be that as may be actually required for the work and shall be subject to the terms and conditions as set forth in the sub-clause 23.4 ibid.

23.3 All materials to be provided by the Contractor shall be in conformity with the Specifications laid down in the Contract and the Contractor shall furnish from time to time proof and samples, at his cost, of the materials as may be specified by the Engineer-in-Charge for his approval before use in the Works. The Engineer-in-Charge shall also have powers to have such tests, in addition to those specified in the Contract, as may be required and the contractor shall carry out the same. The cost of materials consumed in such tests and also expenses incurred thereon shall be borne by the contractor in all cases except when the materials are agreed to be issued by the Employer under the contract and also where such tests which are in addition to those provided in the Contract.

The Engineer reserves the right to waive any off the test requirements if found necessary to expedite the work or to conform to the latest and best practices as may be shown by standards prescribed by trade organizations, manufacturers or engineering societies. The Contractor would also arrange for the test of the material issued by the Nigam. However, the cost of these tests shall be borne by the Nigam.

23.3 The Engineer-in-Charge or his representative shall be entitled at any time to inspect and examine any materials intended to be used in or on the works, either on the site or at factory or workshop or other place(s) where such materials are assembled, fabricated, manufactured, or at any place where these are lying or from where these are being obtained. For this purpose, the contractor shall afford such facilities as may be required for such inspection and examination.

23.4 For the materials listed under **SECTION- V :Schedule: A**, which the Employer has agreed to issue to the Contractor for use in the work under the Contract, the Contractor shall, before 90(ninety) days of the requirement in accordance with the agreed phased programme of the construction of work(s), send a requisition in writing to the Engineer-in-Charge. The issue of such materials shall be subject to the following terms and conditions:

- (i) All materials issued by the Employer to the contractor for use in the work shall vest in the Employer and the Contractor shall hold all such items of materials as mere custodian in trust on behalf of the Engineer-in-Charge.
- (ii) All costs, such as loading, transportation, unloading, and storage etc. whatsoever as may be required for the following activities shall be borne by the Contractor:
  - (a) From the place/point of issue by the Employer to the ultimate use for/in the works and/or
  - (b) in connection with the return of materials by the Contractor to the Employer stores, wherever necessary under the provisions of the Contract.
- (iii) The Contractor shall maintain an account of receipt and use of materials issued by the Employer each day and submits the same monthly to the Engineer-in-Charge in the form as may be prescribed

by Engineer-in-Charge for the purpose of check and accounting. The Contractor shall also, from time to time, render proper account of all materials issued by the Employer.

- 23.5 Material used at site shall be as per Technical Specification and direction of Engineer-in-charge and if found defective the same shall not be allowed to be used at site and contractor has to remove the defective material from site at its own cost within three days of such direction issued from Engineer-in-charge.

**23.6 SAFETY REQUIREMENT**

**23.6.1 General**

The provisions detailed here in under are supplementary to safety requirements as stipulated in Central, State or local bodies laws, rules, regulations etc. applicable for the time being and as amended from time to time. Where the provisions conflict with the aforementioned laws etc. by reasons of amendment or any other causes, the stipulations of the aforementioned laws etc. shall govern.

**23.6.2 Safety Provision**

The contractor shall arrange for the safety in his operation as required including the provisions in the safety Manual published by the Central Water and Power Commission New Delhi (January 1962 edition) as amended from time to time. In case the contractor fails to make such arrangements the Engineer-In-Charge shall be entitled to cause them to be provided and to recover the cost thereof from the contractor.

**23.6.3 Explosive**

All operations involving in procurement handling, storage, transportation and use of explosives in surface as well as underground work shall be performed by the contractor in accordance with all applicable Central, State Municipal laws in ordinances as required by the Chief Controller of Explosives, Agra/Nagpur, Government of India/Explosive Act 1983 or as amended time to time.

**CLAUSE-24: POWER SUPPLY:**

Electricity connection if required will have to be arranged by contractor at its own cost. He shall also arrange at its own cost for temporary lighting for his work area. In case any rerouting of such distribution lines is needed to facilitate work at site contractor shall do at its own cost. However if required necessary support will be provided by employer for Electricity connection if requested by contractor.

**CLAUSE-25: SUPPLY OF WATER:**

The Contractor shall make his own arrangements for water required for and in connection with the work at its own cost. It shall be the responsibility of the contractor to satisfy himself that the water arranged by him is fit for construction & consumption & he shall adequately treat such water whenever it is not found fit for the said purposes.

**CLAUSE-26: WATCHING AND LIGHTING:**

The contractor shall provide and maintain at his own expense towards lights, guards, fencing and watching when and where necessary or as required by the Engineer-in-Charge for the protection of the works or for the safety and convenience of those employed on the works or the public.

**CLAUSE-27: WORK DURING NIGHT OR ON SUNDAYS AND HOLIDAYS:**

- 27.1** Subject to any provisions to the contrary contained in the Contract, the Contractor shall have the options to carry out the works continuously during night, Sunday or holidays, without any additional cost to Employer. However, doing so, labor rules shall be followed by contractor.
- 27.2** For a particular work, if it is stipulated in tender document that contracted work is to be performed in night also and accordingly period of completion is worked out, in that case it is mandatory to perform work day and night to complete the work on or before due date of completion. No extra payment shall be made to contractor for arrangement of all resources required for work in day and night; it shall be considered that all such expenses are included in rates quoted by contractor during bidding. However doing so, labour rules and safety of workers, T&P and employees of contractor and employer shall be ensured by contractor by all such arrangements.

**CLAUSE-28: SITE DRAINAGE, PROTECTION OF TREES AND PREVENTION OF NUISANCE:**

- 28.1 The Contractor shall, throughout the execution and completion of the Works and remedying of any defects therein 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.
- 28.2 The Contractor shall endeavor to protect from damage, the trees marked by the Engineer-in-Charge at the site of work or in the lands licensed to him for use under the contract. Where necessary, the contractor shall provide at his expense temporary fencing to protect such trees/ site drainage as per site requirement. No tree shall be cut unless authorized by Engineer-in-Charge in writing to do so.
- 28.3 The contractor shall at no time, cause or permit any nuisance on the site or cause any thing which shall cause unnecessary disturbance or inconvenience to the public in general and owners/tenants/occupants of adjacent properties.

**CLAUSE-29: LABOUR:**

- 29.1 The Contractor shall employ labour in sufficient numbers to maintain the required rate of progress and quality to ensure workmanship of the degree specified in the Contract.
- 29.2 During continuance of the Contract, the Contractor and his sub-contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the law enforcing authority on account of contravention by the Contractor or his Sub-contractor of any of the provisions of any Act or rules made there under, regulations or notifications including amendments.
- 29.3 The employees of the Contractor and his sub-contractor in no case shall be treated as the employees of the Employer at any point of time. In case of any accident, damaged claimed by labour or his family members shall be borne by contractor under the provision of labour laws
- 29.4 Contractor shall resolve all disputes between him and labour/ labours without involving UJVN limited.
- 29.5 The Contractor shall employ labour in sufficient numbers to maintain the required rate of progress and quality to ensure workmanship of the degree specified in the Contract. The Contractor shall not employ in connection with the works any person who has not completed Eighteen years of age. The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labour with appropriate qualifications and experience from the region of the project. Unskilled labour shall be recruited from local region only.
- 29.6 The Contractor shall furnish and deliver fortnightly to the Engineer-in-Charge, a distribution return of the number and description by trades of the works of people employed on the works. The contractor shall also submit on the 4<sup>th</sup> and 19<sup>th</sup> of every month to the Engineer-in- charge a true statement showing in respect of the second half of the preceding month and the first half of the current month.
- (i) The accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them, and
- (ii) The number of female workers who have been allowed maternity benefit as provided in the Maternity Benefit Act, 1961 or Rules made there under.
- 29.7 The Contractor shall ensure to obtain the EPF code number from the concerned authorities before start of work and will not engage any sub-contractor who does not possess EPF code number.
- 29.8 During continuance of the Contract, the Contractor and his sub-contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention by the Contractor of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/acts/rules/regulations including amendments, if any, on the part of the Contractor, the Engineer/Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

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The employees of the Contractor and his sub-contractor in no case shall be treated as the employees of the Employer at any point of time.

Salient features of some of the major labour laws that are applicable to construction industry are given below.

- (i) Workmen Compensation Act 1923 as amended by Amendment Act No.65 of 1976.

The Act provides for compensation in case of injury or death by accident arising out of and during the course of employment.

- (ii) Payment of Gratuity Act 1972

Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more or on death or on retirement or superannuation at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.

- (iii) Employees PF and Miscellaneous Provision Act 1952 including FPS-71/EPS-95.

The Contractor is required to possess PF Code from the concerned Regional Provident Fund Commission. The benefits payable under the Act are:

- (a) Pension or family pension on retirement or death as the case may be.
- (b) Deposit linked insurance on the death in harness of the worker.
- (c) Payment of PF accumulation on retirement/death etc.

- (iv) Maternity Benefit Act 1961 (Amended)

The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.

- (v) Contract Labour (Regulation and Abolition) Act 1970 with Rules framed there under as amended.

The Act provides for certain welfare measures and wages to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided by the Principal Employer by Law and recover the same from the Contractor from any amount/monies due to him. The principal employer is required to take Certificate of Registration and the Contractor is required to take a License from the designated Officer. The Act is applicable to the establishments of contractor if they employ 20 or more contract labour.

- (vi) Minimum Wages Act 1948 (Amended)

The Contractor is to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act..

- (vii) Payment of Wages Act 1936 (Amended)

It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.

- (viii) Equal Remuneration Act 1979

The Act provides for payment of equal wages for work of equal nature to male and female workers and not for making discrimination against Female employees in the matters of transfers, training and promotions etc.

- (ix) Payment of Bonus Act 1965 and Amendment Act No.43 of 1977 and No.48 of 1978 and any amendments thereof.

The Act is applicable to all establishments employing 20 or more workmen. The Act provides for payments of annual bonus subject to a minimum of 8.33 % of wages and maximum of 20 % of wages to employees drawing Rs. 3,500/- P.M. or less. The bonus to be paid to employees getting Rs. 2,500/- PM or above up to Rs. 3,500/- PM shall be worked out by taking wages as Rs 2,500/- p.m. only. All amounts of Bonus are required to be paid within eight months of closing of financial year. The Act does not apply to certain establishments, classes of employees. The newly set up establishments are exempted for five years in certain circumstances.

- (x) Industrial Disputes Act 1947(Amended)

The Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

- (xi) Industrial Employment (Standing Orders) Act 1946 (Amended)

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It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Contractor on matters provided in the Act and get the same certified by the designated Authority.

(xii) Trade Unions Act 1926

The Act lays down the procedure for registration of trade unions of workmen and employers. The trade unions registered under the Act have been given certain immunities from civil and criminal liabilities.

(xiii) Child Labour (Prohibition and Regulation) Act 1986

The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labour is prohibited in Building and Construction Industry.

(xiv) Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act 1979

The Act is applicable to an establishment, which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The inter-state migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home upto the establishment and back, etc.

(xv) The Factories Act 1948

The Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.

(xvi) The Personal Injuries (Compensation Insurance) Act, 1963 and any modifications thereof and rules made there under from time to time.

(xvii) The Building and other Construction workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess act of 1996:- All the establishments who carry on any building or other construction work and employs the prescribed minimum (say, 10) or more workers are covered under this Act. All such establishment are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The Employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

Any other act governing the deployment of labour in the work area will be considered

29.9 The Engineer-In-Charge shall on a report having been made by an authorized Inspecting Officer as defined in the Contract Labour (Regulation and Abolition) Act and Rules or on his own in his capacity as Principal Employer, have the power to deduct from the amount due to the Contractor any sum required or estimated to be required for making good the loss suffered by worker(s) by reasons of non-fulfillment of the conditions of the Contract for the benefit of workers, non-payment of wages or of deductions made by him from wages which are not justified by the terms of the contract or non-observance of the relevant Acts and Rules with amendments made from time to time. If the Employer makes payment to Contractor's labour due to non-payment of wages to labour by the Contractor, the Employer shall recover the amount thus paid plus 15% towards interest and administration charges from the next Interim Bill of the Contractor.

29.10 The Contractor shall indemnify the Employer against any payments to be made under and for observance of the Regulations, Laws, Rules as stipulated in clause 29.4 above without prejudice to his right to claim indemnity from his sub-contractors. In the event of the Contractor's failure to comply with the provisions of sub-clause 29.4 or in the event of decree or award or order against the Contractor having been received from the competent authority on account of any default or breach or in connection with any of the provisions of sub-clause 29.4 above, the Engineer-in-Charge, without prejudice to any other right or remedy under the Contract, shall be empowered to deduct such sum or sums from the bills of the Contractor or from his Security Deposit or from other payments due under this contract or any other Contract to satisfy within a reasonable time the provisions of the various Acts/Laws/Rules/Codes as mentioned under sub-clause 29.4 above, on the part of the Contractor under the Contract on behalf of and at the expenses of the Contractor and make payment and/or provide amenities/facilities/services accordingly. In this regard, the decision of the Engineer-In-Charge shall be conclusive and binding on the contractor.

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- 29.11 The Contractor shall at his own expense comply with or cause to be complied with the Provisions/Rules provided for welfare and health of Contract Labour in the Contract Labour (Regulation & Abolition) Act and other relevant Acts and Rules framed there under or any other instructions issued by the Employer in this regard for the protection of health and for making sanitary arrangements for workers employed directly or indirectly on the works. In case, the Contractor fails to make arrangements as aforesaid, the Engineer-In-Charge shall be entitled to do so and recover the cost thereof from the Contractor.
- 29.12 The Contractor shall at his own expense arrange for the safety provisions as required by the Engineer-in-Charge, in respect of all labour directly or indirectly employed for performance of the Works and shall provide all facilities in connection therewith. In case the Contractor fails to make arrangements and provide necessary facilities as aforesaid, the Engineer-In-Charge shall be entitled to do so and recover the cost thereof from the Contractor. But this will not absolve the Contractor of his responsibility or otherwise thereof.
- 29.13 In the event of any injury, disability or death of any workmen in or about the work employed by the Contractor either directly or through his sub-contractor, Contractor shall at all times indemnify and save harmless the Employer against all claims, damages and compensation under the Workmen Compensation Act, 1923 as amended from time to time or in other law for the time being in force and rules there under from time to time and also against all costs, charges and expenses of any smooth action by proceedings arising out of such accidents or injury, disability or death of a workmen and against all sum or sums which may with the consent of the Contractor be paid to compromise or compound any claim in this regard. If any award, decree or order is passed against the Contractor for recovery of any compensation under the Workmen Compensation Act, 1923, for any injury, disability or death of a workman by any competent court, the said sum or sums shall be deducted by the Engineer-in-charge from any sum then due or that may become due to the Contractor or from his Security Deposit or sale thereof in full or part under the Contract or any other contract with the Employer towards fulfillment of the said decree, award or orders.
- 29.14 Provided always that the Contractor shall have no right to demand payments/claims whatsoever on account of his compliance with his obligations under this clause and Labour Regulation except those specifically mentioned in the clause 46 pertaining to Price Adjustment/Variation.
- 29.15 Contractor must be well versed with all existing labour rules, laws, regulations, byelaws and notifications of State or Central Government or local authority. Here state or local authority means where work is being executed within the Geographical boundaries.

### **CLAUSE-30: REMOVAL OF CONTRACTOR'S MEN:**

The Contractor shall employ on the execution of the Works only such persons who are skilled and experienced in their respective trades and the Engineer-in-Charge shall be at liberty to object to and instruct the contractor to remove from the works any persons employed by the Contractor on the execution of the works who, in the opinion of the Engineer-in-Charge, misconducts himself or is incompetent or negligent in the proper performance of his duties. The contractor shall forth-with comply with such requisition and such person shall not be again employed upon the works without permission of the Engineer in-charge. Any person so removed shall be replaced immediately.

### **CLAUSE-31: MATERIALS OBTAINED FROM EXCAVATION AND TREASURE, TROVE, FOSSILS ETC:**

- 31.1 Materials of any kind obtained from excavation on the site shall remain the property of the Employer and shall be disposed off as directed by the Engineer-in-Charge.
- 31.2 However, if any of the materials thus obtained from excavation on the site is such as can be used in the execution of the work under the contract, the contractor will be allowed to use the same free of cost (except that any amount of royalty, levies are paid by the Contractor) for the aforesaid purposes provided the same is found suitable and is approved by the Engineer-in-Charge.
- 31.3 Fossils, coins, articles of value, structures and other remains or things of geological or archeological interest discovered on the site shall be the absolute property of the Employer. The Contractor shall take reasonable precautions to prevent his labour or any other person from removing or damaging any such article or thing and shall immediately upon the discovery thereof and before removal acquaint the Engineer-in-Charge with such discovery and carry out the Engineer-in-Charge's directions as to the disposal of the same at the expense of the Employer.

### **CLAUSE-32: FORCE MAJEURE:**

- 32.1 The term "Force Majeure" shall herein mean riots (other than among the contractor's employees), Civil Commotion (to the extent not insurable), war (whether declared or not), invasion, act of foreign enemies, hostilities, civil war, rebellion, revolution, insurrection, military or usurped power, damage from aircraft, nuclear fission, acts of God, such as earthquake (above 7 magnitude on Richter Scale), lightning, unprecedented floods, fires not caused by Contractor's negligence and other such causes over which the Contractor has no control and are accepted as such by the Engineer-in-Charge, whose decision shall be

final and binding. In the event of either party being rendered unable by force Majeure to perform or any obligation required to be performed by them under this contract, the relative obligation of the party affected by such Force Majeure shall be treated as suspended for the period during which such Force Majeure cause lasts, provided the party alleging that it has been rendered unable as aforesaid, thereby shall notify within 10 days of the alleged beginning and ending thereof giving full particulars and satisfactory evidence in support of such cause.

- 32.2 On occurrence of Force Majeure, the liability of either party shall be dealt with, in accordance with the provisions of sub-clause 34.2
- 32.3 There should be a request for extension of time arising out of "Force Majeure" the same shall be considered in accordance with clause 39.

**CLAUSE 33: LIABILITY FOR DAMAGE, DEFECTS OR IMPERFECTIONS AND RECTIFICATIONS THEREOF**

- 33.1 If the Contractor or his labour or sub-contractor, injure, destroy or damage roads, fence enclosures, water pipes, cables, buildings, drains, electricity or telephone posts, wires, trees, grass line, cultivated land in the area in which they may be working or in the areas continuous to the premises on which the work or any part of it is being executed or if any damage is caused during the progress of work, the Contractor shall upon receipt of a notice in writing in that behalf from the Engineer-in-Charge, make the same good at his costs.
- 33.2 If it appears to the Engineer-in-Charge or his representative at any time during construction or reconstruction or prior to the expiration of the Defects Liability period that any work has been executed with unsound, imperfect or unskilled workmanship or that any materials or articles provided by the Contractor for execution of the Works are unsound or of a inferior quality, or otherwise not in accordance with the Contract, or that any defect, shrinkage or other faults found in the work arising out of defective or improper materials or workmanship, the Contractor shall, upon receipt of a notice in writing from the Engineer-in-Charge, forthwith rectify or remove and reconstruct the work so specified in whole or in part, as the case may be, and/or remove the materials/articles so specified and provide other proper and suitable materials at his own expense.
- 33.3.1 If the Contractor fails to rectify, make good or remove and reconstruct the work as notified herein above, the Engineer-in-Charge shall have power to carry out such damages, defects or imperfections by any means or through any other agency or by himself at the risk and cost of the Contractor. In such a case the value of such rectification/replacement, reconstruction through such agencies shall be recovered from the Contractor from any amount due to him. The decision of Engineer-in-Charge in this regard shall be final and binding on the contractor.

**CLAUSE-34: CONTRACTOR'S LIABILITY AND INSURANCE:**

- 34.1 From commencement to completion of the Work(s) as a whole, the Contractor shall take full responsibility for the care thereof and for taking precautions to prevent loss or damage. He shall be liable for any damage or loss that may happen to the Works or any part thereof and to the Employer's Plant, Equipment and Material (hired or issued to the Contractor). Any such loss or damage shall be restored in good order and condition and in conformity in every respect with the requirements of the Contract and instructions of the Engineer-in-Charge.
- 34.2 i) Neither party to the Contract shall be liable to the other in respect of any loss or damage which may occur or arise out of "Force Majeure" to the Works or any part thereof or to any material or article at site but not incorporated in the Works or to any person or anything or material whatsoever of either party provided such a loss or damage could not have been foreseen or avoided by a prudent person and the either party shall bear losses and damages in respect of their respective men and materials. As such liability of either parties shall include claims/compensation of the third party also.
- ii) Provided, however, in an eventuality as mentioned in sub clause 34.2 (i) above, the following provisions shall also have effect:
- (a) The Contractor shall, as may be directed in writing by the Engineer-in-Charge proceed with the erection and completion of the works under and in accordance with the Contract; and
- (b) The Contractor shall, as may be directed in writing by the Engineer-in-Charge, re-execute the works lost or damaged, remove from the site any debris and so much of the works as shall have been damaged and carry the Employer's T&P, Equipment, Material etc, to the Employer's stores. The cost of such re-execution of the works, removal of damaged works and carrying of Employer's store shall be ascertained in the same manner as for deviations and this shall be paid separately to the Contractor.

Provided always that the Contractor shall, at his own cost, repair and make good so much of the loss or damage as has been by any failure on his part to perform his obligations under the Contract or not taking precautions to prevent loss or damage or minimize the amount of such loss or damage.

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- 34.3 The Contractor shall indemnify and keep indemnified the Employer against all losses and claims for death, injuries or damage to any person or any property whatsoever which may arise out of or in consequence of the construction and maintenance of works during the Time for Completion and also against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto, and such liabilities shall include claims/compensations of the third party.
- 34.4 After the issuance of Letter of Acceptance the Contractor shall, without in any way limiting his obligations and responsibilities under this condition, insure and pay all costs and maintain the insurance premium throughout the period of Contract and defects liability period with the coverage as
- (i) for new and renovation/ modernization/up gradation work where new structures are to be built up following insurance will be maintained by contractor throughout the period of contract and defects liability period :
    - (a) the Contractor's Equipment brought at the Site by the Contractor in terms of Clause 21 of GCC., and
    - (b) the contractor's workmen and third part liability ( property and lives)
    - (c) Constructed Structures whether completed or incomplected
  - (ii) for repair and maintenance work, where existing structures are to be repaired and maintained following insurance will be maintained by contractor throughout the period of contract and defects liability period
    - (a) The Contractor's Equipment brought at the Site by the Contractor in terms of Clause 21 of GCC., and
    - (b) The contractor's workmen and third part liability (property and lives)
- 34.5 If the Contractor receives instructions from the Employer to insure against War Risk, such insurance if available shall be effected, at the cost of the Employer.
- 34.6 The Employer shall not be liable for in respect of any damages or compensation payable to any workman or other person in the employment of the Contractor or any subcontractor.
- 34.7 The Contractor shall insure against such liability and shall continue such insurance during the whole of the time and that any persons are employed by him on the Works.
- 34.8 The Contractor shall at his own expense arrange for the safety provisions as laid down in Safety Manual of the Employer in respect of the works covered under this Contract. In case, the Contractor fails to comply with the provisions of the safety manual, the Engineer-in-Charge shall be entitled to and make the necessary arrangement at the risk and cost of the Contractor. This will, however, not absolve the Contractor of his overall responsibility to execute the works under the Contract.
- 34.9 The Contractor shall avail **'Group personal accident insurance policy'** covering all the personnel employed by the Contractor for execution for Works complying requirement of Workmen Compensation Act 1923 as amended by Amendment Act No. 65 of 1976 or amended from time to time

### CLAUSE 35: SUSPENSION OF WORKS:

- 35.1 The contractor shall on the order of the Engineer in- charge suspend the progress of the works or any part thereof for such time or times and in such manner as the Engineer-in-Charge may consider necessary and shall during such suspension properly protect and secure the work so far as is necessary in the opinion of the Engineer in- charge. If such suspension is:
- (a) Provided for in the Contract, or
  - (b) Necessary for the proper execution of the Works or by reason of weather conditions or by some default on the part of the Contractor, or
  - (c) Necessary for the safety of the Works or any part thereof.
- The Contractor shall not be entitled to extra costs (if any) incurred by him during the period of suspension of the works
- 35.2 If the progress of works or any part thereof is suspended on the order of the Engineer-in-Charge for more than three months at a time the contractor may serve a written notice on the Engineer-in-Charge requiring permission within 15 days from the receipt thereof to proceed with the Works or that part thereof in regard to which progress is suspended and if such permission is not granted within that time the Contractor by a further written notice so served may (but is not bound to) elect to treat the suspension where it affects part

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only of the Works as an omission of such part or where it affects the whole of the Works as an abandonment of the Contract by the Employer.

### **CLAUSE 36: FORECLOSURE OF CONTRACT IN FULL OR IN PART DUE TO ABANDONMENT OR REDUCTION IN SCOPE OF WORK:**

- 36.1 If at any time after acceptance of the tender the Employer decides to abandon or reduce the scope of the Works Trade for reason whatsoever and hence does not require the whole or any part of the Works to be carried out, the Engineer-in-Charge shall give notice in writing to that effect to the Contractor, and the contractor shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the works.
- (a) Any expenditure incurred on preliminary works/ trade, e.g. temporary access roads, temporary labour huts, staff quarters and site office; storage accommodation workshop, installation and dismantling of Construction Equipment (batching plant, crushing plant) and water storage tanks.
  - (b) i) The Employer shall have the option to take over Contractor's materials or any part thereof, either brought to site or of which the Contractor is legally bound to accept delivery from suppliers (for incorporation in or incidental to the Work), provided, however, the Employer shall be bound to take over the material or such portions thereof as the Contractor does not desire to retain. The cost shall, however, take into account purchase price, cost of transportation and deterioration or damage which may have been caused to materials whilst in the custody of the Contractor.  
  
ii) For Contractor's materials not retained by the Employer, reasonable cost of transporting such materials from Site to Contractor's permanent stores or to his other Works, whichever is less. If materials are not transported to either of the said places, no cost of transportation shall be payable.
  - (c) If any materials issued by the Employer are rendered surplus, the same except normal wastage for the materials used in the works shall be returned by the Contractor to the Employer.
  - (d) Reasonable compensation for transfer of T&P from Site to Contractor's permanent stores or to his other works whichever is less. If T&P are not transported to either of the said places, no cost of outward transportation shall be payable.
- 36.2 The Contractor shall, if required by the Engineer in- charge, furnish to him books of account, wage books, time sheets and other relevant documents as may be necessary to enable him to certify the reasonable amount payable under this condition.
- 36.3 If the contract termination/ fore closure is triggered on account of orders by Courts, Govt. of India and/or Govt. of Uttarakhand or due to natural calamity, no claim of contractor whatsoever due to such termination or/fore closure of contract shall be payable by the UJVN Limited and no correspondence in this regard shall be entertained.

### **CLAUSE-37: TERMINATION OF CONTRACT ON DEATH:**

If the Contractor is an individual or a proprietary concern and the individual or the proprietor dies, or if the Contractor is a partnership concern and one of the partners dies, then, unless the Engineer-in-Charge is satisfied that the legal representatives of the individual Contractor or of the proprietor of the proprietary concern and in the case of partnership, the surviving partners are capable of carrying out and completing the contract, the Engineer-in-Charge shall be entitled to terminate the Contract as to its uncompleted part without the Employer being in any way liable to payment of any compensation whatsoever on any account to the estate of the deceased Contractor and/or to the surviving partners of the Contractor's firm on account of termination of the Contract. The decision of the Engineer-in-Charge that the legal representatives of the deceased Contractor or the surviving partners of the Contractor's firm cannot carry out and complete the Works under the Contract shall be final and binding on the parties. In the event of such termination, the UJVN Ltd shall not hold the estate of the deceased Contractor and/or the surviving partners of the Contractors firm liable for damages for not completing the Contract. Provided that the power of the Engineer in- charge of such termination of contract shall be without prejudice to any other right or remedy, which shall have accrued or shall accrue to him under the Contract.

### **CLAUSE-38: DEFAULT BY THE CONTRACTOR AND TERMINATION OF CONTRACT IN FULL OR IN PART:**

- 38.1 If the Contractor:
- i) fails or refuses to comply with the conditions of the contract or with the instructions, decision of the Engineer-in-Charge and does not remedy it or take any effective steps to remedy it immediately after a notice in writing is given to him by the Engineer-in-Charge; or

- ii) fails to prosecute or complete the Works or any item of Works with such diligence and such number of skilled and unskilled labour, plant and equipment as in the opinion of the Engineer-in-Charge will ensure its as per construction programme and within the time specified in **Schedule 'B'** or any extended time under the Contract and does not complete the Work(s) or any item of Work(s) within the period specified in a notice given in writing by the Engineer-in-Charge. In such event, the Engineer-in-Charge may communicate by written notice to the contractor his decision to terminate the Contractor's right to proceed with the entire work or such part of the work on which there has been delay; or
- iii) is engaged in corrupt or fraudulent practices in competing for or in the execution of the Contract. For the purpose of this clause
  - a) 'Corrupt Practice' means offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement or execution of Contract.
  - b) 'Fraudulent Practice' means mis-representation of fact (or as per clause 31 of ITB) in order to influence the tendering process or the execution of a Contract and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the employer of the benefits of free and open competition.
- iv) being an individual, or if a firm, any partner thereof, shall at any time be adjudged insolvent or have a receiving order or order for administration of his estate made against him or shall take any proceedings for liquidation for the purpose of amalgamation or reconstruction under any insolvency Act for the time being in force or make any conveyance or assignment of his effective or composition or arrangement for the benefit of his creditors or purport as to do, or if any application be made under any insolvency Act for the time being in force for the sequestration of his estate or if a trust deed be executed by him for benefit of his creditors; or
- v) being a company shall pass a resolution or the Court shall make an order for the liquidation of its affairs or a receiver or manager on behalf of the debenture holders shall be appointed or circumstances shall arise which entitle the Court or debenture holders to appoint a receiver or manager; or
- vi) Suffers an execution being levied on his goods; or
- vii) Assigns, transfers, sublets (engagement of labour on a piece-work basis or of labour with materials not being incorporated in the work shall not be deemed to be subletting) or attempts to assign, transfer or sublet the entire works or any portion thereof without the prior written approval of the Engineer-in-Charge.

In all above events, a notice will be served by registered post/email to contractor by the Engineer-in-charge stating the either of the reason from i) to vii). The Engineer-in-Charge, after the expiry of a period of 14(fourteen) days from the date of receipt of notice by the contractor, shall have powers to terminate the Contract in full or in part as aforesaid without prejudice to any other right or remedy which shall have accrued or shall accrue of which cancellation notice in writing to the Contractor under the hand of the Engineer-in charge shall be conclusive evidence.

viii)

- 38.3 if the contract is terminated in whole or in part, recourse may be taken to any one or more of the following actions:
- a) Forfeiture of the performance security;
  - b) upon such terms and in such manner as it deems appropriate, taking over the site and to complete the works himself or with another contractor (risk Purchase) and use the contractor's materials, equipment, temporary works as he/ they think proper.
  - c) However, the contractor shall continue to fulfill the contract to the extent not terminated.
- 38.2 The Engineer-in-Charge shall, on such termination of the contract, have powers to take possession of the site of work or in part the contract as well as the land/premises allotted to the contractor for his preliminary, enabling and ancillary works and any materials, constructional equipment, implements, stores, structures etc. thereon. The Engineer-in-Charge shall also have powers to carry out the incomplete work by any means or by himself at the risk and cost of the contractor. In such a case, cost of the work done through such agencies shall be paid to the Debitable agency and the Contractor shall pay the excess amount, if any, incurred in completing the work as aforesaid, as stipulated under sub clause 38.4 hereunder.
- 38.3 On termination of the Contract in full or in Part, the Engineer-in-Charge may direct that a part or whole of such plant, equipment and materials, structures be removed from the site of the work as well as from the land/premises allotted to the contractor for his preliminary, enabling and ancillary works, within a stipulated period. If the Contractor shall fail to do so within the period specified in a notice in writing by the Engineer-in-Charge, the Engineer-in-Charge may cause them to be sold, holding the net proceeds of such sale to the credit of the Contractor, which shall be released after completion of works and settlement of amounts under the Contract.
- 38.4 If the expenses incurred or to be incurred by the UJVN Ltd for carrying out and completing the incomplete work or part of the same, as certified by the Engineer-in-Charge, are in excess of the value of the work

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credited/to be credited to the Contractor, the difference shall be paid by the Contractor to the Employer. If the Contractor fails to pay such an amount, as aforesaid, within 14(fourteen) **days** of receipt of notice in writing from the Engineer-in-Charge, the Engineer-in-Charge shall recover such amount from any sums due to the Contractor on any account under this or any other contract or from his Security Deposit or otherwise.

- 38.5 The Engineer-in-Charge shall have the right to sell any or all the Contractor's unused materials, constructional equipment, implements, temporary buildings/structures etc. and apply the proceeds of sale thereof towards the satisfaction of any sums due from the Contractor under the Contract and if thereafter there may be any balance outstanding from the Contractor, the Engineer-in-Charge shall have powers to recover the same as debt.
- 38.6 All decisions/actions of the Engineer-in-Charge under this clause, as aforesaid, shall be conclusive and binding on the contractor.
- 38.7 Termination of contract by other mean**  
If the contract termination/ fore closure is triggered on account of orders by Courts, Govt. of India and/or Govt. of Uttarakhand or due to natural calamity or due to reason beyond the control of UJVN Ltd, no claim of contractor whatsoever due to such termination or/fore closure of contract shall be payable by the UJVN Limited and no correspondence in this regard shall be entertained.

### **CLAUSE-39: TIME FOR COMPLETION AND EXTENSIONS:**

39.1 Time for Completion allowed for execution of the Works/ trade as specified in notice inviting tender.

39.2 However, if the work is delayed on account of:

- i) Delay in handing over of site to the Contractor as per clause 12; or
- ii) Increase in the quantum of work to be done under the contract as per clause 18; or
- iii) Suspension of work /trade as per clause 35; or
- iv) Rebuilding of work as per clause 34; or
- v) "Force Majeure" as per clause 32 or
- vi) Any other cause which, in the opinion of the Engineer-in-Charge is beyond the Contractor's control;

Then, immediately upon the happening of any such event as aforesaid, the Contractor shall inform the Engineer- in charge within fourteen days (14 days) accordingly, but the Contractor shall nevertheless use constantly his best endeavors to prevent and/or make good the delay and shall do all that may be required in this regard. The Contractor shall request, in writing, for extension of time, to which he may consider himself eligible under the Contract, within fourteen days (14 days) of the date of happening of any such events as indicated above.

39.3 In any such case as may have arisen due to any of the events, as aforesaid, and which shall be brought out by the Contractor in writing, the Engineer-in-Charge may give a fair and reasonable extension of Time on prescribed format as per Format IV for Completion of work with a condition that the contractor shall give no claim certificate due to time extension of the contract/work, after taking into consideration the nature of the work delayed and practicability of its execution during the period of extension. Provided in the event of non-receipt of a request for such extensions from the Contractor for reasons whatsoever, the Engineer-in-Charge may, at his sole discretion and with due regard to the event, grant fair and reasonable extension of time sue-motto.

Such extensions, if admissible, shall be communicated to the Contractor by the Engineer-in-Charge in writing.

Provided that Engineer- in – charge is not bound to make any determination unless the Contractor has;

- a) within 14 days after such event has first arisen notified the Engineer-in-charge and
- b) Within 28 days or such other reasonable time as may be agreed by the Engineer – in – charge detailed particulars of any extension of Time for Completion to which the Contractor may consider himself entitled.

39.4 In case, if Engineer –in Charge finds the proposal of time extension is due to default of contractor, the extension of time may be granted by Engineer-in charge with penalty as per clause 40.

### **CLAUSE-40: LIQUIDATED DAMAGE/COMPENSATION FOR DELAY:**

40.1 If the Contractor fails to complete all items of work(s) /trade in respect of any of the sub-group/group and/or work as a whole, as the case may be and as specified in NIT or any extended period under Clause 39 as

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may be allowed, liquidated damage shall levied at a rate 0.05 % (plus GST) of the value of the contract value per day of delay subject to a maximum of 10% (plus GST) of contract value.

- 40.2 The Employer/Purchaser without prejudice to all its other remedies under the contract may deduct from the payable Contract Price the amount of Liquidity damage (Plus GST) as calculated in above manner.
- 40.3 Once the maximum of Liquidity damage is reached, the Employer/Purchaser may terminate the contract pursuant to clause 38 of GCC (default by the contractor and termination of contract in full or in Part).

### CLAUSE-41: INSPECTION AND APPROVAL:

- 41.1 All works / items of supply embracing more than one process shall be subject to examination and approval at each stage thereof and the Contractor shall give due notice to the Engineer-in-Charge or his authorised representative, when each stage is ready. In default of such notice, the Engineer-in-Charge shall be entitled to appraise the quality and extent thereof and the decision of the Engineer-in-Charge in this regard shall be final and binding.
- 41.2 No work/ item of supply shall be covered or put out of view without the approval of the Engineer-in-Charge or his authorized representative and the Contractor shall afford full opportunity for examination of foundations before permanent work is placed thereon. The Contractor shall give due notice to the Engineer-in-Charge or his authorized representative whenever any such work or foundation is ready for examination and the Engineer in- charge or his representative shall, without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly, examine and measure such work or such foundations. In the event of the failure of the contractor to give such notice, he shall, if required by the Engineer-in-Charge, uncover such work at the Contractor's expense.
- 41.3 The Engineer-in-Charge or his representative shall have powers at any time to inspect and examine any part of the works and Contractor shall give such facilities as may be required for such inspection and examination.
- 41.4 The Contractor shall uncover any part of the works/ item of supply and/or make opening in or through the same as the Engineer-in- charge may from time to time direct for his verification and shall reinstate and make good such part to the satisfaction of the Engineer-in-Charge. If any such part has been covered up or put out of view after being approved by the Engineer-in-Charge and is subsequently found, on uncovering, to be executed in accordance with the contract, the expenses of uncovering and/or making openings in or through, reinstating and making good the same, shall be borne by the Employer. In any other causes all such expenses shall be borne by the Contractor.
- 41.4.1 Work executed by the firm /contractor under this bid shall be subject to third party inspection and firm shall be liable to adhere direction of such third party/quality testing and shall make good executed work as per requirement of test, at his own cost. Engineer-in-charge as per its own assessment, shall have right to enforce penalty on the contractor, if any deviation from quality standard is noticed during and after the execution/completion of the work till release of performance guarantee against the contract. Any penalty imposed on the contractor on the basis of third party inspection/quality test report shall be recovered from the any amount payable to the contractor.
- 41.4.2 There shall also be a Project Monitoring system for high value works (Contracts exceeding Rs. 100 Lakh shall be treated as high Value contracts).

### CLAUSE-42: COMPLETION CERTIFICATE:

- 42.1 The work shall be completed to the entire satisfaction of the Engineer-in-Charge and in accordance with the time specified in NIT or any extended period under Clause 39 as may be allowed. As soon as the Works under the Contract is completed as a whole, the Contractor shall give notice of such completion to the Engineer-in-Charge. The Engineer-in-Charge, within two week of receipt of such notice, shall inspect the work and shall satisfy himself that the Work(s) has been completed in accordance with the provisions of the Contract and then issue to the Contractor a certificate of completion indicating the date of completion. If in the notice of Engineer-in-Charge there are defects in the Works or the Works are not considered to be complete, he shall issue a notice in writing to the Contractor to rectify/replace the defective work or any part thereof or complete the work, as the case may be, within such time as may be notified and after the Contractor has complied with as aforesaid and gives notice of completion, the Engineer-in-Charge shall inspect the work and issue the completion certificate in the same manner as aforesaid.
- 42.2 No certificate of completion shall be issued as stipulated under 42.1 above nor Work be considered to be completed unless the Contractor shall have removed from the work site and/or premises all his belongings/temporary arrangements brought/made by him for the purpose of execution of the work and clean the site and/or premises in all respects and made the whole of the site and or premises fit for

immediate occupation/use to the satisfaction of the Engineer-in-Charge. If the Contractor fails to comply with the above mentioned requirements on or before the date of completion of the Work, the Engineer-in-Charge, may, as he thinks fit and at the risk and cost of the Contractor, fulfill such requirements and remove/dispose of the Contractor's belongings/temporary arrangements, as aforesaid, and the Contractor shall have no claim in this respect except for any sum realized by the sale of Contractor's belongings/temporary arrangements less the cost of fulfilling the said requirements and any other amount that may be due from the Contractor. If the expenditure on the aforesaid account exceed the amount realized by sale of such Contractor's belongings/temporary arrangements than the Contractor shall on demand, pay the amount of such excess expenditure.

**CLAUSE-43: DEFECTS LIABILITY PERIOD:**

- 43.1 The "Defect Liability Period" for the entire work under the Contract from the certified date of completion as per clause 42 is as
- a) Defect liability period for demolishing work will be 01 month from date of completion as per clause-42 of GCC.
- 43.2 If during the Defects Liability Period any portion of the Works/ item of supply is found defective or deficient in any manner and is repaired/rectified/replaced pursuant to the defects liability provisions of the Contract, the Defects Liability Period for such portion of the Works, shall, notwithstanding anything to contrary contained herein, be operative for a further period of 6 months from the date of such repair/rectification/ replacement but shall not in any case be operative for more than 18 months from the date of completion stated in the Completion Certificate.

**CLAUSE-44: MEASUREMENTS:**

- 44.1 The Engineer-in-Charge shall except as otherwise stated ascertain and determine by measurement, the value of work/ trade done in accordance with the Contract.
- 44.2 Notwithstanding any provision in the relevant standard method of measurement or any general or local custom, measurement of work done under the Contract shall be taken in accordance with the procedure set forth in the Technical Specifications or Bill of Quantities under the Contract. In the case of items of work, which are not covered by the Technical Specifications or Bill of Quantities, measurement shall be taken in accordance with the relevant standard methods of measurements laid down by the Bureau of Indian Standards (BIS).
- Indian Standards (BIS).
- 44.3 Measurement shall be taken jointly by the Engineer in- charge or his representative and by the Contractor or his authorised representative.
- 44.5 Before taking measurement of any works, the Engineer in- charge or his representative, shall give a reasonable notice to the Contractor. If the Contractor fails to attend or send an authorised representative for measurement after such a notice or fails to countersign or to record the objection within a week from the date of taking the measurements, then in that event the measurements taken by the Engineer in- charge shall be taken to be correct and final measurements of such work.
- 44.6 The Contractor shall, without extra charge, provide assistance with every appliance, labour and other appliances (theodolite, level etc.) and things necessary for measurement.
- 44.7 Measurement shall be signed and dated by both parties on the Site on completion of measurement. If the Contractor objects to any of the measurements recorded by the representative of the Engineer-in-Charge a note to that effect shall be made in the measurement book against the item objected to and such note shall be signed and dated by both parties engaged in taking the measurement. The decision of the Engineer-in-Charge on any such dispute or difference or interpretation shall be final and binding on the contractor in respect of all contract items, substituted items, extra items and deviations. Provided that items of work which are not susceptible to measurement at the later date must be measured jointly and signed accordingly by both the parties at the time of execution of such items.
- contractor in respect of all contract items, substituted items, extra items and deviations. Provided that items of work which are not susceptible to measurement at the later date must be measured jointly and signed accordingly by both the parties at the time of execution of such items.

**CLAUSE- 45 PAYMENTS**

**A** No payment will be made against advance payment by Employer to contractor

**B: PAYMENT ON ACCOUNT:**

- 45.1 Running Account / Interim bills shall be submitted by the Contractor monthly on or before the date fixed by the Engineer-in-Charge for the work executed. The Engineer-in-Charge shall then verify the bills with reference to the measurements recorded in the measurement book(s).

- 45.2 Payment on account for amount admissible shall be made on the Engineer-in-Charge certifying the sum to which the contractor is considered entitled by way of interim payment for the work executed, after deducting therefrom the amounts already paid, the security deposit and such other amounts as may be withheld/deductible or recoverable in terms of the Contract.
- 45.3 Payment of the Contractor's bills shall be made by the Employer within 60 days from the date of submission of the bill subject to the acceptance of the Engineer in- charge.
- 45.4 Payments due to the Contractor shall be made by crossed cheque or through RTGS/NEFT as per the bank account detail provided by the contractor.
- 45.5 Any interim bills given relating to work done or materials delivered, may be modified or corrected by any subsequent interim bills or by the final bill. No certificate(s) of the Engineer-in-Charge supporting an interim payment shall itself be conclusive evidence that any work or materials to which it relates is/are in accordance with the Contract.
- 45.6 There should be a request for extension of Time for completion, pending its consideration; interim payments shall continue to be made as provided herein.
- 45.7 In case of disputed items for which payment has been withheld, the Engineer-in-charge will intimate to the Contractor in writing the details of such disputed items. The Contractor shall submit in writing the clarifications / modifications in regard to these disputed items to the Engineer-in-charge. After receipt of such clarifications / modifications and acceptance thereof by the Engineer-in-charge payment on receipt of such disputed items shall be released within 30 days thereafter.
- 45.8 With respect to material and Plant brought by the Contractor to the Site for incorporation in the Permanent Works, the Contractor shall receive a credit in the month in which these materials and Plant are brought to the Site and be charged a debit in the month in which they are incorporated in the Permanent Works, both such credit and debit to be determined by the Engineer-in-Charge in accordance with the following provisions:
- (a) no credit shall be given unless the following conditions shall have been met to the Engineer-in-Charge's satisfaction:
- (i) The materials and Plant are in accordance with the Specifications for the Works.
  - (ii) the materials and Plant have been delivered to the Site and are properly stored and protected against loss, damage, or deterioration;
  - (iii) The Contractor's record of the requirements, order, receipts and use of materials and Plant are kept in a form approved by the Engineer-in-charge, and such records are available for inspection by the Engineer-in-charge.
  - (iv) The Contractor has submitted a statement of his cost of acquiring and delivering the materials and Plant to the Site, together with such documents as may be required for the purpose of evidencing such cost;
  - (v) The materials are to be used within a reasonable time.
- (b) The amount to be credited to the Contractor shall be the equivalent of 75 percent of the Contractor's reasonable cost of materials and Plant delivered to the Site, as determined by the Engineer-in-Charge after review of the documents listed in sub-para (a)(iv) above; However for perishable material such as lime, cement, sand, aggregate, stone, Timber etc. shall not be credited to contractor to pay such amount. Bricks, rolled steel joists, reinforced steel, GI roofing sheets etc shall be considered imperishable material for which contractor may be credited such amount.
- (c) The amount to be debited to the Contractor for any materials and Plant incorporated into the Permanent Works shall be equivalent to the credit previously granted to the Contractor for such materials and Plant pursuant to Sub-Clause (b) above, as determined by the Engineer-in-Charge.
- 45.9 All interim/progress payments before final payment shall be regarded as provisional payments only and not as payment for work actually completed and shall not preclude defective /imperfect/incomplete work to be removed. Any interim/progress payment will not be considered as an admission by the employer of due performance of the contract or any part thereof by the contractor nor shall it preclude, determine or affect in any way the powers of the Purchaser/Employer under these conditions or in any other way vary or affect the contract.
- 45.10 **No claim Certificate**  
The contractor will submit a 'No Claim Certificate' to Engineer-in-Charge/UJVN Ltd before
- (i) Final payment under the contract

- (ii) Release of Performance Security
- (iii) Release of Bank Guarantee in lieu of Performance Security
- (iv) In lieu of time extension, variation and extra item

45.11 **INTERMEDIATE/RUNNING ACCOUNT PAYMENT:**

From each Intermediate/RA Bill shall be processed for payment with following deductions/recoveries/Retention

- (a) Ninety Five percent (95%) of the running bill value shall be paid on regular interval after satisfactory performance of work. Deducted amount 5% towards security deposit shall only be refunded to contractor after completion of Defect liability period. (Clause 3.3 General Condition of Contract)
- (b) In case, item or its part(s) executed at site found unsatisfactory, an amount may be retained by Engineer-In-Charge from running bill(s) or final bill. The retention money shall only be released unless the Engineer-In-Charge is satisfied that unsatisfactory item of work has been replaced in its best way
- (c) From each running bill/final bill following deductions are mandatory-
  - i. Tax Deduction at Source towards Income tax, GST & Labour cess etc. at the rate prevailed concurrency of contract.
  - ii. Deduction towards royalty as per the government rules and guidelines.
  - iii. Any other deductions towards new statutory taxes/duties if levied in future OR change in tax/duties/levies rate as stipulated in Appendix of Clause-47; shall be governed by clause 47.1 & 47.2 of General Condition of Contract.
- (d) Recovery against material issued to contractor, if any, at a rate stipulated in Schedule-A
- (e) Retention in lieu of time extension till time extension not granted by the Engineer-In Charge of UJVNL at a rate as per Clause-40 of GCC
- (f) Before making first payment, contractor is required to submit his PAN/TIN/GST & EPF number to payment unit of UJVNL.

**C. No Interest on Any Dues:**

No interest shall be payable by UJVNL Ltd on amounts due to contractors pending final settlement of claim. Further no interest shall be payable by UJVNL Ltd on any delayed amount /payment/Earnest money deposit/ Performance security/ Security deposit/or any other withheld/retained amount.

- a. **No claim for delayed payment due to dispute etc.** – The Contractor agrees that no claim for interest or damages will be entertained or payable by the UJVNL Limited in respect of money or balances which may be lying with the UJVNL Limited owing to any disputes, differences or misunderstandings between the parties or in respect of any delay or omission on the part of the Engineer-in-charge in making intermediate or final payments or in any other respect whatsoever.
- b. **Interest on money due to the contractor** – No omission on the part of the Engineer-in-charge to pay the money due upon the measurement or otherwise shall vitiate or make void the contract, nor shall the contractor be entitled to interest upon any guarantee or payments in arrears nor upon any balance which may on the final settlement of his accounts be due to him.”

**CLAUSE-46: PRICE ADJUSTMENT:**

Consideration of Consumer Price Index (CPI) and Whole Sale Price index (WPI) are not applicable to this contract and as such no escalation of rates over the finally accepted rates for execution of the work shall be allowed during the entire contract period or extension thereof. However variation in rates (increased or decreased) due to variation in quantities of individual item of work shall be governed by **Clause-18 “DEVIATION” of GCC.**

**CLAUSE-47: TAXES, DUTIES AND LEVIES ETC:**

- 47.1 All existing customs duty, Import duty, business taxes, Income tax, labour cess or any other tax or duty or levy such as Octroi, Royalty that may be levied in accordance with laws and regulation in force the last date of submission of price bid that the Contractor has to pay on the Contractor's equipment, plant, materials and supplies (permanent, temporary and consumables) acquired for the purpose of the Contract and for the services performed under the Contract shall be payable by the Contractor, and the Employer shall not entertain any claim in this regard. The rate quoted by the Contractor shall be deemed to be inclusive of all such taxes, duties, levies, royalty etc except GST which shall be paid extra as applicable.. Any statutory variation in the rate of aforesaid taxes, if any, during the continuation of the Contract including extension thereof shall be account for to the employer and contractor.

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- 47.2 "However, if a New Tax or Duty or Levy, other than those existing on 28 days before the date of submission of price bid i.e. \_\_\_\_\_ (date to be entered in Agreement) is imposed in India under a statute or law during the continuation of the Contract and the Contractor becomes legally liable there under to and actually pays the same for bonafide use on the Works contracted, then the Contractor shall immediately inform the Engineer-in-Charge in this regard. The Employer will reimburse the same to the Contractor on production of satisfactory proof of payment, provided that the amount thus claimed is not paid under Price variation clause 46 of General Conditions of the Contract. Changes in the rate of deductions towards advance tax rates of Income Tax or any other tax payable to appropriate authorities shall not be construed as a change in the rate(s) of taxes and will not be subject to adjustment.
- 47.3 The Contractor's staff and labor will be liable to pay personal income taxes in respect of such of their salaries and wages as are chargeable under the laws and regulations for the time being in force, and the Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such laws and regulations.
- 47.4 Taxes will be deducted as per statutory laws applicable at the time of payment against the contract. . The contractor shall be liable to pay input credit if any, to the employer as per the prevailing GST rules & regulations.

### CLAUSE-48: PAYMENT OF FINAL BILL:

- 48.1 The final bill shall be submitted by the Contractor within one month of the date fixed for completion of the Work or of the date the Certificate of Completion furnished by the Engineer-in-Charge. No further claim in this regard unless as specified herein under shall be entertained. Payment shall be made within **3 months**, of the submission of Final bill. If there shall be any dispute about any item or items of the work then the undisputed item or items only shall be paid within the said period of **three months**. The Contractor shall submit a list of the disputed items within thirty days from the disallowance thereof and if he fails to do so, his claim shall be deemed to have been fully waived and absolutely extinguished. Provided further 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 Bill.
- 48.2 While paying the final Bill, following deductions shall be made:
- From each Intermediate/RA Bill shall be processed for payment with following deductions/recoveries/Retention
- (a) Ninety Five percent (95%) of the running bill value shall be paid on regular interval after satisfactory performance of work. Deducted amount 5% towards security deposit shall only be refunded to contractor after completion of defect liability period (Clause 3.3 General Condition of Contract).
  - (b) In case, item or its part(s) executed at site found unsatisfactory, an amount may be retained by Engineer-In-Charge from running bill(s) or final bill. The retention money shall only be released unless the Engineer-In-Charge is satisfied that unsatisfactory item of work has been replaced in its best way.
  - (c) From each running bill/final bill following deductions are mandatory-
    - i. Tax Deduction at Source towards Income tax, GST & Labour cess etc. at the rate prevailed concurrency of contract.
    - ii. Deduction towards royalty as per the prevailing government rules.
    - iii. Any other deductions towards new statutory taxes/duties if levied in future OR change in tax/duties/levies rate as stipulated in Appendix of Clause-47; shall be governed by clause 47.1 & 47.2 of General Condition of Contract.
  - (d) Recovery against material issued to contractor, if any, at a rate stipulated in **Schedule-A**
  - (e) Retention in lieu of time extension till time extension not granted by the Engineer-In Charge of UJVNL at a rate as per Clause-40 of GCC .
  - (f) In case extension sought by the contractor is rejected by the Engineer-In-Charge, whole retention amount in lieu of time extension will be withheld on account of clause 40-GCC.

### CLAUSE-49: OVER PAYMENT AND UNDER PAYMENT:

- 49.1 Whenever any claim whatsoever for the payment of a sum of money to the Employer arises out of or under this Contract against the Contractor, the same may be deducted by the Employer from any sum then due or which at any time thereafter may become due to the Contractor under this Contract and failing that under

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any other contract with the Employer or from any other sum whatsoever due to the contractor from the Employer or from his security deposit, or he shall pay the claim on demand.

49.2 The Employer reserve the right to carry out post- payment audit and technical examination of the final bill including all supporting vouchers, abstracts, etc. The Employer further reserves the right to enforce recovery of any overpayment when detected, notwithstanding the fact that the amount of the final bill may be included by one of the parties as an item of dispute before an arbitrator appointed under clause 55 of this Contract and notwithstanding the fact that the amount of the final bill figures in the arbitration award. I figures in the arbitration award.

49.3 If as a result of such audit and technical examination any overpayment is discovered in respect of any work done by the Contractor or alleged to have been done by him under the Contract, it shall be recovered by the Employer from the Contractor by any or all of the methods prescribed above, and if any under-payment is discovered, the amount shall be duly paid to the Contractor by the Employer.

49.4 Provided that the aforesaid right of the Employer to adjust overpayments against amounts due to the Contractor under any other contract with the Employer shall not extend beyond the period of two years from the date of payment of the final bill or in case the final bill is a MINUS bill, from the date the amount payable by the Contractor under the MINUS final bill is communicated to the Contractor.

49.5 Any sum of money due and payable to the Contractor (including the security deposit returnable to him) under the Contract may be withheld or retained by way of lien by the Engineer-in-Charge or Employer against any claim of the Employer or such other person or persons in respect of payment of a sum of money arising out of or under any other contract made by the Contractor with the Engineer-in-Charge or Employer or with such other person or persons.

The sum of money so withheld or retained under this clause by the Engineer-in-Charge or Employer will be kept withheld or retained as such by the Engineer in- Charge or Employer or till his claim arising out of in the same Contract or any other contract is either mutually settled or determined by the arbitrator under Clause 54 hereof, or by the competent court.

### CLAUSE-50: CONTRACT MATTERS TO BE TREATED AS CONFIDENTIAL:

50.1 All documents, correspondence, decisions and orders concerning the Contract shall be considered as confidential and/or restricted in nature by the Contractor and he shall not divulge or allow access to them by any unauthorized person.

50.2 The Contractor shall take necessary steps to ensure that all persons employed on any work in connection with this Contract have noted that the Indian Official Secret Act, 1923 (XIX of 1923) applies to them and shall continue so to apply even after the execution of such Works under the Contract.

### CLAUSE-51: LAWS GOVERNING THE CONTRACT:

Unless otherwise hereinafter provided, this Contract shall be construed, interpreted and governed by laws of India.

### CLAUSE-52 : DISPUTE AVOIDANCE & RESOLUTION MECHANISM:

52.1.1 If any dispute, difference or controversy shall at any time arise between the contractor on the one hand and the Engineer-in-Charge on the other touching out of this the contract, or as to the true construction, meaning, and intent or any part or condition of, or payment for the same, or as to the true intent, meaning, interpretation, construction or effect of the clauses of the contract, specifications or drawings any of them, or as to anything to be done, committed or suffered in pursuance of the contract or specifications, or as to the mode of carrying the contract into effect, or as to the breach or alleged breach of the contract, or as to obviating or compensating for the commission of any such breach, or as to any other matter or thing, whatsoever connected with or arising out of the contract, and whether before or during the progress or after the completion of the contract, such question, difference or dispute shall be referred for adjudication to the 'Dispute Resolution Mechanism' elaborated herein under.

52.1.2 Any dispute arising out at any time between the contractor on the one hand and the Engineer-in-Charge on the other within four-corners of the contract and not resolved at the Engineer-in-Charge in that case such question, difference or dispute shall be referred for adjudication in following order:

|                                      |   |                                                  |
|--------------------------------------|---|--------------------------------------------------|
| i. Negotiation/ Mutual Consultation  | } | <i>Internal Mechanism for Dispute Resolution</i> |
| ii. Conciliation by Sole Conciliator |   |                                                  |

#### 52.1.3 PROCEDURE FOR CLAIMS:

52.1.3.1 Except as otherwise provided in 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 claim

notification to the Engineer-in-charge, within 15 days from the day when Contractor became aware of the event and circumstances giving rise to the claim has first arisen.

52.1.3.2 Upon the happening of the event referred to in Sub-Clause 52.1.3.1, 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-in-Charge shall, on receipt of a notice under Sub-Clause 52.1.3.1, 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-in-Charge to inspect all records kept pursuant to this Sub-Clause and shall supply him with copies thereof as and when the Engineer-in-charge so instructs.

52.1.3.3 Within 90 days from the day when Contractor became aware of the event and circumstances giving rise to the claim has first arisen under Sub-Clause 52.1, the Contractor shall send to the Engineer-in-Charge an account, giving detailed particulars of the amount claimed and the grounds upon which the claim is based. For further clarification Engineer-in-Charge may ask more documentary proof/ accounts regarding claimed amount, and contractor within a 14 (fourteen days) shall send further documents /accounts to the Engineer-in-Charge.

Further, 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-in-Charge 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-in-Charge, the Contractor shall send a final "account within 30 days of the end of the effects resulting from the event. The Contractor shall, if required by the Engineer-in-Charge to do so, also send the copy of all accounts to the Employer which have sent to the Engineer-in-Charge pursuant to this Sub-Clause.

52.1.3.4 The Contractor shall be entitled to have any interim payment certified by the Engineer-in-Charge pursuant to Clause 52.1.3.1 such amount in respect of any claim as the Engineer-in-Charge, may consider due to the Contractor provided that the Contractor has supplied sufficient particulars to enable the Engineer-in-Charge 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-in-Charge. The Engineer-in-Charge shall notify the Contractor of any determination made under this Sub-Clause.

**52.1.4 SUM PAYABLE BY WAY OF COMPENSATION TO BE CONSIDERED AS REASONABLE WITHOUT REFERENCE TO ACTUAL LOSS:**

All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation without reference to the actual loss or damage sustained and whether or not damage shall have been sustained.

**52.2 DISPUTE RESOLUTION BY INTERNAL MECHANISM**

Any dispute arising out at any time between the contractor on the one hand and the Engineer-in-Charge on the other within four-corners of the contract and could not be resolved at the Engineer-in-Charge level, shall first be resolved through Internal Mechanism for Dispute Resolution set by the Employer. This mechanism is basically conciliation in nature whereby dispute between the parties is resolved out of the court with amicable dispute settlement process. With the assistance of the negotiator / conciliator who acts as a neutral third party.

**52.2.1 DISPUTE RESOLUTION BY NEGOTIATION/CONCILIATION**

- i. If the dispute is not resolved at Engineer-in-Charge level, the claim shall be referred to concerned GM within 15 days from the date the claim is denied by Engineer in Charge on the request of contractor through written communication and a meeting will be convened at GM level in UJVN Ltd. wherein authorized representatives of both parties shall discuss all issues. At this level, parties shall put up their views and documentary proof related to work within contractual obligation and clauses binding to both parties. Both parties should try to negotiate with a view to reconcile the disputes and look for solutions. The higher authority shall try to bring both parties on a consensus solution and record the deliberation in detail.
- ii. The process shall be completed in 60 days. However if any party is not satisfied with the decision, the aggrieved party to the case, in next 15 days from the date of decision by the said higher authority through written communication, may refer its claim for conciliation by sole conciliator.

If negotiation does not resolve the dispute between the parties the aggrieved party, within a period of 15 days from the date of failure to resolve the same through mutual consultation, shall notify the other party in writing about such a dispute it wishes to refer for conciliation.

**52.2.2 DISPUTE RESOLUTION BY CONCILIATOR**

**I. Commencement of Conciliation**

- i. If negotiation at the level of UJVNL higher authority does not resolve the dispute between the parties and engagement of a third party seems inevitable to amicably solve the disputes, the dispute shall

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be referred to Conciliation by Sole Conciliator under provision of Part-III of Arbitration & Conciliation Act 1996 & subsequent amendment.

- ii. The party initiating conciliation shall send to the other party a written invitation to such invitation for Conciliation containing sufficient information of the dispute to enable the other party to be fully informed as to the nature, amount of the claim, if any, and apparent cause of action.
- iii. If the party initiating Conciliation does not receive any reply within thirty days from the date for Conciliation request, or within such other period as specified in the request, it shall be treated as rejection of the request for conciliation by the other party and the aggrieved party shall have right to take any alternative action available under the contract.
- iv. If the other party rejects the invitation, there will be no Conciliation proceedings.
- v. During concurrency of Conciliation proceedings, either of the parties shall not invoke the disputes in any other forum or Court of law.

### II. Appointment of Sole Conciliator

- i. The Sole conciliator shall be appointed from the empanelled members of UJVN Ltd.
- ii. The members may be empanelled as per eligibility criteria laid down under section 43 of Arbitration & Conciliation Act 1996 & subsequent amendment or from the panel of experts approved by UJVNL.
- iii. Aggrieved party, within a period of 15 days from the date of failure to resolve the same through mutual consultation, shall notify the other party in writing about such a dispute it wishes to refer for Conciliation. Such Invitation for Conciliation shall contain sufficient information as to the dispute to enable the other party to be fully informed as to the nature of the dispute, amount of the monetary claim, if any, and apparent cause of action.
- iv. If Conciliator is not appointed until the request for Conciliation is initiated, Engineer in charge will initiate the case for appointment of Conciliator within a week from receiving the proposal for conciliation. After appointment of Conciliator by competent authority of UJVN Limited, Engineer in charge will notify the same to the other party.
- v. The contractor will submit his consent for the appointed Sole Conciliator as per provision of Arbitration & Conciliation Act 1996 & subsequent amendment.

### III. Fee of the Conciliator

Fee of conciliators as approved by UJVNL, subject to condition that it will not exceed the fee schedule given in the Arbitration & Conciliation Act 1996 & subsequent amendment. The cost of Conciliation proceedings including but not limited to fees for Conciliator, cost towards Air/Train/Car travel, Local transport, fooding & lodging, conference facility etc., as per convenience of conciliator, shall be paid as determined by UJVNL from time to time and shall be paid equally by the parties to the dispute.

### IV. Submission of Claim to the Conciliator

- i. The party seeking conciliation shall submit dispute issues with and related documents to Conciliator with a copy of claim to other party within a period of 14 days from the date of appointment of Conciliator. Preferably the aggrieved part shall provide statement of disputes in the following format:
  - a. Chronology of the dispute.
  - b. Brief of the contract.
  - c. Brief history of the dispute.
  - d. Issues.

| S. No. | Description of Claims / Counter Claims | Amount<br>(in foreign currency/ INR) | Relevant Contract Clause |
|--------|----------------------------------------|--------------------------------------|--------------------------|
|        |                                        |                                      |                          |

- e. Details of Claim(s)/Counter Claim(s)
- f. Basis/Ground of claim(s)/counter claim(s) (along with relevant clause of contract).
- g. Other relevant information with respect to claim/dispute.
- h. The legal basis for the claim, whether based on a term of the Contract or otherwise, and if based on a term of the Contract, clearly identifying the specific term
- i. The facts relied upon in support of the Claim in sufficient detail to permit verification
- j. Details of the amount claimed and how it has been calculated

Note: Statement of claims shall be restricted to maximum limit of 20 pages.

- ii. The parties shall be represented by their in-house employees. No party shall be allowed to bring any advocate or outside consultant/advisor/agent to contest on their behalf. Ex-officers of

UJVNL who have handled the subject matter in any capacity shall not be allowed to attend and present the case before Conciliator on behalf of contractor. However, ex-employees of parties may represent their respective organizations. Parties shall not claim any interest on claims/counter-claims from the date of notice invoking Conciliation till execution of settlement agreement, if so arrived. In case, parties are unable to reach a settlement, no interest shall be claimed by either party for the period from the date of notice invoking Conciliation till the date of recommendations by Conciliator and 30 days thereafter in any further proceeding.

**V. Conciliation Proceedings**

- i. All the conciliation proceedings shall be governed by Arbitration and Conciliation Act 1996 and subsequent Amendment, if any. However, the conciliator does not have the right to enforce its decisions. Conciliation is an informal process to resolve dispute between parties with a 'Round – Table' discussion where Conciliator is allowed to discuss issues in dispute, develop all alternatives to help the parties bring them in a mutually agreed out come
- ii. During the conciliation process, if it appears to the conciliator that there exists an element of settlement, which may be acceptable to both parties, he/she shall formulate terms of possible settlement & submit them to parties for their observation. Conciliator may communicate to parties orally or in writing. Conciliator may meet and discuss the issues with the parties together or with each of them separately
- iii. Conciliator will conclude its proceedings in maximum 10 meetings, and give its recommendations within 90 days to 180 days of its first meeting depending upon the claim amount & documentation involved. Conciliator will give its recommendations to both the parties recommending possible terms of settlement.
- iv. Conciliator may grant variation in the time limits mentioned for various steps to be taken by either party during proceedings of Conciliation, based on genuine reasons/grounds. Managing Director, UJVNL may extend the time/number of meetings, in exceptional cases, if Conciliator requests for the same with sufficient reasons.
- v. The parties shall keep confidential all matters relating to the Conciliation proceedings. Parties shall not rely upon them as evidence in arbitration proceedings or court proceedings.
- vi. Parties are free to terminate Conciliation proceedings at any stage as provided under the Arbitration & Conciliation Act 1996 & subsequent amendment
- vii. If the parties reach to a mutual consensus during the conciliation proceedings, a Settlement Agreement under section 73 of the Arbitration & Conciliation Act 1996 & subsequent amendment will be drafted within 15 days of contractor's acceptance and same shall be authenticated by the Conciliator. Provided that draft settlement agreement is approved by competent authority of UJVNL.  
Once settlement agreement between Engineer in-charge on behalf of UJVNL Ltd and contractor is finalized & agreed by both party, the settlement agreement shall be signed by both parties (between Engineer in-charge on behalf of UJVNL Ltd and contractor)

**52.3. APPEAL AGAINST CLAIM / SETTLEMENT**

Each party who is not satisfied with the said conciliation process/settlement agreement may appeal to court of Law. The appellant court in case of civil suit will be the District court of the project area and in case of commercial suit will be Commercial Court at Dehradun.

**CLAUSE 53: BREAKUP OF LUMP SUM ITEMS**

For the purposes of statements submitted in accordance with Sub-Clause 45, the Contractor shall submit to the Engineer-in-Charge, a break-up for each of the lump sum items contained in the Tender. Such break-ups shall be subject to the approval of the Engineer-in-Charge.

**CLAUSE 54: DEFECTS LIABILITY PERIOD & UNFULFILLED OBLIGATIONS**

The Contract shall not be considered as completed until a Defects Liability Certificate shall have been signed by the Engineer-in-Charge and delivered 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-in-Charge's satisfaction. The Defects Liability Certificate shall be given by the Engineer-in-Charge within 28 days after the expiration of the Defects Liability Period.

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 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.

### Clause 55: ENVIRONMENTAL AND ECOLOGICAL BALANCE

The Contractor shall be required to ensure that there shall be no indiscriminate felling of trees by him or his labourers or their family members and he will be solely responsible for their acts in this regard. The Contractor shall try to maintain ecological balance by preventing deforestation, water pollution and defacing of natural landscape in the vicinity of work areas. The Contractor shall so conduct his construction operations as to prevent an unnecessary destruction of, scarring or defacing the natural surroundings in the vicinity of the work area. In order to maintain the ecological balance, the Contractor shall specifically observe the following instructions:

- a) Where unnecessary destruction, scarring, damage or defacing may occur as a result of the Contractor's operation, the same shall be repaired, replanted or otherwise corrected at the Contractor's expense. The Contractor will prevent scattering of rocks and other debris outside the work areas. All work areas shall be smoothed and graded in a manner to conform to the natural appearance of the landscape as directed by the Engineer-in-Charge.
- b) All trees and shrubs, which are not specifically required to be cleared or removed for construction purposes, shall be preserved and shall be protected from any damage that may be caused by the Contractor's construction operation and equipment. The removal of trees or shrubs will be permitted only after prior approval by the Engineer-in-charge. Special care shall be exercised where trees or shrubs are exposed to injuries by construction equipment, blasting, and excavating, dumping, chemical damage or other operation and the Contractor shall adequately protect such trees by use of protective barriers or other methods approved by the Engineer-in-Charge. Trees shall not be used for anchorage.
- c) The Contractor's construction activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter contaminants, debris and other objectionable pollutants and wastage into river. Pollutants and wastes shall be disposed of in a manner and at sites approved by the Engineer in-Charge. The Contractor shall fully comply with Water (Prevention and Control of Pollution) Act, 1974 section -33(A).
- d) In the Conduct of construction activities and operation of equipment, the Contractor shall utilize such practicable methods and devices as are reasonably available to control, prevent and otherwise minimize air pollution. The contractor shall fully comply with Air (Prevention and Control of Pollution) Act, 1981 section -31(A).
- e) Burning of materials resulting from clearing of tree, bush, combustible construction materials and rubbish may be permitted only when atmospheric conditions for burning are considered favorable.
- f) Separate payment will not be admissible to the Contractor for complying with the provisions of this clause and all costs shall be deemed to have been included in the ITEM OF RATE mentioned in the Bill of Quantities. If any provision(s) is not complied with, within a reasonable time even after issue of a notice in this respect, the necessary actions would be carried out by the Engineer-in-charge at the cost of the Contractor.

### Clause 56: GENERAL

- 56.1 Save and except as expressly provided elsewhere in this Contract all costs, expenses, charges and liabilities for the completion of the Works in accordance with the Contract and/or for the due and faithful performance and/or the fulfillment of all of the Contractor's obligations under the Contract including furnishing of bank guarantees to the Employer pursuant to the Contract shall be to the account of and be borne by the Contractor and shall be deemed to be included in the unit rates provided for in the Bill of Quantities and the Employer shall not be liable in any manner whatsoever therefore.
- 56.2 Whenever any claim whatsoever for the payment of a sum of money to the Employer arises out of or under this contract against the Contractor, the same may be deducted by the Employer from any sum then due or which at any time thereafter may become due to the Contractor under this Contract and failing or under any other contract between the Employer and the Contractor or from any other sum whatsoever due to the Contractor from the Employer or from his Security Deposit or he shall pay the claim on demand.

### Clause: 57: Banning/Debaring of the Bidders/ Contractors

- 57.1 Indulging in unfair / corrupt practice in tender process
- 57.2 Indulging in bid rigging or collusive bidding
- 57.3 Subcontracting of whole or part of supply/ work without permission of Employer/UJVN Ltd
- 57.4 Tampering with downloaded bid document form the website.

In case it is found that the tenderer has submitted false information, fabricated information or incorrect information related to pre-qualification criteria of the tender then the tender will be rejected and the tenderer will be debarred to participate in other tenders of UJVN Ltd

## **Short Term Tender 23/EE/PCM/Dhalipur/2025-26**

- (i) First time for one year
- (ii) and for seven years for repetition in submission of false information, fabricated information or incorrect information related to pre-qualification criteria in any tender of UJVN Ltd..

SIGNATURE OF CONTRACTOR

Office Inviting Tender

**SECTION-IV**

**SPECIAL CONDITIONS OF CONTRACT**

## **SPECIAL CONDITION OF CONTRACT**

These special conditions shall be read and construed along with General Condition of Contract modified by the provisions hereof. But if there be any conflict or inconsistency between the Special Condition and General Conditions then special conditions shall prevail.

### **A. SCOPE OF WORK:**

#### **1. GENERAL:**

- 1.1** Scope of this tender covers the work in totality for which tendering is intended. Items of work mentioned in bill of quantity (Section VII) form the work in general. Each individual item shall be executed as per technical specification or as per the direction of Engineer-In- Charge in such a way that it completes the work in proper way. Scope of work will remain in existence until unless the work for which tendering is intended, is completed properly as per General condition of contract, Special condition of contract and technical specification. A prior visit to site is essential before submitting the tender.
- 1.2** After receiving LOI, contractor shall authorize his site representative, who will be responsible to contractor and will keep close liaison with the concerned J.E/A.E for taking day to day instructions at site whether verbal or in writing, regarding emergency work or routine work.
- 1.3** All materials used in above tender should be approved by the E/I of the work before taking into use
- 1.4** Contractor or his authorized representative shall keep close liaison daily with concerned J.E. /A.E. for taking day to day instructions progress/complaints pertaining to the work
- 1.5** Contractor has to follow the labour rules, other rules applicable for this type of work and statutory rules laid by GOUK/GOI.

The scope of work stipulated above is not confined to particular site, on requirement or in emergent situation, contractor may be asked to execute the work at other site within eight Kms from the site under scope of tender

#### **2. EXCLUSIVE:**

- 2.1** Under Scope of this work contractor has to execute the work of **“Demolishing 08 Non Residential store building of Asan Colony at Dhalipur, Dehradun.”** as & when asked by the E/I.
- 2.2** A tentative list of required T&P is at **Schedule C.**
- 2.3** It is the sole responsibility of the contractor to follow the statutory rules and laws regarding labour and mining. In case the violation of laws, if any penalty or punishment is imposed by the law enforcing bodies, UJVNL shall not bear such penalty or punishment.
- 2.4** During execution of work, material or items samples such as cement, fine aggregate, coarse aggregate, steel , concrete, epoxy etc. if required, may be collected and referred to laboratory test by Engineer-in-Charge and bill thus raised by concerning laboratory shall be paid by contractor or deducted from Contractor's bill.
- 2.5** The entire Work under the Contract shall have to be completed in all respects within 1 Month from the date of start of Work.
- 2.6** The contractor shall have to submit latest challan of EPF in each bill and shall record on each bill a certificate that he has paid upto date wages of his labors and has deposited upto date EPF thereof.
- 2.7** All the equipment machines deployed should be in good working condition.
- 2.8** Rates offered by the contractor should be inclusive of all taxes (excluding GST which shall be paid extra as applicable) applicable as per the statutory rules of GoU/Gol.
- 2.9** Contractor will be responsible for safety of machines, staff and structure etc.
- 2.10** The work shall be carried out as per C.P.W.D or P.W.D specifications/specification mentioned in PWD S.O.R and to the entire satisfaction of Engineer-In Charge.
- 2.11** Contractor shall be responsible for mobilization and demobilization of man, material, equipment and all other necessary resources to ensure timely completion of the work.
- 2.12** No escalation shall be paid by the Nigam.
- 2.13** All arrangement for execution of work shall be made by the contractor including arrangement for storage of material, camp office/residences etc.
- 2.14** The Contractor shall at all time exercise reasonable and proper precautions for the safety of the labour and equipments at site. The Contractor shall be responsible for all risk to the lives and property belonging to the Nigam and other Contractors working in the area. Although all the reasonable and proper precautions may have been taken by the Contractor. He shall be called upon by a Court of law to make good any loss or damage. Properly ascertained by reasons of any act of negligence or omission of

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the Contract which the Nigam may be required to pay in respect thereof any amount or any cost or charge including legal charges in connection with all -legal proceedings which the Nigam may incur in reference thereto shall be chargeable from- the Contractor.

- 2.15** Any penalty if imposed by any authority on account of illegal quarrying and transportation or any other reasons shall be borne by the contractor.
- 2.16** Contractor has to follow the labour laws, tax laws and all other rules applicable for this type of work and statutory rules of GoU/Gol.
- 2.17** The contractor or his authorized representative will keep close liaison with the J.E./A.E. concerned for taking day to day instructions regarding emergency work or otherwise.
- 2.18** The dismantled unserviceable /replaced waste materials shall be disposed off by the contractor from the site of work without any additional cost at any suitable location.
- 2.19** Along with the each RA Bill/Final Bill, the firm/contractor will provide EPF Challan with the following detail:-

| SL No | Name and complete address of the Employee | Gross salary/wages paid | EPF deducted | Employer contribution | Total EPF | Date of Deposit |
|-------|-------------------------------------------|-------------------------|--------------|-----------------------|-----------|-----------------|
| 1     | 2                                         | 3                       | 4            | 5                     | 6         | 7               |
|       |                                           |                         |              |                       |           |                 |

### B. ELECTRICITY:

The electricity connection for the work shall be arranged by the contractor and all expenditure in this regard shall be borne by the contractor himself. however if used from Nigam source the same shall be charged @ 1.5% of the items of works executed by M.S. work and related to electricity consumption work.

- C. WATER:** For construction work water shall be arranged by contractor on his own cost. If not provided departmentally, however if used from Nigam source the same shall be charged @ 1.5% of the items of works executed by/with cement.

### D. MATERIAL & T&P :

All T&P as well as material including cement and steel shall be arranged by contractor. However, on exigency Cement and steel may be provided to the contractor and issue rates as mentioned in 'Schedule-A' shall be deducted from contractor's bill. However, in case in non-issuance of any material from UJVNL, contractor shall not claim any compensation.

### E. TERMS & CONDITIONS OF PAYMENT

#### 1. PRICES:

- a. Prices shall be firm during the currency of the contract as specifically indicated in contract Document.
- b. **The Bidder** shall quote his rates for all items required for complete work. The rate quoted by the contractor shall be deemed to be inclusive of all such taxes & duties levies, royalty and incidental charges and shall also include cost towards boarding, lodging and transportation of contractor's staff and labour, which shall be the responsibility of the contractor only etc except GST which shall be paid extra as applicable.(refer clause -47 of GCC) The above charges shall remain firm during the continuation of the Contract and changes, if any shall be governed by **clause-47.1 & 47.2 of GCC**.
- c. Royalty from each RA bill shall be deducted as per '**prevailing government rules**.'
- d. Rate of each item of work shall only payable to contractors after completion of work as per site requirement/ as per technical specification or as per direction of Engineer In- charge or his representative, otherwise **clause 4** of SCC shall be imposed on contractor.

#### 2. PENALTY:

- a. Liquidated damage shall be as per charged as per **Clause -40 of GCC**.
- b. If any day, it is found at site that contractor has deployed lesser material / man power and machinery at site which is unable to perform the work within time frame then penalty shall be imposed by Engineer –In – Charge on his discretion, penalty thus imposed shall be charged from contractor's forthcoming bill.
- c. In case contractor fails to achieve desired progress as per **Schedule-B**, Liquidated Damage may be imposed accordingly.

**3. REMOVAL OF DEFECTIVE MATERIAL:**

Material used at site shall be as per Technical specification and direction of Engineer –In – Charge and if found defective the same shall not be allowed to use at site and Contractor has to remove the defective material from site at his own cost within three days of such direction issued by Engineer –In – Charge.

**4. PAYMENT**

All intermediate/Running account and final payment shall be processed as per Clause-45 & 48.

**F. TERMS AND CONDITIONS OF PRICE BID:**

- a. Bidders are advised to go through General condition/special condition/ Schedules/Technical specification/safety manual/ tender Drawing before quoting their rates. A prior site visit is also advisable
- b. Quantity of work may vary up to any extent on either side and no extra rate shall be paid towards variation of quantity.
- c. **Rates** quoted shall be inclusive of cartage, loading, unloading, insurance during transportation etc and other miscellaneous expenditures.
- d. **The** rate quoted shall be considered exclusive of GST & inclusive of all other taxes & duties such as royalty, I.T., excise duty, Labour Cess, EPF & insurance of labors etc at prevailing rates at the time of submission of '**FINANCIAL BID**'. GST shall be paid extra as applicable.
- e. All work shall be carried out as per technical specification and as per instructions of Engineer-in-charge.
- f. Bidder has to enter only item rate basis in Bill of Quantity. Lump- Sum rates shall not be considered in any case and tender shall be rejected without giving any reason.
- g. Bidder shall not write anything on Bill of Quantity except rate. After quoting rates on bill of quantity nothing shall be added or deducted by the bidder from quoted rates, such practice shall not be accepted and only quoted rates shall be considered for bidding

**G. GENERAL:**

In case of any discrepancy in terms and conditions, order of precedence shall prevail as per clause -2 of General Condition of Contract. However, if interpretation of any term and condition is not cleared from General Condition of Contract, Special Condition of Contract, Price Bid, Technical Specification; decision of Engineer- In- Contract shall be final and binding to contractor.

**Signature of Contractor**

**Office Inviting tender**

**SECTION-V**  
**SCHEDULES**

**SCHEDULE-A**

## ISSUE OF DEPARTMENTAL MATERIALS TO THE CONTRACTOR

**(Refer Clause 23 of General Conditions of Contract)**

[illegible]

**PERIOD OF COMPLETION AND INTERMEDIATE MILESTONE**

(See Clause-39 of GCC)

**(Tentative Construction schedule shall be submitted by the Contractor showing completion of work in  
1 Month)**

**LIST OF PLANT & MACHINERY REQUIRED**

(See Clause 21 of GCC)

|                                                                                                                                                               |                                                             |                                                      |                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------|-----------------|
| The key equipments for construction of works and field testing laboratory are:                                                                                | <b>For Construction of above Proposed Works (Tentative)</b> |                                                      |                 |
|                                                                                                                                                               | <b>S. No.</b>                                               | <b>Name of the Equipment</b>                         | <b>Quantity</b> |
|                                                                                                                                                               | 1                                                           | Hydraulic Excavator 1.5 Cum                          |                 |
|                                                                                                                                                               | 2                                                           | JCB break hoe Loader                                 |                 |
|                                                                                                                                                               | 3                                                           | Dumpers 15 T capacity                                |                 |
|                                                                                                                                                               | 4                                                           | Bulldozers 90HP                                      |                 |
|                                                                                                                                                               | 5                                                           | Roller Compactor 1 T                                 |                 |
|                                                                                                                                                               | 6                                                           | Concrete Batching and Mixing Plant 30Cum/hr          |                 |
|                                                                                                                                                               | 7                                                           | Tower Crane of 80 m boom with Pouring Bucket 1.5 Cum |                 |
|                                                                                                                                                               | 8                                                           | Concrete Pump 25 cum                                 |                 |
|                                                                                                                                                               | 9                                                           | Vibratory needle Type                                |                 |
|                                                                                                                                                               | 10                                                          | Transit Mixer 3 cum                                  |                 |
| The bidder must produce the documentary evidence in support of his owning/leasing/procurement of the above equipment: No payment will be made for equipments. |                                                             |                                                      |                 |

**NOTE:** Above list is tentative. Any additional plant & machinery required for proper completion of work shall be arranged by contractor on his own cost, no additional payment shall be paid to contractor.

**SCHEDULE-D****SCHEDULE OF STANDARD CONSUMPTION OF MATERIAL**

| Sl. No. | Item                                                                                                    | Unit | No. of cement bag | Sand in Cum | Bricks in Nos, | Stone/Ballast Cum. |
|---------|---------------------------------------------------------------------------------------------------------|------|-------------------|-------------|----------------|--------------------|
| A       | Its Class Brick Work in cement mortar                                                                   |      |                   |             |                |                    |
| 1.      | 1:3 Mix                                                                                                 | Cum  | 2.65              | 0.27        | 460            | -                  |
| 2.      | 1:4 Mix                                                                                                 | Cum  | 1.90              | 0.27        | 460            | -                  |
| 3.      | 1:5 Mix                                                                                                 | Cum  | 1.58              | 0.27        | 460            | -                  |
| 4.      | 1:6 Mix                                                                                                 | Cum  | 1.33              | 0.27        | 460            | -                  |
| 5.      | 1:8 Mix                                                                                                 |      | 0.94              | 0.27        | 460            | -                  |
| B       | Cement Concrete                                                                                         |      |                   |             |                |                    |
| 1.      | 1:1:2                                                                                                   | Cum  | 11.00             | 0.40        | -              | 0.80               |
| 2.      | 1:1.5:3                                                                                                 | Cum  | 7.80              | 0.44        | -              | 0.85               |
| 3.      | 1:2:4                                                                                                   | Cum  | 6.00              | 0.46        | -              | 0.90               |
| 4.      | 1:3:6                                                                                                   | Cum  | 4.25              | 0.48        | -              | 0.92               |
| 5.      | 1:4:8                                                                                                   | Cum  | 3.20              | 0.51        | -              | 0.95               |
| 6.      | 1:5:10                                                                                                  | Cum  | 2.50              | 0.50        | -              | 0.95               |
| 7.      | 1:6:12                                                                                                  | Cum  | 2.25              | 0.48        | -              | 0.95               |
| C       | Cement Plaster 12mm thick.                                                                              |      |                   |             |                |                    |
| 1.      | 1:2 Mix                                                                                                 | Sqm  | 0.19              | 0.015       | -              | -                  |
| 2.      | 1:3 Mix                                                                                                 | Sqm  | 0.16              | 0.015       | -              | -                  |
| 3.      | 1:4 Mix                                                                                                 | Sqm  | 0.11              | 0.015       | -              | -                  |
| 4.      | 1:5 Mix                                                                                                 | Sqm  | 0.09              | 0.015       | -              | -                  |
| 5.      | 1:6 Mix                                                                                                 | Sqm  | 0.08              | 0.015       | -              | -                  |
| 6.      | 20mm thick Cement Plaster. (1:2 Mix) in DADO.<br>20mm thick marble flooring 1:2 Cement mortar cover     | Sqm  | 0.28              | 0.019       | -              | -                  |
| 7.      | 15mm base coat & top coat 5mm.<br>Rough cast finish plaster.<br>Extra material for rough phase plaster. | Sqm  | 0.32              | 0.019       | -              | -                  |
| 8.      | 3mm thick floating coat of neat cement                                                                  | Sqm  | 0.09              | -           | -              | -                  |
| D       | Damp Proof Course.                                                                                      |      |                   |             |                |                    |
| 1.      | 20mm thick DPC with 1:2 Mix.                                                                            | Sqm  | 0.28              | 0.019       | -              | -                  |
| 2.      | 20mm thick DPC with 1:1.5:3 Mix.                                                                        | Sqm  | 0.20              | 0.011       | -              | 0.021              |
| 3.      | 40mm thick DPC with 1:2:4 Mix.                                                                          | Sqm  | 0.26              | 0.018       | -              | 0.036              |
| 4.      | 25mm thick DPC in 1:1.5:3.                                                                              | Sqm  | 0.247             | 0.011       | -              | 0.023              |
| 5.      | 40mm thick DPC in 1:1.5:3.                                                                              | Sqm  | 0.40              | 0.022       | -              | 0.042              |
| E       | Cement Pointing                                                                                         |      |                   |             |                |                    |
| 1.      | 1:2 Mix                                                                                                 | Sqm  | 0.045             | 0.003       | -              | -                  |
| 2.      | 1:3 Mix                                                                                                 | Sqm  | 0.035             | 0.003       | -              | -                  |
| 3.      | 1:4 Mix                                                                                                 | Sqm  | 0.027             | 0.003       | -              | -                  |
| 4.      | Raised Pointing on brickwork in 1:2 C.M.                                                                | Sqm  | 0.107             | 0.004       | -              | -                  |
| 5.      | Drip course in 1:2 Mix (25x12mm section)                                                                | R.M. | 0.005             | 0.010       | -              | -                  |

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|    |                                                                                    |     |       |       |     |       |
|----|------------------------------------------------------------------------------------|-----|-------|-------|-----|-------|
| F  | Flooring                                                                           |     |       |       |     |       |
| 1. | 25mm thick 1:2:4 in flooring over 75mm cc 1:4:8 including rendering etc. complete. | Sqm | 0.45  | -     | -   | -     |
| 2. | 25mm thick CC 1:2:4 flooring without base concrete                                 | Sqm | 0.21  | -     | -   | -     |
| 3. | 40mm thick CC 1:2:4 flooring without base concrete                                 | Sqm | 0.30  | 0.018 | -   | 0.036 |
| 4. | Flat brick soiling 1:6 without top pointing.                                       | Sqm | 0.09  | -     | -   | -     |
| 5. | BOE flooring 1:6 without top pointing.                                             | Sqm | 0.13  | -     | -   | -     |
| 6. | Mosaic flooring including 6mm mosaic 25mm CC 1:2:4 and 75mm CC 1:4:8 complete.     | Sqm | 0.55  | -     | -   | -     |
| 7. | 20mm Mosaic dado complete with plaster 1:2 Mix.                                    | Sqm | 0.30  | -     | -   | -     |
| 8. | Top coat 5mm thick white cement over 15mm thick 1:2 cement mortar.                 | Sqm | 0.23  | 0.019 | -   | -     |
| 9. | 6mm thick white glazed tiles flooring & skirting in 1:3 cement mortar.             | Sqm | 0.35  | -     | -   | -     |
|    | ½" thick white glazed tile flooring in 1:3 Mix.                                    |     |       |       |     |       |
|    | 75mm thick CC 1:3:6 in Apron with rendering in 1:2 mix.                            |     |       |       |     |       |
| G. | R.B. work in 1:3 Mix.                                                              | Cum | 3.60  | 0.33  | 420 | -     |
| H. | Stone work                                                                         |     |       |       |     |       |
| 1. | R.R. 1:6                                                                           | Cum | 1.40  | 0.30  | -   | 1.00  |
| 2. | R.C.R. 1:6                                                                         | Cum | 1.24  | 0.25  | -   | 1.25  |
| 3. | R.C.R. 1:4                                                                         | Cum | 1.85  | 0.25  | -   | 1.25  |
| I. | White Washing                                                                      |     |       |       |     |       |
| 1. | Cement washing                                                                     | Sqm | 0.008 | 0.64  | -   | -     |
| 2. | Cement washing in 1:2 (Cement & Lime)                                              | Sqm | 0.002 | 0.62  | -   | -     |
| J. | Block Masonry                                                                      |     |       |       |     |       |
| 1. | Masonry in CC 1:4:8 laid in 1:6 C.M.                                               | Cum | 4.40  | -     | -   | 0.91  |
| 2. | Masonry in CC 1:3:6 laid in 1:6 C.M.                                               | Cum | 5.60  | -     | -   | 0.88  |
| K. | Laying of Kota stone                                                               | Sqm | 0.11  | 0.08  | -   | -     |

**NOTE:**

1. However, on later stage as per mix design, consumption of material may be varied for which contractor shall not make any claim whatsoever.
2. The above consumption includes wastage up to 2% (Two Percentage).
3. The cement consumption is 5% (Five percentages) less in case use of shingle in place of broken graded stone aggregate.

**SECTION-VI**

**FORMATS**

**APPLICATION FOR TENDER**

To

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1. I/We have read and examined the following tender documents relating to “-----  
-----” (Name of work)

SECTION-I Notice Inviting Tender  
 SECTION-II Instructions to Bidder (ITT)  
 SECTION-III General Conditions of Contract,  
 SECTION-IV Special Conditions of Contract  
 SECTION-V Schedules  
 SECTION-VI Form and Proforma  
 SECTION-VII Bill of Quantity  
 SECTION-VIII Technical Specifications  
 SECTION-IX Safety Manual, if any  
 SECTION-X Tender Drawing, if any.

2. I/We hereby tender for execution of the works referred to in the documents mentioned in paragraph above upon the terms and conditions contained of referred to in the aforesaid documents and in accordance to all respects with the specifications, designs, drawings and other details given there in and at the rates contained in “Bill of Quantity” and within the period(s) completion as given in SECTION-I Notice Inviting Tender and subject to such terms and conditions as stipulated in contract.
3. I/We agree to keep this tender open for acceptance for 120 days after the deadline date for Tender submission and also agree not to make any modifications in its terms and conditions of our own accord.
4. A sum of Rs..... (Rupees..... only) is hereby forwarded in form of FDR from Scheduled Bank of India as earnest Money. I/We agree that if I/We fail to keep the validity of tender open, as aforesaid, or make any modifications in the terms and condition of my/our tender of our own accord and/or fail to commence the execution of the works as provided in the documents referred in paragraph above, after the acceptance of our tender, I/We shall become liable for forfeiture of my/our earnest money, as aforesaid and the Employer shall without prejudice to any other right of remedy, be at liberty to forfeit the said earnest money absolutely.
5. I/We agree to abide by and fulfill all the terms and conditions and provisions of the above mentioned tender documents.
6. I/We certify that the Tender submitted by me/us is strictly in accordance with the terms, conditions, specifications etc. as contained in your tender documents referred in paragraph 1) above and it does not contain any deviations to the aforesaid documents. It is further certified that information furnished in the Tender submitted by us correct to the best of our knowledge and belief.

(Signature of person duly sign the Tender on behalf of the Bidder along with seal of company/Firm)

Signature \_\_\_\_\_

Designation \_\_\_\_\_

Date \_\_\_\_\_

Name of Company/Firm \_\_\_\_\_

Address \_\_\_\_\_

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**Short Term Tender 23/EE/PCM/Dhalipur/2025-26**

Postal Address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Telephone No. \_\_\_\_\_

Fax No. \_\_\_\_\_

e- mail \_\_\_\_\_

**FORM OF DECLARATION*****(To be furnish in stamp paper of Rs 100/-)***

M/s \_\_\_\_\_ (name of Bidder) having its registered office at \_\_\_\_\_ (hereinafter referred to as "The Bidder") having carefully studied all the documents, specifications, drawings etc. pertaining to the Work for "-----" (name of work), the local and site conditions and having undertaken to execute the said works.

DO HEREBY DECLARE THAT:

1. The Bidder is familiar with all the requirements of the Contract.
2. The Bidder has not been influenced by any statement or promise of any person of the Employer but only the Contract Documents.
3. The Bidder is financially solvent.
4. The Bidder is experienced and competent to perform the contract to the satisfaction of the Employer.
5. The Bidder is familiar with all the general and special laws, acts, ordinances, rules and regulations of the Municipalities, District, State and Central Government of India that may affect the work, its performance or personnel employed therein.
6. The Bidder hereby authorize the Employer to seek reference from the bankers of Bidder for its financial position.
7. The Bidder undertakes to abide by all labour welfare legislations.
8. The statement submitted by the Bidder is true and correct.
9. After submitting the tender, if it is found at later stage that Bidder has submitted any wrong/ false document to influence the tender then UJVN Ltd. has right to make any suitable legal action against the Bidder and forfeit the bid security/EMD or any sum payable to Bidder.
10. The Bidder is agree to extend the validity of rates entered in the BoQ "Priced Bid" for a period of 120 days after the deadline date for Tender submission.( a separate certificate in this respect will be provided by the Bidder).
11. The Bid, consisting of the "Technical Bid and the Price Bid", shall be valid for period of 120 days in accordance with the Bidding Documents, and it shall remain binding upon the Bidder and shall be accepted to bidder at any time before expiration of that period. The proposal in response to the above invitation shall not be withdrawn within 120 days from the date of the opening of the tender, also to the condition that if thereafter Bidder withdraws his proposal within said period, the earnest money deposited by the Bidder shall be forfeited by the UJVN Ltd. in the discretion of the later."

***Certified that I/we have visited the site and get familiarized with nature of WORK/ SUPPLY and site conditions. I/we will not make any claim regarding damage to WORK/SUPPLY, T&P, labour etc and will be fully responsible to complete the WORK/SUPPLY as per General condition/special condition/Bill of Quantity/Technical specification/ as per instructions of Engineer-In-Charge.***

Dated \_\_\_\_\_

Signature

For and behalf of Bidder

## FORM OF AGREEMENT

This agreement made the ----- between ----- (herein after referred to as the Contractor of the one part and the UJVNL Ltd of the other.

WHEREAS the UJVNL is about to construct the “-----” (hereinafter called the works) mentioned, enumerated or referred to in certain General Conditions Specifications, Schedules, Drawing, Form of tender, Covering letter and Schedule of Prices which for the purpose of identification have been signed

by: \_\_\_\_\_ on behalf of \_\_\_\_\_ (Contractor) and \_\_\_\_\_ (The Engineer-in-charge of the UJVNL) on behalf of Managing Director Uttarakhand Jal Vidyut Nigam Ltd and all of which shall form part of this contract as through separately set out herein and are included in the expression (Contract) wherever herein used.

AND WHEREAS the UJVNL has accepted the tender of the Contractor for the provisions and execution of the said work for the sum of **Rupees** \_\_\_\_\_ **only** upon the terms and subject to the conditions hereinafter mentioned.

NOW PRESENT WITNESS and the parties hereto hereby agree and declare as follows:-  
That is to say, in consideration of the payments to be made to the Contractor by the UJVNL as hereinafter mentioned the Contractor shall duly provide the plan for the said works and things in the Contract mentioned or described or which are limited there form or therein respectively or may be reasonably necessary for the completion of said works within and at the time and in the manner and subject to the terms, and conditions and stipulations mentioned in the said contract.

And in consideration at the due provisions, erection, execution consideration and completion of the said works and maintenance thereof, as aforesaid the UJVNL will pay to the Contractor the said sum of **Rupees** \_\_\_\_\_ **only** or such other sums as may be become payable to the Contractor under the provisions of this contract such payments to be made at such time and in such manner as is provided of the contract.

In WITNESS WHEREOF the parties hereto have signed this deed hereunder on the dates respectively mentioned against the signatures of each.

Signed

Signed

(For and on behalf of the UJVNL)

by (date)

(Contractor)

in the presence of and of  
(date)

in the presence of and of

**PROFORMA OF TIME EXTENSION CASE**

| S No | Particulars                                                               | Details |
|------|---------------------------------------------------------------------------|---------|
| 1    | Name of work                                                              |         |
| 2    | Agreement No & Date.                                                      |         |
| 3    | Value of Agreement                                                        |         |
| 4    | Name of contractor /Firm                                                  |         |
| 5    | Date of Start as per Agreement                                            |         |
| 6    | Due date of completion as per Agreement                                   |         |
| 7    | Actual date of completion                                                 |         |
| 8    | Date of application of Time extension from contractor                     |         |
| 9    | Amount of work done upto date of application by Contractor in Rs and in % |         |
| 10   | Date up to which extension already sanctioned already sanctioned, if any  |         |
| a)   | First time Extension Sanctioned, if any                                   |         |
| b)   | Second time Extension Sanctioned, if any                                  |         |
| 11   | Amount of work done up to last sanctioned extensions in Rs and in %       |         |
| 12   | Date upto which Time extension is demanded at present                     |         |
| 13   | Justification in support of time extension                                |         |
| 14   | No Claim certificate                                                      |         |

15. Brief particular of work to be executed during time extension

| Value of work as per Agreement | Value of work executed during the period specified in the agreement. | Approx. Value of work to be executed during extension period. |
|--------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------|
|                                |                                                                      |                                                               |

16. Whether there will be any loss or financial liability arise to the Nigam  
 Due to proposed extension .....

(Signature of contractor)

**NO CLAIM CERTIFICATE**

It is to certify that grant of time Extension for the work upto xxxxxxxxxx for work named as "xxxxxxxxxxxxxxxxxxxxxxxxxxxx" against agreement no xxxxxxxxxx shall not form basis of any extra claim what so ever.

Sign of Contractor

( )

Name of Firm xxxxxxxxxxxxxxxxxxxxxx

Note: As per clause 39.3 of GCC no claim due to time extension of the contract/work will be admissible.

**FORMAT FOR POWER OF ATTORNEY FOR AUTHORISED SIGNATORY OF JOINT VENTURE (JV)  
PARTNERS POWER OF ATTORNEY\*(Not Applicable)**

**(To be executed on non-judicial stamp paper of the appropriate value in accordance with relevant stamp Act. The stamp paper to be in the name of the company who is issuing the Power of Attorney.)**

Know all men by these present, we ..... do hereby constitute, appoint and authorize Mr/Ms.....who is presently employed with us and holding the position of .....as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our bid for the work of including signing and submission of all documents and providing information/ responses to UJVN Ltd representing us in all matters, dealing with UJVN Ltd in all matters in connection with our Tender for the said project.

We hereby agree to ratify all acts, deeds and things lawfully done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us. Dated this the .....day of.....20xx.

Signature of the attorney

Signature of the attorney is  
attested

(Signature of authorized  
signatory)

(by the authorised signatory of the company)  
(Signature and Name in Block letters of  
Signatory)

Seal of Company

Witness:

Witness 1:

Name :

Address :

Occupation :

Witness 2:

Name :

Address :

Occupation : Notes: i) To be executed by all the partners individually, in case of a Joint Venture.

ii) The made of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.

iii) In case of incorporated companies, the common seal of the company has to be embossed on all pages

**FORMAT FOR POWER OF ATTORNEY TO LEAD PARTNER OF JOINT VENTURE (JV)**

**(To be executed on non-judicial stamp paper of the appropriate value in accordance with relevant stamp Act. The stamp paper to be in the name of the company who is issuing the Power of Attorney)**

POWER OF ATTORNEY Whereas UJVN Ltd has invited Tender for the work of Whereas, the members of the Joint Venture comprising of M/s.....M/s.....and M/s....., are interested in submission of bid for the work .....(insert name of work..... in accordance with the terms and conditions contained in the bidding documents. Whereas, it is necessary for the members of the Joint Venture to designate one of them as the Lead Partner, with all necessary power and authority to do, for and on behalf of the Joint Venture, all acts, deeds and things as may be necessary in connection with the Joint Venture's bid for the project, as may be necessary in connection the Joint Venture's bid for the project. NOW THIS POWER OF ATTORNEY WITNESSETH THAT: We, M/s....., hereby designate M/s....., being one of the partners of the Joint Venture, as the lead partner of the Joint Venture, to do on behalf of the Joint Venture, all or any of the acts, deeds or things necessary or incidental to the Joint Venture's Tender for the contract, including submission of Tender, participating in conferences, responding to queries, submission of information/documents and generally to represent the Joint Venture in all its dealings with UJVN Ltd any other Government Agency or any person, in connection with the contract for the said work until culmination of the process of Tendering till the contract agreement is entered into with the UJVN Ltd and thereafter till the defect liability period. We hereby agree to ratify all acts, deeds and things lawfully done by lead member, our said attorney pursuant to this power of attorney and that all acts deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us/ Joint Venture. Dated this the .....day of.....20xx

Signature of the attorney

Signature of the attorney is attested

(by the authorised signatory of the company)

**Notes:**

- i) To be executed by all the partners individually, in case of a Joint Venture.
- ii) The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure. iii) In case of incorporated companies, the common seal of the company has to be embossed on all pages.

(Name in Block letters of Executants)

Seal of Company

Witness 1:

Witness 2:

Name :  
Address :  
Occupation :

Name :  
Address :  
Occupation :

**DRAFT MEMORANDUM OF UNDERSTANDING (MOU) FOR JOINT VENTURE PARTICIPATION  
BETWEEN**

M/s.....having its registered office at..... (hereafter referred to as ..... ) acting as the Lead Partner of the first part. And M/s.....having its registered office at.....(hereafter referred to as '.....') in the capacity of a Joint Partner of the other part. The expressions of.....and .....shall whatever the context admits, mean and include their respective legal representatives, successors-in-interest and assigns and shall collectively be referred to as "the Parties" and individually as "the Party" WHEREAS; UJVN Ltd (hereinafter referred to as "Client") has invited bids for.....(insert name of work).....

**NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:**

1. The following documents shall be deemed to form and be read and construed as an integral part of this MOU. i) Notice for bid, and ii) Tender document iii) Any Addendum / Corrigendum issued by (Southern Railway Mechanical organization) iv) The Tender submitted on our behalf jointly by the Lead partner.

2. The 'Parties' have studied the documents and have agreed to participate in submitting a 'Tender' jointly.

3. The name of the Joint Venture firm shall be\_\_\_\_\_.

4. M/s..... shall be the lead member of the JV for all indents and purpose and shall represent the Joint Venture in its dealing with Client. For the purpose of submission of Tender proposals, the parties agree to nominate ..... as the leader duly authorized to sign and submit all documents and subsequent clarifications, if any, to the Client. However, M/s..... shall not submit any such proposals, clarifications or commitments before securing the written clearance of the other partner which shall be expeditiously given by M/s..... to M/s.....

5. The 'Parties' have resolved that the distribution of share and responsibilities is as under:

a) Lead Partner share.....%;

Responsibilities . i).....

ii).....

iii).....

b) Joint Venture Partner's share.....%

Name.....

Responsibilities i).....

ii).....

iii).....

C) Joint Venture Partner's share.....%

Name.....

Responsibilities

i).....

ii).....

iii).....

6. JOINT AND SEPARATELY RESPONSIBILITY The Parties undertake that they shall be jointly and separately liable to the client in the discharge of all the obligations and liabilities as per the contract with the client and for the performance of contract awarded to their JV.

7. ASSIGNMENT AND THIRD PARTIES The parties shall co-operate throughout the entire period of this MOU on the basis of exclusively and neither of the parties shall make arrangement or enter into agreement either directly or indirectly with any other party or group of parties on matters relating to the Project except with prior written consent of the other party.

8. EXECUTIVE AUTHORITY The said Joint Venture through its authorized representative shall receive instructions, payments from the client. The management structure for the project shall be prepared by mutual consultations to enable completion of project to quality requirements within permitted cost and time.

## Short Term Tender 23/EE/PCM/Dhalipur/2025-26

9. GUARANTEES AND BONDS Till the award of the work, the lead partner shall furnish Earnest Money and all other bonds/guarantees to the Client on behalf of the Joint Venture, which shall be legally binding on all the partners of the Joint Venture.

10. INDEMNITY Each party hereto agrees to indemnify the other party against its respective parts in case of breach / default of the respective party of the contract works of any liabilities sustained by the Joint Venture.

11. For the execution of the respective portions of works, the parties shall make their own arrangements to bring the required finance, plants and equipment, materials, manpower and other resources.

12. DOCUMENTS & CONFIDENTIALITY Each party shall maintain in confidence and not use for any purpose related to the Project all commercial and technical information received or generated in the course of preparation and submission of the bid.

12. DISPUTE AND ARBITRATION Any dispute, controversy or claim arising out of or relating to this agreement shall be settled in the between the parties as per procedure laid in Clause -54 & 55 of GCC

13. VALIDITY This MOU/ JV Agreement shall remain in force till the occurrence of the earliest to occur of the following unless by mutual consent, the parties agree in writing to extend the validity for a further period.

a. The Tender submitted by the joint venture is declared unsuccessful, or

b. Cancellation / shelving of the project by the client for any reasons prior to award of work.

c. Execution of detailed JV agreement by the parties, setting out detailed terms after award of work by the client.

14. This MOU is drawn in.....number of copies with equal legal strength and status. One copy is held by M/s..... and the other by M/s..... & M/s..... and a copy submitted with the proposal.

15. This MOU shall be construed under the laws of India.

16. NOTICES Notice shall be given in writing by registered mail or commercial courier or Fax to the following Fax numbers and addresses.

Lead Partner

.....  
(Name and Address)  
Fax no: .....

Other Partner

.....  
(Name and Address)  
Fax no.....

IN WITNESS WHERE OF THE PARTES, have executed this MOU the day, month and year first before written.

M/s.....  
.....  
(Seal)

M/s.....  
.....  
(Seal)

Witness:

1..... (Name & Address)  
2..... (Name & Address)

**SECTION-VII**

**BILL OF QUANTITIES**

## Short Term Tender 23/EE/PCM/Dhalipur/2025-26

### PART –II: FINANCIAL-BID

| Name of Work :- Demolishing Dilapidated 140 Residential & Non Residential building of Asan Colony at Dhalipur, Dehradun. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |                              |               |
|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------------------------------|---------------|
| S.no                                                                                                                     | Item of Works                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Qty. | Unit | Recovery amount pay to UJVNL |               |
|                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      | Amount (Rs.)                 | in Word (Rs.) |
| 1                                                                                                                        | Demolishing Dilapidated 08 Nos. Non Residential Store building of Asan Colony at Dhalipur, Dehradun. Demolishing Brick work, Cement Concrete 1:3:6 or richer mix, Stone RR masonry & Dismantling Roofing etc, Steel Work including dismantling and stacking. Including supply of all material labour (Plumber,Mason,Welder & unskilled Labour) T&P ( JCB &Welding Machine) etc as per requirement at site for miscellaneous work and proper completion of the work. Including stacking & disposal of scrap material & Cleaning site as per direction of Engineer-in-charge. | 1.00 | Job  |                              |               |
|                                                                                                                          | Net Amount                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |      |                              |               |

Signature of contractor

JE

AE

The demolishing of dilapidated structures under Asan Colony Dhalipur is to be done according to the following conditions:-

1. The minimum recovery of scrap material for the said demolition will be kept at Rs. 5,07,726.00 (GST Extra)
2. After demolition by the firm with highest price, the scrapo material will be disposed of at its own level.
3. The entire amount (GST Extra) of the maximum value has to be deposited by the firm/contractor in the account no. (P.N.B. 0639002100009390)/ Demand draft in the name of UJVN Limited account no. (P.N.B. 0639002100009390) within 05 days.
4. To participate in the tender, each firm/contractor will have to deposit an FDR/TDR of Rs. 20,600.00 only as security deposit in the name of Dy.G.M. (Civil Maintenance), Dhalipur as per the terms and condition of the tender
5. Maximum time of 01 month is prescribed for the said work.
6. During the above demolition and disposal of scrap material, if any damage is caused to other structures of the department and electric poles, water pipelines etc. then the bidder will be responsible for its compensation/repair.

Signature of contractor

Executive- Engineer (PCM)  
Dhalipur, Dehradun

**SECTION-VIII****TECHNICAL SPECIFICATIONS****TECHNICAL SPECIFICATIONS**

| S.No. | Contents                                    |
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| 15    | D.P.C.                                      |
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|    |                                                  |
|----|--------------------------------------------------|
| 21 | <b>REPAIRS OF BUILDING</b>                       |
| 22 | <b>DISMANTLING AND DEMOLISHING</b>               |
| 23 | <b>OTHER RELEVANT STANDARDS /CODES/GUIDLINES</b> |
| 24 | <b>QUALITY CONTROL</b>                           |

**1- INTRODUCTION:**

Technical specifications stipulated herein are to guide the contractor so that quality of work may be ensured. However, to execute the work under the provision of Technical Specification contractor cannot free from his obligation till quality of final work is assured by way of physical checking or test at site or laboratory test or by any other means by the owner i.e. UJVN Ltd.

**2- SCOPE OF WORK:**

As detailed hereunder:

Scope of this tender cover the work in totality for which tendering is intended. Items of work mentioned in bill of quantity [BOQ} form the work in general. Each individual item shall be executed as per approved drawings, technical specification and/or as directed by the Engineer-In- Charge in such a way that it will complete the work in proper way. Scope of work will remain in existence until and unless the work for which tendering is intended, is completed properly as per General condition of contract, Special condition of contract, approved drawings, technical specifications and / or as directed by the Engineer-in-Charge.

**3- GENERAL**

1 All Technical specifications of PWD Uttarakhand, Indian Road Congress (IRC) /Ministry of Road, Transport & Highways (MORTH)/ Central Public Works Department (CPWD) including specifications listed in this Bid Document will be followed. BIS codes of latest revision shall be referred wherever necessary. All works shall be carried out in conformity to the specifications contained in relevant I.S codes available for the purpose, except in so far as inconsistency between the two specifications of any work are not given in either the I.S. code or here in the work shall be carried out in all respects in accordance with the instructions of the Engineer-in-charge given from time to time. A copy of each of the relevant IS codes shall be made available at site office by the Contractor for reference. In case any specification is missing, the work shall be carried out in all respects in accordance with the instructions of the Engineer-in-charge. The specifications are only for guidance purpose, the decision of Engineer-in-charge shall be final.

2 The contractor shall not do any work other than that mentioned in the agreement without the written orders of the Engineer-in-charge. No claim, whatsoever, shall be entertained for any unauthorized work.

3 No claim shall be entertained by the Nigam in respect of any theft, loss or damages/injuries or death of any personnel of the Contractor, due to accident occurring for any reason what so ever. The contractor shall be responsible for the safety of the working personnel, works and the materials issued to him for the work.

4 No claim shall be entertained for idle labor for any reason what so ever.

5 The Engineer-in-charge shall have the right to take possession of or use any completed part of work. Such possession or use shall not be deemed as taking over any work not completed in accordance with the contract.

6 All the works during the progress and after the completion may be subjected to the technical audit, any defects of materials of workmanship discovered during such audit and established as shall be rectified by the contractor at his own cost. Any recoveries or reduction

in rates on any account considered necessary shall be made from the contractor even if the work has been accepted by the Engineer- in charge from the subsequent bills or securities of the contractor.

7 All materials arranged by the contractor shall be subjected to approval of the Engineer-in Charge. At any instance, if any material is found to be sub-standard and / or unfit to use in work, shall immediately be removed from the working premises at the cost and responsibility of the Contractor, failing which an unconditional penalty will be imposed upon the Contractor to remove the rejected materials from the site, without assigning any reason.

8 No claim for the interest or damages will be entertained by the Nigam with respect to any money or balance which may be lying with the Nigam or may become due owing to any disputes, difference or misunderstanding between the Engineer-in-charge on the one and the contractor on the other hand or with respect to any delay on the part of the Engineer-in-charge in making periodical of final payment or in any respect whatsoever.

#### **4- MATERIALS**

##### **1 CEMENT:**

1.1 Cement shall be fresh, dry and free from any lump and shall be arranged by the Contractor himself. Cement shall be Ordinary Portland Cement (OPC) and / or Portland Pozzolana Cement (PPC) in conformity to IS 269 / IS 8112 and / or IS 1489 and / or as directed by the Engineer-in-Charge. Every bag shall contain 50kg of the cement. Test Certificates for conformity to the physical and chemical requirements of cement in accordance with IS 269, 445, 1489 and 8112 from any approved laboratory shall be submitted once for each source of supply and occasionally when called for in case of long and / or improper storage.

1.2 Contractor shall make his own arrangements of cartage from market to site of work. He shall be responsible for any loss to the pilferage of cement due to rain or dampness from ground or otherwise including pilferage. Detailed information about the source of receipt, brand and make of the cement proposed to be used in work shall be informed well in advance for approval of the Engineer-in-Charge before placing order for supply to site.

1.3 Construction of the curing tank, Water tank and bench mark pillage etc. as per direction of the Engineer-in-charge shall be made under bona-fide requirements.

##### **2 STEEL:**

2.1 Steel required for reinforcement shall conform to IS 1786 and shall be arranged by the Contractor himself. Contractor shall make his own arrangements of cartage from market to site of work.

2.2 Detailed information about the source of receipt, brand and make of the reinforcements proposed to be used in work shall be informed well in advance for approval of the Engineer-in-Charge before placing order for supply to site.

##### **3 AGGERGATES:**

3.1 Aggregates (Coarse and Fine) shall conform to IS 383 & 2386 and shall be collected from the approved quarry as directed by the Engineer-in-charge. It shall be free from clays, grass and other organic impurities in conformity to IS 2386(PI) and shall be screened before use.

3.2 All the quarry charges, taxes and royalty shall be done by Contractor himself.

3.2 Fine sand of F.M. not less than 1.2 shall be used in Masonry work and plaster only.

3.3 Coarse sand of F.M. more than 2.0 shall be used in all concrete and R.C.C. works.

3.4 Sand shall be used by volume in dry condition and a suitable allowance for bulkage shall be added if the sand found moist at the time of its use.

3.5 Coarse aggregates shall be well graded as described in the following table and shall be clean and free from any organic or objectionable matter, subject to the limit as defined in IS 2386(PII).

3.6 Well graded aggregates of maximum size of 40mm crushed from hard, tough stone shall be used in foundation and floor base concrete and well graded crushed aggregate of maximum size 20mm shall be used in R.C.C. and plain cement concrete work.

3.7 It shall be approved by the Engineer-in-charge at the site of quarry before it is actually cartage to site of work and shall be crushed and graded as per table given below:

| S.No. | Nomina<br>size of<br>stone<br>ballast | Percent passing on I.S. sieve |        |        |        |       |        | Fineness<br>Modulus |
|-------|---------------------------------------|-------------------------------|--------|--------|--------|-------|--------|---------------------|
|       |                                       | 40mm                          | 20mm   | 16mm   | 12.5mm | 10mm  | 4.75mm |                     |
| 1.    | 2                                     | 3(a)                          | 3(b)   | 3(c)   | 3(d)   | 3(e)  | 3(f)   | 4                   |
| 1     | 40mm                                  | 95-100                        | 30-70  | -      | -      | 10-35 | 0-5    | 6.0 to 7.5          |
| 2.    | 20mm                                  | 100                           | 95-100 | -      | -      | 25-55 | 0-10   | 6.35 to 6.9         |
| 3.    | 16mm                                  | -                             | 100    | 90-100 | -      | 30-70 | 0-10   | 6.35 to 6.9         |
| 4     | 12.5m<br>m                            | -                             | 100    | -      | 90-100 | 40-85 | 0-10   | 5.05-6.6            |

3.8 All the quarry charges, taxes and Royalty and transportation shall be borne by the Contractor himself. Receipts for taxes & royalty paid by the Contractor shall be attached along with the Running Bills, failing which no such Bill of the Contractor will be entertained.

3.9 Contractor may be asked by the Engineer-in-charge to wash and screen the aggregates to achieve proper gradation before use.

#### 4 ADMIXTURES

Admixtures shall be suitable plasticizers and chemical admixtures, free from calcium chlorides, conforming to IS 1093. The admixtures as approved by the Engineer-in-Charge shall be of uniform consistency and quality and shall be maintained at the job site at uniform strength of solution. Admixtures shall be batched separately in liquid form in dispensers capable of measuring at one time the full quantity of each admixtures required for each batch.

#### 5 WATER:

Water for use in mixing and curing shall be of drinkable quality. Water shall be free from injurious pills, oils & greasy matters, alkaline and acidic reactions and organic matters and other impurities that may be deleterious to concrete or steel Water shall conform to IS 456.

#### RR STONE MASONRY

This section covers the furnishing of all labour, materials and equipment and the performing of all operations required for the stone masonry work and incidental items pertinent thereto, in accordance with the drawings and these specifications.

The Material of all nature shall confirm to the CPWD detailed specification as per Sub head 7.0 Vol-1 -2019.

The measurement and payment shall be done on the basis of unit given in Bill of Quantities.

#### SITE CLEARANCE:

1 All plants, shrubs & bushes, roots and other objectionable materials from site of work within the area required to be cleared, shall be completely removed from the site and disposed of as directed by the Engineer-in-charge.

2 The layout of foundations shall be clearly marked on the ground by dabbling and constructing level pillars as per drawing and direction of Engineer-in-charge before starting any digging work.

**6. EXCAVATION IN FOUNDATIONS AND PREPARATION:**

**1 General:**

1.1 The contractor shall be fully responsible for proper setting out of works, profiling in excavation, stacking, etc, taking adequate safety measures, etc and shall carry out all works meant within the intent of the specifications even if not explicitly mentioned hereunder. All works shall be executed to the satisfaction of the Engineer-in-Charge.

1.2 During excavation, the Contractor shall take all necessary precautions against soil erosion, water and environmental pollution. Before start of the work, the Contractor shall submit to the Engineer-in- Charge for approval, his work plan and the procedure he intends to follow for disposal of waste materials. However, approval of the Engineer-in-Charge for such plans shall not absolve the Contractor of his responsibility for safe and sound work.

1.3 The Contractor shall make his own survey arrangement for locating the coordinates and positions of all work and establishing the RLs at these locations based upon two reference grid lines and one bench mark which will be furnished by the Engineer-in-Charge. The Contractor shall provide all survey instruments with qualified surveyors to the satisfaction of the Engineer-in-Charge.

1.4 The work to be done under this clause consists of furnishing all plant, labour, and materials and performing all work required to be excavation, and maintain the excavated slopes and prepare the foundations as specified in these specifications and as may be directed by the Engineer-in-charge. The item shall comprise excavation for foundations of power house building and machine foundations and protection wall etc. and its preparation for laying masonry or concrete.

**2 CLASSIFICATION:**

The earth and rocks shall be classified for excavation under the following categories in order to facilitate measurement and payment.

**2.1. Common Excavation:**

Common excavation shall include all over-burdens, dry or wet restricted to materials such as silt, earth, clay, sand, gravel, moorum, and loose boulders, soft and disintegrated rock, which can be removed by hand, pick axes, barring and wedging, without continuous and systematic ballasting.

**2.2. Rock Excavation:**

Rock excavation by blasting, barring and wedging shall include all solid rock and boulders required to be excavated which in the opinion of the Engineer-in-charge cannot efficiently be worked until loosened by blasting to additional allowances above the unit price stated in the

schedule of bids for excavation will be made on account of any of the material being wet or frozen.

**3. Limits of Excavation:**

3.1 The excavation for foundations of structures shall be carried out in accordance with an approved programme after their layout is marked at site and duly approved by the Engineer-in-charge. The excavation for power house building, machine foundation, protection wall etc. shall however, shall be one in accordance with initial cross section. Reference / level pillar shall be constructed by the contractor at his own expenses at every 10 meters or as directed by the Engineer-in-charge and preserved till completion of work.

3.2 The contractor shall be required to do excavation in all types of strata of earth, sand, shingle, boulders, clay, clay shale, sand rock, sand stone, silt stone and all other types of rocks or any mixture of them in dry, wet or saturated condition including jungle clearance, and removal of all tree stumps & their roots and disposal of excavated material inclusive of all leads and lifts as per enclosed specifications. No claim shall be admissible to the contractor on account of any variation in quantities of different types of strata actually met with and change in type of earth and rock from these estimated.

3.3 Excavation shall include removal of all materials encountered in the foundation and no claim for blasting and removal of materials or in respect of any difficulty that may be met in carrying out the excavation shall be entertained.

3.4 The bottom and side slopes upon or against which concrete and or masonry is to be placed shall be finished accurately to the established lines and grades and loose materials on surface so prepared shall be moistened with water and if tamped or rolled with suitable tools and equipment to form a firm foundation for the structure. Where the material is found to be unsuitable to form a firm foundation, further excavation may be ordered by the Engineer-in-charge. This extra excavation will be filled up as directed by the Engineer-in-charge. Such excavation will be payable to the contractor.

3.5 The contractor shall safeguard the excavated area from inflow of water or slush from outside. No payment shall be admissible to the contractor for removal of slush from the excavated area in case of his inability to check its inflow into the excavation.

3.6 If at any point in common excavation, material is excavated beyond the lines required to receive the structures, the over excavation shall be filled with selected materials in layers, moistened and thoroughly compacted. Where concrete or masonry is to be placed on weathered or sound rocks, the over excavations shall be filled with the stone masonry or lean cement concrete by the contractor as may be specified by Engineer-in-charge, at his own expense including cost of materials.

3.7 The contractor shall flatten at his own cost any side slopes which being unstable may slide into the foundations and hereby obstruct the work.

3.8 The contractor shall ensure that no damage is done to the forest property by his workers. In case of any damage, the contractor shall be liable for action therefor.

3.9 The contractor will have to obtain license at his own cost for keeping the explosive and will take all precautions for the safe storage, transit, use and will be liable to pay compensation if any damage whatsoever is caused due to negligence on his part. The

contractor should exhibit red flags, signboards and lights, caution boards etc. to avoid chances of damage and accidents during excavation and / or blasting operations.

**4 BLASTING:**

4.1. Blasting shall be done only when proper precautions are taken for the protection of persons work and property, and damage done to the work or property by blasting shall be repaired by the contractor at his own expenses. Blasting may be done only to depth and extent approved by the Engineer-in-charge with explosives of approved type and quantity and in such locations as may neither crack nor the rock outside the prescribed limits of the damage excavation.

4.2 The contractor shall make himself fully acquainted with the Government of India Explosive Act. Regulations 1983 and Rules mentioned pertaining to the said Act in connection with the quarrying operation, storing and firing of all explosives and shall strictly abide by them.

**5. DISPOSAL:**

5.1. The disposal for foundations of structures and that for machine Foundation shall be done at specified location within an initial lead of 100 m.

5.2. Waste piles shall not be located where in the opinion of the Engineer-in-charge they will harmfully interfere with the construction work, or will do tract from the appearance of the completed structures or will interfere with the accessibility of the structures for operation. The disposal in waste piles shall be done in layers of 25cm thickness or as directed by Engineer-in-charge.

5.3. But in case the Contractor is directed by the Engineer-in-charge for disposal of waste piles beyond 100 meters, the contractor shall be allowed to dispose the excavated materials on extra payment based on schedule of rates of the Nigam.

5.4. Suitable material from excavation from the power house works & protection works under this contract shall be used in Rock fill, back fill, rip-rap, R.R./C.R. masonry works so far as practicable and as determined by the Engineer-in-charge.

5.5. Materials suitable for the purpose listed above shall be placed separately from the materials to be wasted and suitable materials shall be segregated by loads from excavations and shall be placed in designated final locations directly from excavation or shall be placed in temporary stock piles and later place in the designated locations as directed by the Engineer-in-charge. Such suitable material, obtained from excavation, if used for the purpose listed above, shall be allowed and shall be paid by the contractor. However the royalty charges shall be paid by the contractor.

5.6. No lifts for ascending or descending in excavation work shall be admissible at all. The piles of excavated material shall be leveled and trimmed to reasonably regular lines and the contractor shall be entitled to an additional payment on account of this requirement.

**6. MEASUREMENT AND PAYMENT:**

6.1. Cross section of the site of excavation for power house, machine foundation, protection works shall be taken just prior to commencement of work under this contract at every 5 meters or at closer intervals as considered necessary by the Engineer-in-charge and the grades and lines for excavation shall be fixed in advance. The cross sections approved by the Engineer-in-charge before start of work shall be signed by the contractor in token of acceptance of their accuracy. The final excavated section shall be taken on completion of excavation and prior to commencement of work on it.

6.2. The contractor or his authorized representative shall be present while original, intermediate final cross sections are recorded by the representative of the Engineer-in-charge, for which 7 days notice shall be given to the contractor. If the contractor or his authorized representative fails to be present, the cross section recorded by the representative of the Engineer-in-charge shall be final and binding on the contractor.

6.3. The final excavated section shall be plotted on the cross section previously taken. all measurement of the cross section will be based on this survey subject to the condition that excavation in excess of the lines and grades given in the construction drawings, issued to the contractor or as modified subsequently shall be measured while plotting the cross section but shall be deleted from measurement. The estimated quantities for the three classes excavation are given in the bill of the quantities. The quantities are approximate and shall be paid according to the actual measurement at site.

## **7. BACKFILL:**

### **General:**

The work to be done under this section consists of furnishing all plants, Labor and material and performing all works required to place compacted backfill as indicated in the drawings or as directed in the field by the Engineer-in-charge, all in accordance with the provisions here in Engineer-in-charge after specified .

### **1.1 Compacted backfill:**

Compacted backfill shall be placed where indicated on the drawing or as directed by the Engineer in Charge. Materials used shall be only those approved by the Engineer-in-charge, and shall be secured from required excavation or from other sources developed by the contractor as approved or as directed by the Engineer-in-charge. Materials shall be free from shale, bush, roots, sods or other perishable and objectionable materials. Rock fragments may be used in compacted backfill, provided that voids occurring between rock fragments or filled with earth or other approved material to provide a compact mass, and that rock is distributed throughout the course, using no rock that is large in any of its dimension than the depth of the coarse where in the rock is placed. The gradation of the backfill material shall be uniform throughout the backfill.

### **1.2 Placement:**

The contractor will be required to break up the fill material to such maximum size as is determined necessary by the Engineer-in-charge to permit satisfactory placement. Compacted backfill shall be placed in layers approximately 15 cm in thickness prior to compaction and then compacted by suitable tamers as approved by Engineer-in-charge.

If so approved by the Engineer-in-charge, the Contractor shall add water by uniform sprinkling in advance of the compaction of each layer. the amount of sprinkling shall be controlled so that no water will appear on the surface during or subsequent to compaction.

### **1.3 Measurement:**

Measurement for the payment of compacted backfill will be made in cubic meters of material placed between the lines and grades as indicated in the drawing. Cross sections shall be taken at every 5metres or at closer intervals if considered necessary by the Engineer-in-charge prior to the commencement of backfilling. Finally finished profile of back fill shall be plotted on the aforesaid cross sections. This will form the basis of all measurement for payment. Due to conditions obtaining at site or for any other reason the Engineer-in-charge, according to his discretion, can adopt any other mode of measurements and the same shall be acceptable to the contractor. The excavated material used directly in the backfill shall be deducted from measurements, as it will be measured and paid for against item of excavation. The rate of back fill materials shall be inclusive of initial lead of 60m.

## 8. CEMENT CONCRETE WORK

## CONCRETE WORKS

## Concrete in Structures

## General

The items in the BOQ for concrete in the structures includes all cast-in-place concrete in the structure.

Cast-in-place concrete for the structures shall confirm to the requirement, miscellaneous metal work, mechanical and electrical equipment and other items forming a part of the structures are provided for elsewhere in these specification.

The structures shall be built to the lines, grades and dimensions shown on the drawings. The dimensions of each structure as shown on the drawings will be subject to such modifications as may be found necessary by the Project Manager to adopt the structure to the conditions disclosed by the excavation or to meet other conditions. Where the thickness of any portion of a concrete structure is variable it shall vary uniformly between the dimensions shown. Where necessary, as determined by the Project Manager, the contractor shall be furnished additional detail drawings of the structures to be constructed. The contractor will not be entitled to any additional allowances above the price bid in the bill of quantities by reason of the dimensions fixed by the Project Manager or by reasons of any modifications or extension of a minor character to adopt a structure at site, as determined by the Project Manager.

The cost of furnishing all materials and performing all work for installing timber, metal and other accessories for which specific price are not provided in the BOQ, shall be included in the applicable prices bid in the BOQ for the work to which such items are appurtenant.

## General concrete requirements

## Preparation of concrete

Concrete shall be composed of cement, sand, coarse aggregate, water admixtures (if any) as specified and all well mixed in batching & mixing plant by weight or by concrete mixture by volume / weight and brought to the proper consistency. Batching plant, if deemed required for large volume of concrete work, shall conform to I.S code No. 4925. For works in which water tightness is required the specification in IS 3370 shall be applied. Concrete shall be mixed in a fully automatic batching plants. In the works involving very small quantities of concrete, Project Manager may allow the use of proper mechanical mixer for the production of concrete. No other mixers shall be allowed for concrete mixing. The concrete batching plant shall have the cloud based memory for accessing the production data in real time. The batching plant shall be able to produce concrete as per 3 to 4 types of mix. Output from batching plant shall be as dense as possible, plastic enough to consolidate well and stiff enough to stay in place on the slopes. Mixing shall be continued until there is a uniform mixing of the materials and the concrete is uniform in color and consistency. The time of mixing shall be as shown in Table 1 of IS 457 and reproduced in the table below.

**TABLE 1 TIME OF MIXING**

| CAPACITY OF MIXER                | MINIMUM TIME OF MIXING |                            |
|----------------------------------|------------------------|----------------------------|
|                                  | Natural<br>Aggregates  | Manufactured<br>Aggregates |
| 3 cu m ( or 3 cu yd ) or larger  | 2 minutes              | 2½ minutes                 |
| 2 cu m ( or 2 cu yd )            | 1½ minutes             | 2 minutes                  |
| 1 cu m ( or 1 cu yd ) or smaller | 1¼ minutes             | 1½ minutes                 |

Nominal maximum size of aggregates

For sizes of aggregates IS 383 shall apply. The coarse aggregate to be used in concrete shall be as large as practicable, consistent with required strength, spacing of reinforcement and embedded items, and placement thickness. The size of the coarse aggregates to be used will be determined by the Project Manager and may vary incrementally according to the conditions encountered in each concrete placement. Nominal maximum size of aggregate for concrete in structures and dam lining shall be as indicated in the relevant drawings appended to the contract documents. Medium coarse aggregate than specified shall be used where in the opinion of the Project Manager that proper placement of concrete is impracticable with the size of the aggregate specified in the drawings.

### Mix proportions

Grades of concrete to be used shall be as per the specification in the approved drawing. The proportions of various ingredients to be used in the strength based concrete for different items of the work are to be determined from mix design. In volume proportion of concrete; the quantity of both cement and aggregate should be determined by volume. Water shall be either measured by volume in calibrate tanks or weighed. Batching plant shall confirm I.S 4925. {Indian Standard Specification for batching and mixing plant). All measuring equipment shall be maintained in a clean serviceable condition and their accuracy periodically checked. The acceptance or rejection of concrete shall be as per the acceptance criteria laid down in clause 16 of I.S. 456-2000.

The net water cement ratio exclusive of water absorbed by the aggregate shall be sufficiently low to provide adequate durability in concrete. The water-cement ratio shall normally be governed by Table 5 of IS 456:200, reproduced below, and firmed up by the trial mix designs, which shall be intimated to the Contractor by the Project Manager.

**Table 5 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum Size**

(Clauses 6.1.2, 8.2.4.1 and 9.1.2)

| Sl No. | Exposure    | Plain Concrete                           |                                 |                           | Reinforced Concrete                      |                                 |                           |
|--------|-------------|------------------------------------------|---------------------------------|---------------------------|------------------------------------------|---------------------------------|---------------------------|
|        |             | Minimum Cement Content kg/m <sup>3</sup> | Maximum Free Water-Cement Ratio | Minimum Grade of Concrete | Minimum Cement Content kg/m <sup>3</sup> | Maximum Free Water-Cement Ratio | Minimum Grade of Concrete |
| 1)     | (2)         | (3)                                      | (4)                             | (5)                       | (6)                                      | (7)                             | (8)                       |
| i)     | Mild        | 220                                      | 0.60                            | –                         | 300                                      | 0.55                            | M 20                      |
| iii)   | Moderate    | 240                                      | 0.60                            | M 15                      | 300                                      | 0.50                            | M 25                      |
| iii)   | Severe      | 250                                      | 0.50                            | M 20                      | 320                                      | 0.45                            | M 30                      |
| iv)    | Very severe | 260                                      | 0.45                            | M 20                      | 340                                      | 0.45                            | M 35                      |
| v)     | Extreme     | 280                                      | 0.40                            | M 25                      | 360                                      | 0.40                            | M 40                      |

#### NOTES

1 Cement content prescribed in this table is irrespective of the grades of cement and it is inclusive of additions mentioned in 5.2. The additions such as fly ash or ground granulated blast furnace slag may be taken into account in the concrete composition with respect to the cement content and water-cement ratio if the suitability is established and as long as the maximum amounts taken into account do not exceed the limit of pozzolona and slag specified in IS 1489 (Part 1) and IS 455 respectively.

2 Minimum grade for plain concrete under mild exposure condition is not specified.

The water cement ratio for various grades of concrete shall be as determined and ordered by the Project Engineer.

Consistencies:

The slump of concrete at the placement shall be governed by IS : 456-2000:

If the specified slump is exceeded at the placement, the concrete is unacceptable. The Project Manager reserves the right to require lesser slump whenever concrete of such lesser slump can be consolidated readily into place by means of vibration specified by the Project Manager. To maintain concrete at proper consistency, the amount of water and sand batched for concrete shall be adjusted to compensate for any variation in the moisture content or grading of the aggregates as they enter the mixer. Addition of water to compensate for stiffening of the concrete after mixing but before placing will not be permitted. Uniformity in concrete consistency from batch to batch shall be maintained.

#### Concrete Quality Control Measures and Concrete Quality Assurance Test Program Concrete quality control measures

The contractor shall be fully responsible for providing quality concrete to ensure compliance of the contract requirements.

Making and curing concrete test specimens in the field, transporting to the laboratory and testing concrete specimen shall confirm to relevant clauses of I.S 516.

Testing of concrete shall be carried out by the Contractor on representative samples taken at the site of laying the concrete in accordance with relevant clauses of I.S. 1119.

#### Sampling procedure and frequency

A random sampling procedure shall be adopted to ensure that each concrete batch has a reasonable chance of being tested, i.e. the sampling should be spread over the entire period of concreting and should cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with the IS:456-2000 (section 15.2.2 and reproduced below) & I.S:1199.

**The minimum frequency of sampling of concrete of each grade shall be in accordance with the following:**

| <i>Quantity of Concrete in the Work, m<sup>3</sup></i> | <i>Number of Samples</i>                                                           |
|--------------------------------------------------------|------------------------------------------------------------------------------------|
| 1 - 5                                                  | 1                                                                                  |
| 6 - 15                                                 | 2                                                                                  |
| 16 - 30                                                | 3                                                                                  |
| 31 - 50                                                | 4                                                                                  |
| 51 and above                                           | 4 plus one additional sample for each additional 50 m <sup>3</sup> or part thereof |

NOTE—At least one sample shall be taken from each shift. Where concrete is produced at continuous production unit, such as ready-mixed concrete plant, frequency of sampling may be agreed upon mutually by suppliers and purchasers.

#### Test specimen

Three test specimens shall be made from each sample for testing at 28 days. Additional cubes may be required for various purposes, such as to determine the strength of concrete at 7 days or at the time of striking formwork, or to determine the duration of curing or to check the testing cubes cured by accelerated methods as described in IS: 9013. The specimen shall be tested as described in IS:516.

#### Test strength of samples

The test strength of the sample shall be the average of three specimens. Individual variation shall not be more than 15 percent of the average.

Testing shall be carried out at the testing laboratories set up at the site or at any other laboratory that the Project Manager may decide upon and the results given thereby shall be considered as correct and authentic and acceptable to the Contractor.

Acceptance criteria

Acceptance criteria will be as per clause 16 and clause 17 of IS: 456-2000 and as per Table 11 of IS 456-2000, which is reproduced below.

**Table 11 Characteristic Compressive Strength Compliance Requirement**  
(Clauses 16.1 and 16.3)

| Specified Grade | Mean of the Group of 4 Non-Overlapping Consecutive Test Results in $\text{N/mm}^2$                                                                                                  | Individual Test Results in $\text{N/mm}^2$ |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| (1)             | Min<br>(2)                                                                                                                                                                          | Min<br>(3)                                 |
| M 15 and above  | $\geq f_{ck} + 0.825 \times \text{established standard deviation}$<br>(rounded off to nearest $0.5 \text{ N/mm}^2$ )<br>or<br>$f_{ck} + 3 \text{ N/mm}^2$ ,<br>whichever is greater | $\geq f_{ck} - 3 \text{ N/mm}^2$           |

NOTES

- 1 In the absence of established value of standard deviation, the values given in Table 8 may be assumed, and attempt should be made to obtain results of 30 samples as early as possible to establish the value of standard deviation.
- 2 For concrete of quantity up to  $30 \text{ m}^3$  (where the number of samples to be taken is less than four as per the frequency of sampling given in 15.2.2), the mean of test results of all such samples shall be  $f_{ck} + 4 \text{ N/mm}^2$ , minimum and the requirement of minimum individual test results shall be  $f_{ck} - 2 \text{ N/mm}^2$ , minimum. However, when the number of sample is only one as per 15.2.2, the requirement shall be  $f_{ck} + 4 \text{ N/mm}^2$ , minimum.

Note: the above criterion is as per Amend No.3 to IS 456:2000 (Fourth Revision, April 2007)

Cement shall conform to relevant clause 5 of IS. 456:2000 and include 33 Grade ordinary Portland cement (IS 269); 43 Grade ordinary Portland cement (IS 8112); 53 Grade ordinary Portland cement (IS 12269); Portland pozzolana cement (fly ash based) conforming to IS 1489 (Part I); Portland slag cement (IS 455); Low heat Portland cement (IS 12600); and Sulphate Resisting cement (IS 12330). Cement to be used shall be with the prior approval of Project Manager.

The provisions of this paragraph apply to cement for use in cast-in-place concrete required under these specifications.

The contractor shall make his own arrangements for the procurement of cement to specifications required for the works. Transportation from the place of supplying to the batching plant shall be in any weather tight means which will protect the cement completely from exposure to moisture. Cement bags shall not be stacked more than 1.5 m high. Each shipment of bagged cement shall be stored separately so that it may readily be distinguished from other shipment and shall be stored in a dry enclosed area protected from moisture. Storage of materials shall be as described in I.S. 4082 (I.S. recommendation on stacking and storage of construction materials at site). To prevent under aging of bagged cement after delivery, the contractor shall use bags of cement in the chronological order in which they were delivered to the job site. All storage facilities shall be subject to approval of the Project Manager. The manufacturer test certificate of cement must show that the alkali content is less than 0.6 % and should also show the chloride content.

Admixtures

When only deemed necessary, the contractor shall use Accelerating, retarding, water reducing and Air entraining agents & other admixtures like —Polypropylene Fiber as directed by the Project Manager. Admixtures shall be of uniform consistency and quality and shall be

maintained at the job site at uniform strength of solution. An admixture's suitability and effectiveness shall be verified by trial mixes with the other materials used in the works. If two or more admixtures are to be used simultaneously in the same concrete mix, their interaction shall be checked and trial mixes done to ensure their compatibility. There should also be no increase in risk of corrosion of reinforcement or other embedment's. Admixtures shall be batched separately in liquid form in containers capable of measuring at one time the full quantity of each admixture required for each batch. Chemical admixtures which harm the quality and strength of concrete shall not be used in the concrete.

Admixtures to be used in concrete shall conform to I.S. 9013-1979 Indian Standard Specifications for admixtures for concrete.

Chemical Admixtures:

Chemical admixtures are used in concrete mixes of low water-cement ratio to improve their workability to enable easy placement and consolidation of concrete. Chemical admixtures are plasticizers / super plasticizers which are organic compounds and are used to improve the workability of fresh concrete. A super plasticizer allows the production of concrete of higher workability (slump) with the same water-cement ratio. Concrete with low water-cement ratio (0.40, 0.45, 0.50) and concrete with very low water-cement ratio (0.25, 0.28; 0.30; 0.35 etc) becomes harsh and presents problems in placement and compaction/consolidation. M25, M30, M35, M40 concrete mixes are designed with low water-cement ratio ranging from 0.50 to 0.40. High strength concrete mixes (M60, M70, M80, M90 ) are designed with very low water-cement ratio ranging from 0.33 to as low as 0.28. Chemical admixtures are to be added to increase their slump and workability without addition of any extra water whatsoever. Following types of admixtures are commercially available and can be used with the approval of Project Manager:

MLS (Modified Lignosulphonates).

SNF (Sulphonated Napthalene Formaldehyde).

SMF (Sulphonated Melamine Formaldehyde).

PCE (Poly Carboxylic Ether)

The first three types (MLS, SNF, SMF) are conventional super plasticizers and the last one, PCE is considered to be the state-of-art new generation super plasticizer. MLS, SNF and SMF types of super plasticizers give water reduction from about 15 % to 20 %, where as, PCE super-plasticizer can give water reduction up to about 30 to 35 %. As such, PCE is known as "high range water reducing admixture".

Dosage of Chemical Admixture / Super plasticizer: The dosage of the respective super plasticizer is given in the brochure / literature of the manufacturer. Dosage is also best determined through trial mixes. It may range from about 0.70 % to about 2 % by weight of cement or by weight of cementitious material (cement plus mineral admixture, if used). Example for Illustration. M30 Design Mix made with 43 Grade OPC (Ordinary Portland Cement).

| Sl No. | Cement<br>Kg /m <sup>3</sup> | Admixture<br>(Litres) | W / C<br>Ratio | Slump<br>(mm) | Compressive Strength (N/mm <sup>2</sup> ) |        |         |
|--------|------------------------------|-----------------------|----------------|---------------|-------------------------------------------|--------|---------|
|        |                              |                       |                |               | 1 day                                     | 7-days | 28-days |
| 1.     | 375                          | NIL                   | 0.57           | 55            | 10                                        | 26     | 40      |
| 2.     | 375                          | 3.75                  | 0.57           | 140           | 11                                        | 30     | 43      |

The above illustrates that with the addition of 3.75 litres of chemical admixture, the slump of M30 concrete mix has increased from 55 mm to 140 mm without addition of any extra water what so ever while maintaining the same specified water-cement ratio (W/C) of 0.57 as is of M30 concrete mix without any admixture. Thus, super plasticized concrete allows concrete of high workability with very low water-cement ratio, excellent homogeneous & cohesive mix and easy placement in congested reinforcement affording very good finish.

#### Mineral Admixtures:

Mineral Admixtures are used as part replacement of Ordinary Portland Cement (OPC). These are by-products/ waste products of thermal plants and metallurgical industries. Principal mineral admixtures are:

(a) Fly ash. It is the by product from the coal-based thermal power plants. It is used to manufacture Portland Pozzolana Cement (fly ash based) with fly ash content ranging from 20 % to about 25 %. Fly ash improves cohesiveness of concrete mix; reduces thermal cracking; improves resistance to Alkali-Silica Reaction (ASR); and reduces permeability of concrete.

Standards / Specifications of Fly Ash . IS: 3812-Part-1-2003

**Table 1 Chemical Requirements**  
(Clause 6.1)

| Sl No. | Characteristic                                                                                                                                                              | Requirements                  |                                | Method of Test, Ref to |                        |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------------|------------------------|------------------------|
|        |                                                                                                                                                                             | Siliceous Pulverized Fuel Ash | Calcareous Pulverized Fuel Ash | Annex                  | IS No.                 |
| (1)    | (2)                                                                                                                                                                         | (3)                           | (4)                            | (5)                    | (6)                    |
| i)     | Silicon dioxide (SiO <sub>2</sub> ) plus aluminium oxide (Al <sub>2</sub> O <sub>3</sub> ) plus iron oxide (Fe <sub>2</sub> O <sub>3</sub> ) in percent by mass, <i>Min</i> | 70                            | 50                             | –                      | IS 1727                |
| ii)    | Silicon dioxide (SiO <sub>2</sub> ) in percent by mass, <i>Min</i>                                                                                                          | 35                            | 25                             | –                      | IS 1727                |
| iii)   | <sup>1)</sup> Reactive silica in percent by mass, <i>Min</i>                                                                                                                | 20                            | 20                             | <b>B</b>               | –                      |
| iv)    | Magnesium oxide (MgO) in percent by mass, <i>Max</i>                                                                                                                        | 5.0                           | 5.0                            | –                      | IS 1727                |
| v)     | Total sulphur as sulphur trioxide (SO <sub>3</sub> ) in percent by mass, <i>Max</i>                                                                                         | 3.0                           | 3.0                            | –                      | IS 1727                |
| vi)    | Available alkalis as sodium oxide (Na <sub>2</sub> O) in percent by mass, <i>Max</i>                                                                                        | 1.5                           | 1.5                            | –                      | IS 4032                |
| vii)   | Total chlorides in percent by mass, <i>Max</i>                                                                                                                              | 0.05                          | 0.05                           | –                      | IS 12423 <sup>2)</sup> |
| viii)  | Loss on ignition in percent by mass, <i>Max</i>                                                                                                                             | 5.0                           | 5.0                            | –                      | IS 1727                |

<sup>1)</sup> Optional test.

<sup>2)</sup> For the purpose of this test, wherever reference to cement has been made, it may be read as pulverized fuel ash.

(b) Silica / Micro silica. It is the by product in the production of ferro- silicon alloys or silicon from quartz & carbon in an electric arc furnace. It contains 85 % to 90 % Silicon Dioxide (SiO<sub>2</sub>). It is an extremely fine powder and is a highly reactive pozzolana having particles of an average diameter of 0.1 micron. The average specific surface area of silica fume is as much as about 20,000 m<sup>2</sup> / kg to 25,000 m<sup>2</sup> / kg compared to about 250 – 275 m<sup>2</sup> / kg fineness of Ordinary Portland cement. Thus, micro silica particle is about 100 times finer than the cement particle and imparts high strength to the concrete mix.

Use of Micro Silica. Micro Silica is an important constituent in the design of ‘High Strength Concrete Mixes’ ranging from M60 to M 90 and even higher. It is also used in the ‘Steel Fibres Reinforced Shotcrete (SFRS)’. Dosage of Micro Silica Dosage varies between 8 % to 15 % of the cement content depending upon the strength of the mix to be designed. Its dosage in SFRS is about 7 % of cement content.

Specifications Of Silica Fume / Micro Silica – Indian Standard IS: 15388-2003 and Tables 1 and 2 of the code are reproduced below.

**Table 1 Chemical Requirements**  
(Clause 4)

| Sl No.<br>(1) | Characteristic<br>(2)                              | Requirements<br>(3) | Test Method<br>(4) |
|---------------|----------------------------------------------------|---------------------|--------------------|
| i)            | SiO <sub>2</sub> , percent by mass, <i>Min</i>     | 85.0                | IS 1727            |
| ii)           | Moisture content, percent by mass, <i>Max</i>      | 3.0                 | see Note 1         |
| iii)          | Loss on ignition, percent by mass, <i>Max</i>      | 4.0                 | IS 1727            |
| iv)           | Alkalies as Na <sub>2</sub> O, percent, <i>Max</i> | 1.5                 | See Notes 2 and 3  |

**Table 2 Physical Requirements**  
(Clause 5)

| Sl No.<br>(1) | Characteristic<br>(2)                                                                                           | Requirement<br>(3) | Method of Test, Ref to<br>(4) (5) |      |
|---------------|-----------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------|------|
| i)            | Specific surface m <sup>2</sup> /g, <i>Min</i> (see Note 1)                                                     | 15                 | A                                 | —    |
| ii)           | Oversize percent retained on 45 micron IS Sieve, <i>Max</i> (see Note 1)                                        | 10                 | —                                 | 1727 |
| iii)          | Oversize percent retained on 45 micron IS Sieve, variation from average percent, <i>Max</i> (see Notes 1 and 2) | 5                  | —                                 | 1727 |
| iv)           | Compressive strength at 7 days as percent of control sample, <i>Min</i> (see Note 3)                            | 85.0               | —                                 | 1727 |

(C) Ground Granulated Blast Furnace Slag (ggbs). It is the byproduct of steel plants manufacturing pig iron. It is used in the manufacture of Portland Slag Cement (IS 455) and the slag content varies from 50 % to 70 %. Use of Portland Slag Cement with at least 50 % slag in the cement concrete offers many advantages, such as (a) significantly decreases the permeability of concrete, there by, increasing its durability (b) increases resistance to corrosion of steel reinforcement resulting in longevity of structures (d) Lowers heat of hydration, there by minimizing thermal cracking (e) provides increased resistance to ASR (Alkali Silica Reaction). Slag content in the Portland Slag Cement (IS 455) can be increased to as much as 70 %.

Specifications Of Ground Granulated Blast Furnace Slag. British Standard BS: 6699.

|                                              |                          |                                               |              |
|----------------------------------------------|--------------------------|-----------------------------------------------|--------------|
| Fineness (Blaine)                            | = 275 m <sup>2</sup> /kg | Soundness                                     | = 10 mm Max. |
| Glass content                                | = 67 % Min.              | Loss on ignition                              | = 3 % Max.   |
| Chloride content                             | = 0.1 % Max.             | Manganese content                             | = 2 % Max.   |
| Compressive Strength (70 % ggbs & 30 % OPC): |                          |                                               |              |
| 7-day strength = 12 N/mm <sup>2</sup> Min.   |                          | 28-day strength = 32.5 N/mm <sup>2</sup> min. |              |

#### Synthetic fibre additives

When only deemed necessary, synthetic fibres, made of 100% virgin grade polypropylene, should be added to concrete for special application to enhance properties (Clause 5.8 of IS 456 as per amendment 3 August 2007). The fibre should be as per guidelines of ASTM C 1116 ( Type III) or equivalent. Synthetic fibres can be used in cement plaster/ concrete lining / Shotcrete work / guniting work. Synthetic fibres may be used 6mm ( in Plaster / Guniting) / 12mm ( in PCC / RCC / concrete lining / Shotcreteing) @ 125 gm per 50 kg of cement or in the ratio as specified by the manufacturer specification and direction of Project Manager. For effective performance of concrete , the recommended dosage rate of polypropylene fibers is 0.9 kg/m<sup>3</sup> , approximately 0.1% by volume or as decided during mix design of concrete.

#### Steel fibres

When only deemed necessary, steel Fibres are used in Concrete and Shotcrete. Advantages of Steel Fibres. Specifications of Steel Fibres. Addition of steel fibres in concrete and shotcrete mixes gives the following advantages:

improves flextural strength of concrete / shotcrete.

Improves ductility of concrete / shotcrete.

Improves shear strength of concrete / shotcrete.

Improves impact resistance of concrete / shotcrete.

Improves crack resistance of concrete / shotcrete.

Steel fibres transform concrete / shotcrete from brittle to ductile material.

Steel Fibres Reinforced Concrete offers better resistance against abrasion & erosion.

The most important aspects that control the performance of steel fibres in concrete and shotcrete are:

Aspect Ratio (Length / Diameter)

Tensile strength.

Geometrical Shape.

Fibre Network.

The higher the aspect ratio and fibre network of a high strength fibre, the better the performance of “High Strength Steel Fibre Reinforced Concrete” / “Steel Fibre Reinforced Shotcrete (SFRS)”. Aspect Ratio of 60 to 80 is considered to be good. With smaller diameter fibres, the number of fibres per unit weight increases which densify the fibre network, thereby, making the concrete / shotcrete more efficient. Two types of steel fibres are tabulated below for illustration:

| Fibre Type (L/Dia) | Length | Diameter | Aspect Ratio (Length/Diameter) | Fibre Network (m/kg) |
|--------------------|--------|----------|--------------------------------|----------------------|
| 35/0.55            | 35 mm  | 0.55 mm  | 65                             | 556                  |
| 30/0.60            | 30 mm  | 0.6 mm   | 50                             | 450                  |

Usually, steel fibres of 36 mm length and 0.45 mm diameter (Aspect Ratio of 80) are used in the High Strength Fibre Reinforced Concrete Mix.

Shape of Fibres. The steel fibres shall have “hooked ends” to provide superior anchorage.

Glued steel fibres bundled together with a water soluble glue have now been developed which afford much better mixing and their uniform dispersion throughout the entire concrete matrix / shotcrete matrix instead of using loose fibres which pose mixing problem and do not spread evenly/uniformly in the concrete mix / shotcrete mix. Steel fibres of reputed manufacturer shall be used. DramixR steel fibres are considered to be of high quality. Such steel fibres are depicted in Annex 2 for illustration.

Tensile Strength of Steel Fibres. The tensile strength of steel fibres shall be higher than 900 MPa (900 N/mm<sup>2</sup>). It should preferably be 1000 MPa (1000 N/mm<sup>2</sup>). The fibres shall not be galvanized.

Dosage of Steel Fibres. Dosage of steel fibres may vary from about 5 % to 6 % of the cement content used in the Concrete mix / Shotcrete mix.

Specifications Of Synthetic Fibre Admixture

The fibre should be as per guidelines of ASTM C 1116 ( Type III) or equivalent. The Polyfin( Polypropylene and Polyethylene) fibres should have the following properties:-

Compliance - ASTM C 1116 ( Type III)

Length of Fibre - Minimum 6mm ( in Plaster / Guniting) / 12mm ( in PCC / RCC / concrete lining / Shotcreteing)

Construction - Straight / Fibrillated Mesh Fibre

Melting Point - 165 Degree Celcius

Absorption - Nil

Acid Resistant - Excellent

Alkali Resistant - Excellent

Salt Resistant - High

Thermal conductivity - Low

Tenacity - 6.5 GDP + Elongation @ 19 % maximum

Specific gravity - 0.92 gm /cc

Elastic Modulus - 500-700 Ksi

Water

The water used in making and curing of concrete, mortar and grout shall be clean and free from objectionable quantities of silt, organic matter, injurious amounts of oils, acids, salts and

other impurities. Potable water is generally considered satisfactory for mixing concrete. However, water shall be tested and shall conform to the following acceptable limits. At least 3 tests shall be conducted for all period of concreting and one test every 3 months for grouting work.

**Acceptable Limits:**

pH 6.0 -8.5. (ii) Sulphates (as  $\text{SO}_3$ ) = 400 ppm max. (iii) Organic impurities = 200 ppm max (Chloride 250 ppm max (v) Total dissolved solids = 1000 ppm max. (vi) Total hardness= 500 ppm max.

B.I.S. specification is No. 456-2000.

**Sand (Fine Aggregate)**

**General**

Sand shall be from approved sources of natural deposit and must be free from silt, organic impurities and other deleterious materials as per I.S.383 & I.S.2386.

Sand as collected for concrete, shall have a uniform and stable moisture content.

Determination of moisture content shall be made as frequently as possible, the frequency for a given job being determined by the Project Manager according to weather conditions, (I.S. 456 - 2000).

Sand may be rejected if it fails to meet any of the following quality requirements.

The Contractor shall carry out tests on sand at periodic intervals for the presence of any inorganic impurities (silt, clay) and the presence of any organic impurities. These tests shall be duly documented in a register and copy of tests shall be furnished to the Project Manager.

For every 500 m<sup>3</sup> of sand, Soundness Tests on sand shall be conducted by the Contractor.

Soundness after 5 cycles by  $\text{Mg SO}_4$  (Magnesium Sulphate) shall be less than 15 % and

Soundness after 5 cycles by  $\text{Na}_2 \text{SO}_4$  (Sodium Sulphate) shall be less than 10 % for the acceptance of sand.

**Specific gravity:**

The sand to be used shall have minimum specific gravity of 2.6

Sand shall be screened before use. If sand brought to site is not clean it must be washed clean in water, Fine draft sand or sea sand or sand containing saline impurities shall on no account to be used.

**Grading**

The sand as batched shall be well graded and when tested by means of standard sieves shall confirm to the limits given in I.S. 383 and shall be described as fine aggregates, grading zones I,II, III and IV. Sand complying with the requirements of any of the four grading zones is suitable for concrete. But, sand confirming to the requirements of grading zone -IV shall not be used for reinforced cement concrete work.

**Coarse Aggregate**

**General**

For the purposes of these specifications, the term “Coarse Aggregate” designate clean well graded aggregate most of which is retained on 4.75 mm I.S. Sieve and containing only so much finer material as permitted for various types described under relevant clause of I.S. 383.

Coarse Aggregate for concrete shall be furnished by the Contractor from the approved quarries.

**Quality**

The coarse aggregate shall consist of naturally occurring stones, and shall be hard, strong, durable, clear and free from veins and adherent coating, and free from injurious amounts of disintegrated pieces, alkali, vegetable matter and other deleterious materials. Coarse aggregate will be rejected if it fails to meet any of the following requirements:

**LOS-ANGLES ABRASION TEST**

The abrasion value of Aggregates when tested in accordance with the method specified in I.S 2386 (Part -IV) using Los-Angles machine shall not exceed 30% for Aggregates to be used in concrete for wearing surface and 50% for aggregate to be used in other concrete.

#### AGGREGATE CRUSHING STRENGTH TEST

Aggregate crushing value, when determined in accordance with I.S. 2386 (Part- IV) 1 963 shall not exceed 45 % for aggregate used for concrete other than wearing surface and 30 % for wearing surfaces. As an alternative to the crushing strength test, aggregate impact value shall be found out with the method specified in I.S. 2386 (Part - IV) 1 963. The aggregate impact value shall not exceed 45 % by weight for aggregates used for concrete for other than wearing surfaces, and 30 % by weight for concrete for wearing surfaces.

#### SOUNDNESS TEST

The coarse aggregate to be used for all concrete works shall pass a sodium-or magnesium sulphate accelerated soundness test specified in I.S. 2386 (Part - V) 1 963 and the average loss of weight after 5 cycles shall not exceed the limits specified in clause 3.6 of I.S. 383-1970.

For every 500 m<sup>3</sup> of coarse aggregate, Soundness Tests on coarse aggregate shall be conducted by the Contractor. Soundness after 5 cycles by MgSO<sub>4</sub> (Magnesium Sulphate) shall be less than 18 % and Soundness after 5 cycles by Na<sub>2</sub> SO<sub>4</sub> (Sodium Sulphate) shall be less than 12 % for acceptance of the coarse aggregate.

#### SPECIFIC GRAVITY :

The coarse aggregate shall have specific gravity of 2.60 minimum.

#### DELETERIOUS MATERIAL

The maximum quantity of deleterious materials in coarse aggregates shall not exceed the limits specified in Table I of I.S. 383-1 970 when tested in accordance with I.S. 2386-1 963. No separate payment will be made for tests of materials. If sand and coarse aggregate are to be obtained from a deposit not previously tested and approved by the Project Manager, the contractor shall submit representative samples for pre-construction test and approval, well in advance before the sand and coarse aggregates are required for use. Each sample shall approximately consist of 100 Kg. of material. In addition to pre-construction tests, the approval of deposits, the Project Manager may test the aggregates for their suitability during their processing. The contractor shall provide such facilities as may be necessary for procuring representative samples free of cost at the aggregate processing plant and at the batch plant. Final compliance of aggregates will be based on the samples taken from the batch plant or mixing platform.

Use and development of any such deposit shall be subject to the approval by the Project Manager. Any royalties (or other charges) required for materials taken from deposits either owned by the State Government or controlled by the Department of Mines and Geology, Government of India or owned by any other person shall be paid by the Contractor.

#### Approval of Quarry / Quarries for Obtaining Coarse Aggregate & Fine Aggregate

Some aggregates containing particular varieties of silica may be susceptible to attack by alkalis (Na<sub>2</sub> O and K<sub>2</sub> O) originating from cement or other sources, producing an expansive reaction which can cause cracking and disruption of concrete. This is known as Alkali-Silica Reaction (ASR) or Alkali – Aggregate Reaction ( AAR). ASR / AAR is a ‘concrete cancer’. It is therefore essential that following tests are got conducted to pre-screen the coarse & fine aggregate sources / quarries in respect of the presence of any reactive aggregates. These being special tests, these are to be got conducted from reputed institutions well versed in conducting such tests, such as, National Council of Cement & Building Materials, Ballabgarh (under Govt. of India) or CSMRS (Central Soil & Materials Research Organization, Delhi under GOI).

Petrographic Examination of Aggregates. Potentially reactive components of an aggregate can be identified and quantified through petrographic examination. It is a very useful screening procedure that should be done early in the development and testing of the source of aggregate. In case, the petrographic examination shows presence of more than 20 % strained quartz having an undulatory extinction angle (an optical property indicating deformed crystals) greater than 15 degrees, the aggregate is considered potentially reactive and it is required to be tested for deleterious expansion as per Indian Standard IS:383-2016.

**Mortar Bar Expansion Test.** It is an important test to determine whether a cement-aggregate combination is potentially alkali-silica reactive or not. This test is explained in ASTM C 227 (American Society of Testing Materials C 227). An average length change (for 3 mortar bars) greater than 0.05 % at 3 months and greater than 0.10 % at 6 months is considered to be excessive and is indicative of potentially deleterious ASR (Alkali-Silica Reaction).

Specimens exhibiting expansion greater than 0.05 % at 3 months but less than 0.10 % at 6 months are not considered to be deleterious by ASTM C 33. This test is considered to be an accurate indicator of a highly reactive silicious aggregate's potential for deleterious reactivity with alkalies in concrete.

**Accelerated Mortar-Bar Expansion Test.** This test is modification of ASTM C 227 test. As per this test, if after 22 days, the average expansion is less than or equal to 0.10 %, the cement-aggregate combination is considered to be non reactive. If the average expansion is more than 0.10 %, the aggregate is considered to be deleteriously reactive. The accelerated mortar bar test is quick and reliable.

#### **Preventive Measures**

In case, the aggregates are determined to be reactive, alternate sources / quarries shall be explored for obtaining non reactive aggregates. If still not possible, preventive measure / measures for controlling Alkali-Silica Reaction shall be taken. A practical and result-oriented measure is to use “fly ash” in the design of concrete mixes. Inclusion of fly ash substantially reduces the Alkali-Silica Reaction (ASR), thereby, protecting the concrete (and the steel reinforcement) from deterioration which results from the expansion. Decrease in ASR comes from the fact that fly ash reacts chemically with and absorbs Alkalies in the cement, thereby, making these unavailable for reaction with reactive aggregate.

#### **Batching Of Concrete**

Production of concrete shall be done with fully automatic intelligent concrete batcher. All the production data of batcher should be program in the plan. The computer of plant shall be protected from password, once the mix ratio has been program. Password of plant shall be kept with Project Manager. All the data of production of concrete shall be stored in memory of batcher and also stored in cloud through internet. This will facilitate the employer to access the production data from remote. Contractor shall submit hard copy of batching details along with the running bills. The contractor shall notify the Project Manager 24 hours before batching concrete. Unless inspection is waived in each case, batching shall be performed only in the presence of an Engineer authorized by Project Manager.

The contractor shall provide, maintain and operate the equipment as required to accurately determine and control the prescribed amounts of the various materials entering the concrete mixers. The quantities of cement sand and each size of coarse aggregate entering each batch of concrete shall be determined by individual weight. Cement has to be weighed separately from the aggregates. Sand and coarse aggregate may be weighed with separate scales and hoppers.

The grading of aggregates shall be controlled by obtaining the coarse aggregate in different sizes and blending them in the right proportions, the different sizes being stacked in separate stock piles, the materials shall be stock piled a day before use. The grading of coarse and fine aggregates will be checked as frequently as directed by the Project Manager, Water shall be added by weight or measured by volume in calibrated tanks. The amount of added water shall be adjusted to compensate for any observed variations in the moisture contents.

Determinations of moisture content in the aggregate shall be in accordance with I.S 2386 (Part -III) 1963 (Indian Standard Method of test for aggregate for concrete Part -111). The amount of surface water carried by aggregates will be determined in accordance with IS 456-1978.

#### **Mixing**

##### **General**

The concrete ingredients shall be thoroughly mixed in fully automatic mixers designed to positively ensure uniform distribution of all the component materials. Mixing shall be done as

per clause 9 of I.S 456-2000. The mixer should comply with I.S. 1791-1985 (I.S Specifications for batch type concrete mixers). Where small quantities of concrete are involved and work sites are fairly scattered, Project Manager may allow use of standard mechanical mixers for the production of concrete. The mixers shall be fitted with water measuring (metering) devices. In the absence of the metering device, it shall be ensured by the Contractor that measured quantity of water is added to the concrete mix ingredients with calibrated transparent buckets / transparent plastic mugs duly calibrated in order to strictly maintain the specified water-cement ratio. Also, proper “gauge boxes” shall be used for specified proportioning of cement, sand, fine aggregate and coarse aggregate. Mixing time of the concrete mix ingredients shall be at least 2 minutes to ensure that there is a uniform distribution of materials and the mass is uniform in colour and consistency. If any ‘segregation’ is observed in the concrete mix after unloading from the mixer, the concrete shall be remixed. Workability (slump) shall be checked at frequent intervals.

The concrete as discharge from the mixer, shall be uniform in composition and consistency from batch to batch. Workability shall be checked at frequent intervals as per I.S. 1199-1959. Mixers shall be examined regularly by the Project Manager or his authorized Engineer for changes in condition due to accumulation of hardened concrete or mortar or to wear of blades. The mixing shall be continued until there is a uniform in color and consistency and to the satisfaction of the Project Manager. If there is aggregation after unloading the concrete should be remixed.

#### **Temperature Of Concrete**

Fresh structural concrete and fresh dam lining concrete shall be placed at temperature of between 15° C to 30° C. During hot or cold weather, the concreting should be done as per the procedure set in I.S. 7861- (Part -D-1975 or I. S 7861 (Part – II).

The temperature of concrete at the batch plant shall be adjusted to assure that the specified concrete temperature is attained at the placement. The contractor shall not be entitled for any additional compensation due to the foregoing requirements.

#### **FORM WORK**

##### **General**

Form Work should confirm criteria stipulated in IS 456 and IS 14687.

Form shall be used wherever necessary, to confine the concrete and shaping it to the required lines. If a type of form does not consistently perform in an acceptable manner, as determined by the Project Manager, the type of form shall be changed and method of erection shall be modified by the Contractor subject to approval of the Project Manager.

Plumb and string lines shall be installed before, and maintained during concrete placement. Such lines shall be used by the Contractor's personnel and by the Project Manager and shall be in sufficient number and properly installed as determined by the Project Manager. During concrete placement, the contractor shall continuously monitor plumb and string line, form positions and immediately correct deficiencies.

Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete and shall be maintained rigidly in position. Where form vibrators are to be used, forms shall be sufficiently rigid to effectively transmit energy from the form vibrators to the concrete, while not damaging or altering the positions of forms. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Chamfer strips shall be placed to produce beveled edges on permanently exposed concrete surfaces. Interior angle of intersecting concrete surfaces and edges of construction joints shall not be beveled except where indicated on the drawings.

Suitable struts or stiffeners or ties shall be used for the form work wherever necessary. All supports shall be braced and cross braced into two directions. All splices and braces shall be secured by bolting unless specially intended otherwise. All struts shall be firmly supported against settlement and slipping, by suitable means as directed. All supports shall be cut square at both ends and firmly supported against settlement and slipping. When the form work is

supported on soils, sleepers etc., shall be used to properly disperse the loads. In case, the supports rest on already, completed beam or slab, suitable props shall be provided under the latter.

The form work shall be of well seasoned timber or steel of appropriate thinness as per specification to avoid any undulations during the use. When timber forms are used, they shall be lined with M.S. Sheet or other suitable smooth faced non-absorbent materials as specified. Supports may be of timber or steel. Suitable wedges in pairs to facilitate adjustment and subsequent releasing of forms shall be provided preferably at the upper end of the supports. The details of the proposed form work and supports shall be submitted to the Project Manager and got approved before erection.

In case of columns, retaining walls or deep vertical component, the height of the column shall facilitate placement and compaction of concrete and suitable arrangement may be made for securing the forms to the already poured concrete for placing the subsequent lifts. No steel ties or wires used for securing this form work shall be left exposed of the face of the finished work.

Suitable inserts for blackouts for electrical and other service fixtures where necessary shall be provided in the required locations as specified.

**Cleaning and oiling of Forms:-** At the time the concrete is placed in forms, the surfaces of the forms shall be free from encrustations of mortar, grout or other foreign material. Before concrete is placed, the surface of the forms shall be oiled with commercial forms of oil.

**Removal of Forms:**

The stripping of form work shall conform to relevant clause of I.S 456-2000. The Contractor shall be liable for damage and injury caused by removing forms before the concrete has gained sufficient strength. Forms on upper sloping faces of concrete such as forms on the water sides of warped transitions, shall be removed as soon as the concrete has attained sufficient stiffness to prevent sagging. Any needed repairs or treatment required on such slopping surfaces shall be performed atone and be followed immediately by the permitted curing.

To avoid injury appearance of concrete that might result from swelling of forms, wood forms for wall openings shall be loosened as soon as the loosening can be accomplished without damages to the concrete. Forms for the opening shall be constructed as to facilitate such loosening. Forms shall be removed with care so as to avoid injury to concrete and any concrete so damaged shall be repaired.

**Cost**

The cost of furnishing all materials and performing all work for constructing forms, including any necessary treatment or coating of forms will be paid at applicable prices bid in the schedule.

**Measurement and payment**

The formwork will be measured in Sqm. of surface area of concrete surface to which forms are necessary.

Payment for formwork in BOQ includes 1) all costs for supplying labor, materials, T&P, machineries and consumables required for erecting the forms to line, level and plumb as per approved drawing and all such costs necessary for removing the forms after the concrete has hardened, 2) all other costs necessary for carrying out formwork operation mentioned, 3) All costs for carrying out repair of hardened concrete 4) any other incidental expenditure to complete the finished item of work as per specification and direction of Project Manager.

**TOLERANCES FOR CONCRETE CONSTRUCTIONS**

**General**

Tolerances are defined as allowable variations from specified lines, grades, and dimensions and as the allowable magnitude of the surface irregularities. Allowable variations from specified lines, grades and dimensions are listed as given under sub paragraph {b) below.

The intent of this paragraph is to establish tolerances that are consistent with modern construction practice that is governed by the effect that permissible variations may have upon a structure. The Project Manager reserves the right to diminish the tolerances set forth herein if such tolerances impair the structural action, operational function or architectural appearance of a structure or position thereof.

Concrete shall be within all stated tolerances even though more than one tolerance may be specified for a particular concrete structure. Provided that the specified variation for one element of the structure shall not apply when it will permit another element of the structure to exceed its allowable variation. Where tolerances are not specified for particular structure, tolerances shall be those specified for a similar work. As an exception to the general provisions, specific tolerances shown herein in connection with any dimension shall govern. The Contractor shall be responsible for finishing the concrete forms within the limits necessary to insure that the completed work will be within the tolerance limits specified. The defective work where the tolerance limit is exceeded shall be remedied in accordance with the provisions mentioned under Concrete surface irregularities" in succeeding paragraphs.

#### Variations From Specified Lines, Grades And Dimension

Hardened concrete structure shall be checked by the contractor and will be subject to such inspection and measurement as needed to determine that the structures are within the tolerance specified in the table below.

Variation is defined as the distance between the actual position of the structure or any element of the structure and the specified position in plan for the structure or the particular element. Plus or minus variations shown indicate a permitted actual position up or down and in or out from the specified position in plan. Variations not designated as plus or minus indicate the maximum deviation permitted between designated successive points on the completed element of construction.

Specified position in plan is defined as the lines, grade and dimensions described in those specifications or shown on the drawings or as otherwise prescribed by the Project Manager.

#### Tolerances For Dam Structures

Deviations from specified dimensions of cross section of columns, beams, piers and slabs[(-6) mm to (+) 12 mm]

Deviations from dimensions of footing:

Dimensions in plan = (-) 12 mm to (+) 50 mm

Eccentricity = ( $\pm$ ) 0.02 times width of footing in the direction of deviation but not more than 50 mm.

Thickness = ( $\pm$ ) 0.05 times the specified thickness.

Note: Tolerances apply to concrete dimensions only, but not for positioning of vertical reinforcing bars or dowels.

#### Concrete surface irregularities

##### GENERAL

Bulges, depressions and offsets are defined as concrete surface irregularities. Concrete surface irregularities are classified as "abrupt" or "gradual" and are measured relative to the actual concrete surface.

##### ABRUPT SURFACE IRREGULARITIES

Abrupt surface Irregularities are defined herein as offsets such as those caused by misplaced or loose forms, loose knots in form, or other similar forming faults. Abrupt surface irregularities are measured using a straight edge held firmly against the concrete surface over the irregularity and the magnitude of the offset is determined by direct measurement

##### GRADUAL SURFACE IRREGULARITIES

Gradual surface irregularities are defined herein as bulges and depressions resulting in gradual changes on the concrete surface. Gradual surface irregularities are measured using a suitable template conforming to the design profile of the concrete surface being examined. The

magnitude of the gradual surface irregularities is defined herein as measures of the rate of change in slopes of the concrete surface.

The surface irregularities shall not exceed 6 mm for bottom slab and 12 mm for side slopes when tested with a straight edge of 1.5 meter in length.

The magnitude of gradual surface irregularities on concrete shall be checked by the Contractor to ensure that the surfaces are within the specified tolerances. The Project Manager will also make such checks of hardened concrete surfaces as determined necessary to insure compliance with such specifications.

#### **Repair Of Hardened Concrete Not Within Specified Tolerances**

Hardened concrete which is not within specified tolerances shall be repaired to bring it within those tolerances. Such repair shall be in accordance and shall be accomplished in a manner approved by the Project Manager. Concrete repair to bring concrete within the tolerances shall be done only after consultation with a representative of Project Manager regarding the method of repair. The Project Manager shall be notified as to the time when repair will be performed. Concrete shall be finished in a manner which will result in concrete surface with a uniform appearance. Any rough projections can then be rubbed down and the whole surface brought to an even finish by rubbing with a wooden float using a mortar of one part cement by two parts of coarse sand as an abrasive, the mortar at the same time filling the voids. A neat cement wash shall then be applied to give a smooth surface. If the concrete has set hard, the fins and rough projections, if any, shall be removed by using carborundum brick or a paved grinding machine by chipping, before finishing off with the smoothing wash. If the work of chipping is not done with care or if the surface exposed after removal of the forms cannot be satisfactorily dealt with in this manner due to bad work or for other reasons, a coat of cement plaster of 1:2 of thickness as ordered by the Project Manager shall be applied.

No extra payment will be given for finishing concrete surface as instructed above in this clause.

#### **Prevention Of Repeated Failure To Meet Tolerances**

When concrete placements result in hardened concrete that does not meet the specified tolerances, the contractor shall submit to the Project Manager an outline of all prevention actions such as modification to form, modified procedure for setting screeds, and different finishing techniques to be implemented by the contractor to avoid repeated failure.

The Project Manager reserves the right to delay concrete placement until the contractor implements such preventive actions which are approved by the Project Manager.

### **REINFORCEMENT BARS**

#### **General**

Reinforcing bars shall be placed in the concrete as shown in the approved drawings or as directed. For anchoring the concrete to the Hard rock contractor shall place the anchor rods to the spacing and depth shown in the drawings.

#### **Materials**

Unless shown otherwise on the drawings the reinforcement to be used shall be High yield strength deformed bars of grade Fe 415 conforming to I.S 1786-1985 specification for high yield strength deformed steel bars and wire for concrete reinforcement.

#### **Placing**

Reinforcement shall be bent and fixed in accordance with the procedure specified in I.S. 2502-1963 code of practice for bending and fixing of bars for concrete reinforcement. All reinforcement shall be placed and maintained in the position shown in the drawings. Splices shall be located where shown in the drawings, provided that the location of the splice may be altered subject to written approval of the Project Manager.

Subject to the written approval the Project Manager, the contractor may, for his convenience, splice bars at additional locations other than those shown on the drawings. All additional splices allowed shall be at the expense of the contractor.

Unless otherwise prescribed, placement dimensions shall be to the center line of the bars. Reinforcement will be inspected for compliance with requirement as to size, shape, length, splicing, position and amount after it has been placed, but before being embedded in concrete. Before reinforcement is bent and fixed, the surface of the bars shall be cleaned of heavy flaky rust, loose scale, dirt grease or other foreign substances which in the opinion of the Project Manager are objectionable. Heavy flaky rust that can be removed by firm rubbing is considered objectionable.

As specified in clause 12 of I.S 456-2000 unless otherwise specified by the Project Manager, reinforcement shall be placed with the following tolerances.

- a. For effective depth 200 mm or less =  $\pm 10\text{mm}$
- b. For effective depth more than 200 mm =  $\pm 15\text{ mm}$

The cover in no case be reduced

Reinforcement shall be securely held in position so that it will not be displaced during the placing of the concrete and special care shall be exercised to prevent any disturbances of the reinforcement in concrete that has already been placed. Welding of bars shall be done as directed by the Project Manager and in conformity with the requirements of I.S 456-1978. Chairs, hangers, spacers and other supports for reinforcement shall be of concrete, metal or other approved material. Concrete cover shall be as shown on the drawings.

Reinforcement Drawings

The Project Manager shall supply drawings of reinforcement details and bar bending schedules for adoption.

Measurement and Payment

Measurement for payment of reinforcement bars will be based on the weight of the bars placed in the concrete in accordance with the drawings supplied by the Project Manager. The total weight of bars placed as reinforcement in concrete shall be arrived at by adding the products of lengths of each size and mass per meter (vide Table 1 and Para 6.2.1 of IS 1786-1985) of that size of rod. Payment for furnishing and placing reinforcing bars will be made at the unit price bid in the bill of quantities for furnishing and placing reinforcement bars. Unit price shall include the cost of labor, materials T & P, machineries, equipments and consumables for completing the following items.

Cost of Procurement and transportation of reinforcement bars, and cleaning, straightening, cutting, bending, binding, tying, placing the grill, welding wherever required and securing the reinforcement grill in position as per approved drawing.

No separate payment will be made for lap length, splices, ties, chairs, spacers and binding wire used in the work.

All taxes GST, Royalties, excise duty.

Construction of approach road, haul road, site illumination, construction of coffer dam till completion of the work and subsequent removal at appropriate time, and all mobilization and demobilization cost to complete the above operations.

All testing and quality control works, recording of photographs.

Any other incidental cost to complete the items of work as per specification and direction of Project Manager.

Dowels

The dowels shall be of same HYSD bars of grade Fe 415/500 conforming to I.S 1786-1985 as used for reinforcement.

Details for dowels shall be as shown on the drawings or as directed by the Project Manager. Dowels shall be placed in the concrete where shown on the drawings or where directed and will be inspected for compliance with requirements as to size, shape, length, position, and amount after they have been placed but before being covered by concrete.

Before the dowels are embedded in concrete, the surfaces of dowels be cleaned of all dirt, grease or other foreign substances which in the opinion of the Project Manager are objectionable.

The dowels shall be accurately placed and secured in position so that they will not be displaced during the placing of the concrete.

Measurement for payment of dowels will be made only on the weight of the dowels placed in the concrete in accordance with the drawings or as directed.

Payment for furnishing and placing of dowels will be made at the unit price bid in the bill of quantities for furnishing and placing of reinforcing bars which unit price shall included the cost of furnishing all the materials and for placing the dowels as required.

#### **PREPARATION FOR PLACING**

##### **General**

No concrete shall be placed until all form work installation of items to be embedded and preparation of surface involved in the placement have been approved.

The contractor shall supply concrete placement checkout cards (Placement Register) satisfactory to the Project Manager and shall provide a water tight container for such cards at the convenient location near each individual concrete placement site. The cards shall list all the various work items for example "cleanup" and "embedded items" required prior to placement of concrete. After each work item for an individual placement has been completed that item on the cards shall be signed by contractor or his representative signifying completion of the required work. Engineer authorized by the Project Manager will inspect the work during and after completion of each phase of the preparation and if the work is satisfactory will sign the check- out card (placement register). Approval of preparation for placement will not be complete until the contractor or his representative and above authorized Engineer have approved by signature all applicable, items for the placement.

All surfaces of forms and embedded materials shall be free from curing compound, dried mortar from previous placements and other foreign substance before the adjacent or surrounding concrete placement is begun.

Prior to beginning concrete placement, the contractor shall make ready a sufficient number of properly operating vibrators and operators and shall have readily available additional vibrators to replace defective one during the progress of the placement. The Engineer's representative at the placement may delay the start of the concrete placement until the number of working vibrators available is acceptable.

##### **Foundation surfaces**

All surfaces upon or against which concrete is to be placed shall be free from frost, ice, water, mud and debris.

Rock surface shall be free from oil, objectionable coatings, and loose semi-detached and unsound fragments. Immediately prior to placement of concrete, surfaces of rock shall be washed with an air water jet and shall be brought to uniform surface dry condition.

Earth foundation surfaces shall be wet to a depth of 15 cm, or to impermeable material whichever is less before concrete placement.

#### **PLACING OF CONCRETE**

##### **General**

The contractor shall notify the Project Manager before batching begins for placement of concrete. Placing shall be performed only in the presence of Project Manager's representative. Placement shall not begin until after preparations are complete and the concrete placement check out card has been signed by the contractor or his representative and the authorized representative of the Project Manager substantiating completion of all preparation for that placement.

##### **Transportation**

The transportation of concrete shall conform to clause 13 of I.S 456-2000.

Concrete shall be deposited as near as practical to its final position. The use of Aluminum pipe or Aluminum chutes for delivery of concrete will not be permitted. Concrete buckets shall be capable of promptly discharging concrete of the specified mix design and the

dumping mechanism shall be capable of discharging at one location, Medium portions of concrete from a full bucket.

#### Placing

The placing of concrete shall be in accordance with relevant clause of I.S 456-2000.

Concrete shall be deposited as nearly as practical in its final position and shall not be allowed to be placed in running water and placed concrete shall not be subjected to running water until the concrete has hardened.

Concrete shall be deposited as nearly as practical in its final position and shall not be allowed to flow in such a manner that the lateral movement will cause segregation of the coarse aggregate from the concrete mass. Methods and equipment employed in depositing concrete in forms shall minimize clusters of coarse aggregates, clusters that occur shall be scattered before the concrete is vibrated.

Forms shall be constantly monitored and their position adjusted as necessary during concrete placement in accordance.

Concrete shall not be placed in rain sufficiently heavy or prolonged to wash mortar from concrete.

The Contractor shall introduce strict supervision and ensure that the reinforcement is erected in such a way that, the 'Nominal Cover' is within the tolerance levels specified in IS:456-2000 to the effect that actual concrete cover shall not deviate from the required nominal cover by + 10 mm & minus 0 mm. The 'Minimum Nominal Cover' to meet Durability

Requirements shall be as indicated below, as per IS:456-2000:

| Exposure    | Nominal Cover in mm not Less Than |
|-------------|-----------------------------------|
| Mild        | 20 mm                             |
| Moderate    | 30 mm                             |
| Severe      | 45 mm                             |
| Very Severe | 50 mm                             |
| Extreme     | 75 mm                             |

**IMPORTANCE of Maintaining Specified Nominal Cover for Durability Of RCC Structures.**  
It is essential that RCC structures remain durable for a very long period and, that, they do not suffer pre-mature deterioration due to corrosion of steel reinforcement embedded in. It is of paramount importance to strictly maintain the 'nominal cover of steel reinforcement' since the 'cover thickness' is the path through which the environmental elements (carbon dioxide, moisture, oxygen, chlorides etc) penetrate the body of concrete and travel to reach the reinforcement bars and initiate the corrosion process. In case, due to lack of supervision by the Contractor, the actual cover of reinforcement bars is much less than the designed / specified cover, the deleterious environmental elements will quickly reach the bars and shall initiate the corrosion there-of. Subsequently, in few years time, steel bars shall suffer heavy corrosion. Product of corrosion being almost two times that of the original volume of steel, bursting pressure shall cause cracking & spalling of concrete making the RCC structure suffer severe premature deterioration and damages.

**Monitoring Of Nominal Cover with Logging Cover Meter.** In order to ensure that the Contractor erects the reinforcement strictly adhering to the designed / specified Nominal Cover within the tolerance levels and, that, the reinforcement does not get displaced during concrete placement, Project Manager or his Representative shall check the actual nominal cover after the concrete is placed in the respective lifts through deployment of 'Logging Cover Meter'. It is a device which measures the depth of concrete cover over the reinforcement bars. A pre set value of Nominal Cover (viz designed cover/specified cover) is entered into the 'Data logger' and the head of the Logging Cover Meter is moved over the concrete surface. All values of Nominal Cover less than the pre-set value are recorded automatically. Also, an audible alarm signal is given by the device. This device is battery operated and all data can also be downloaded to any PC-Compatible computer. In case, scanning of the concrete surface of a particular lift indicates the actual cover to be less than

the designed/specified cover, Project Manager can direct the contractor to dismantle the particular lift and re-do the job at his expense itself. Thus, monitoring by the Logging Cover Meter shall act as a big deterrent and make the Contractor do the job correctly.

#### **CONSTRUCTION JOINTS**

Joints shall confirm criteria specified in IS 456 and IS 11817.

When the work has to be resumed on a surface which has hardened, such surface shall be roughened. It shall then be swept clean & thoroughly wetted. For vertical joints neat cement slurry shall be applied on the surface before it is dry. For horizontal joints the surface shall be covered with a layer of mortar about 10 to 15 mm thick composed of cement and sand in the same ratio as the cement and sand in concrete mix. This layer of cement slurry or mortar shall be freshly mixed and applied immediately before placing of the concrete.

Where the concrete has not fully hardened all imperfections shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of particles or aggregate. The surface shall be thoroughly wetted and all free water removed. The surface shall then be coated with neat cement slurry and fresh concrete laid.

#### **CONTRACTION JOINTS**

Contraction joints serve to provide for volumetric shrinkage of monolithic concrete and or movement between monolithic unit at established joints, thus preventing formation of objectionable shrinkage cracks elsewhere in concrete. Prior to application of wax based curing compound to contraction joints, the surfaces of all joints shall be cleaned thoroughly of accretion of concrete or other foreign material by scraping, chipping or other means approved by the Project Manager. Water stops, reinforcing bars and other embedded items shall be free of curing compound when adjoining concrete is placed.

#### **COMPACTION**

The compaction of concrete shall conform to clause 13.3 of I.S 456-2000.

Concrete shall be consolidated by vibrators/ tampers. The vibrations shall be sufficient to remove all undesirable air voids from the concrete, including the air voids trapped against the forms. After consolidation, the concrete shall be free of rock pockets and honey comb areas and shall be closed against all surfaces of forms and embedded materials. All concrete shall be properly consolidated before it hardens.

Except as herein after provided, consolidation of all concrete shall be by immersion-type vibrators, immersion type vibrators shall be operated in nearly vertical position and the vibrating head shall penetrate and re-vibrate the concrete in the upper portion of the underlying layer. Care shall be exercised to avoid contact of the vibrating head with embedded items and with formed surfaces which will later be exposed to view. Concrete shall not be placed upon either plastic concrete until the previously placed concrete has been thoroughly consolidated.

Immersion type vibrators shall be operated at speeds of at least 7000 revolutions per minute when immersed in concrete. Form vibrators shall operate at speeds of at least 8000 revolutions per minute when being used to consolidate concrete. The Contractor shall immediately replace improperly operating vibrators with acceptable vibrators.

Form vibrators shall be used in conjunction with slip form lining machines to consolidate concrete in dam linings. Such vibrators shall be arranged for effective uniform consolidation of the concrete. The Project Manager or his representative may remove samples of the hardened concrete for testing and examination, and the Contractor shall repair, at no cost to the Government, concrete from which such samples are removed.

#### **FINISHES AND FINISHING**

The requirements for finishing of concrete surface shall be as specified in this paragraph, or as otherwise indicated on the drawings. The contractor shall notify the Project Manager before finishing concrete. Unless inspection is waived, in each specific case, finishing of concrete shall be performed only when Project Manager's representative is present. Concrete surface will be tested by the Project Manager in accordance, where necessary to determine whether the

concrete surface is within the specified tolerances. Finished concrete which is not within the specified tolerances shall be repaired in accordance.

Interior surface shall be sloped for drainage where shown on the drawings or as directed. Surfaces which will be exposed to the weather and which would normally be level, shall be sloped for drainage.

Floating may be performed by use of hand or power driven equipment. Floating shall be started as soon as the screened surface has stiffened sufficiently and shall be the minimum necessary to produce a surface that is free from screened marks and is uniform in texture.

Joints and edges shall be tooled where shown on the drawing or as directed.

After the surface of road way slabs of concrete bridges, have been wood floated, the surfaces shall be given a broom finish. The finish shall be applied when the water sheet has practically disappeared. The broom shall be drawn transversely across the pavement with adjacent strokes slightly overlapping. The brooming shall be completed before the concrete is in such condition that the surface will be torn or unduly roughened by the operation. The finished surfaces shall have a uniform appearance and shall be free of corrugations exceeding 1.5 millimeter in depth. Broom shall be of quality, size and construction be so operated as to produce a surface finish satisfactory to the Project Manager.

#### **PROTECTION**

The contractor shall protect all concrete against damage until final acceptance by the Project Manager.

When precipitation appears imminent, the contractor shall immediately make ready at the placement site all materials which may be required for protection of fresh concrete. The Project Manager may delay placement of concrete until adequate provisions for protection against weather are made.

All fresh concrete surfaces shall be protected from contamination and from foot traffic until the concrete has hardened. Hardened concrete surfaces which have to receive finish shall be protected against damage from foot traffic and the construction activity by covering with protective mats, plywood, or by other effective means. Method of protection shall be subject to approval by the Project Manager.

#### **CURING**

##### **General**

The curing is guided by Clause 13.5 of IS : 456-2000.

The contractor shall furnish all materials and perform all work required for curing concrete.

All concrete including bed and sides of dam lining shall be cured by water curing for 28 days.

The uniformed top surfaces of bridges decks shall be cured for 28 days with a damp sand cover or curing mat cover. The sand or curing mats shall not be kept so wet as to allow water to drain from them and stain other concrete. The sand or curing mats shall be removed after the expire of the curing period.

All concrete surfaces shall be treated as specified to prevent loss of moisture from the concrete until the required curing period elapsed or until immediately prior to placement of other concrete or backfill against those surfaces. Only sufficient time to prepare construction joint surfaces and to bring them to a surface dry condition shall be allowed between discontinuance of curing and placement of adjacent concrete.

Forms shall be removed after the concrete has hardened sufficiently conforming to clause 11.3 of I.S 456-2000 to prevent structural collapse or other damage by careful form removal.

Where required, repair of all minor surface imperfection shall be made immediately after form removal and prior to curing, minor surface repair shall be completed within 2 hours after form removal and shall be immediately followed by the initiation of curing by the applicable method specified herein. Concrete surfaces shall be kept continuously moist after form removal until initiation of curing.

In case, the Project Manager finds that the curing arrangements mobilized by the Contractor are deficient and, that, he is not doing efficient curing of concrete, the Project Manager shall

have the right to direct the Contractor to undertake curing of concrete with 'Membrane-Forming Curing Compound.

**Specifications Of Curing Compound.** The Curing Compound shall be white pigmented membrane forming compound conforming to ASTM –C-309 – 81 Type 2 Standard. The white pigmented compound is advantageous since it reflects sun light, there by, minimizing the evaporation of water from concrete / shotcrete surfaces. Contractor shall procure the Curing Compound from a reputed supplier. The Curing Compound shall meet the requirement of the 'water-retention test' as per ASTM – C- 156-80 which specifies that the loss of water is to be not more than 0.55 kg/m<sup>2</sup> of the surface area in 72 hours. The Curing Compound shall also conform to the ASTM – E – 97 test to the effect that the 'day light reflectance' of the Curing Compound is not less than 60 % of that of Magnesium Oxide (MgO<sub>2</sub> ). The Curing Compound shall be sprayed mechanically with a power nozzle uniformly on the concrete surface as soon as the bleeding water or shine disappears. A dosage of one litre of Curing Compound for covering 4 m<sup>2</sup> surface area of concrete is O.K. to provide effective curing Materials

Concrete cured with water shall be kept wet for at least 28 days from the time the concrete has attained sufficient set to prevent detrimental efforts to the concrete surfaces. The concrete surfaces to be cured shall be kept wet covering them with water-saturated materials by using a system of perforated pipes, mechanical sprinklers or porous hose, or by other methods which will keep all surface continuously (not periodically) wet. All curing methods are subject to approval of Project Manager.

#### **COST**

The cost of furnishing all materials and performing all work for curing concrete shall be included in the price bid in the bill of quantities for the concrete on which the particular curing methods are required.

#### **REPAIR OF CONCRETE**

Concrete shall be repaired in accordance with clause 5.7 of I.S 3873-1978. Imperfections and irregularities on concrete surface shall be corrected in accordance.

#### **TYPES OF REPAIR**

Repairs to concrete surfaces and addition where required shall be made by cutting regular opening into the concrete and placing fresh concrete to the required lines. The chipped openings shall be sharp and shall not be less than 70 mm. in depth. The fresh concrete shall be reinforced and chipped and troweled to the surface of the openings. The concrete shall be placed in layers not more than 20 mm, in thickness after being completed each layer shall be compacted thoroughly. All exposed concrete surfaces shall be cleaned of impurities, lumps of mortar or grout and unsightly stains.

#### **COST**

The cost of furnishing all materials and performing all work required in the repair of concrete shall be borne by the contractor.

#### **MEASUREMENT OF CONCRETE**

Measurement for payment of concrete required to be placed directly upon or against surfaces of excavation will be made to the lines of construction as per approved drawing.

Measurement for payment of concrete will be made to the neat lines of structures constructed as shown on the approved drawings and prescribed in the specification. The unit of measurement will be cubic meter. In measuring concrete for payment, the volume of all opening, fixtures, embedded pipes and metal work, each of which is larger than 0.1 square meter in cross section will be deducted.

#### **PAYMENT FOR CONCRETE**

Concrete works of different grades and specifications are to be executed as per items of BOQ. The measurements for these items will be recorded in cubic meter basing on dimensions of concrete as per execution with reference to approved drawings. The item rates for different

concrete items includes all costs for labor, material, T&P, machineries, equipments and consumables required for carrying out the following operations.  
Carrying out all necessary operations for setting out works, clearing, preparation of beds, removal of silt etc. described under Technical Specifications..  
Laboratory testing of sample of aggregates, cement, water.  
Procurement of fine aggregates, coarse aggregates, cement, admixtures and water at site of work. (Procurement cost of Reinforcement bars & placement are excluded )  
Batching, mixing, laying of concrete, vibrating and curing as per Specifications.  
Erection of gangways, scaffolding, chutes and dismantling the same after completion of work.  
Construction of approach road, haul road, site illumination, construction of coffer dam till completion of the work and subsequent removal at appropriate time, and all mobilization and demobilization cost to complete the above operations.  
Recording of photographs. Quality control works.  
Payment of all taxes, royalties, GST etc.  
Provision of contraction joints and provision for embedment of items as per approved drawings.  
Cost of all safety precautions.  
Any other incidental cost to complete the items of work as per specification and direction of Project Manager.  
Measurement & Payment will be made as per BOQ regardless of methods and type of equipments used for execution of the work.  
The cost of concrete used in (1) wasted concrete, (2) in replacement of damaged or defective concrete, (3) in extra concrete required as a result of over excavation, (4) in concrete placed by the contractor in excavations intentionally performed to facilitate the contractor's operations, and (5) Extra concrete due to tolerance in concrete finish shall be borne by the contractor. No extra payment shall be made to contractors for such additional quantity.

#### **9. REINFORCEMENT STEEL:**

- 1 Steel required for reinforcement, conforming to IS 1786, shall be arranged by the Contractor himself. Contractor shall make his own arrangements of cartage from market to site of work, but he should produce all related documents towards quality, source of receipt and the manufacturer specifications to the Engineer-in-charge for approval, prior to placing supplier order to the supplier. Unless otherwise approved by the Engineer-in-charge, no such material shall be brought into the work site.
- 2 The reinforcement shall be as per sizes and shape as per drawing or direction of the Engineer-in-charge. Extra reinforcement, if placed other than that provided in drawing shall not be paid by the Nigam. However standard Laps and Hooks wherever necessary, shall be allowed as per I.S: 456-1978 or its subsequent revision, if any.
- 3 The reinforcement shall be tied in position by welding or by steel wires of 16 SWG or stays as approved by the Engineer-in-charge. Wire for tying reinforcement shall be of soft annealed steel and shall have an ultimate strength not less than 5600 Kg/cm<sup>2</sup> and a yield point of not less than 3700Kg/cm<sup>2</sup>. The exact position, size and shape of reinforcement are not shown in all cases on the drawing or included in these specifications and where not shown they shall be in all respects as specified by the Engineer-in-charge. Detailed drawing for reinforcement will be furnished by the Engineer-in-charge as soon as practicable and according to the construction schedule. Bars shall be bent cold to the shapes and dimensions as per drawings and as directed. Heating of bars for bending shall not be allowed, except where expressly permitted by the Engineer-in-charge.

**4. Placing of Reinforcement:**

Before placing the reinforcement bars in position, rust and scales shall be removed. A clear cover of 50mm shall be maintained between reinforcement and concrete side and bottom surfaces and these distances shall be maintained during vibration of concrete. Joints in steel bars of 25mm diameter and above will be required to be welded unless otherwise directed by the Engineer-in-charge.

5 The measurement of steel at place shall be done before laying of concrete. No reinforcement shall be covered or embedded unless it is measured and entered in measurement book by the authorized representative of the Engineer-in-charge.

6 The contractor shall make proper arrangement for providing covers and spacing in reinforcement steel by making spacers/chairs for which nothing extra shall be paid.

7 The tendered rates shall include cost of steel, its handling, carriage from stores to site, cutting , bending, binding and placing in position including cost of binding wires.

**10. FORMWORK:**

**1. Forms:**

**(a) General**

Forms shall be of wood, steel or other approved material, type, size, quality and strength of materials. Of which the forms are made shall be subjected to the approval of the Engineer-in-charge. Forms shall be used, wherever necessary to confine the concrete and shape it to the required lines or to ensure against contamination of the concrete by materials caving or sloughing from adjacent surface left by excavation. Forms shall have sufficient strength to withstand the pressure resulting from the placement and vibration of the concrete and shall be maintained rigidity in correct position. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Moulding strips shall be placed in the form as to provide beveled edges on permanently exposed concrete surfaces. Interior angles on such surface will not require beveling unless requirement for beveling is indicated on the drawings. Cost of centering and scaffolding which may be necessary shall be included in the item for shuttering and therefore nothing extra will be paid for centering and scaffolding.

**(b) Cleaning and Oiling of Forms:**

At the time concrete is placed in the forms, the surfaces of the forms shall be free from the encrustations of mortar, grout or other foreign materials that would contaminate the concrete or interfere with the fulfilment of the specifications requirements relative to the finish of formed surfaces. Before concrete is placed, the surfaces of the forms shall be oiled with commercial form oil or treated with other form coating materials that will effectively prevent sticking and will not stain the concrete surfaces. For wood surfaces, oil shall consists of

straight, refined, pale, paraffin mineral oil or other form coating material satisfactory to the Engineer-in-charge. For steel forms, form oil shall consist of refined mineral oil suitably compounded with one or more ingredients which are appropriate for the purpose or other from coating material.

**(c ) Inspection and Approval of Forms:**

After the forms are erected and before any concrete is placed, the forms shall be inspected for line, level and grade, with respect to the structure, adequacy of bracing, freedom from dirt, fixtures, keyways, opening etc. No concrete shall be placed against the forms unless the forms have been checked and placement of concrete permitted by the Engineer-in-charge. Such inspection and approval shall, however, not absolve the contractor of his responsibility for the sufficiency and stability of the forms. The contractor shall, at all times, be solely responsible for its sufficiency and stability.

**2. Types of Shuttering:**

**(a) Plain Shuttering:**

Shuttering for block outs of all shapes and sizes, precast slabs and those faces which are concealed from view and other locations not covered by para (b) shall be measured and paid for as plain shuttering.

**(b) Plain/Curve Smooth Shuttering:**

The shuttering for concrete that is exposed to view e.g. Gantry, Column ceilings of slabs, beams curve smooth surface etc. and at places as per directions of Engineer-in-charge, shall be plain/curve smooth shuttering. The shuttering pieces shall have ply board of the approved quality or steel plates on smooth face and sufficiently rigid to withstand pressure and buckling. Before manufacture of shuttering plates the design, shape, and method of fixing shall be got approved by the Engineer-in-charge.

**3 Removal of Forms:**

Removal of forms shall not be started until the concrete is thoroughly set and has aged to give it sufficient strength to carry its own weight, and the live load which is likely to come on the work during the course of construction. The length of time, the form should remain in place shall be decided by the Engineer-in-charge with reference to weather conditions, shape and position of the structure of structural member, the nature and amount of dead and live loads. The minimum intervals as specified in I.S.:456-1978 will generally be allowed between placing concrete and striking moulds if normal Portland cement is used but the period shall be increased in case of wet weather and also at the option of the Engineer-in-charge. The contractor shall be solely responsible for any damage that may be caused by the negligence, lack of proper precautions of hastiness etc. in the matter of removal of forms and shall make the same good at his own cost to the satisfaction of the Engineer-in-charge.

**4 Measurement and payment:**

Cost of Shuttering is included in the rate of related concrete work and no extra payment shall be made to contractor in lieu of supply and erection of same at site. It also includes the cost of centering and scaffolding, wherever required, and its cartage to site and fixing.

**4- DEWATERING:**

The cost incurred towards dewatering if required is included in the rates and no separate payment shall be done for dewatering by any means i.e. either by gravity or by pump (Diesel or Electric). The contractor shall bear all cost towards dewatering.

**5- METAL WORKS (STRUCTURAL STEEL WORK):**

5.1 The Metal of all nature shall confirm to the CPWD detailed specification for Item Nos-4.1.3, 4.1.5, 4.1.8, 5.1.2, 5.2.2, 5.3, 5.33.1.1 & 5.33.2.1 in CPWD DSR-2023 .

5.2 The measurement and payment shall be done on the basis of unit given in Bill of Quantities.

### 5.3 METALWORKS SUPPLIED AND INSTALLED BY THE CONTRACTOR

#### 5.3.1 Steel Pipes

(1) The Contractor shall supply and install steel pipes of various diameters and fittings in the positions shown on the Construction Drawings or as directed by the Engineer-in-Charge.

(2) Steel Pipes used shall be ERW (Electric Resistance Welded) of Steel grade Fe 410 as specified in IS 3589 or as per approved construction drawings.

(3) Weight of the pipe shall be calculated as per **Table 5** of IS 3589.

(4) Pipes shall be carefully fastened and supported within the shuttering, in order to avoid any movement when pouring concrete.

(5) Pipes where not cast into concrete shall be adequately supported by galvanized mild steel holderbats or other approved means. The distance between pipe supports shall not exceed 2.0 meters.

#### 5.3.2 Miscellaneous Steel Sections

The Contractor shall supply and install all small galvanized steel sections such as edge protection, angles, frames, bearing plates, brackets, beads at plastered corners, etc., of various dimensions. Bolts, screws, anchors and other accessories for interior or exterior purposes shall be included.

#### 5.3.3 Ladders, and Climbing Irons

(1) The Contractor shall supply and install ladders, and climbing irons fabricated out of steel flats and plain round bars as shown on the Tender Drawings. Ladders may have protection cages whenever required for safety of personnel. Fixings and fittings shall be of stainless steel or material approved by Engineer-in-charge. All items shall be fabricated according to the shop drawings prepared by the Contractor in the course of Works.

(2) Ladders, climbing irons and protection cages shall be painted as specified above in this Section.

### 6.0 OTHER CONDITIONS:

1. Contractor will make his own arrangement for communication among his employees/Workers.
2. Contractor shall abide by the rules and regulations of the Nigam inside the project area.
3. The contractor shall follow all the safety rules as required by statutory authorities.
4. It is sole responsibility of contractor to get the material approved from Engineer-in-Charge before taking into use at site.
5. Contractor or his authorized representative shall keep close liaison daily with J.E./A.E. concerned for taking day to day instructions progress/complaints pertaining to the work.
6. Contractor has to follow the minimum wages, EPF, ESIC, labour rules, other rules applicable for this type of work and statutory rules laid by GOUK/GOI.
7. During execution of work samples of material and items such as concrete, sand stone ballast, steel or any other material may be referred for laboratory test by Engineer-in-Charge and bill thus raised by concerned laboratory shall be paid by contractor at his own cost.

### 7.0 RR STONE MASONRY

#### 7.1 General

This section covers the furnishing of all labour, materials and equipment and the performing of all operations required for the stone masonry work and incidental items pertinent thereto, in accordance with the drawings and these specifications.

7.2 The Material of all nature shall confirm to the CPWD detailed specification for Item No. 7.1.1 in CPWD DSR 2023.

10.3 The measurement and payment shall be done on the basis of unit given in Bill of Quantities.

### 8.0 CEMENT CONCRETE FLOORING

8.1 The specification of material and execution shall confirm to the CPWD detailed specification for Item Nos-11.3.1 in CPWD DSR-2023.

8.2 The measurement and payment shall be done on the basis of unit given in Bill of Quantities.

### 9.0 CEMENT PLASTER

9.1 The specification of material and execution shall confirm to the CPWD detailed specification for Item Nos-13.1.1, 13.1.2, 13.2.1, 13.2.2, 13.16, & 13.9.1 in CPWD DSR-2023.

9.2 The measurement and payment shall be done on the basis of unit given in Bill of Quantities.

### 10.0 WHITE WASHING

10.1 The specification of material and execution shall confirm to the CPWD detailed specification for item Nos.13.41.1 & 13.46.1 in CPWD DSR-2023.

**10.2** The measurement and payment shall be done on the basis of unit given in Bill of Quantities.

**11.0 PAINTING OF WOODEN/STEEL STRUCTURES**

**11.1** The specification of material and execution shall confirm to the CPWD detailed specification for item Nos.13.62.1 in CPWD DSR-2023.

**11.2** The measurement and payment shall be done on the basis of unit given in Bill of Quantities.

**12.0 MORTARS**

**12.1** The specification of material and execution shall confirm to the CPWD detailed specification.

**12.2** The measurement and payment shall be done on the basis of unit given in Bill of Quantities.

**13.0 CARRIAGE OF MATERIALS**

The carriage of Materials shall conform to the CPWD.

**14.0 BRICK WORK**

**14.1** The specification of material and execution shall confirm to the CPWD detailed specification for item Nos. 6.1.2, 6.4.2, 6.13.2 & 6.15 in CPWD DSR-2023.

**17.2** The measurement and payment shall be done on the basis of unit given in Bill of Quantities.

**15.0 D.P.C.**

**15.1** The specification of material and execution shall confirm to the CPWD detailed specification for item Nos. 4.10 in CPWD DSR-2023.

**15.2** The measurement and payment shall be done on the basis of unit given in Bill of Quantities.

**16.0 WOOD WORK**

**16.1** The specification of material and execution shall confirm to the CPWD detailed specification for item Nos. 9.20.1 in CPWD DSR-2023.

**16.2** The measurement and payment shall be done on the basis of unit given in Bill of Quantities.

**17.0 ROOF WORK**

**17.1** The specification of material and execution shall confirm to the CPWD detailed specification for item Nos. 26.26.2, 5.9.3 & 5.3 in CPWD DSR-2023.

**17.2** The measurement and payment shall be done on the basis of unit given in Bill of Quantities.

**18.0 ROAD WORK**

The Road work of all nature shall conform to the CPWD/Uttarakhand P.W.D. detailed specification No. 20 (Chapter 20) for Kankar Consolidation. Bricks Ballast Consolidation. Stone Ballast Consolidation. Base Course or sub base of bricks. Surface dressing with bituminous binders. Laying lean premix macadam (8 cm. thick and 10 cm. thick base course). Laying Asphalt concrete (40 mm and 25. thick). Priming with Bituminous Primers. Stabilized Soil layer for Road base course. Stabilized Soil with soft aggregate for Road base coats. laying Bitumen carpet (2 cm thick (Lying gap graded Bitumen concrete shelerate. Bituminous penetration Macadam (Full grout). use of pre coated chips of painting work on road and kankar pitching.

**19.0 PLUMBING AND SANITARY WORK**

**19.1** The specification of material and execution shall confirm to the CPWD detailed specification for item Nos. 18.11.1,18.11.2, 18.12.1, 18.12.2, 18.12.3 ,18.49.1, 18.51.1, 18.53.1, 17.28.2.1, 18.21.2.1, 18.18.1, 18.18.2, 18.16.1, 18.17.1, 17.2.1, 17.16A, 17.34.1, 17.1.1, 17.7.1, 17.8, 17.10.2.2,17.4.1, 18.48, 18.62.1, 17.37.1,17.72, 17.73, 17.73.2,18.65, 18.75.2,18.58.1.1, 18.58.1.2,12.41.2,12.42.6.2, 12.41.1, 12.42.5.1 & 12.42.6.1 in CPWD DSR-2023.

**19.2** The measurement and payment shall be done on the basis of unit given in Bill of Quantities.

**20.0 CONTRACT LABOUR ACT COMPLIANCE**

The contractor will also ensure license for Contract labour under Regulation and Award Act. 1970 and Uttarakhand Rules 1975 para 2 and 21.

**21.0 SUB HEAD -14 REPAIR OF BUILDING ( AS PER CPWD DSR SECIFICATION)**

**14.1 REPAIRS TO PLASTER**

**14.1.0** The work includes cutting the patch and preparing the wall surface. Patches of 2.50 square metres and less in area shall be measured under item of 'Repairs to Plaster' under this sub-head. Plastering in patches over 2.5 square metres in area shall be paid for at the rate as applicable to new work under sub head 'Finishing'.

**14.1.1** Scaffolding Scaffolding as required for the proper execution of the work shall be erected. If work can be done safely with the ladder or jhoola these will be permitted in place of scaffolding.

14.1.2 Cutting The mortar of the patch, where the existing plaster has cracked, crumbled or sounds hollow when gently tapped on the surface, shall be removed. The patch shall be cut out to a square or rectangular shape at position marked on the wall as directed by the Engineer-in-Charge or his authorized representative. The edges shall be slightly under cut to provide a neat joint.

14.1.3 Preparation of Surface The masonry joints which become exposed after removal of old plaster shall be raked out to a minimum depth of 10 mm in the case of brick work and 20 mm in the case of stone work. The raking shall be carried out uniformly with a raking tool and not with a basuli, and loose mortar dusted off. The surface shall then be thoroughly washed with water, and kept wet till plastering is commenced. In case of concrete surfaces, the same shall be thoroughly scrubbed with wire brushes after the plaster had been cut out and pock marked as described in 13.1.2. The surface shall be washed and cleaned and kept wet till plastering is commenced.

14.1.4 Application of Plaster Mortar of specified mix with the specified sand shall be used. The method of application shall be as described for single coat plaster work of the specified mix and under Chapter 13. The surface shall be finished even and flush and matching with the old surrounding plaster. All roundings necessary at junctions of walls, ceilings etc. shall be carried out in a tidy manner as specified in sub-head 13.0. All dismantled mortar & rubbish etc. shall be disposed off within 24 hours from its dismantling promptly as directed by the Engineer-in-Charge.

14.1.5 Protective Measure Doors, windows, floors, articles of furniture etc. and such other parts of the building shall be protected from being splashed upon. Splashing and droppings, if any, shall be removed by the contractor at his own cost and the surface cleaned. Damages, if any, to furniture or fittings and fixtures shall be recoverable from the contractor.

14.1.6 Curing Curing shall be done as per plaster work with special reference to the particular type of plaster mix as described under sub-head 'finishing'.

14.1.7 Finishing After the plaster is thoroughly cured and dried the surface shall be white washed or colour washed to suit the existing finishing as required unless specified.

14.1.8 Measurements Length and breadth shall be measured correct to a cm. The area shall be calculated in square metre correct to two places of decimal. Patches below 0.05 square metre in area shall not be measured for payment. Pre-measurements of the patches to be plastered shall be recorded after the old plaster has been cut and wall surface prepared.

14.1.9 Rate The rate includes the cost of all the materials and labour involved in all the operations described above including lead as described in the item for disposal of old dismantled plaster /material.

#### **14.2 FIXING DOOR, WINDOW OR CLERESTORY WINDOW CHOWKHATS IN EXISTING OPENING**

##### **14.2.1 Making Holes**

14.2.1.1 In case of door frames without sills, holes 40 mm deep shall be made in the floor for fixing the lower end of verticals of the frames. For doors with sills, the sill plates shall be partly fixed in the floor so that they project above the floor to the height as directed by the Engineer-in-Charge.

14.2.1.2 For embedding hold fasts of doors, windows or clerestory windows, the requisite number of holes at the correct positions shall be cut out in the masonry. The size of the holes shall be such that the chowkhats with the hold-fasts can be conveniently erected in position. Where necessary, masonry shall be chipped uniformly to facilitate easy insertion of the frame in the opening.

14.2.1.3 Special care shall be taken when holes are made in load bearing pillars or wall portions separated by openings to ensure that beams etc. supported by them are properly propped up. In such portions cutting holes shall be done on one side at a time. The sides of the holes shall be truly parallel and perpendicular to the plane of the wall. Due care shall be taken, not to disturb the adjoining masonry and the masonry under the bearings of lintels and arches etc. spanning the opening. The holes shall then be cleaned of all dust, mortar and brick bats or stone pieces and thoroughly wetted.

14.2.2 Fixing The sides of chowkhats of door, window or clerestory window abutting against or to be embedded in masonry shall be painted with two coats of coal tar before being placed in position. The chowkhats shall then be inserted in position with their hold-fasts bolted tight. The chowkhats shall then be adjusted to proper line and plumb and secured in position by temporary bracing which shall not be disturbed or removed until the hold fasts are embedded in the masonry and the concrete block has set. The concrete to be used for embedding hold- fasts shall be cement concrete 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size). The minimum size of concrete block in which the hold-fasts will be embedded shall be 30 x 10 x 15 cm for 35 cm long holdfasts. The concrete of the block shall completely fill the hole made in the masonry for the purpose. The chase cut in the floor shall be cut square and construction joint shall be provided filled in with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) and rendered smooth at the top and finished to match the existing type of floor.

14.2.3 Finishing After the surface surrounding the hold-fasts has sufficiently dried it shall be cleaned of dust etc. and wetted. It shall then be plastered with cement mortar 1:4 (1 cement : 4 fine sand) flush and matching with the surrounding plaster work. In case of exposed brick work, stone work, the finishing shall be done to match the surrounding. Any other portion of the wall opening, if damaged, shall be repaired in similar way

After the cement plaster patches have been thoroughly cured and dried, they shall either be white washed or colour washed as required unless otherwise specified. All malba and debris obtained from cutting etc. shall be disposed off to the nearest dumping ground promptly as directed by Engineer in-Charge.

##### **14.2.4 Measurements**

The chowkhats of doors, window and clerestory windows shall be enumerated separately.

##### **14.2.5 Rate**

The rate shall apply irrespective of the size of the chowkhat upto a maximum area of opening

3.75 square metres for doors, 2.5 square metres for windows and 1.2 square metres for clerestory windows. The rate is inclusive of labour and materials involved in all the operations described above, excluding (a) cost of chowkhats and (b) cost of supplying and fixing the hold-fasts including C.C. block and bolts.

#### **14.3 FIXING CHOWKHATS IN EXISTING OPENING IN BRICKS / RCC WALL WITH DASH FASTNERS**

14.3.1 In case of door frames without sills, holes 40 mm deep shall be made in the floor for fixing the lower end of verticals of the frames. For doors with sills, the sill plates shall be partly fixed in the floor so that they project above the floor to the height as directed by the Engineer-in-Charge.

14.3.1.1 For fixing dash fasteners /chemical fasteners of doors, windows or clerestory windows, the requisite number of holes at the correct positions shall be in the masonry/RCC wall. The size of holes shall be such that the fasteners can be conveniently placed in position. Where necessary, masonry shall be chipped uniformly to facilitate easy insertion of the frame in the opening.

14.3.1.2 Special care shall be taken when holes are made in load bearing pillars or wall portions separated by openings to ensure that beams etc. supported by them are properly propped up. In such portions cutting holes shall be done on one side at a time. The sides of the holes shall be truly parallel and perpendicular to the plane of the wall. Due care shall be taken, not to disturb the adjoining masonry and the masonry under the bearings of the lintels and arches etc. spanning the opening. The holes shall then be cleaned of all dust, mortar and brick bats or stone pieces and thoroughly wetted.

#### 14.3.2 Fixing

The sides of chowkhats of door, window or clerestory window abutting against or to be embedded in masonry shall be painted with two coats of coal tar before being placed in position. The chowkhats shall then be inserted in position tight. The chowkhats shall then be adjusted to proper line and plumb and secured in position by temporary bracing which shall not be disturbed or removed until the fasteners are embedded in the masonry /RCC wall.

#### 14.3.3 Finishing

After the surface surrounding the hold-fasts has sufficiently dried it shall be cleaned of dust etc. and wetted. It shall then be plastered with cement mortar 1:4 (1 cement: 4 fine sand) flush and matching with the surrounding plaster work. In case of exposed brick work, stone work, the finishing shall be done to match the surrounding. Any other portion of the wall opening, if damaged, shall be repaired in similar way. After the cement plaster patches have been thoroughly cured and have dried, they shall either be white washed or colour washed as required unless otherwise specified. All malba and debris obtained from cutting etc. shall be disposed off to the nearest dumping ground.

### 14.0 : REPAIRS TO BUILDINGS

#### 14.3.4 Measurements

The chowkhats of doors, window and clerestory windows shall be enumerated separately.

#### 14.3.5 Rate

The rate shall apply irrespective of the size of the chowkhat upto a maximum area of opening 3.75 square metres for doors, 2.5 square metres for windows and 1.2 square metres for clerestory windows. The rate is inclusive of labour and materials involved in all the operations described above, including cost of dash fasteners chemical fasteners but excluding cost of chowkhat.

### 14.4 MAKING OPENING IN THE MASONRY CONSTRUCTION AND FIXING CHOWKHATS FOR DOORS, WINDOWS AND CLERESTORY WINDOWS

14.4.0 Before making opening it is necessary to examine that the wall exclusive of opening is adequate to take the load coming on the structure. All the structural members supported on the walls which have direct bearing over the area in which opening is to be made, shall be properly supported with props to relieve the load from masonry wall till the lintel over the opening is strong enough to take the load. Care should also be taken not to disturb the adjoining masonry. All precautions as explained in Chapter 15.0 (Demolition and Dismantling) should be followed in case of dismantling the external walls. The portion to be dismantled may be clearly marked on both sides of the wall. Dismantling shall be carried out from top to bottom within the marked area. The sides of the opening shall be as far as possible, parallel and perpendicular to the plane of wall.

#### 14.4.1 Making Opening

14.4.1.1 The openings for fixing door/window frames shall be to the extent of accommodating the holdfast. The hold fasts shall be fixed in cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 stone aggregate 20 mm nominal size) or in masonry as required. Where only opening is to be made in the masonry, the width of the opening shall be such that the sides of the masonry can be built true to line and plumb and such masonry built shall conform to the specifications of the particular type of masonry in which the opening is made with particular reference to size of corner stones etc. In order to get continuity with old masonry, proper key shall be provided. The height of the opening shall be such that it can accommodate the required depth of the RCC lintel also.

14.4.1.2 The sides of opening in masonry shall be cleaned of all dust, mortar, brick bats/loose stones, chips etc. and the surface left rough and thoroughly wetted.

14.4.1.3 The lintel shall be invariably cast first in the opening made for the purpose. One side of the shuttering shall be kept open in the beginning till the concrete is laid. The shuttering shall then be fixed for half of the opening and concreting completed.

14.4.1.4 Curing of lintel casted shall be done for a minimum period of 7 days.

14.4.1.5 Precast RCC lintel or R.S. Joist may also be used if directed by the Engineer-in-Charge.

14.4.2 Fixing Chowkhats Fixing of chowkhats shall be done as specified in 14.2.2.

#### 14.4.3 Finishing

14.4.3.1 After the surface of the sides of masonry opening and lintel are sufficiently dry and set, it shall be cleaned free of dust, loose mortar etc. and wetted thoroughly. It shall then be plastered or pointed as required flush with the surrounding masonry work. Any other portion of the wall if damaged shall be finished in similar manner.

14.4.3.2 After the cement plaster/pointing has been thoroughly cured and have dried the surface shall be either white or colour washed/painted as required. The surface of the wall which is spoiled due to splashing of mortar shall be cleaned forthwith.

#### 14.4.4 Measurements

The openings made for doors, windows, clerestory windows shall be measured correct to cms and area shall be calculated in square metres correct to two places of decimal.

#### 14.4.5 Rate

The rate shall apply per sqm of opening. The rate is inclusive of labour and material involved in all the operations described above. Cost of Chowkhats, cost of CC blocks, cost of supplying the hold-fasts bolts, cost of R.C.C lintel or R.S. Joist which shall be paid for separately.

### 14.5 RENEWING FLOATING GLASS PANES WITH PUTTY AND NAILS

14.5.1 Removing Broken Glass Panes Old putty shall be raked out with hack knife. The brad (small nails without head) and pieces of broken glass shall be removed from the rebates of the sash bars. The pieces of glass panes as found useful shall be handed over to the Engineer-in-Charge of the work. No glass shall be inserted in frames until they have been primed and prepared for painting so that the wood may not draw oil out of the putty.

### 14.5.2 Floating Glass Panes

The floating glass panes shall conform to specifications described in IS 14900.

### 14.5.3 Fixing

The floating glass panes shall be so cut that it fits slightly loose in the frame and as specified in A&B of IS 14900. A thin layer of Putty conforming to IS 419 shall be prepared by mixing one part of white lead with three parts of finely powdered chalk and then adding the boiled linseed oil to the mixture to form a stiff paste and adding varnish to the paste @ 1 litre of varnish to 18 kg. of paste. The putty so prepared in the form of a stiff paste shall be drawn along the inner edge of the rebate, for bedding the back of the glass panes. The glass pane shall then be put in position, pressed home against the thin layer of the putty, and secured in rebate by new brads. The brads shall not be spaced more than 7.5 cm from each corner and not more than 15 cm apart. The putty shall then be applied in the rebate uniformly, sloping from the inner edge of the rebate. In doing this care shall be taken to keep the putty a little within the inner edge of the rebate and surplus putty removed so that none of it is seen through the glass from the inside. The putty so filled in the rebates shall be leveled smooth and finished in a straight line. When dried the putty shall be covered with a coat of paint of approved quality and shade to match the existing finish of joinery work. The floating glass panes shall be cleaned with methylated spirit. All splashings or droppings of washing and paints shall be removed. All rubbish and unserviceable materials shall be disposed off to the dumping ground promptly as per the direction of Engineer-in-Charge.

### Thickness and Tolerance of Floating Glass

#### Thickness Tolerance

4 mm  $\pm$  0.3 mm

5 mm  $\pm$  0.3 mm

6 mm  $\pm$  0.3 mm

Note : Frosted glass panes should be replaced with frosted glass panes. These shall be fixed with frosted face on the inside.

### 14.5.4 Measurements

Length and breadth of glass panes shall be measured correct to a cm. The area of the glass panes as fixed shall be calculated in square metre correct to two places of decimal.

### 14.5.5 Rate

The rate shall include the cost of labour and materials involved in all the operations described above.

## 14.6 RENEWING FLOATING GLASS PANES WITH WOODEN FILLETS

### 14.6.1 Removing Broken Glass Panes

The specifications shall be the same as in para 14.5.1 except that the wooden fillets including nails shall be taken out carefully.

### 14.6.2 Glazing

The specifications for glass panes and their fixing shall be the same as per IS 14900. The fillet shall either be fixed flush or projected uniformly to match with the existing work by means of nails (brads). The new fillet provided shall be painted or finished otherwise to match with the existing finish of the joinery work. The glass panes shall be cleaned with methylated spirit of all sorts of splashing and droppings of wash and paints. All rubbish and unserviceable materials shall be disposed off in the dumping ground promptly as per the direction of Engineer-in-Charge.

### 14.6.3 Measurements

Length and breadth of glass panes shall be measured correct to a cm. The area of the glass panes as fixed shall be calculated in square metre correct to two places of decimal. The new wooden fillets fixed shall be measured in running metres correct to a cm.

### 14.6.4 Rate

The rates shall include the cost of labour and material involved in all the operations described above except that the cost of new wooden fillets used in the work and their finishing shall be paid for separately.

## 14.7 RENEWING FLOATING GLASS PANES AND REFIXING EXISTING WOODEN FILLETS

The specifications shall be same as described in 14.6 above.

## 14.8 PROVIDING NEW WOODEN FILLETS

14.8.1 The fillets shall be of wood, as specified in the item of work, these shall be cut and planed smooth to the required shape and dimensions.

### 14.8.2 Fixing

The specifications for glass panes and their fixing shall be the same as given in 9.6.4.6. The fillet shall either be fixed flush or projected uniformly to match the existing work. The fillet shall be painted or finished otherwise to match with the existing finish of the joinery work. The glass panes shall be cleaned with methylated spirit of all sorts of splashing and dropping of wash and paints.

### 14.8.3 Measurements

The fillets shall be measured in running metres. The lengths shall be measured correct to a cm.

### 14.8.4 Rate

The rate shall include the cost of all labour and materials involved in all the operations described above. The rate shall also include the cost of removal of worn out fillets, when these are met with in old work. The rate shall vary according to the class of wood used.

## 14.9 RENEWAL OF OLD PUTTY OF GLASS PANES

14.9.1 The old putty shall be removed as specified in 14.5.1 and new putty fixed as specified in 14.5.3.

### 14.9.2 Measurements

The work shall be measured in running metres. The length along the rebate shall be measured correct to a cm.

### 14.9.3 Rate

The rate shall include the cost of labour and materials involved in all the operations described above.

**14.10 REFIXING OLD GLASS PANES WITH PUTTY AND NAILS**

14.10.1 Specification same as described in 14.5 above. Except for the glass panes, old glass panes will be used for which nothing extra will be paid.

**14.11 FIXING OLD GLASS PANES WITH WOODEN FILLETS**

14.11.1 Specifications same as described in para no. 14.6 above except for the glass panes. Old glass panes will be used for which nothing extra shall be paid.

**14.12 FIXING FAN CLAMPS IN EXISTING R.C.C. SLABS**

14.12.1 The fan clamps to be fixed in an existing R.C.C. slab shall be of type shown in Fig. 14.1. These shall be made of 16 mm dia M.S. bar.

**14.12.2 Fixing**

A 15 x 7.5 cm size chase shall be cut from the ceiling to expose the reinforcement and upto 2.5 cm clear round the reinforcement bar as directed. This shall be done without any damage to adjoining portion of the ceiling. The two arms at the ends of the clamps shall be passed through the space over the reinforcement bar from the bottom of the slab. Then the two arms shall be bent down about 1.5 cm by means of a crow bar. The clamp shall be held in position and chase in the ceiling filled with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size). The ceiling shall then be finished to match the existing surface and properly cured. The exposed portion of the clamp shall be given two or more coats of paint including one priming coat of shade as directed by the Engineer-in-Charge.

**14.12.3 Measurements and Rate**

Clamps shall be counted in numbers. The rate per fan clamp shall include the cost of labour and materials involved in all the operations described above. The rate shall apply irrespective of the thickness of the slab.

**14.13 REGRADING OF MUD PHUSKA TERRACING**

**14.13.1 Dismantling**

The specified area of roof as directed by the Engineer-in-Charge shall be dismantled carefully so that the minimum of tiles or bricks are damaged. The serviceable tiles or bricks shall be cleaned and stacked on places as directed by the Engineer-in-Charge, or on the parapet wall if convenient and safe or otherwise carried to ground and stacked as directed by the Engineer-in-Charge for which nothing extra shall be paid. All unserviceable tiles and debris shall be disposed off to the dumping ground as directed by the Engineer-in-Charge. Suitable earth shall be stacked separately for reuse.

**14.13.2 Laying**

Mud phuska shall be removed, cleaned of all foreign matter and brought to the ground. After approval of the Engineer-in-Charge it shall then be reduced to fine powder and then mixed with additional soil for regrading and additional fibrous reinforcing materials such as chopped straw or fresh bhusa at the rate of 8 kg/cum of mud mortar shall be mixed with old earth. The choppings used shall not be more than 20 mm in length. A pit shall be dug where the mixture shall be added and allowed to mature for a period of not less than 7 days. During this period the mixture shall be worked up at interval with feet and spades so as to get pugged into homogeneous mass free from lumps and clods. The consistency of the mortar shall be adjusted by taking it in a trowel and observing how it slides off the face of the trowel. The mortar shall readily slide off, but at the same time shall be so wet as to part into large drops before falling.

**14.13.3 Leeping Plaster**

Shall be prepared by mixing soil which is free from coarse sand with approximately equal volume of cow dung and adding the required quantity of water. The mixture shall work to a homogeneous mass. The quantity of gobar used in gobrileeping shall not be less than 0.03 cum per 100 sqm of plaster area.

**14.13.4 Laying Tile Bricks and Grouting**

The specifications shall be as described in 12.11.4 except that new tile as necessary to replace the broken tiles shall be used. Half or cut brick tiles shall not be used except where necessary to complete the bond. New work shall be finished in level with surrounding surface.

**14.13.5 Curing and Measurements**

Shall be as specified in 12.11.5 and 12.11.6.

**14.13.6 Rate**

The rate shall include the cost of all materials and labour involved in all the operations described above except for new tiles or bricks which shall be paid for separately.

**14.14 REPLACING RED OR WHITE SAND STONE SLABS IN ROOFING**

**14.14.1 Dismantling Roof**

The general specifications given in 15.1 shall apply. The cracked or decayed stone slabs as marked by the representative of the Engineer-in-Charge shall be removed after dismantling the tile covering with mud phuska over it if any, or other type of covering over the stone slabs. Mud phuska terracing with tile brick covering shall be dismantled as per 14.13.1 over the specified cracked or decayed tiles to an area extending 15 cm on all sides of stone slabs. This area may be increased by the Engineer-in-Charge, if found necessary. Stone slabs shall then be dismantled and carried down and stacked properly. In case the stone slabs are not covered at top with mud phuska or lime terracing, the decayed or cracked stone slabs shall be dismantled and carried down or lowered with ropes and stacked properly.

**14.14.2 Relaying of Stone Slab Roofing**

Before placing the stone slab the condition of the existing wooden battens shall be checked by suitable methods and replaced if required by Engineer-in-Charge. The upper surface of the wooden battens and beams supporting the stone slab, shall be painted with two coats of coal tar if not already treated and with one coat of coal tar if originally treated. The specifications for stone slabs, laying, finishing and curing, shall be as described under 12.15.

**14.14.3 Relaying of Mud Phuska with Tile**

The specifications shall be as described in 14.13.2 to 14.13.4 and shall be paid for separately.

**14.14.4 Curing and Measurements**

Shall be done as described in 12.11.5 and 12.11.6.

14.14.5 All unserviceable material shall be disposed off to the dumping ground as directed by the Engineer-in-Charge.

**14.14.6 Rate**

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The rate shall include the cost of materials and labour involved in all the operations described above, except the cost of wooden battens which shall be paid for separately.

### 14.15 RENEWING WOODEN BATTENS /BEAMS IN ROOFS

#### 14.15.1 Dismantling Wooden Battens / Beams

Dismantling shall be done as described in para 15.1 of dismantling and demolishing. Proper scaffolding shall be erected and got inspected by Engineer-in -Charge. Propping and bracing as directed should be done adequately and members required to be dismantled should be removed carefully including nails/bolts etc. and dismantling of masonry wall. The dismantled members should not be thrown or dropped but lowered with ropes carefully and stacked properly.

#### 14.15.2 Relaying of Wooden Battens

The wooden battens/beams of required section and size should be placed at proper interval and surface of the wooden batten/beams shall be painted with oil type wood preservative of approved brand and manufacture and as per the direction of Engineer-in-Charge.

14.15.3 All serviceable material shall be stacked properly and all the unserviceable material shall be deposited with the Engineer-in-Charge.

#### 14.15.4 Measurement

The work shall be measured in cubic meters. The length, breadth and depth shall be measured correct to a cm.

#### 14.15.5 Rate

The rate shall include the cost of materials and labour involved in the operations described above.

### 14.16 PANELLED GLAZED OR PANELLED AND GLAZED SHUTTERS

14.16.0 Pannelled or glazed shutters for doors, windows, ventilators and cupboards shall be constructed in the form of timber frame work of stiles and rails with panel inserts of timber, plywood, block board, veneered particle board, fibre board wire gauze or sheet glass. The shutters may be single or multipanelled, as shown in the drawings or as directed by the Engineer-in-Charge. Timber for frame work, material for panel inserts and thickness of shutters shall be as specified. All members of the shutters shall be straight without any warp or bow and shall have smooth well planed face at right angles to each other. Any warp or bow shall not exceed 1.5 mm. The right angle for the shutter shall be checked by measuring the diagonals and the difference between the two diagonals should not be more than  $\pm 3$  mm.

#### 14.16.1 Frame Work

14.16.1.1 Timber for stiles and rails shall be of the same species and shall be sawn in the directions of grains. Sawing shall be truly straight and square. The timber shall be planed smooth and accurate to the required dimensions. The stiles and rails shall be joined to each other by plain or haunched mortise and tenon joints and the rails shall be inserted 25 mm short of the width of the stiles. The bottom rails shall have double tenon joints and for other rails single tenon joints shall be provided. The lock rails of door shutter shall have its centre line at a height of 800 mm from the bottom of the shutters unless otherwise specified. The thickness of each tenon shall be approximately one- third the finished thickness of the members and the width of each tenon shall not exceed three times its thickness.

14.16.1.2 Gluing of Joints : The contact surfaces of tenon and mortise shall be treated, before putting together, with bulk type synthetic resin adhesive conforming to IS 851 suitable for construction in wood or synthetic resin adhesive (Phenolic and aminoplastic) conforming to IS 848 or polyvinyl acetate dispersion based adhesive conforming to IS 4835 and pinned with 10 mm dia hardwood dowels or bamboopins or star shaped metal pins; after the frames are put together and pressed in position by means of press.

14.16.1.3 Stiles and bottom rail shall be made out of one piece of timber only. Intermediate rail exceeding 200 mm in width may be out of one or more pieces of timber. The width of each piece shall be not less than 75 mm. Where more than one piece of timber is used for rails, they shall be joined with a continuous tongued and grooved joint glued together and reinforced with metal dowels at regular intervals not exceeding 200 mm.

TABLE 14.1

Dimensions of Components of Frame Work Sl. No. Description Width Thickness Mm mm

#### A. DOOR SHUTTERS

(a) Stile, top and freeze rail 100 35 or 40

(b) Lock rail 150 35 or 40

(c) Bottom rail 200 35 or 40

(d) Muntin 100 35 or 40

(e) Glazing bar 40 35 or 40

#### B. WINDOW, VENTILATOR & CUPBOARD SHUTTERS

(a) Stile, top and freeze rail 80 20, 25 or 30

(b) Bottom rail 80 20, 25 or 30

(c) Muntin 60 20, 25 or 30

(d) Glazing bar 40 20, 25 or 30

14.16.2 Muntin and glazing bars where required shall be stubtenoned to the maximum depth which the size of the member would permit or to a depth of 25 mm whichever is less. Unless otherwise specified the finished dimensions of the components of frame work of shutters shall be as given in Table 14.1. The tolerance on width of styles and rail shall be  $\pm 3$  mm. The tolerance in thickness will be  $\pm 1$  mm. The thickness of all components of frame work shall be the same as the thickness of the shutter. Tolerance on over all dimensions of the shutter shall be  $\pm 3$  mm.

#### 14.16.3 Rebating

The shutters shall be single-leaf or double leaved as shown in the drawings or as directed by the Engineer-in-Charge. In case of double leaved shutters, the meeting of the stiles shall be rebated by one-third the thickness of the shutter. The rebating shall be either splayed or square type as shown in Fig. 14.2.

#### 14.16.4 Panelling

The panel inserts shall be either framed into the grooves or housed in the rebate of stiles and rails. Timber, plywood, hard board and particle board panels shall be fixed only with grooves. The depth of the groove shall be 12 mm and its width shall accommodate the panel inserts such that the faces are closely fitted to the sides of the groove. Panel inserts shall be framed into the grooves of stiles and rails to the full depth of the groove leaving on space of 1.5 mm. Width and depth of the rebate

shall be equal to half the thickness of stiles and rails. Glass panels, asbestos panels wire gauze panels and panel inserts of cupboard shutters shall be housed in the rebates of stiles and rails. 14.16.4.1 Timber Panels : Timber panels shall be preferably made of timber of large width; the minimum width and thickness of the panel shall be 150 mm, and 15 mm respectively. When made from more than one piece, the pieces shall be jointed with a continuous tongued and grooved joint glued together and reinforced with headless nails at regular intervals not exceeding 100 mm. Depth and thickness of such joint shall be equal to one-third of thickness of panel. The panels shall be designed such that no single panel exceeds 0.5 square metre in area. The grains of timber panels shall run along the longer dimensions of the panels. All panels shall be of the same species of timber unless otherwise specified.

14.6.4.2 Plywood Panels : Plywood boards used for panelling of shutters shall be BWP type or grade as specified in 9.2.2. Each panels shall be a single piece of thickness, 9 mm for two or more panel construction and 12 mm for single panel construction unless otherwise specified.

14.16.4.3 Block Board Panels : Block board used for panelling of shutters shall be Grade I (Exterior Grade) bonded with BWP Type Synthetic resin adhesives as specified in 9.2.2. Each panel shall be a single piece of thickness 12 mm unless otherwise specified.

14.16.4.4 Veneered Particle Board Panels : Veneered Particle board used for panelling of shutters shall be Exterior Grade bonded with BWP type synthetic resin adhesive as specified in 9.2.4.2. Each panel shall be a single piece of thickness 12 mm unless otherwise specified.

14.16.4.5 Fibre Board Panels : Fibre board used for panelling of shutters shall be Exterior Grade bonded with BWP type synthetic resin adhesive as specified in 9.2.8.2. Each fibre board panel shall be a single piece of thickness 10 mm unless otherwise specified.

14. 16.4.6 Wire Gauze Panels : Wire Gauze used for panelling of shutters shall be woven with 0.63 mm dia galvanised mild steel wire to form average aperture size of 1.40 mm as specified in 9.2.10. Wire gauze shall be securely housed into the rebates of stiles and rails by giving right angles bend turned back and fixed by means of suitable staples at intervals of 75 mm and over this wooden beading shall be fixed. The space between the rebate and the beading shall be fixed with putty to give a neat finish. Each wire gauze panel shall be a single piece, and the panels shall be so designed that no single panel exceeds 0.5 sqm in area. However, care shall be taken to prevent sagging of wire gauge, of panel by providing and fixing 20 x 20 mm square or equivalent beading to the external face in the required patterns as decided by the Engineer-in-Charge.

14.16.4.7 Glass Panels : Glass panelling (Glazing) shall be done with float sheet glass as per IS 14900. Glazing in the shutters of doors, windows and ventilators of bath, WC and Lavatories shall be provided with frosted glass the weight of which shall be not less than 10 kg/sqm. Frosted glass panes shall be fixed with frosted face on the inside. Glass panels shall be fixed by providing a thin layer of putty conforming to IS 419 applied between glass pane and all along the length of the rebate and also between glass panes and wooden beading.

14.16.4.8 Putty can be prepared by mixing one part of white lead with three parts of finely powdered chalk and then adding boiled linseed oil to the mixture to form a stiff paste and adding varnish to the paste at the rate of 1 litre of varnish to 18 kg of paste. Fixing of glass panes without beading shall not be permitted. Glazing shall be done after the shutters have been primed and prepared for painting, so that wood may not draw oil out of putty.

14.16.4.9 Finish : Panels of shutters shall be flat and well sanded to a smooth and level surface.

#### 14.16.5 Beading

Beatings in panelled shutter shall be provided where specified in architectural drawings or directed by the Engineer-in-Charge. Each length of beading shall be single piece. Joints at the corners shall be mitred and exposed edges shall be rounded. Beading shall be fixed with headless nails at 75 mm intervals. For external shutters, the beading shall be fixed on the outside face.

#### 14.16.6 Machine/Factory made Shutters

Machine made shutters, where specified, shall be procured from an approved factory. For machine made shutters, operations like sawing, planning, making tongue and tenons, cutting grooves, mortises and rebates, drilling holes and pressing of joints shall be done by suitable machines. Machines made shutters shall be brought to the site fully assembled but without any priming coat. Panel inserts of sheet glass and wire gauze may, however, be fixed at site.

#### 14.16.7 Fixing of Shutters

For side hung shutters of height upto 1.2 m, each leaf shall be hung on two hinges at quarter points and for shutter of height more than 1.2 m, each leaf shall be hung on three hinges one at the centre and the other two at 200 mm from the top and bottom of the shutters. Top hung and bottom hung shutters shall be hung on two hinges fixed at quarter points of top rail or bottom rail. Centre hung shutter shall be suspended on a suitable pivot in the centre of the frame. Size and type of hinges and pivots be as specified. Flap of hinges shall be neatly counter sunk into the recesses cut to the exact dimensions of flap. Screws for fixing the hinges shall be screwed in with screw driver and not hammered in. Unless otherwise specified, shutters of height more than 1.2 m shall be hung on butt hinges of size 100 mm and for all other shutters of lesser height butt hinges of size 75 mm shall be used. For shutter of more than 40 mm thickness butt hinges of size 125 × 90 × 4 mm shall be used. Continuous (piano) hinges shall be used for fixing cup-board shutters where specified.

#### 14.16.8 Fittings

Fittings shall be provided as per schedule of fittings decided by Engineer-in-Charge. Appendix H (P-361/SH 9.0) gives for guidance the schedule of fittings and screws usually provided. Cost of providing and fixing shutter shall include cost of hinges and necessary screws for fixing the same. All other fittings shall be paid for separately. The fittings shall conform to specifications laid down in 9.6.8. Where the fittings are stipulated to be supplied by the department free of cost, screws for fixing these fittings shall be provided by contractor and nothing extra shall be paid for the same.

#### 14.16.9 Wooden Cleats and Blocks

Wooden cleats and blocks shall be fixed to doors and windows as directed by Engineer-in-Charge, as per size and shape approved by him. These are included in the cost of providing and fixing the shutters.

#### 14.16.10 Measurements

Framework and panelling shall be measured separately.

14.16.10.1 Frame Work of Shutters : The overall length and width of the framework of the shutters shall be measured nearest to a cm in fixed position (overlaps not to be measured in case of double leaved shutters) and the area calculated in square

metres correct to two places of decimeter. No deduction shall be made to form panel openings or louvers. No extra payments shall be made for shape, joints and labour involved in all operations described above.

14.16.10.2. For panelling of each type or for glazed panel length and width of opening for panels inserts or glazed panels shall be measured correct to a cm before fixing the beading and the area shall be calculated to the nearest 0.01 sq.m. The portions of the panel inserts or glazed panel inside the grooves or rebates shall not be measured for payment.

**14.16.11 Rate**

Rate includes the cost of materials and labour involved in all the operations described above. The frame work and panelling of each type or glazed panels shall be paid separately. The rate for frame work includes the cost of butt hinges and necessary screws as specified in 9.6.7. However, extra shall be paid for providing moulded beading where specified. Nothing extra shall be paid for plain beading as stated in 9.6.5 when specified in drawing.

**14.17 TRELLIS (JAFFRI) WORK**

14.17.0 Specified timber shall be sawn in the direction of the grains. Sawing shall be truly straight and square. The timber shall be planed smooth and accurate to the full dimensions, rebates, roundings, and mouldings as shown in the drawings made, before assembly. Patching or plugging of any kind shall not be permitted except as provided.

**14.17.1 Plain Trellis (Jaffri)**

This shall consist of wooden strips or laths 35 x 10 mm section unless otherwise specified planed and nailed together at every alternate crossing. The strips shall cross each other at right angle and shall be spaced 35 mm apart, so as to form 35 x 35 mm square opening or as shown in the drawing. These shall be fixed with nails to the frame. To cover the ends of strips, 50 x 12 mm beading shall be fixed to the frame with screws. The finished work with a tolerance of  $\pm 1$  mm may be accepted.

**14.17.2 Trellis (Jaffri) Doors and Windows Shutters**

Shutter frame of specified timber shall consist of two stiles and top, lock and bottom rails, each of section 75 x 35 mm unless otherwise specified. The stiles and rails shall be properly mortised and tenoned. The tenons shall pass through the stiles for at least 3/4th of the width of the stile. Shutter frame shall be assembled and passed by the Engineer-in-Charge before jointing. The joints shall be pressed and secured by bamboo pins of about 6 mm diameter. To this frame, plain trellis (Jaffri) work as described in 9.11.1 shall be fixed as shown in the drawings or as directed by the Engineer-in-Charge. Fixing, fittings, wooden cleats and blocks shall be provided as specified under 9.6.

**14.17.3 Measurements**

Width and height of plain trellis work and trellis shutters shall be measured overall correct to a cm. The area shall be calculated in square metres nearest to two places of decimal. In case of shutters, the measurement shall be as specified in 9.11.2.

**14.17.4 Rate**

It includes the cost of materials and labour required in all the operations described above.

**14.18 FITTINGS**

14.18.0 Fitting shall be of mild steel brass, aluminium or as specified. Some mild steel fittings may have components of cast iron. These shall be well made, reasonably smooth, and free from sharp edges and corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws. These shall be of the following types according to the material used.

**(a) Mild Steel Fittings**

These shall be bright satin finish black stone enamelled or copper oxidised (black finish), nickel chromium plated or as specified.

**(b) Brass Fittings**

These shall be finished bright satin finish or nickel chromium plated or copper oxidised or as specified.

**(c) Aluminium Fittings**

These shall be anodised to natural matt finish or dyed anodic coating not less than grade AC 10 of IS 1868.

The fittings generally used for different type of doors and windows are indicated in Appendix H (P-361/SH 9.0) attached. The fittings to be actually provided in a particular work shall, however, be decided by the Engineer-in-Charge.

Screws used for fittings shall be of the same metal, and finish as the fittings. However, chromium plated brass screws or stainless steel screws shall be used for fixing aluminium fittings. These shall be of the size as indicated in respective figures. Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in-Charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screw driver and not hammered in. Recesses shall be cut to the exact size and depth for the counter sinking of hinges.

**14.18.1 Butt Hinges**

**(a) Cast brass butt hinges light/ordinary or heavy.**

14.18.1.1 Cast Brass Butt Hinges : These shall be light/ordinary or heavy as specified. These shall be well made and shall be free from flaws and defects of all kinds. These shall be finished bright or chromium plated or oxidised or as specified. These shall generally conform to IS 205. Hinge Pin : Hinge pin shall be made of brass or of phosphor bronze. The hinge pins shall be firmly rivetted and shall be properly finished. The movement of the hinge pin shall be free, easy and square and shall not have any play or shake. Knuckles : The number of knuckles in each hinge shall not be less than five. The number of knuckles in case of sizes less than 40 mm shall be three. The sides of the knuckles shall be straight and at right angle to the flap. The movement of the hinge pin shall be free and easy and working shall not have any play or shake. Screw Holes : The screw holes shall be clean and counter sunk and of the specified size for different types and size of hinges. The size of the holes shall be such that when it is counter sunk it shall be able to accommodate the full depth of counter sunk head of wood screw specified.

14.18.1.2 Sampling and Criteria for Conformity : The number of butt hinges to be selected from a lot shall depend on the size of lot and shall be in accordance with Table 10. Butt hinges for testing shall be taken at random from at least 10 per cent of the package subject to a minimum of three, equal number of hinges being selected from each package. All butt hinges selected from the lot shall be checked for dimensional and tolerance requirements. Defects in manufacture and finish shall also be checked. A lot shall be considered conforming to the requirements of this specification if the number of defective hinges among those tested does not exceed the corresponding number given in Table 14.2.

TABLE 14.2

Lot size Sample size

Permissible No. of defective hinges

Upto 200 15 0

201 to 300 20 1

301 to 500 30 2

501 to 800 40 2

801 and above 55 3

Note: Any hinge which fails to satisfy the requirements of any one or more of the characteristics shall be considered as defective hinge.

14.18.2 Spring Hinges : (Single or double acting)

14.18.2.1 These shall be single acting when the shutter is to open on one side only or double acting when the shutter opens on both sides. These shall be made of M.S. or brass as specified, and shall generally conform to IS 453. Hinges shall work smoothly and shall hold the door shutter truly vertical in closed position. Each double-acting spring hinge shall withstand the following tests which shall be carried out after fixing it to a swing door in the normal manner.

(a) When the door is pushed through 90° and released 2000 times on each side in quick succession the hinge shall show no sign of damage or any appreciable deterioration of the components during or on completion of the test.

(b) The door shall require a force of  $2.0 \pm 0.5$  kg for 100 mm hinges and  $3.0 \pm 0.5$  kg for 125 mm and 150 mm hinges at a distance of 4.5 cm from the hinge pin to move the door through 90°. The size of spring hinge shall be taken as the length of the plate.

14.18.2.2 These shall be of the following type :

(a) Mild Steel : The cylindrical casing shall be made either from M.S. sheet of 1.60 mm thickness, lap jointed and brazed, welded and rivetted, or from solid drawn tube of thickness, pressed to form the two casing. It shall be stove enamel leadblack or copper oxidized or as specified.

(b) Cast Brass : The cylindrical casing shall be made either from brass sheet of 1.60 mm thickness, lap jointed and brazed, or from solid drawn brass tube of not less than 1.60 mm thickness. It shall be satin, bright nickel — plated or copper oxidized or as specified.

14.18.2.3 Sampling : The number of spring hinges shall be selected from the lot and this number shall depend on the size of the lot and shall be in accordance with Table 14.3.

TABLE 14.3

Lot size Sample size Permissible No. of defective spring hinges

1 to 25 3 0

26 to 50 6 0

51 to 100 12 0

101 to 200 15 0

201 to 300 20 1

301 to 500 30 2

501 to 800 40 2

801 and above 55 3

14.18.3 Flush Bolts (Fig. 14.3)

14.18.3.1 These should generally conform to IS 5187. These shall be of cast brass, cast aluminium alloy or extruded aluminium alloy as specified. Only one material shall be used in the manufacture of all the components of flush bolts except spring which shall be of phosphor bronze or steel strip. When the rod is completely in its maximum bolting position it shall be retained in that position by the spring. The length of the bolt shall be such that, when the bolt is pulled down, the top of the bolt shall be flush with the top of the lip face. The top of the bolt shall be given a taper of 45° to enable easy pull or push.

14.18.3.2 Brass flush bolts shall be satin or bright polished. Alternatively they may be nickel or chromium plated as specified in IS 4827 or copper oxidised in accordance with IS 1378. Aluminium flush bolts shall be anodised and the quality of the anodised finish shall not be less than grade AC 15 of IS 1868.

Note : The working of flush bolts is found satisfactory only in case of shutters made of high quality timber like teakwood properly seasoned and when there is no warping due to changes in weather Brass flush bolts which give a more satisfactory performance are costly and uses scarce materials. Hence use of flush bolts is to be discouraged.

14.18.4 Floor Door Stopper (Fig. 14.4)

14.18.4.1 The floor door stopper shall conform to IS 1823. This shall be made of cast brass of overall size as specified and shall have rubber cushion. The shape and pattern of stopper shall be approved by the Engineer-in-Charge. It shall be of brass finished bright, chromium plated or oxidised or as specified. The size of floor stopper shall be determined by the length of its plate. It shall be well made and shall have four counter sunk holes for fixing the door stoppers to the floor by means of wood screws. The body or housing of the door stopper shall be cast in one piece and it shall be fixed to the cover plate by means of brass or mild steel screws and cover plate shall be of casting or of sheet metal. The spring shall be fixed firmly to the pin. Tongue which would be pressed while closing or opening of the door shall be connected to the lower part by means of copper pin. On the extreme end a rubber piece shall be attached to absorb shock. All parts of the door stopper shall be of good workmanship and finish, burrs and sharp edges removed. It shall be free from surface and casting defects. Aluminium stopper shall be anodised and anodic film shall not be less than grade AC-10 of IS 1868.

14.18.4.2 Sampling and Criteria for Conformity : It shall be same as specified in 9.21.1.4.

TABLE 14.4

Requirements for Rubber

Particulars Requirements Testing procedure

Relative density Max 1.3 IS 3400 (Part IX) Hardness  $60 \pm 5$  IS 3400 (Part II) Change in initial hardness ageing for 24 hours at  $100^\circ \pm 1^\circ \text{C} +5$  IS 3400 (Part II)

14.18.5 Hanging Rubber Door Stopper

14.18.5.1 These shall be of cast brass, finished bright, chromium plated or as specified. Aluminium stopper shall be anodised and the anodic coating shall not be less than grade AC-10 of IS:1868. The size and pattern of the door stopper shall be approved by the Engineer-in-Charge. The size shall be determined by its length.

14.18.6 Casement Brass Stays (Straight Peg Type) (Fig. 14.5)

14.18.6.1 These shall be made of mild steel, cast brass, aluminium (extruded section) or plastic (Polypropylene) as specified. Mild steel casement stays shall be a copper oxidised (black finish) or as specified. Cast brass stays shall be finished bright or chromium plated or as specified. Aluminium stays shall be anodised and the anodic coating shall not be less than grade AC-10 of IS 1868. Aluminium and M.S. stays shall be made from channel section. The stays shall not weigh less than that indicated below :

200 mm 0.24 kg each

250 mm 0.28 kg each

300 mm 0.33 kg each

14.18.6.2 The shape and pattern of the stays shall be approved by the Engineer-in-Charge. The size of stays shall be determined by its length as shown in the plate. The plastic (Polypropylene) stays shall conform to IS 6318.

14.18.7 Fan Light Pivots

14.18.7.1 These shall generally conform to IS 1837. These shall be of mild steel or cast brass or Aluminium or as specified. The brass, fan light pivots shall be finished bright, chromium plated or as specified. M.S. fan light pivot shall be copper oxidized (black finish) or as specified. The base and socket plate of M.S. fan light pivots shall be made from minimum 3.0 mm M.S. sheet and the pivot shall be of round M.S. bar of minimum 10 mm diameter projecting out by minimum 12 mm length and firmly rivetted to the base plate.

14.18.7.2. The base and socket plate of cast brass fan light pivots shall be made from minimum 3.0mm thick brass plate and the projected pivot shall not be less than 12 mm diameter and 12 mm length, cast in single piece with the base plate.

14.19 Clause shifted to Sub Head 13 (Finishing) as clause no. 13.14

14.20 Clause shifted to Sub Head 13 (Finishing) as clause no. 13.18

14.21 Clause shifted to Sub Head 13 (Finishing) as clause no. 13.19

14.22 Clause shifted to Sub Head 13 (Finishing) as clause no. 13.21

14.23 PAINTING READY MIXED PAINT OVER G.S. SHEETS

14.23.0 Ready mixed paint, suitable for painting over G.S. sheets, of approved brand and manufacture and of the required shade shall be used. New or weathered G.S. sheets shall be painted with a priming coat of one coat of redoxide zinc chromate paint. Primer shall be applied before fixing sheets in place.

14.23.1 Preparation of Surface

14.23.1.1 Painting New Surface : The painting of new G.S. sheets shall not usually be done till the sheets have weathered for about a year. When new sheets are to be painted before they have weathered they shall be treated with a mordant solution prepared by mixing 38 gm of copper acetate in a litre of soft water or 13 gm hydrochloric acid in a solution of 13 gm each of copper chloride, copper nitrate and ammonium chloride dissolved in a litre of soft water. This quantity of solution is sufficient for about 235 sqm. to 280 sqm of area and is applied for ensuring proper adhesion of paint. The painting with the mordant solution will be paid for separately. Before painting on new or weathered G.S. sheets, rust patches shall be completely cleaned with coarse emery paper and brush. All grease marks shall also be removed and the surface washed and dried and rusted surface shall be touched with readymixed paint of red lead. 14.23.1.2 Painting Old Surface : If the old paint is firm and sound, it shall be cleaned of grease, smoke etc. The surface shall then be rubbed down with sand paper and dusted. Rusty patches shall be cleaned up and touched with red lead. If the old paint is blistered and flaked, it shall be completely removed as described in 13.41. Such removal shall be paid for separately and painting shall be treated as on new work.

14.23.2 Application

The number of coats to be applied shall be as in the description of item. In the case of C.G.S. sheets, the crowns of the corrugations shall be painted first and when these get dried the general coat shall be given to ensure uniform finish over the entire surface without the crowns showing signs of thinning. The second or additional coats shall be applied when the previous coat has dried.

14.23.3 The specifications described in 13.23 shall hold good so far as they are applicable.

14.24 Clause shifted to Sub Head 13 (Finishing) as clause no. 13.44

14.25 Clause shifted to Sub Head 13 (Finishing) as clause no. 13.45

14.26 Clause shifted to Sub Head 13 (Finishing) as clause no. 13.46

14.27 PAINTING WITH ENAMEL PAINT

14.27.1 Enamel Paint (conforming to IS 2933) of approved brand and manufacture and of the required colour shall be used. For the under coat, the paint of same quality but of shade to suit that of the top coat shall be used.

14.27.2 Preparation of surface and application shall be as specified under 13.32 for painting on new surfaces or old surfaces, as the case may be.

14.27.3 Other details shall be as specified in 13.23 as far as applicable.

14.28 Clause shifted to Sub Head 13 (Finishing) as clause no. 13.47

14.29 Clause shifted to Sub Head 13 (Finishing) as clause no. 13.48

14.30 Clause shifted to Sub Head 13 (Finishing) as clause no. 13.35

14.31 VARNISHING

14.31.0 Ordinary copal varnish or superior quality spray varnish shall be used. The work includes sizing of transparent wood filler.

14.31.1 Varnish (conforming to IS 347) for the finishing and undercoats shall be of the approved manufacturer.

14.31.2 Varnishing on New Surfaces

14.31.2.1 Preparation of Surface : New wood work to be varnished shall have been finished smooth with a carpenter's plane. Knots shall be cut to a slight depth. Cracks and holes shall be cleaned of dust. The knots, cracks etc. shall then be filled in with wood putty made as follows: On a piece of wood say 20 x 15 cm face and on the side where cross grains appear, a small quantity of glue size shall be poured and the surface scraped with the edge of a fine carpenter's chisel. Very fine wood powder shall be mixed with the glue and the stiff paste thus formed shall be used for the filling. The fillings when dry shall be

rubbed down with a carpenter's file and then the entire surface shall be rubbed down perfectly smooth with medium grained and fine sand papers and wiped with dry clean cloth so that it presents uniform appearance. In no case shall sand papers be rubbed across the grains, as in this case even the finest marks will be visible when the varnishing is applied.

14.31.2.2 Sizing or Transparent Wood Filler Coat : The surface shall then be treated with either glue sizing or with transparent wood filler coat as stipulated in the description of item.

(a) Sizing : When sizing is stipulated, an application of thin clean size shall be applied hot on the surface. When dry, the surface shall be rubbed down smooth with sand paper and cleaned. It shall then be given another application of glue size nearly cold. The sized wood work shall again be rubbed down smoothly with fine sand paper and cleaned. The surface shall be perfectly dry and all dust shall be removed not only from the surface but also from the edges and joints before varnishing is commenced. If the wood work is to be stained, the staining colour shall be mixed with the second coat of the size which must be applied evenly and quickly keeping the colour on the flow.

Any joining up with work already dry will show badly. The object of application of the glue size is to seal the pores in wood to prevent absorption of the oil in the varnish. Glue sizing is inadvisable on floors, table tops and other horizontal surfaces likely to carry wet household utensils which are likely to disturb the size coatings and thus expose bare wood. Where glue sizing is omitted to be done the rate for the work shall be suitably reduced.

(b) Transparent Wood Filler Coat : Where instead of glue sizing, transparent wood filler application is stipulated in the item, then the surface prepared as described in 13.37.2.1 shall be given as application of the filler with brush or rag in such a way that the filler fills up all the pores and indentations and levels up the surface. It shall be allowed to dry for 24 hours. Then it shall be cut and rubbed with emery paper so that the surface of the wood is laid bare, with the filler only in the pores and crevices of the wood.

14.31.2.3 Application of Varnish : The number of coats to be applied shall be as stipulated in the description of the item. The undercoat shall be with a flattening varnish. This dries hard and brittle and when cut and rubbed down to produce a smooth surface enhances the gloss of the finishing varnish. The top coat shall be given with stipulated brand of finishing varnish. The varnish shall be applied liberally with a full brush and spread evenly with short light strokes to avoid frothing. If the work is vertical the varnish shall be crossed and recrossed and then laid off, latter being finished on the upstrokes so that varnish, as it sets, flows down and eliminates brush marks, the above process will constitute one coat. If the surface is horizontal, varnish shall be worked in every direction, with light quick strokes and finish in one definite direction so that it will set without showing brush marks, in handling and applying varnish care should be taken to avoid forming froth or air bubbles. Brushes and containers shall be kept scrupulously clean. Rubbing down and flattening the surface shall be done after each coat except the final coat with fine sand paper. The work shall be allowed to dry away from draughts and damp air. The finished surface shall then present a uniform appearance and fine glossy surface free from streaks, blister etc. Any varnish left over in the small container shall not be poured back into the stock tin, as it will render the latter unfit for use. Special fine haired varnishing brushes shall be used and not ordinary paint brushes. Brushes shall be well worn and perfectly clean.

14.31.2.4 Other details shall be as specified in 13.23 as far as they are applicable.

14.31.3 Varnishing on Old Surface

14.31.3.1 Preparation of Surface : If the old varnished surface is firm and sound it shall be cleaned of grease and dirt with turpentine and then rubbed with wet sand paper until the surface is clean and smooth. It shall be dried and wiped clean with a soft cloth. Knots, holes and cracks shall be stopped as specified in 13.37.3. The entire surface shall then be rubbed down smooth with sand paper and wiped clean. If the old varnished surface is peeled or cracked then it will be necessary to remove the entire varnish as described in para 13.41 and such removal shall be paid for separately outside the rate for varnishing. Further the varnishing itself will have to be done like new work and will be paid for as such.

14.31.3.2 Application : The specification shall be same as described in 13.37.3.2 as far as applicable except that the coats to be applied will be with the stipulated quality of varnish for finishing coat.

14.31.3.3 Other details shall be as specified in 13.23 as far as they are applicable.

14.32 Clause shifted to Sub Head 13 (Finishing) as clause no. 13.40

14.33 DOUBLE SCAFFOLDING

Specifications are same as described in sub head RCC work. (Figure 14.6)

14.34 FIXING OLD WIND TIES

14.34.1 Specified same as described in 14.5 above. Except for the old wind tie will be used for which nothing extra will be paid. The old wind tie shall be properly cleaned off and anticorrosive bituminous paint shall be applied before fixing the same at required location of the roof sheets with new J hook and bolts and washers for resisting water from dripping through bolt of same size as existing in the bolt tie to securing the same imposition.

14.34.2 Measurement

Work shall be measured in running meter

14.34.3 Rate

The rates are include the cost of labours and materials in all the operations described above.

14.35 BRICK WORK IN MUD MORTAR

14.35.1 Selection of clay for mud mortar

The clay or mixture of clays should preferably conform to the following mechanical composition. Grain size analysis shall be done in accordance with the method given in IS 2720 (Part 4): 1986.

Clay 18-22 percent by weight

Silt 40-45 percent by weight

Sand 30-40 percent by weight

The total content of clay and silt be preferably not less than 60 percent by weight.

Note:- In case of soils which are more sandy or clayey than the limits specified above, the same should be blended with more plastic clay or non-plastic materials as the case may be so as to bring the mechanical composition within the above specified limits. Since the mud mortar is susceptible to weathering mud mortar masonry may be used for temporary structures and low rise structures having adequate lateral stability. Thickness of mud mortar should not be more than 20mm in case of brick masonry works and 30mm in case of stone masonry works. The masonry should preferably be plastered or pointed by cement

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or lime mortar externally to avoid erosion of mortar from joints. Concentrated load should be distributed by providing plain concrete or RCC bed blocks or by using cement mortar masonry below the concentrated loads.

Note:- For mud mortar construction in seismic zones refer IS 4326 : 1976.

### 14.35.2 Preparation of Mortar

The soil for preparation of mud mortar should be processed so as to free from gravel coarse sand (particle size greater than 2mm) lime and kankar particles vegetable matter, etc. Coarse grit, kankar etc. if present should be removed by wet sieving.

The sieved clay should be allowed to dry and then blended with plastic clay or a non-plastic locally available material (like rice husk, jute waste, wheat husk etc.) as the case may be so as to bring the mechanical composition within the limits specified above. Where wet sieving is not necessary, the soil shall be lightly broken up and wetted. The wet mass shall be tempered over under the feet, repeatedly turned over big spades and then thoroughly kneaded. The kneaded mass shall then be left for rempering for at least 24 hrs with the soil being preferably covered with wet gunny bags. Immediately before use in the masonry a small quantity of the prepared soil shall be mixed with a further quantity of water to obtain the decided consistency and workability. The total moisture content of the prepared mortar shall be in the range of 35 to 40 percent by weight of soil.

### 14.35.3 Field Test

For quick field observation and intermittent checks, sample test as given in Annex-B may be made. If the ball prepared as given in Annex-B as deformed on drying and crumbles easily when pressed lightly, it may be inferred that sand content is excessive. If the ball is hard but shows cracks on the surface, then the sand content is insufficient. If the soil is not found suitable, as inferred above the test should be repeated after modifying the composition of the soil, such as by mixing different proportions of two soils or by addition of sand or clay whichever is needed, for checking the stability.

### ANNEX B

#### FIELD TEST FOR SOIL FOR MASONRY MUD MORTAR

B-1 The soil should be ground to a fine powder and mixed with sufficient water, added in small quantities. The mix should then be kneaded into a plastic mass of the required consistency. B-2. Take a handful of the soil prepared in B-1 and form into a ball of about 80mm diameter.

B-3. Keep the ball in the sun for drying. When dried, examine the ball for loss of shape and surface cracks, if any.

### 14.35.4 Measurements

Brick work shall be measured in cubic metres unless otherwise specified. Any extra work over the specified dimensions shall be ignored. Dimensions shall be measured correct to the nearest 0.01 m i.e. 1 cm. Areas shall be calculated to the nearest 0.01 sq mtrs and the cubic contents shall be worked out to the nearest 0.01 cubic metres. All other specifications of brick work for such as bond, laying, finishing of joints, scaffolding, measurements shall be followed same as a regular brick work. The thickness of joints shall be kept 12mm uniformly.

14.35.5 Rate: The rate shall include the cost of all materials and labour involved in all the operations described above.

### 14.36 BRASS CURTAIN RODS

#### 14.36.1 Material

The brass curtain rods of required dia 20mm/25mm with wall thickness 1.25mm shall be provided with 2 no. brass brackets fixed with brass screws to the wall by means of wooden plugs/PVC Rawl Plugs. The size of brass screws shall not less than 60mm length.

#### 14.36.2 Measurements

Curtain rod shall be measured in running meter two nos. brass brackets including necessary screw.

14.36.3 Rate: The rate shall include the cost of all materials and labour involved in all the operations described above.

### 14.37. FIXING MS ROUND OR SQUARE BARS IN WOODEN FRAME OF WINDOW

The MS Square or Round Bars of 12mm shall be properly fixed on 50x6mm inner frame. The outer frame shall be made with 50x6mm flat with clear distance of 50mm from the inner frame. Both the frames should be fixed with a flat of 50x6mm with proper welding at a spacing of 30cm centre to centre all around the frame. The 4 corners of the both frames shall be diagonally connected with 50x6mm flat with proper thorough welding and removal of sludge and proper grinding with machine to have a smooth surface. The spacing of MS bars shall be kept 10cm centre to centre and the MS flats shall be fixed to the wooden frame with the MS screws of 50mm size at a 30cm spacing along the entire periphery of the outer frame. The frame should be properly cleaned with sand paper to receive the coat of primer of ready mix zinc chromate yellow primer shall be applied on the entire surface properly. The payment of the steel grill work shall be paid by weight.

#### 14.37.1 Measurements

Steel grid shall be measured in Kg.

#### 14.37.2 Rate

It includes the cost of labour and material involved in all the operations described above including fixing including coat of yellow zinc primer.

### 14.38 WOODEN KARRIES FOR ROOFING

The required size wooden karries of designated wood shall be procured. These should be properly seasoned before using in the work and shall be hoisted with suitable hoisting by means of mechanical/manual arrangements with suitable safety measures. A RCC band minimum 50mm thick shall be laid on top of brick wall over which the wooden karries shall be placed at required spacing depending upon the design/load of roof. The both end of the wooden karries having bearing on the wall to be painted with bituminous paint. The good quality wood preservative shall be applied all round the wooden karries.

#### 14.38.1 Measurements

Wooden karries shall be made in cubic meter and it includes every cost of material and labour/T&P required for fixing the karries in position.

#### 14.38.2 Rate

It includes the cost of labour and material involved in all the operations described above.

### 14.39. DOUBLE SCAFFOLDING SYSTEM UPTO SEVEN STOREY HEIGHT MADE WITH MS TUBE

The double scaffolding made with 40mm dia and 25mm dia pipe shall be erected along the wall surface. The MS pipe of heavy duty with wall thickness 4mm shall be used for the scaffolding. The scaffolding shall be erected in double row system and at every 9m height the extra 1 row of 40mm dia pipe perpendicular to wall surface shall be provided to secure the both

layer of vertical pipe in the wall for better stability. It should be strong enough to with stand all coming load / wind pressure/tilt etc. The double scaffolding consist of 2 rows of vertical with horizontal and diagonal bracing forming essentially a structure independent of the building. The bottom of the scaffolding shall be fixed in suitable MS chair on base plate of minimum 12mm thick and 25x25cm size. The plate should be properly placed firm plate concrete floor. The frame work of scaffolding made with 40mm dia MS tube 1.5m centre to centre horizontal and vertical joint with cup and lock system and MS fixtures etc. MS

tube challies and MS tube staircase in scaffolding for working platform etc. shall also be provided. The scaffolding system shall be stiffened with bracings, runners, connection with the building etc. wherever required for inspection of work at required locations with essential safety features for the workman etc. complete as per directions and approval of Engineer-in-charge.

Note:- 1. The condition of MS tube and required claddings should be in good condition and should not have been used more than the specified time/nos. Scaffolding system shall remain the property of the contractor after completion of work.

2. This item to be used for maintenance work judiciously, necessary deduction for scaffolding in the existing item to be done.

#### 14.39.1 Measurement & Rate

The elevational area of the scaffolding shall be measured for payment in sqm. The payment will be made once irrespective of duration of scaffolding.

#### 14.40 REPAIR TO PLASTER IN PATCHES.

The repair to plaster of thickness 12mm to 20mm in patches of area upto 2.5 sqm shall be done with white cement polymer modified self curing mortar. Before applying the mortar cutting the patch in proper regular (square/ rectangle) shape, racking out joints and preparing the wall to receive the plaster shall be done. The payment shall be made in area of patches measured in sqm.

##### 14.40.1 Measurements

Patch repair shall be measured in sqm.

14.40.2 Rate: The rate shall include the cost of all materials and labour involved in all the operations described above.

#### 14.41 – CLEANING

##### 14.41.1 CLEANING OF WATER STORAGE TANKS

14.41.1.1 The Water Storage Tanks at terrace upto 2000 lt. capacity at all heights shall be cleaned with pressure water jetting with chemical mixed water with suitable pump arrangement and followed by coconut brushes, duster etc. including removal of silt, rubbish from the tank and cleaning the tank with fresh water disinfecting with bleaching powder @0.5gm per litre capacity of tank including marking the date of cleaning on the side of tank body with the help of stencil and paint and disposing of malba all complete as per direction of Engineer-in-charge. (The old date already written on tank should be removed with paint remover or black paint and if date is not written with the stencil or old date is not removed deduction will be made Rs.0.10 per litre) (if during cleaning any GI fittings or ball cock is damaged that is to be replaced by contractor at his own cost and nothing extra will be paid on this account).

##### 14.41.1.2 Measurement

Cleaning of water storage tank shall be measured in litre.

14.41.1.3 Rate: The rate shall include the cost of all materials and labour involved in all the operations described above.

##### 14.41.2 CLEANING AND DE-SILTING OF GULLY TRAP

14.41.2.1 The gully trap/chamber shall be cleaned and de-silted in following manner:

1. Removal of rubbish mixed with earth by deployment of sufficient manual labour.
2. Disposal of the accumulated malba, rubbish to the approved dumping ground with the help of trolley/wheel barrows properly lined with PVC sheet to avoid splashes of the sewage/ rubbish on the ground.

All above mentioned 2 operations shall be done by making all adequate safety arrangement to the labour including providing them medical aid, rubber gloves, helmets, masks, oxygen cylinder etc. and make the site neat and clean after completion of work. The payment to be making is inclusive of all operation like labour, material and T&P whichever is required.

##### 14.41.2.2 Measurement & Rate

Cleaning and de-silting of gully trap shall be measured and payment in numbers. The payment to be making is inclusive of all operations like labours, materials and T&P whichever is required.

##### 14.41.3 CLEANING OF CHOKED SEWER LINE

14.41.3.1 The choked / blocked sewer line shall be cleaned in following steps:

1. The manhole covers shall be kept open for same time before the cleaning of sewer line so as to escape the foul gases.
2. Sucking the choked malba material by diesel running, vehicle mounting hydraulic operated suction/jetting cleaning machine with appropriate capacity as per requirement.
3. Disposal of the accumulated malba, rubbish to the approved dumping ground with the help of trolley/wheel barrows properly lined with PVC sheet to avoid splashes of the sewage/rubbish on the ground. All above mentioned 2 operations shall be done in presence of supervisor and by making all adequate safety arrangement to the labour including providing them medical aid, rubber gloves, helmets, masks, oxygen cylinder etc.

##### 14.41.3.2 Measurement & Rate

Cleaning and desilting of sewer line shall be measured and payment in numbers. The payment to be making is inclusive of all operations like labours, materials and T&P whichever is required.

##### 14.41.4 CLEANING OF UNDERGROUND SUMP, OVER HEAD R.C.C. TANK

The process of cleaning of underground sump, Over Head R.C.C. Tank (independent staging) will be done in following operations:-

1. Tank shall be emptied of water by pumping & bottom shall be cleaned of silt and other deposits.
2. Entire surface area of the sump shall be cleaned with pressure jetting of water mixed with cleaning chemical atleast two times and thoroughly etc. and finally washing with simple water jet to clean properly the wall surface.
3. Chlorination of RCC internal surface by liquid chlorine.
4. The treated surface shall be dried using air jetting and all loose particles shall be removal from the surface.

5. Finally the surface shall be treated with ultraviolet radiation etc. as per direction of Engineer-in-Charge. All above mentioned four (4) operations shall be done by making all adequate safety arrangement to the labour including providing them medical aid, rubber gloves, helmets, masks etc.

#### 14.41.4.1 Measurement

Cleaning of internal surface area of underground sump, Over Head RCC tanks shall be measured in sqm.

14.41. 4.2 Rate: The rate shall include the cost of all materials and labour and T&P involved in all the operations described above.

#### 14.42 DISCONNECTING DAMAGED OVERHEAD/TERRACE

The execution/operation of the item is as under:

1. Closing the water supply line tank by means gate valve /stop cock etc.
2. Emptying the water tank completely.
3. The Water tank supply connection will be disconnected and the delivery pipe line shall also be disconnected by removing all the fitting and fixtures completely.
4. The delivery pipes from the bottom of the tank shall also be disconnected from the tank.
5. Removing the water storage tank from terrace and shifting it to the ground floor by mechanical means or by manual with all safety reasons as directed by Engineer-in-charge.

#### 14.42.1 Measurement & Rate

The measurements of overhead/ terrace PVC water storage tanks of any size shall be measured in numbers and payment shall be made on each basis.

#### 14.43 REPLACEMENT OF OLD DAMAGED W.C. SEATS

The execution/operation of the item is as under:

1. Dismantling and taking out the old WC seat and “S” or “P” trap at site complete with all operations including all necessary materials, labour and disposal of dismantled material i/c malba, debris etc. including lead upto dumping ground.
2. Providing “S” or “P” trap and water closet squatting pan (Indian type) of approved brand of good quality.
3. Fixing the W.C. with trap in position along with trap by making all arrangement of connecting it to the flushing cistern. Thereafter the gap left in the filled up portion is to be leveled by cement concrete 1:5:10 and floor tiles of same shade are also to be provided over it to match the floor of the toilet.

#### 14.43.1 Measurement & Rate

The measurements and payment of replaced W.C Seats shall be made on each basis

#### 14.44 CUTTING HOLES OF REQUIRED SIZE IN BRICK MASONRY WALL

Cutting holes of required size in brick masonry wall for fixing of exhaust fan including providing and fixing 300mm dia PVC pipe conforming BIS-12818 and making good the same etc. complete. The hole shall be cut with cutting tool by marking hole all round the circle with the help of power drill machine so that the adjoining wall should not get damaged.

#### 14.44.1 Measurement & Rate

The measurements and payment of cutting holes and finishing etc. shall be made on each basis

#### 14.45 DISMANTLING W.C. PAN OF ALL SIZES

Dismantling W.C. Pan of all sizes including disposal of dismantled materials i/c malba all complete as per directions of Engineer-in-Charge. The W.C. seat is taken out along with trap and the area is to be cleaned off all dust and rubbish etc. Thereafter the hole left in the flooring is to be leveled by cement concrete 1:5:10 and floor tiles of same shade are also to be provided over it to match the floor of the toilet room.

#### 14.45.1 Measurement & Rate

The measurements and payment of dismantling W.C. Pan of all sizes shall be made on each basis.

#### 14.46 HACKING OF CC FLOORING

Hacking the CC flooring including cleaning the surface etc. complete as per direction of the Engineer-inCharge. The hacking of CC flooring is done with chisel and hammer to make the top surface of flooring rough before laying tile/ marble/granite flooring etc. The hacking should be at least 10 nos. in 30x30cm area of the floor.

#### 14.46.1 Measurement & Rate

The measurements and payment of hacking of CC flooring shall be made on sqm.

#### 14.47 DISMANTLING 15 TO 40MM DIA G.I. PIPE

Dismantling 15 to 40mm dia G.I. pipe including stacking of dismantled pipes (within 50 metres lead) as per direction of Engineer-in-Charge. The pipe dismantling is done from tap point to main line. The 15mm dia is to be dismantled first and thereafter the dismantling/taking out the pipe shall proceed towards bigger dia pipe at the last. The pipe is removed from its joints/sockets/T-section gently with pipe wrench/tool so that the old pipe is not get damaged and the same can be reused where required. The old dismantle pipe will be stacked dia wise and connected fittings are also to be stored properly for reuse.

#### 14.47.1 Measurement & Rate

The measurements and payment of Dismantling G.I. pipe shall be made on meter.

#### 14.48 TAKING OUT EXISTING WOODEN DOOR SHUTTER AND RE-FIXING THE SAME AFTER REPAIRS

Taking out existing wooden door shutter, repair by de-screwing hinges etc. and re-fixing the repaired door shutters to existing door frames, including replacement of hinges with screws etc. as required, all complete as per the direction of the Engineer-in-charge. The old shutter is to be taken out by removing the screws from the hinges by screw driver/screw fixing equipment (electric driven). Thereafter, the damaged part of the shutters such as styles/ panels/veneering etc. is replaced with new one and the door shutter is prepared for re-fixing to the door frame. During re-fixing the position of hinges if required may be shifted for proper anchorage with 50mm stainless steel screw with cross head. The re-fixing with butt hinges by means of screws is done with the help of electric driven screw driving equipment. The whole door including chokhat is to be re-painted with required colour to match the door and shutter with the same shade.

#### 14.48.1 Measurement & Rate

The measurements and payment shall be made on each basis.

#### 14.49 WATER PROOFING TREATMENT WITH APP (ATACTIC POLYPROPYLENE POLYMERIC) MEMBRANE

Water proofing treatment of roofs with APP modified polymeric membrane shall be either five course, seven course as specified in the item. In selecting the combinations of layers of APP membrane, consideration shall be given to the type and construction of buildings, climate and atmospheric conditions and the degree of permanence required. Five course treatment is a normal treatment suitable to moderate rainfall conditions (less than 50 cm.) and seven course treatment is suitable for heavy rainfall (50 cm and above). Seven course treatment with APP modified polymeric membrane 2.00 mm thick and weight 3.00 kg./sqm. to suitable for very heavy conditions of rainfall (more than 150 cm.).

### 14.49.1 Materials

14.49.1.1 The bitumen primer shall conform to the requirements laid down in IS 3384.

14.49.1.2 APP Modified Membrane: It is a polymeric water proofing membrane manufactured to high standards. It is five layered APP modified polymeric membrane with centre core as 20 micron HMHDPE/100 micron HMHDPE High Molecular High Density Polyethylene Film, is the heart of the membrane and protects against water and moisture. The centre core is sandwiched on both sides by high quality polymeric mix with properties of high softening point, high heat resistance and cold resistively to make it ideal for all water proofing treatment. The polymeric mix is protected on both sides with 20 micron HMHDPE film. The membrane is available in variable thickness and weights. Usual width is 1.0 m. Important physical and chemical parameter of the membrane shall be as given in Table 14.5 for guidance

Where proprietary brands Atactic Polypropylene modified polymeric membrane is proposed to be used by the contractor, they shall conform in all respect to the specification in the preceding paras and manufactured by a company of repute.

14.49.1.3 Bonding Material: This shall consist of blown type bitumen conforming to IS 702 or residual bitumen 85/25 conforming to IS 73 heated to the correct working temperature of 180°C. The penetration of the bitumen shall not be more than 40 when tested in accordance with IS 1203, unless otherwise specified each coat of bonding material shall be of blown type bitumen of grade 85/25 heated to a working temperature of 180 degree C and applied @ 1.20 kg. per square metre of the surface area.

14.49.1.4 Surface Finish: Surface finish shall be with brick tiles of class designation 100 grouted with cement mortar 1:3 (1 cement : 3 fine sand ) with 2% integral water proofing compound by weight of cement over a 12 mm thick layer of cement mortar 1:3 (1 cement: 3 fine sand) and finished neat, as shown in Fig. 14.7. Surface finish shall be measured and paid for separately.

14.49.1.5 Preparation of Surface: The surface to be treated shall have a minimum slope of 1 to 120. This grading shall be carried out with cement concrete or cement plaster with coarse sand, as desired, to the average thickness required and finished smooth. Such grading shall be paid for separately. Junctions between the roof and vertical faces of parapet walls, chimneys etc. shall be chased by running triangular fillets 7.5 x 7.5 cm. size, cement concrete. At the drain mouths, the fillets shall be suitably cut back and rounded off for easy application of water proofing treatment and easy flow of water. Cement concrete where shall be 1:2:4 mix (1 Cement: 2 Coarse sand: 4 Graded stone aggregate 20 mm. Nominal size). The provision of fillets shall be deemed to be covered by the item of water proofing and shall not be measured or paid for separately. In existing roof where gola and drip course are provided at the junction of roof and vertical face of parapet wall, chimney stacks, etc. These shall be dressed suitably and finished smooth so as to ensure an easy and gradual turning of the flashing. Any dismantlement or forming and finishing smooth the junction for forming the base of the flashing shall not be measured or paid for separately and shall be deemed to form part of the preparation of the surface. While the grading of roof surface is being done, it shall be ensured that the outlet drain pipe have been fixed and mouth at the entrance have been eased and rounded off properly for easy flow of water. When any pipe passes through the roof to be treated, angular fillet of shape shown in Fig. 22.11 shall be built around it for the water proofing treatment to be taken over it. These fillets shall not be measured or paid for separately. For carrying over and tucking in the water proofing felts into the parapet walls, chimneys stacks etc. a horizontal groove 6.5 cm. deep, 7.5 cm. wide section with its lower edge at not less than 15 cm. above the graded roof surface shall be left on the inner face of the same; during construction if possible. When such groove has not been left, the same shall be cut out neatly and the base at rear of the groove shall be finished smooth with cement plaster 1:4 (1cement: 4 coarse sand). Such cutting of the groove and its finishing smooth shall be part of the water proofing or paid for separately. No deduction shall be made either for not making the groove or when the latter has already been left in the masonry by the construction agency. Tucking in the water Centre Core Film Thickness Weight 20 micron HMHPDE 20 micron HMHPDE 1.5 mm 2.25 kg/ sqm. 100 micron HMHPDE 20 micron HMHPDE 2.00 mm 3.00 kg./ sqm.

proofing felt will be required where the parapet wall exceeds 45 cm. in the height from the graded surface. Where the height is 45 cm. or less, no groove will be required as the water proofing treatment will be carried over the top of the parapet wall to its full thickness. In the case of low dividing walls of height 30 cm. or less, outlets therein shall be cut open for full height and the bottom and sides shall be rendered smooth and corners rounded and such treatment shall not be measured and paid for separately. Where expansion joints are left in the slab the provision of dwarf walls and/or RCC slabs for covering them and finishing the surface smooth shall be the responsibility of the construction agency, which had laid the roof slab and will not be included in the operation of water proofing. The graded surface of the roof and concrete fillets and the faces of walls shall be thoroughly cleaned with wire brushed and all loose scales etc. removed. The surface shall then be dusted off. Any crack in the roof shall be cut to V section, cleaned and filled up flush with cement mortar slurry 1:4 (1 cement : 4 coarse sand) or blown type petroleum bitumen of IS grade 85/25, or approved quality conforming to IS 702. Such cleaning of the surface or treating the cracks shall not be paid for separately.

14.49.1.6 Treatment: The water treatment shall be of five or seven course as specified. In seven course treatment, the first four courses shall be the same as for five course treatment. The fifth course shall be a layer of APP modified polymeric membrane. The sixth course shall be a coat of bonding material and the top most seventh course shall be of specified surface finish.

### 14.49.1.7 Laying

(a) First course shall be a coat of bitumen primer @ 0.40 kg per sqmt followed by subsequent course as per treatment required.

(b) Drain outlets shall be given a four or six course treatment as specified for the roof in the description of the item in the manner specified for the flat roof surface. Water proofing treatment shall be carried into the drain pipe or outlets by at least 10 cm. The water proofing treatment laid on the roof surface shall overlap the upper edge of the water proofing treatment in the drain outlets by at least 10 cm.

(c) The APP modified polymeric membrane shall be cut to the required length, brushed clean of dusting material and laid out flat on the roof to eliminate curls and subsequent stretching. The membrane shall normally be laid in length in the direction of the slope and laying shall be commenced at the lowest level and worked up to crest. The membrane shall not be laid in single piece of very long lengths as they are likely to shrink; 6 to 8 m are suitable lengths. The roof surface shall be cleaned and dry before starting the membrane treatment. Each length of membrane shall be laid in position and rolled up for a distance of half its length. The hot bonding material shall be poured on the roof across the full width of the rolled membrane as the latter is steadily rolled out and pressed down. The pouring shall be so regulated that the correct weight of bonding material per unit area is spread uniformly over the surface. Excess bonding material that gets squeezed out at the ends shall be leveled up as laying proceeds. When the first half of the strip of felt has been bonded to the roof, the other half shall be rolled up and then unrolled on the hot bonding material in the same way. Subsequent strips shall also be laid in the same manner. Each strip shall overlap the preceding one by at least 7.5 cm. at the longitudinal edges and 10 cm. at the ends. All overlaps shall be firmly bonded with a blow lamp and levelling down unevenness. The fourth layer of bonding material in the five course treatment shall be carried out in a similar manner after the flashing has been completed.

(d) In a seven course treatment the fifth layers of membrane shall be laid in the manner already described, taking care that laps in the membrane are staggered from those in the earlier layer. The sixth layer of bonding material shall be carried out after the flashing is done.

(e) High Parapet Walls, Chimney Stacks etc.: Membrane shall be laid as flashing wherever junctions of vertical and horizontal surfaces occur. Longitudinal laps shall be 10 cm. The lower layer of flashing membrane in a six course treatment shall overlap the roof water proofing by not less than 20 cm. while the upper layer shall overlap the roofing felt by 10cm. The minimum overlap of the flashing membrane in five course treatment over the roofing membrane shall be 10 cm. The flashing shall consist of the same five or seven course treatment as for the roof except that the final course shall be replaced by an application of 12 mm thick cement plaster 1:3 on the vertical and sloping faces only, of the flashing as shown in Fig 14.8. The overlap along the length of flashing shall stagger with those in the second layer of flashing membrane (in a seven course treatment and with the joints in the roof membrane). The upper edge of the finishing membrane shall be well tucked into the flashing grooves in the parapet, chimney stacks etc. to a depth of not less than 6.5 cm. Corresponding applications of bonding material shall also be made. The flashing treatment shall be firmly held in place in the grooves with wood edges at intervals and the grooves shall be filled up with cement mortar 1:4 (1 cement: 4 coarse sand) or cement concrete 1:2:4 (1 cement: 2 coarse sand : 4 graded stone aggregate 6 mm nominal size) and surface finished smooth with the rest of the wall. The cement work shall be cured for 7 days. When dry, the exposed plaster joints of grooves shall be painted with bitumen and two coats of bituminous solution shall be applied on the vertical and sloping surface of flashing (see Fig. 14.7). After the top flashing membrane layer has been fixed, the penultimate layer of bonding material shall be applied over the roofing membrane and the horizontal overlaps and vertical and sloping surfaces of the flashing at the specified rate.

(f) Low Parapet Walls: Where parapet walls are of height 45 cm. or less, membrane flashings shall be provided in the same manner as for flashings in the case of high parapet walls except that the upper edge shall be carried upto the full height of the wall and taken right across the top of the parapet and down on the external vertical faces to a minimum distance of 5 cm. (see Fig 14.8).

(g) Low Dividing Walls: Where low dividing walls or inverted beams are met with, the same shall be covered with a four or six layer treatment as for the main roof, the latter bearing carried down both sides of the wall and overlapping the roofing treatment as in the case of flashing of high parapet walls (see Fig. 14.10). Drain outlets where formed in the low dividing walls, shall be given water proofing treatment of the same number of courses as specified for the flat roof surface. The bottom and sides shall be so treated that all overlaps are in the direction of flow of drainage.

(h) Expansion Joints: Where the expansion joints are provided in the slabs, the joints and their cover slabs shall be suitably treated with water proofing. A typical sketch of an expansion joint with the RCC slabs on either side of the joint turned vertically up and dwarf walls by not less than 7.5 cm. and are provided with throatings on their underside along their length. The water proofing treatment shall be taken up the sloping junction fillets and the vertical faces of the walls to the underside of the cover slabs. The cover slabs are given the water proofing treatment like the roofs slabs, after the cross joints between adjacent cover slabs are first sealed with 15 cm width of roofing felt struck to them with bitumen. The water proofing treatment shall be carried down the sides of the cover slabs to their full thickness. Care shall be taken to see that overlaps if any in the roofing over the cover slabs stagger with the joints between cover slabs.

The formation of the expansion joints and provision of the cover slabs shall be the responsibility of the construction agency. The formation of the junction fillets and the water proofing treatment of the joint and cover slabs shall be carried out by the water proofing agency. Nothing agency extra shall be paid for the sealing of the cross joints in the cover slab with 15 cm. width of bitumen strips.

(i) Pipes: Where vertical pipe outlets are met with, 7.5 x 7.5 cm fillets of lime or cement concrete of the type and section shown in Fig. 14.10 shall be provided and flashing of four or six course treatment, same as for the roofing treatment shall be laid. The upper edge of the flashing shall be laid sloping down forward and butted against the pipe and annular depression so formed shall be filled with hot bitumen. A circular metal collar in the shape of an inverted truncated cone shall be fixed on the pipe to throw off the rain water clear of the flashing and this shall be paid for separately.

14.49.1.8 Measurement: Length and breadth shall be measured correct to a cm. The area shall be calculated in square metres correct to two places of decimal. Measurements shall be taken over the entire exposed area of roofing and flashing treatment including flashing over low parapet walls, low dividing walls and expansion joints and at pipe projections etc. Overlaps and tucking into flashing grooves shall not be measured. Vertical and sloping surfaces of water proofing treatment shall also be measured under the five or seven course treatment as the case may be, irrespective of the fact that the final course is replaced by bitumen primer. No deduction in measurements shall be made for either openings or recesses for chimney stacks, roof lights and the like, for areas upto 0.4 sqm nor anything shall be paid for forming such openings. For areas exceeding 0.40 sqm deduction will be made in measurements for full opening and nothing extra shall be paid for forming such openings.

14.49.1.9 Rate: The rate shall include the cost of all labour and materials involved in all the operations described above. The top most layer shall be paid for separately. Clause 14.49 brought from Sub Head 22 (Water Proofing) clause no 22.11

**14.50 FIVE LAYERED WATER PROOFING TREATMENT WITH ATACTIC POLYPROPYLENE POLYMER MODIFIED PREFABRICATED MEMBRANE**

14.50.1 Atactic Polypropylene Polymer modified prefabricated five layer water proofing membrane shall be of thickness as specified. In selecting thickness of membrane due consideration shall be given to the type and construction of building, climate and atmospheric condition and permanence required. Five layered treatment 2.00 mm thick with glass fibre is with a normal duly treatment suitable for pitched roofs. Five layered 3.00 mm thick with glass fibre matt treatment is suitable for moderate condition of rainfall (50 to 150 mm) and fine layered 3.00 mm thick with non-woven polyester matt treatment is suitable for heavy condition of rainfall.

14.50.1.1 Materials

Bitumen primer for bitumen membrane shall have density at 25°C in the range of 0.87 - 0.89 kg./litre and viscosity of 70-160 CPS primer shall be applied @ of 0.40 litre/sqm.

14.50.1.2 Atactic Polypropylene Polymer Modified Prefabricated Membrane: It is a polymeric water proofing membrane. This shall be one of the following types:

(i) 2 mm thick with glass fibrematt.

(ii) 3 mm thick glass fibrematt.

(iii) 3 mm thick with non-woven polyester matt.

It is prefabricated five layered black finish water proofing membrane comprising of centre core of 50 gsm. Glass fibre matt/170 gsm nonwoven polyester matt sandwiched on both sides by APP polymer modified bitumen which is protected on both sides by 20 micronthermofusible polyethylene sheet. Composite thickness of the membrane including all five layers shall be 2/3 mm with glass fibre matt and 3 mm with non woven polyester matt. It is available in 1 m width and variable lengths.

Physical and chemical parameters of the membrane shall be as given in Table 14.6

TABLE 14.6

When tested Atactic polypropylene modified black finished is proposed to be used shall conform in all respects to the specification in the preceding paras. The work should be got done through authorized applicator/specification agency.

14.50.1.3 Preparation of Surface: The surface to be treated shall have a minimum slope of 1 in 120 or as specified, provision specified in clause 14.49.1.5 shall apply for preparation of surface except for pitched roof where surface shall be cleaned off any loose material dust etc. To ensure good adhesion between the surface and water proofing treatment suitable method to dry the surface shall be adopted. All hair line cracks in the surface should be filled with approved sealant.

14.50.1.4 Treatment: The water proofing shall consist of prefabricated five layered 2 mm / 3 mm membrane as shown in Fig. 14.11. The choice of 2 mm or 3 mm membrane will depend on the type of roof i.e. pitched or flat and importance of building, durability, cost and rainfall etc.

14.50.1.5 Laying: Bitumen primer @ 0.40 lts/sqm shall be applied to the prepared roof, drain and all other surfaces where polymer modified membrane is to be laid. The five layered water proofing membrane shall be laid using Butane torch and sealing all joints and preparing the surface complete. Drain outlets shall be given same treatment as specified for the roof in the description of the item in the manner specified for the flat roof surface. Water proofing treatment shall be carried into the drain pipe or outlets by at least 10 cm. The water proofing treatment laid on the roof surface shall overlap the upper edge of the water proofing treatment in the drain outlets by at least 10 cm. The APP polymer modified prefabricated water proofing membrane shall be cut to the required length. Water proofing membrane shall normally be laid in length in the direction of the slope and laying shall be commenced at the lowest level and worked upto crest. APP water proofing membrane shall be laid in 6 to 8 m lengths. The roof surface shall be cleaned and bitumen primer shall be applied in the correct quantity, over this specified water proofing membrane shall be laid with butane torch after allowing 24 hours for primer to dry. Each strip shall overlap the preceding one by at least 10 cm. at the longitudinal edges and 15 cm. at the ends. All overlaps shall be firmly bonded with bitumen primer and levelled by heating the overlap with butane torch. SI. No. of Layers Thickness Elongation at Joint Tear strength Softening Cold No. 23° C in strength in in longitudinal Point flexibility longitudinal longitudinal Transverse transverse and direction direction Transverse direction

1 2 3 4 5 6 7 8

1 Five Layered 2 mm 3 N/5 cm. 350/300 60/80 N 150° -2°C reinforced with N/5 cm. fibre glass

2 Five layered 3 mm 3.3 N/5 cm. 350/3000 60/80 N 150° -3°C reinforced with N/5 cm. fibre glass

3 Five layered 3 mm 40/50 N/5 650 N/450 300/250 N 150° -2°C reinforced with cm. N/5 cm. non-woven polyester matt.

719 SUB HEAD 14.0 : REPAIRS TO BUILDINGS

If the roof is accessible the treatment is protected by brick tiles laid over 12 mm thick cement mortar of specified grade bedding and joints sealed with cement mortar of which shall be measured and paid for separately. APP water proofing membrane shall be laid as flashing wherever junction of vertical and horizontal surfaces occur. Longitudinal laps shall be 10 cm. The upper edge of flashing membrane shall be well tucked into the flashing grooves in the parapets, chimney stack etc. to a depth of not less than 6.5 cm; corresponding applications of primer coat shall also be made. The flashing treatment shall be firmly held in the grooves and it shall be sealed with the approved sealant after terminating the membrane. Where parapet walls are of height 45 cm or less AP water proofing membrane flashing shall be provided in the same manner as for splashing in the core of high parapet walls except that upper edge shall be carried out the full height of the wall and taken right across the top of the parapet and down on the external vertical faces to a minimum distance of 5 cm. Where low dividing walls or inverted beams are met with, the same treatment shall be provided as for the main roof, the lateral bearing carried down both sides of the wall and overlapping the roof treatment. Drain outlets where formed in the low dividing walls, shall be given water proofing treatment same as for the main roof. Where the expansion joints are provided in the slabs, the joints and their cover slabs shall be suitably treated with water proofing treatment. A typical sketch of an expansion joint with the RCC slabs on either side of the joint turned vertically up and covered with precise RCC cover slabs as given in Fig. 14.10. The cover slabs shall cover the vertical turned up dwarf walls by not less than 7.5 cm and are provided with throatings on their underside along their length. The water proofing treatment shall be taken up the slopping junction fillets and the vertical faces of the walls to the underside of the cover slabs are given the water proofing treatment like the roof slabs, after the cross joints between adjacent cover slabs are first sealed with 15 cm. width of roofing felt struck to them with bitumen. The water proofing treatment shall be carried down the sides of the cover slabs to their full thickness. Care shall be taken to see that overlaps if any in the roofing over the cover slabs stagger with the joints between cover slabs. The formation of the expansion joints and provision of cover slabs shall be the responsibility of construction agency. The formation of the junctions fillets

and the water proofing treatment of the joint and cover slabs shall be carried out by the water proofing agency. No extra shall be paid for the junction fillets or for the sealing of the cross joints in the cover slab with 15 cm. width of bitumen strips.

14.50.1.6 Measurements: Length and breadth shall be measured correct to a cm. The area shall be calculated in square metres correct to two places of decimal. Measurement shall be taken over the entire exposed area of roofing and flashing treatment including flashing over low parapet walls, low dividing walls and expansion joints at pipe projections etc. overlaps and tucking into flashing grooves shall not be measured. No deduction in measurements shall be made for either openings or recesses for chimney stacks, roof lights and the like, for areas upto 40 square decimeter (0.4 sqm.) nor any thing shall be paid for forming such openings. For areas exceeding 0.40 sqm. deductions will be made in measurements for full opening and nothing extra shall be paid for forming such openings.

14.50.1.7 Rate: The rates shall include the cost of all labour and materials involved in all the operations described above.

## **22- SUB HEAD : 15.0 (AS PER CPWD DSR SECIFICATION)**

### **DISMANTLING AND DEMOLISHING**

#### **LIST OF BUREAU OF INDIAN STANDARD CODES**

##### **S. No. BIS. No. Subject**

1. IS 1200 (Pt - XVIII) Method of Measurements of Building and Civil Engineering Works (Part -XVIII) Demolition and Dismantling

2. IS 4130 Demolition of Buildings-

##### **15.3.11 Reinforced Concrete and Brick Work**

Reinforced concrete structures and reinforced brick roofs and walls shall be measured in cubic meters and if reinforcement is required to be salvaged, it shall be so stated. Where reinforcement is required to be separated, scraped and cleaned, the work shall be measured separately in quintal of salvaged steel.

##### **15.3.13 Wood Work**

All wood work including karries average 40 sq cm or over in section, shall be measured in cubic meters, while that under 40 sq cm in section, in running meters. Ballies shall be measured in running meters. Boarding including wooden chajjas and sun shades along with supports shall be measured in square meters in its plane.

##### **15.3.14 Steel and Iron Work**

(i) All steel and iron work shall be measured in quintals. The weight shall be computed from standard tables unless the actual weight can readily be determined.

(ii) Riveted work, where rivets are required to be cut, shall be measured separately.

(iii) Marking of structural steel required to be re-erected shall be measured separately.

(iv) In framed steel items, the weight or any covering material or filling such as iron sheets and expanded metal shall be included in the weight of the main article unless such covering is not ordered to be taken out separately.

##### **15.3.15 Doors and Windows**

Dismantling of doors, windows, clerestory windows, ventilators etc. (wood or metal) whether done separately or along with removal of wall by making recess in the wall shall be enumerated. Those exceeding 3 sqm each in area shall be measured separately. The item shall include removal of chowkhats architraves, holdfasts and other attachments. If only shutters are to be taken out it shall be measured separately

##### **15.3.16 Pipes and Sewer Lines**

(i) Water pipe lines including rain water pipes with clamps and specials, sewer lines (salt glazed ware or concrete) etc. shall be described by their diameter and length measured in running metres inclusive of joints.

(ii) If the joints, special and fittings etc. are required to be separated, it shall be so stated and enumerated.

(iii) Pucca drains shall be measured under relevant items.

(iv) Valve cistern, public fountain platform, fire hydrants, etc. shall be enumerated.

(v) Manholes and inspection chambers shall be enumerated stating the size and depth of manhole/inspection chamber. They shall be classified into different groups depending upon the depth, in unit of half and one metre depth. The depth of the manhole shall be the distance between the top of manhole cover and invert level of the drain.

(vi) Ventilating shafts, gully traps, flushing cisterns and other appurtenant items of work shall be enumerated.

##### **15.3.17 Posts or Struts**

Posts or struts (wood, steel or RCC) section including taking out embedded portion shall be measured in running meters.

##### **15.3.18 Fencing Wire Mesh**

Wire mesh fencing of any type with frame shall be measured in square metres.

##### **15.3.19 Glazing**

Taking out any portion of serviceable glass except polished plate, from old sashes, skylights, etc. (any thickness, weight or size) raking out old putty, etc. shall be measured in square meters. Irregular circular panes shall be measured as rectangle or square enveloping the same. The width and height being measured correct to the nearest 0.5 cm.

##### **15.3.20 Road Work**

(i) Different types of road surfaces shall be measured separately.

(ii) Road surfaces metalling or soling (base) shall be measured in square meters.

(iii) Concrete paving shall be measured as in 15.3.8 or 15.3.9 as the case may be.

##### **15.4 Rates**

The rate shall include the cost of all labour involved and tools used in demolishing and dismantling including scaffolding. The rate shall also include the charges for separating out and stacking the serviceable material properly and disposing off unserviceable material within a distance of 50 meters. The rate shall also include for temporary shoring for the safety of portions not required to be pulled down, or of adjoining property, and providing temporary enclosures or partitions, where considered necessary.

Other relevant standards/codes/guidelines

IS:432 (Part 1) – specifications for mild steel and medium tensile steel bars and hard

- drawn steel bars for concrete reinforcement  
IS:456 Code of practice for plain and reinforced concrete  
IS:1786 Specifications for high strength deformed steel bars and wires for concrete reinforcement  
IS:2502 code of practice for bending and fixing of bars  
IS:2571 – code of practice for welding of mild steel bars  
IS:13920 – code of practice for Ductile detailing of reinforced concrete structures  
IS: 8112 - 43 Ordinary Portland Cement  
IS: 456 - Code of practice for Plain and Reinforced Concrete  
IS: 383 - Coarse and fine aggregates from natural sources for Concrete  
IS: 2386 (Part-IV) - Method of testing of aggregates for Concrete- Mechanical property  
IS: 5878 (Part-V) - Code of practice for Construction of tunnels conveying water  
Concrete Lining  
IS: 516- Method of test for strength of Concrete  
IS: 1489- Portland Pozzolana Cement Fly Ash based  
IS: 1199- Method of sampling and analysis of Concrete  
IS: 457- Code of practice for general construction of plain and reinforced concrete for dams and other massive structures  
IS:9103- Concrete Admixtures : Specifications  
IS: 7861 (Part-I and Part-II) - Code of practice for Extreme weather concreting, Recommended Practice (Hot weather and Cold weather concreting  
IS: 2505 Concrete Vibrators – Immersion type general requirements  
IRC:44-2017 Guidelines for Cement Concrete Mix Designs for Pavements (Clause 6- Pervious Concrete)  
IS 16014:2012 Mechanically Woven, Double Twisted Hexagonal wire mesh gabions.

## 15 Quality Assurance & Quality Control

Quality Assurance Plan & Quality Checking shall be prepared by Contractor within 21 days of issue of Letter of Acceptance by Employer & jointly agreed to within next 15 days thereafter.

### 1 Quality Control:

The Engineer-in-Charge shall introduce O.K. Card System to ensure methodical enforcement of specifications during the execution of various works to promote construction quality of works. The printed O.K. Cards, work-wise, shall be filled activity-wise by the contractor/his authorized representative and, then, put up to the field engineers (JE/AE/AEE/EE). Any deficiency observed by the field engineer/quality control engineer shall be promptly rectified by the contractor, failing which work may be rejected.

If anything is not covered under above specifications for any items, contractor shall abide by the relevant latest CPWD/Uttarakhand PWD/IS codes specifications. The final deciding authority for specifications shall be Engineer-in-charge.

SIGNATURE OF CONTRACTOR

Executive Engineer (civil-II)

## **SECTION-IX**

### **Safety Manual**

**(All safety norms as mentioned in Clause 23.6 of General Conditions of Contract shall be strictly adhered to during actual execution of the Works)**

## **SECTION-X**

### **DRAWINGS AND LAYOUT**

(The drawing and layout annexed with tender document are merely for the purpose to assess the rates for bidding. During execution of work separate drawing shall be issued)