



**HINDUSTAN PETROLEUM CORPORATION LIMITED**

**CONSTRUCTION OF HPCL GREEN R&D CENTRE AT  
BENGALURU**

**(BIDDING DOCUMENT NO. KNM/ A298-000-CQ-TN-7030/1007)**

**BIDDING DOCUMENT FOR  
HARDSCAPE, HORTICULTURE AND ALLIED WORKS  
VOLUME I OF II  
(COMMERCIAL)**

**Prepared & Issued by:**

**इंजीनियर्स  
इंडिया लिमिटेड**  **ENGINEERS  
INDIA LIMITED**  
(भारत सरकार का उपक्रम) (A Govt. of India Undertaking)

**Regd. Office : Engineers India Bhawan, 1, Bhikaiji Cama Place, New Delhi - 110066**

Cost of tender document: Rs.10,000/- (Non-transferable)

## MASTER INDEX

**NAME OF WORK** : **HARDSCAPE, HORTICULTURE AND ALLIED WORKS**  
**NAME OF PROJECT** : **CONSTRUCTION OF HPCL GREEN R&D CENTRE AT BENGALURU**  
**BIDDING DOCUMENT NO.** : **KNM/ A298-000-CQ-TN-7030/1007**

### (COMMERCIAL SECTION)

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**NAME OF WORK : HARDSCAPE, HORTICULTURE AND ALLIED WORKS**

**BIDDING DOCUMENT NO. : KNM/ A298-000-CQ-TN-7030/1007**

1.0 One set of Bidding Document along with drawings, if any comprising of following PARTS in the form of a Compact Disc (CD) is issued to the Bidder mentioned at Sl. No. 2.0 below:

PART- I : **COMMERCIAL SECTION & SCHEDULE OF RATES**

PART- II : **TECHNICAL SECTION**

2.0 Name of Bidder : .....

Address of Bidder : .....

.....

.....

3.0 The fee for this set of Bidding Document (non-refundable) is Rs. 10,000/- (Rupees Ten Thousand only) in the form of crossed Demand Draft / Pay Order / Banker's Cheque in favour of "**Hindustan Petroleum Corporation Limited**" payable at Bengaluru.

The Bidding document is sold vide receipt No. \_\_\_\_\_ dated \_\_\_\_\_.

4.0 The Bidding Document is not transferable in any other name.

ASST.GENERAL MANAGER (C & P)  
ENGINEERS INDIA LTD., NEW DELHI



**DOMESTIC NOTICE FOR INVITATION FOR BIDS (IFB) FOR  
CONSTRUCTION OF HPCL GREEN R&D CENTRE AT BENGALURU  
BIDDING DOCUMENT NO.: KNM/ A298-000-CQ-TN-7030/1007**

Engineers India Limited (EIL), on behalf of M/s Hindustan Petroleum Corporation Limited (HPCL), invites sealed bids from eligible bidders for the following works.

Name of Work	Sale Period of Bidding Document	Bid Due Date / Time
Hardscape, Horticulture and Allied Works	23.09.2013 to 21.10.2013	22.10.2013 Up to 1200 Hrs.(IST)

Contact Person: AGM (C&P), Engineers India Limited. EI Annexe, 4<sup>th</sup> Floor, 2-B, Bhikaiji Cama Place, R.K. Puram, New Delhi -110066, Fax: 011-26191714 / 26167664, Tel: 011-26763718 / 26763957, Email: [kn.mahapatra@eil.co.in](mailto:kn.mahapatra@eil.co.in) / [vandana@eil.co.in](mailto:vandana@eil.co.in)

For Detailed IFB and Bidding Document, visit EIL's website: <http://tenders.eil.co.in>, Govt. website: <http://eprocure.gov.in/cppp> and HPCL's website <http://www.hindustanpetroleum.com>

All revisions, clarifications, corrigenda, addenda, time extensions etc., to the tender will be hosted on HPCL's website & EIL's website only. Bidders should regularly visit the websites to keep themselves updated

AGM (C & P), EIL, NEW DELHI



**INVITATION FOR BIDS (IFB) FOR  
HARDSCAPE, HORTICULTURE AND ALLIED WORKS FOR CONSTRUCTION OF HPCL  
GREEN R&D CENTRE AT BENGALURU FOR M/s HINDUSTAN PETROLEUM  
CORPORATION LIMITED**

**(BIDDING DOCUMENT NO.: KNM/ A298-000-CQ-TN-7030/1007)  
(DOMESTIC COMPETITIVE BIDDING)**

**1.0 INTRODUCTION**

- 1.1 **M/s Hindustan Petroleum Corporation Limited (HPCL)** desires to establish its world class 'Green R&D Centre' with State of the Art Research & Development facilities at Bengaluru with an objective to support refineries for operational improvement and develop innovative & path breaking technologies for licensing. HPCL has appointed M/s Engineers India Limited (EIL) as Project Management Consultant (PMC) for execution of the Project.
- 1.2 EIL, on behalf of HPCL, invites sealed bids for **Hardscape, Horticulture and Allied Works** for the HPCL Green R&D Centre, Bengaluru from experienced and competent agencies with sound technical and financial capabilities fulfilling the Bidder's Qualification Criteria (BQC) as stated at para 5.0 below.

**2.0 BRIEF SCOPE OF WORK**

2.1 Brief scope of work includes but not limited to the following:

- a) Green Belt Development
- b) External Development with Stone Work, Planter beds, R.C.C. Urns.
- c) Civil & Electro Mechanical works for water bodies.
- d) Pathways with paving material.
- e) Irrigation system (drip irrigation for planting, Sprinkler system for lawns).

**3.0 TIME SCHEDULE :**

Time Schedule for completion of works shall be Eight (08) Months from the date of issue of Letter/ Fax of Intent/PO, whichever is earlier.

Maintenance Period of Horticulture Works 1(One) year after completion of work and acceptance thereof by Engineer-in-Charge.

**4.0 SALIENT FEATURES OF BIDDING DOCUMENT :**

S. No.	Salient Feature	Details
a)	<b>Bidding Document No.</b>	: KNM/ A298-000-CQ-TN-7030/1007
b)	<b>Bidding Document on Sale</b>	: From 23.09.2013 to 21.10.2013

S. No.	Salient Feature	Details
c)	<b>Date &amp; Time of Pre Bid Meeting</b>	: 03.10.2013 at 1100 Hrs. (IST)
d)	<b>Venue of Pre Bid Meeting</b>	: HPCL, Corporate R & D Centre, 176, Adarsh Eco Place, 1st Floor, EPIP Zone II, Whitefield, Bengaluru-560 066.
e)	<b>Last date of receipt of Bidder' Queries for Pre-bid meeting</b>	: Bidder may submit their queries, if any, latest by 01.10.2013 addressed to Mr. K.N. Mahapatra, AGM (C&P) at Fax No. (011) 26167664 / 26191714 or e-mail: <a href="mailto:kn.mahapatra@eil.co.in">kn.mahapatra@eil.co.in</a> / <a href="mailto:vandana@eil.co.in">vandana@eil.co.in</a> .
f)	<b>Last Date and time for receipt of Bids</b>	: 1200 Hrs. (IST) on 22.10.2013
g)	<b>Bids to be submitted at</b>	: Dak Receipt Section, Engineers India Limited, EI-Annexe Building, 2B, Bhikaiji Cama Place, R.K. Puram, New Delhi-110066.
h)	<b>Opening of Bids</b>	: 1400 Hrs. (IST) on 22.10.2013 In presence of authorised representative(s) of attending bidder(s).
i)	<b>Cost of Bidding Document</b> (Non-refundable)	: Rs. 10,000/- (Rupees Ten Thousand Only) in the form of Crossed Demand Draft / Pay Order / Banker's Cheque, <b>in favour of "Hindustan Petroleum Corporation Limited", payable at Bangalore.</b>
j)	<b>Earnest Money Deposit (EMD)</b>	: Rs. 13.225 Lakh (Rupees Thirteen Lakh Twenty Two Thousand Five Hundred Only) in the form of Crossed Demand Draft / Pay Order / Banker's Chsxeque, <b>in favour of "Hindustan Petroleum Corporation Limited", payable at Bangalore</b> or in the form of Bank

If any of the days mentioned above happens to be EIL holiday, the next working day shall be implied.

Bids must be accompanied with the Earnest Money Deposit (EMD) as mentioned above. EMD shall be submitted in the form of crossed Demand Draft/Pay Order / Banker's Cheque in favour of Hindustan Petroleum Corporation Limited, payable at Bangalore or a Non-revocable Bank Guarantee (BG) in the name of HPCL from any Scheduled Bank (excluding Co-Operative Banks). BG shall be valid for a period of 6 (Six) months from the due date of opening of Techno-commercial Bids and shall be submitted from any Scheduled Bank (excluding Co-Operative Banks) in the format included in Bidding Document. Bids received without Earnest Money Deposit will be summarily rejected. Indian Central Public Sector Undertakings / Enterprises are exempted from submitting EMD subject to submission of required declaration in this regard.

In case the bidder is registered with National Small Industries Corporation (NSIC), then Tender Documents shall be issued free of cost and they shall be exempted from payment of EMD provided the certificates issued by the relevant agency are valid on the date of opening of Bids. Valid Certificate should be submitted in the envelope marked "EMD" along with a covering letter on the Letter Head stating the exemption from EMD & Tender Fees.

## 5.0 **BIDDER'S QUALIFICATION CRITERIA (BQC)**

Bidders shall fulfill the following qualification criteria:

### 5.1 **Experience Criteria**

Bidder should have successfully completed the following works in previous Seven (7) years ending last day of the month previous to the one in which Bids are invited:

One contract involving similar completed work costing not less than Rs. 572 Lakh (Rupees Five Hundred Seventy Two Lakh only).

OR

Two contracts involving similar completed works, each costing not less than Rs. 357.50 Lakh (Rupees Three Hundred Fifty Seven Lakh Fifty Thousand only).

OR

Three contracts involving similar completed works, each costing not less than Rs. 286 Lakh (Rupees Two Hundred Eighty Six Lakh Only).

“Similar Works” means Hardscape/External Development and Horticulture Works.

## 5.2 **Financial Criteria**

### 5.2.1 Annual Turnover :

Average Annual Financial Turnover during the preceding three financial years should be at least Rs. 214.50 Lakh (Rupees Two Hundred Fourteen Lakh Fifty Thousand only).

## 6.0 **General**

- 6.1 Consortium / Joint Venture bids shall not be accepted.
- 6.2 Bidder should not be in the Holiday / Negative list of EIL/HPCL.
- 6.3 Bidder should not be under liquidation, court receivership or similar proceedings.
- 6.4 Vendors / contractors with negative net worth will not be considered barring PSUs approved by EIL/HPCL.
- 6.5 Experience of only the bidding entity shall be considered. A job executed by a bidder for its own plant/projects shall not be considered as experience for the purpose of meeting requirement of experience criteria of the Bidding Document. However, jobs executed for Subsidiary / Fellow Subsidiary / Holding company will be considered as experience for the purpose of meeting experience criteria subject to submission of tax paid invoice(s) duly certified by Statutory auditor of the bidder towards payments of statutory tax in support of the job executed for Subsidiary / Fellow Subsidiary / Holding company. Such bidders shall submit these documents in addition to the documents specified in the Bidding Document to meet ‘Experience Criteria’.
- 6.6 In case of composite works comprising of other types of works in addition to the qualifying work stated above, then the value of such qualifying work out of total value of completed composite work, shall be considered for the purpose of evaluation.
- 6.7 If work order/ completion certificate does not indicate all activities as defined under “Similar Works” as mentioned at para 5.1 above, then bidder should submit a certificate to this effect from the Client correlating the work order/ completion certificate number or furnish the detailed Schedule of Rates (SOR) pertaining to the work order / AFC drawings approved by Client to verify that all the salient works had been undertaken while executing the contract.
- 6.8 Bidder shall furnish documentary evidence i.e. copies of work orders including Schedule of Rates (SOR), completion certificate, complete annual audited financial year statements including balance sheets, profit & loss accounts statement and all other schedules, self certification of being not under liquidation, court receivership or similar proceedings, registration of bidder with National Small Scale Industries Corporation (NSIC) etc., in the first instance itself, in support of their fulfilling the Bidder’s Qualification Criteria.

EIL/HPCL reserve the right to complete the evaluation based on the details furnished without seeking any additional information.

6.8.1 All documents furnished by the bidder in support of meeting the BQC including Certificate of registration in support of bidder registered with National Small Scale Industries Corporation (NSIC), if any, shall be signed and stamped by the bid signatory and shall be

- either

duly certified by the Statutory Auditor of the bidder or a practicing Chartered Accountant (not being an employee or a Director or not having any interest in the bidder's company/firm) where audited accounts are not mandatory as per law.

- or

duly notarized by any Notary Public. However, in case of notarization, bidder shall also submit an Affidavit in the enclosed format signed by the authorized signatory of the bidder.

Bidders are also required to submit the original certified documents in a separate booklet. This booklet shall be titled as "Documentation against Bidder Qualification Criteria" with proper index and should be submitted along with the original EMD and Bidding Document Fee.

Bidder to note that submission of authentic documents is the prime responsibility of the bidder. Wherever EIL/HPCL has concern or apprehension regarding the authenticity/correctness of any document, EIL/HPCL reserves a right of getting the document cross verified from the document issuing authority.

6.9 In case, audited balance sheets and profit & loss account of immediate preceding financial year is not available for bid closing date upto 30th September, the bidder has an option to submit the audited balance sheets and profit & loss account of the three previous years immediately prior to the last financial year. However, for bid closing date after 30th September, bidder has to compulsorily submit the audited balance sheets and profit & loss account for the immediate three preceding financial years, for evaluation and his qualification with respect to financial criteria.

6.10 Bidding Document (non-transferable) is available for sale in the form of CDs and may be purchased on any working day (Monday to Friday) between 1400 Hrs. (IST) to 1600 Hrs. (IST) during the sale period, from the Sale Counter, Engineers India Limited, EI Annexe Building, 2B, Bhikaiji Cama Place, R.K. Puram, New Delhi-110066, on written request and upon payment of Cost of Bidding Document (non refundable) in the form of crossed Demand Draft / Pay Order / Banker's Cheque, in favour of "**Hindustan Petroleum Corporation Limited**" payable at Bangalore. Request for sending Bidding Document by post, courier or any other mode shall not be entertained. Units registered under NSIC are entitled to exemption from payment of fee for tender documents. Documentary proof (valid on the date of opening of bids) in support of the same needs to be provided.

6.11 The complete Bidding Document is also available on the website of EIL <http://tenders.eil.co.in> and on HPCL website <http://www.hindustanpetroleum.com> and from Govt. website: <http://eprocure.gov.in/cppp>

6.12 Bidders desirous to submit their bid on downloaded document shall have to pay cost of Bidding Document, as mentioned in the above para, while submitting the bid, failing which their bid shall not be considered for evaluation.

6.13 Bidder shall purchase or download Bidding Document in his own name and submit the bid directly. The Bidding Document is non-transferable. Bids submitted by Bidder who have not purchased the Bidding Document either directly or through their authorized agent or have not downloaded the Bidding Document shall not be considered.

6.14 Bidder shall sign the Integrity Pact as per the format given in the Bidding Document. Bidder's offer shall be summarily rejected if they refuse to sign the Integrity Pact.



- 6.15 Bids not received by the due date and time shall be summarily rejected, without any reference/correspondence with the bidder.
- 6.16 EIL/HPCL reserves the right to assess Bidder's capability and capacity to execute the work using in-house information by taking into account other aspects such as concurrent commitments and past performance etc.
- 6.17 EIL/HPCL shall not be responsible for any expense incurred by bidders in connection with the preparation & delivery of their bids, site visit, participating in the discussion and other expenses incurred during the bidding process.
- 6.18 Corrigenda/Addenda, if any, shall also be available on the referred web sites. No extension in the bid due date / time shall be considered on account of delay in receipt of any document by mail.
- 6.19 Purchase preference for public sector enterprises and price preference for the vendors registered with NSIC are applicable as per laid down Govt rules and as per the clauses mentioned below.
- 6.19.1 In case the Bidder is a Small Scale Industry, which is registered with the NSIC and is seeking Price Preference, the following should be submitted along with their Un-Priced bid, failing which the Offer of the Bidder will be evaluated without considering Price Preference, WITHOUT ANY reference to and/ or correspondence with the Vendor:
- (a) Photocopy of the NSIC Registration Certificate, which clearly shows the following details/information:
    - (i) Name of the Bidder
    - (ii) Address of the Bidder
    - (iii) Validity of the Registration
    - (iv) Items for which the Bidder is registered
    - (v) Monetary Limit
  - (b) In case the Bidder has secured Orders for same items, in competition with Large Scale Units, during the preceding 12 months, WITHOUT any Price Preference, then Bidder shall furnish a Declaration to this effect, on their Letter-Head. If not, the Bidder should specify that they have not secured the orders, in competition with Large Scale Units, during the preceding 12 months, WITHOUT any Price Preference, on their letter head.
- 6.20 Bids sent through Telex/ Telegraphic/ Fax/ E-mail/Computer Floppy/CD/DVD/Pen Drive shall not be accepted.
- 6.21 Bidder may note that Bid shall be submitted on the basis of "ZERO DEVIATION" and shall be in full compliance to the requirements of Bidding Document, failing which bid shall be considered as non-responsive and may be liable for rejection.
- 6.22 EIL/HPCL reserves the right to reject any or all the bids received at its discretion or annul the bidding process at any time without assigning any reason whatsoever.
- 6.23 In case any bidder is found to be involved in cartel formation, his bid will not be considered for evaluation / placement of order. Such bidder will be debarred from bidding in future.
- 6.24 Canvassing in any form by the bidder or by any other agency on their behalf may lead to disqualification of their bid.
- 6.25 Clarification, if any, can be obtained from AGM (C&P) through Ph. 0091-11-26763718 / 26763957. Telefax: 0091-11-26167664 / 26191714; Email: [kn.mahapatra@eil.co.in](mailto:kn.mahapatra@eil.co.in) / [vandana@eil.co.in](mailto:vandana@eil.co.in).

ASST. GENERAL MANAGER (C & P)  
ENGINEERS INDIA LIMITED, NEW DELHI

(To be typed on Bidder's Letter Head)

**ACKNOWLEDGEMENT CUM CONSENT LETTER**

To

ENGINEERS INDIA LIMITED  
EI-ANNEXE, 4TH FLOOR,  
2B, BHIKAJI CAMA PLACE,  
R.K. PURAM, NEW DELHI - 110 066

**PHN: 011- 26763718 / 26763957**

**ATTN : Mr. K.N. Mahapatra, AGM (C&P)**

**SUBJECT: HARDSCAPE, HORTICULTURE AND ALLIED WORKS FOR CONSTRUCTION OF HPCL GREEN R&D CENTRE AT BENGALURU**

**(BIDDING DOCUMENT NO.: KNM/ A298-000-CQ-TN-7030/1007)**

Dear Sir,

We hereby acknowledge receipt of a complete set of Bidding Document along with enclosures for subject works as per the Master Index for our use in preparing the Bid.

We undertake that the contents of the above Bidding Document shall be kept confidential and further that the drawings, specifications and documents shall not be transferred and that the said documents are to be used only for the purpose for which they are intended.

A) We intend to bid as requested for the subject works and furnish following details with respect to our quoting office:

- (i) POSTAL ADDRESS : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- (ii) CONTACT PERSON : \_\_\_\_\_
- (iii) TELEPHONE NUMBER : \_\_\_\_\_
- (iv) MOBILE NUMBER : \_\_\_\_\_
- (v) TELEFAX NUMBER : \_\_\_\_\_
- (vi) E-MAIL ADDRESS : \_\_\_\_\_

B) Contact person at Delhi, if any:

(i) POSTAL ADDRESS : \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(ii) CONTACT PERSON : \_\_\_\_\_

(iii) TELEPHONE NUMBER : \_\_\_\_\_

(iv) MOBILE NUMBER : \_\_\_\_\_

(v) TELEFAX NUMBER : \_\_\_\_\_

(vi) E-MAIL ADDRESS : \_\_\_\_\_

C) We are unable to submit bid for the reasons given below.

Reasons for non-submission of bid:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

AGENCY'S NAME : \_\_\_\_\_

SIGNATURE : \_\_\_\_\_

NAME : \_\_\_\_\_

DESIGNATION : \_\_\_\_\_

DATE : \_\_\_\_\_

NOTE : Bidder is requested to furnish the details mentioned at (A) and (B) or (C) immediately after receipt of Bidding Document.

**(SIGNATURE OF BIDDER)**

**COVERING LETTER FOR SUBMISSION OF OFFERS**  
(to be typed on bidder's letter head)

From :

\_\_\_\_\_  
\_\_\_\_\_

Our Ref: ----- dated -----

To  
AGM (C&P)  
Engineers India Ltd.  
4<sup>th</sup> Floor, El Annexe Building  
Bhikaiji Cama Place, R.K. Puram  
New Delhi – 110066

**SUBJECT : HARDSCAPE, HORTICULTURE AND ALLIED WORKS FOR CONSTRUCTION  
OF HPCL GREEN R&D CENTRE AT BENGALURU  
(BIDDING DOCUMENT NO. KNM/ A298-000-CQ-TN-7030/1007)**

**ATTN: MR. K.N. MAHAPTRA, AGM (C&P)**

Dear Sir,

Please find herewith our offer in line with requirement of EIL Bidding Document. We confirm that:

1. Earnest Money Deposit is submitted by BG /Demand Draft/ Pay Order as follows:

EMD Amount	No. & date	Drawn on Bank
<b>Rs. 13.225 Lakh (Rupees Thirteen Lakh Twenty Two Thousand Five Hundred Only)</b>		

2. Offer is in complete compliance with technical as well as commercial requirements of bidding document and there is no technical or commercial deviation in the offer.
3. We understand that any technical or commercial deviation in the offer shall render our offer liable for rejection.
4. Our offer shall remain valid for a period of 4 **Months** from the date of opening of tender and EMD shall be valid for 2 **months beyond the validity period.**

We declare that the statement made and the information provided in our offer is true and correct in all respect. In case, it is found that the information/ documents provided by us are incorrect/ false, our application shall be rejected by EIL without any reference to us.

Thanking you,

Very Truly Yours,

(Signature of Authorised person)  
Full Name :  
Designation:  
Company Seal :

## **INSTRUCTIONS TO BIDDER**

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**A GENERAL****1.0 BRIEF SCOPE OF WORK**

The scope of work is given in Technical Part of Bidding Document

**2.0 ELIGIBLE BIDDERS:**

2.1 The invitation of bid is open to any bidder meeting the BQC.

2.2 Bidder should not be under liquidation, court receivership or similar proceedings.

2.3 The bidder shall not be on Holiday / negative list of EIL/Owner as on the due date of submission of bid. If the documents were issued inadvertently / downloaded from website, offers submitted by such bidders shall not be considered for opening / evaluation / award.

2.4 If the agency is placed on holiday / negative list of EIL/Owner after opening of unpriced bids but before opening of price bids, further evaluation shall be stopped and the corresponding price bid will not be opened.

**3.0 COST OF BIDDING**

3.1 The Bidder shall bear all costs associated with the preparation and delivery of its bid, including costs and expenses related to visits to the site and the Owner will in no case be responsible or liable for these costs regardless of the outcome of the bidding process.

**4.0 ACKNOWLEDGEMENT & CONFIRMATION**

4.1 Within 7 (Seven) days of receipt of Bidding Document, Bidder shall acknowledge the receipt for the tendered work as per proforma "Acknowledgement Letter" enclosed in Bidding Document.

**5.0 SPLIT-UP OF WORK**

5.1 No Split up of work is envisaged. Total work shall be awarded to one agency only.

**6.0 SITE VISIT**

6.1 Bidder is advised to visit and examine the site, its surroundings and familiarise himself with the existing facilities and environment, and collect all other information which he may require for preparing and submitting the bid and entering into the Contract. Claims and objections due to ignorance of existing conditions or inadequacy of information will not be considered after submission of the Bid and during implementation.

6.2 Any loss to the property / life of the visitor due to visitor's negligence shall be the visitor's responsibility. Visitor shall keep Owner indemnified from any legal consequences arising there from.

**7.0 LOCATION OF SITE:**

The location of the proposed site is at Tarabahalli (village), Devanagonthi, Hosakote (Taluk) of Bengaluru in the State of Karnataka.

Nearest Railway Station: Devanagonthi.

Nearest Airport: Bengaluru International Airport.

**Site:**

- Site area is but not limited to
- HPCL Green R&D Centre
  - Gurukul (Guest House)

7.1 Bidder may contact the following person at site for site visit purpose :

Mr. P K Das  
Resident Construction Manager  
Ph. No.: +91 97425 11717

**B BIDDING DOCUMENT, CLARIFICATIONS AND AMENDMENT****8.0 BIDDING DOCUMENT**

8.1 The Bidding Document can be downloaded from the designated website(s) of EIL and HPCL.

The Bidding Document shall consist of the following and should be read in conjunction with any amendment issued subsequently:

- i) Invitation for Bids (IFB).
- ii) Instructions to Bidders and its attachments.
- iii) General Conditions of Contract (GCC).
- iv) Special Conditions of Contract (SCC) and its attachments.
- v) Schedule of Rates (SOR) / Schedule of Prices (SOP).
- vi) Technical Specifications / Standards, Drawings, if any

Bidder shall submit the Master Index of the bidding document duly signed and stamped in token of having received, read and complied to all parts of Bidding Document. The Bidding Document shall be read in conjunction with any Amendment.

8.2 The Bidder is expected to examine the Bidding Document, including all instructions, forms, terms, specifications and drawings in the Bidding Document. Failure to furnish all information required as per the Bidding Document or submission of a bid not substantially responsive to the Bidding Document in every respect may result in the rejection of the Bid.

8.3 Bidding documents once issued are non-transferable in other name and shall at all times remain the exclusive property of the OWNER with a licence to the Bidder to use the Bidding Documents for the limited purpose of submitting the bid.

8.4 Bidder shall treat the Bidding Document and contents thereof as confidential. If at any time, during the bid preparation stage, Bidder decides to decline to Bid, all documents must be immediately returned to EIL.

**9.0 CLARIFICATION OF BIDDING DOCUMENT**

9.1 Although the details presented in this Bidding document consisting of Conditions of Contract, Scope of Work, Technical Specifications and Drawings have been compiled with all reasonable care, it is the Bidder's responsibility to ensure that the information provided is adequate and clearly understood and it includes all documents as per the Index.

9.2 Any failure by Bidder to comply with the aforesaid requirement shall not excuse the Bidder, after subsequent award of contract, from performing the work in



- accordance with the Letter of Acceptance (LOA) / Purchase Order (PO).
- 9.3 Bidders are requested to resolve all their clarifications/queries to the Bidding Document before due date of submission of bid and submit their bid in total compliance to Bidding Document without any deviation /stipulation /clarification /assumption. Accordingly, bidder must submit format for "Compliance to Bid requirement" as per **FORM- E to ITB** duly filled in along with Unpriced part of Bid.
- 9.4 The responses to Bidder's queries / clarifications raised will be furnished as expeditiously as possible to all who have been issued the Bidding Documents. Any modification of the Bidding Document, which may become necessary as a result of the bidders query, shall be sent to all bidders to whom the Bidding Document is issued through the issue of an Addendum/ Amendment.
- 10.0 **CLARIFICATION REQUESTS FROM BIDDERS**
- 10.1 A bidder may seek clarifications regarding the bidding document provisions, bidding process and/or rejection of his bid.EIL shall respond to such requests within a reasonable time.
- 11.0 **AMENDMENT OF BIDDING DOCUMENT**
- 11.1 EIL may, for any reason whether at his own initiative or in response to the clarification requested by the prospective bidder(s), issue amendment in the form of Addendum during the bidding period or subsequent to receiving the bids. Any Addendum thus issued shall become part of Bidding Document and Bidder shall submit a copy of the Addendum duly signed and stamped in token of his acceptance. Addendum shall be issued to only those bidders, who have been issued the Bidding Document.
- 11.2 In case Addendum is issued during the bidding period, Bidder shall consider its impact in his bid. In case Addendum is issued subsequent to receipt of bids, Bidder shall follow the instructions issued along with Addendum with regard to submission of impact on quoted price / revised price, if any.
- 12.0 **CONFIDENTIALITY OF BIDDING DOCUMENT**
- 12.1 The Bidding Document is and shall remain the exclusive property of the Owner without any right to Bidder to use them for any purpose except for the purpose of Bidding.
- 12.2 On no account will any agency to whom Bidding Documents is issued, part with possession thereof or copy or take copies or tracings of any drawing, plan etc. It should be understood that the information therein is confidential, and that the Bidding Documents are therefore being issued to bidders in the strictest confidence.
- 13.0 **LANGUAGE OF BID**
- The Bid prepared by the Bidder, all correspondence and documents relating to the bid exchanged by the Bidder and the EIL shall be written in the English language. Any printed literature/certificate/any other document furnished by the Bidder may be in another language, provided they are accompanied by an accurate translation of the relevant passages in the English language, in which case, for purpose of interpretation of the Bid the English translation shall prevail.
- In the event of submission of any document/ certificate by the Bidder in a language other than English, the English translation of the same duly authenticated by Chamber of Commerce of bidder's country shall be submitted by the bidder.

#### 14.0 **COMPLIANCE TO BID REQUIREMENT**

##### 14.1 ZERO DEVIATION:

Bidder to note that this is a ZERO deviation bidding document. Owner will appreciate submission of offer based on the terms and conditions in the enclosed GCC, SCC, ITB, Scope of Work, and Technical Specification etc. to avoid wastage of time and money in seeking clarifications on technical / commercial aspect of the offer.

14.2 Accordingly, Bidder must submit format for "Compliance to Bid requirement" as per Form-E duly filled in along with Unpriced part of Bid.

14.3 Notwithstanding the above, no deviation to the bid conditions in respect of the following shall be entertained and bids shall be liable for rejection.

- (a) Time Schedule
- (b) Schedule of Prices / Schedule of Rates
- (c) Defect Liability Period
- (d) Arbitration
- (e) Scope of Work
- (f) Scope of Supply
- (g) Composite Performance Bank Guarantee (CPBG)
- (h) Suspension of work
- (i) Termination of Contract
- (j) Force Majeure
- (k) Bid Validity
- (l) Proforma of all Bank Guarantees
- (m) Liquidated Damages/Price Reduction due to Delay in completion

14.4 Any other condition specifically mentioned in the tender documents elsewhere that non-compliance of the clause lead to rejection of the bid.

14.5 In case Bidder stipulate deviations, Owner have the right to reject such bid at its absolute discretion without giving any opportunity for such Bidder to make good such deficiency.

#### 15.0 **DOCUMENTS COMPRISING BID**

15.1 The Bid should be prepared by the Bidder and shall be submitted in Two Parts with three separate sealed envelopes as per the following details. All the documents submitted by the bidder as part of the bid shall be signed and stamped by the authorised signatory of the bid.

- i) PART – I (Envelope-1): Earnest Money Deposit (EMD), Cost of Bidding Document and Integrity Pact  
(Envelope-2): Techno-commercial / Unpriced Bid
- ii) PART - II (Envelope-3) - Price Bid

15.2 PART- I (Envelope-1)– EMD, Cost of Bidding Document and Integrity Pact

15.3 This Part shall contain EMD, cost of Bidding document and Integrity Pact as per provision of Clause no. 19.0 of ITB & Cl.6.12 of IFB in a separate sealed envelope super scribed with Bidding document no., Bid due date, Bidder's name & address and "EMD , Cost of Bidding Document and Integrity Pact – Envelope No. 1".

Envelope-2 shall be opened ONLY IF EMD & Cost of Bidding Document is submitted in Envelope-1. **Bidder's offer shall be summarily REJECTED if EMD& cost of Bidding Document is not submitted and Bidder refuses to**

**sign the Integrity Pact.**

15.4 PART – I (Envelope-2) -TECHNO-COMMERCIAL/ UNPRICED BID

15.5 This Part shall contain Technical and Unpriced Commercial bid in one original and two copies and shall comprise hard copies of the attachments specifying attachment number arranged in the order as per following in a separate sealed envelope super scribed with Bidding document no., Bid due date, Bidder's name & address and "**Techno-Commercial/ Unpriced Bid – Envelope No. 2**".

- i) Covering letter of Bid on bidder's letter head as per the proforma given in the Bidding document.
- ii) Master Index and copies of all technical and commercial amendments/addendums issued, duly signed and stamped on each page as a token of having received and read all parts of the bidding document and having accepted and considered the same in preparing their bid.
- iii) Power of attorney in favour of signatory (ies) of the bid.
- iv) Details of experience meeting the BQC in the last 7 years by the Bidder as per Form-A to ITB.
- v) Details of Annual Turnover as per Form-C to ITB along with copies of complete audited Annual Financial Year Statements including audited balance sheets, Profit & Loss account statement with all schedules for preceding 3 years.
- vi) Details of present commitments as per FORM-D, which include all work under execution, in hard copy and soft copy (file in Excel format) indicating the percentage progress as on date of sale of bid document
- vii) Compliance to Bid requirement as per Form-E to ITB.
- viii) Check List of submission of bid as per Form-F to ITB.
- ix) Commercial Questionnaire as per Form-G to ITB.
- x) Bidders queries as per Form-H to ITB.
- xi) Declaration by Bidder as per Form-I to ITB.
- xii) Details of P.F. Registration Number as per Form-J to ITB.
- xiii) Bidders General Information as per Form–K to ITB.
- xiv) Bank Account Particulars as per Form-L to ITB.
- xv) Compliance to Deployment of minimum Construction Equipments, Supervisory personnel & Qualification & Experience requirement of Key personnel as per list enclosed with Special Conditions of Contract.
- xvi) Bidder's declaration that they are not under any liquidation, court receiver ship or similar proceedings
- xvii) Integrity Pact duly filled in, signed & stamped.
- xviii) Organization details
  - In case of a proprietorship firm, the name and address of proprietor, and certified copy of 'Certificate of Registration of firm'.
  - In case Bidder is a partnership firm, certified copy of the partnership deed.

- In case of company (whether private or public), certified copy of the 'Certificate of Incorporation' together with certified Memorandum/Articles of Association.
- xix) As a token of confirmation that the prices are quoted as per the requisite format, Unpriced copy of Summary of Prices (FORM SP-1) with the quoted percentage being replaced by the word "Quoted" duly signed and stamped.
- xx) All the documents submitted for meeting the bidder's qualification criteria shall either be notarised by any Notary Public or shall be duly certified by the statutory Auditor of the bidder in original or a practicing Chartered Accountant, as the case may be, in line with the requirement of IFB. In case of notarisation, Bidder shall submit an affidavit in the format enclosed as Form-B1.  
  
Bidders submitting documentation against Bidder's Qualification Criteria are required to submit the same in a separate booklet. This Booklet shall be titled as "Documentation against Bidder Qualification Criteria (Technical & Commercial)" with proper index.
- xxi) Any other information required in the Bidding Documents or considered relevant by the bidder.

## 15.6 PART - II - PRICE BID

- 15.7 This Part shall contain the Price Bid in one original plus one copy in separate sealed envelope clearly super scribing Bidding document no., Bid due date, Bidder's name & address and "**Price Bid - Envelope No. 3**" and shall contain the following:

A Single Consolidated Percentage increase/ decrease to the estimated cost as per FORM SP-1 duly filled, signed & stamped. The same Percentage shall be applicable for all items of the tender without exception. The offers of vendors quoting separate/different rates and/or separate/different percentages for different items, shall be liable for rejection, without reference to/correspondence with the vendor.

In this part of bid, the bidder shall not stipulate any conditions. There shall not be any overwriting or erasure of original writings by use of 'white fluid'. In case any erasure using 'white correcting fluid' is found, such Bid(s) shall be liable to be rejected.

- 15.8 Deviation to terms and conditions, presumptions etc. shall not be stipulated in Price part of bid and price bids shall also not contain any stapled slips. In case of any conditions stipulated in price bids or the price bid containing any stapled slips, the bids of such bidders shall be summarily rejected and shall not be considered for further evaluation. Evaluation shall be carried out excluding such bidder(s).

## 16.0 **BID PRICES**

- 16.1 Unless stated otherwise in the Bidding Documents, the Contract shall be for the total works as described in Bidding Document, based on the Schedule of Rates submitted by the Bidder and accepted by the Owner/EIL.
- 16.2 Bidder shall quote a single consolidated percentage increase / decrease in the estimated price and the same percentage shall be applicable to all the items of works of the Estimated Schedule of Rates. Bidder shall be presumed to have quoted against the tendered description of work as per the detailed Schedule of

- Rates and the same shall be binding on the Bidder.
- 16.3 In case any activity though specifically not covered in description of item under 'Schedule of Rates' (detailed), but is required to complete the work as per Scope of Work, Scope of Supply, Specifications, Standards, Drawings, General Conditions of Contract, Special Condition of Contract or any other part of Bidding Document, the prices quoted shall be deemed to be inclusive of cost incurred for such activity.
- 16.4 The quoted prices shall be inclusive of all applicable Taxes, Duties, Service Tax, WCT/VAT, Cess etc except Labour Cess/Construction worker cess. Labour cess/Construction worker cess (as applicable) shall be reimbursed extra at actual on furnishing of necessary documentary evidences. HPCL/EIL reserves the right to seek proof of payment of the taxes, duties, cess etc., if required. In such cases, further payment due to the contractor shall be released after furnishing documentary proof of the same. Statutory variations in taxes, duties and cess shall be to Contractor's account. Owner shall make from Contractor's bills such tax deductions as are required as per rules and regulations in force from time to time.
- 16.5 Any new taxes/duties/cess/levies notified/imposed after the submission of last/final price bid but before the contractual date of completion of work shall be to OWNER's account.
- 16.6 It is for the bidder to assess and ascertain the rates of applicable Taxes & Duties for the tendered work. It is clearly understood that HPCL/EIL will not have any additional liability towards payment of applicable Taxes & Duties as a result of Bidder's wrong assessment / interpretation of applicable taxes & duties. Bidder must note that HPCL shall not issue any concessional form (C - Form) against Sales Tax / CST / VAT.
- 16.7 Prices quoted by the bidder, shall remain firm and fixed and valid until completion of the Contract and will not be subject to variation on any account.
- 16.8 Alternative bids shall not be considered.
- 17.0 **CURRENCIES OF BID & PAYMENT**  
The Bidder shall quote in Indian Rupees and shall be paid in Indian Rupees only.
- 18.0 ***BID VALIDITY***
- 18.1 Bid submitted by Bidder shall remain valid for a minimum period of 04 (Four) months from the due date of submission of Bids. Bidders shall not be entitled during the said period of four months, without the consent in writing of the Owner, to revoke or cancel their Bid or to vary the Bid given or any term thereof. In case of Bidders revoking or cancelling their Bid or varying any terms in regard thereof without the consent of Owner in writing, Owner shall forfeit EMD paid by them along with their bids.
- 18.2 Owner/EIL may solicit the bidders consent to an extension of the period of validity of bid. The request and the responses there to shall be made in writing. If the Bidder agrees to the extension request, the validity of Bank Guarantee towards EMD shall also be suitably extended. Bidders may refuse the request of extension of Bid validity without forfeiting his EMD. However, bidders agreeing to the request for extension of validity of bid will not be permitted to modify the bid.
- 19.0 ***EARNEST MONEY DEPOSIT (EMD)***
- 19.1 The Bid must be accompanied by Earnest Money (interest free) for the amount

- indicated in IFB in the form of Crossed Demand Draft/Pay Order/Banker's cheque in favour of HPCL, Bangalore or a Non-revocable Bank Guarantee in the name of HPCL, from any Scheduled Bank (excluding Co-Operative Banks) as per proforma enclosed in the Bidding Document, and valid upto two months beyond the validity of the bids. EMD shall be submitted in a separate envelope along with Integrity Pact (Envelope-1) marked EARNEST MONEY DEPOSIT ,COST OF BIDDING DOCUMENT & INTEGRITY PACT, with Part-I of the Bid. Bank guarantee shall be revalidated for extended period as required by Owner / EIL in writing. **Any Bid not accompanied by EMD & Cost of Bidding Document as stated above will be summarily rejected.**
- 19.2 If the Bidder, after submission, revokes his Bid or modifies the terms and conditions thereof during the validity of his Bid except where OWNER / EIL has given opportunity to do so, the earnest money shall be liable to be forfeited. OWNER / EIL may at any time cancel or withdraw the Bidding Process without assigning any reason and in such cases the earnest money submitted by Bidder will be returned to him.
- 19.3 The successful Bidder shall be required to submit CPBG with Owner in the manner and within the time period indicated in General Conditions of Contract / Special Conditions of Contract. Should the successful Bidder fail to furnish the CPBG within the specified period, the earnest money shall be forfeited without prejudice to his being liable to any further loss or damage incurred in consequence by Owner.
- 19.4 After the award of work to the successful Bidder by Owner, Owner will return the Earnest Money to all unsuccessful Bidders. Earnest Money shall be returned to the successful Bidder after he has furnished the CPBG to Owner.
- 20.0 **ARRANGEMENT OF BID**
- 20.1 The Bidder shall prepare EMD , Cost of Bidding Document & Integrity Pact, one Original and two copies of the Techno-Commercial Bid and One Original plus One copy of Price Bid, clearly marking each one as "EMD, Cost of Bidding Document & Integrity Pact (PART-I-Envelope-1) ": "ORIGINAL – TECHNO-COMMERCIAL BID (PART-I-Envelope-2)", "ORIGINAL - PRICE BID (PART-II-Envelope-3)", "COPY NO.1& 2 – TECHNO-COMMERCIAL BID (PART-I), COPY NO. 1 PRICE BID (PART-II)", etc. as appropriate. In the event of discrepancy between the original and any copy, the original shall prevail.
- 20.2 The original and all copies of the bid shall be typed or written in indelible ink (in case of copies, Photostats are also acceptable) and shall be signed by person(s) duly authorised to sign on behalf of the bidder. All pages of bid shall be stamped and initialled by person(s) signing the bid.
- 21.0 **CHECK LIST FOR SUBMISSION OF BID**
- 21.1 To assist Bidder in ensuring the completeness of bid, a checklist for submission of various documents/details in un-priced commercial part of bid', as per **FORM-F to ITB** has been enclosed.
- 21.2 Bidder is required to fill the checklist and submit along with the bid for ready reference.
- C BID SUBMISSION**
- 22.0 **ONE BID PER BIDDER**
- 22.1 A bidder shall submit only one final bid in the same bidding process. A Bidder who submits or participates in more than one final bid will cause all the proposals in

- which the bidder has participated to be disqualified.
- 23.0 SEALING AND MARKING OF BID**
- 23.1 The Bidder shall seal EMD, Cost of Bidding Document & Integrity Pact, one Original and two copies of the Techno-Commercial Bid and one Original plus one copy of Price Bid, clearly marking each one as " EMD, Cost of Bidding Document & Integrity Pact (PART-I-Envelope-1) ": "ORIGINAL – TECHNO-COMMERCIAL BID (PART-I-Envelope-2)", "ORIGINAL - PRICE BID (PART-II-Envelope-3)", "COPY NO.1& 2 – TECHNO-COMMERCIAL BID (PART-I), COPY NO. 1 PRICE BID (PART-II)", etc. as appropriate.
- 23.2 The Bidder shall seal the original and each copy of the bid in an inner and outer envelope, duly marking the envelopes "Original" and "copy".
- 23.3 The inner and outer envelopes shall be addressed to the EIL at the following address:
- AGM(C&P)  
EIA,4<sup>th</sup> Floor  
Engineers India Limited  
Dak Receipt Section  
Engineers India Annexe,  
2-B, Bhikaiji Cama Place, R.K. Puram  
New Delhi-110066. (INDIA)  
Attn: Sh. K.N.Mahapatra,AGM (C & P).
- and bear the name of works "(the project name)", the Bidding Document No., and the words "DO NOT OPEN BEFORE (date and time of opening of bids as indicated in Notice/Letter Inviting Tenders).
- 23.4 In addition to above, the outer envelope shall indicate the name and address of the Bidder to enable the bid to be returned unopened in case it is declared "Late".
- 23.5 If the outer envelope is not sealed & marked as above, EIL will assume no responsibility for the misplacement or premature opening of the bid.
- 24.0 DEADLINE FOR SUBMISSION OF BIDS**
- 24.1 Bids must be submitted by the time and date mentioned in the Letter Inviting Bid at the address stated therein.
- 24.2 OWNER / EIL may, at its discretion, extend the deadline for submission of bids by issuing an Amendment in accordance with Clause 10.0 above, in which case all rights and obligations of the Owner and the bidders previously subject to the original deadline will thereafter be subject to the deadline as extended.
- 25.0 LATE /UNSOLICITED BIDS**
- 25.1 Any bid received by the EIL after the deadline for submission of bids will be declared "Late" and rejected and representative of such Bidders shall not be allowed to attend the Bid opening. Unopened bids shall be returned to the Bidder.
- 25.2 Unsolicited bids or bids submitted at address other than one specifically stipulated in the bid document shall not be considered for opening/evaluation.
- 25.3 Bids received by way of Fax or Telex or Telegram or email or in open condition shall not be considered.
- 26.0 MODIFICATION AND WITHDRAWL OF BIDS**
- 26.1 The Bidder may modify or withdraw its bid after the bid's submission, provided that written notice of the modification or withdrawal is received by the EIL prior to

- the deadline prescribed for submission of bids.
- 26.2 The Bidder's modification or withdrawal notice shall be prepared, sealed, marked and despatched in accordance with the provisions of procedure for submission of bids. A withdrawal notice may also be sent by e-mail or fax but must be followed by signed confirmation copy. No bid may be withdrawn in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder.
- 26.3 No bid shall be modified after the deadline for submission of bids.

## **D BID OPENING AND EVALUATION**

### **27.0 OPENING OF TECHNO-COMMERCIAL BIDS**

- 27.1 The EMD, Cost of bidding Document & Integrity Pact (Part-I-Envelope-1) and Techno-Commercial part of the Bid (Part-I-Envelope-2) shall be opened in the presence of attending representatives of Bidder. The attending representative(s) of the Bidder may have to produce authorisation letter from their competent authority, otherwise they will not be allowed to attend the Bid opening. Number of representative will be restricted to maximum one person. The Bidder's representative who is present shall sign a Bid opening statement evidencing their attendance. Envelope-2 shall be opened ONLY IF EMD & COST OF BIDDING DOCUMENT is submitted in Envelope-1. Non-submission of EMD & COST OF BIDDING DOCUMENT shall summarily lead to REJECTION of offer.
- 27.2 The Bidder's names, modifications and Bid withdrawals, and the presence or absence of the requisite EMD & Cost of bidding Document, and such other details as the OWNER / EIL at its discretion, may consider appropriate, will only be announced, and recorded at the time of opening.

### **28.0 EVALUATION OF TECHNO-COMMERCIAL BIDS**

- 28.1 Prior to detailed evaluation of bids, the Owner /EIL will determine whether each bid (i) is accompanied by required EMD , Cost of bidding document & Integrity Pact; (ii) totally comply to the requirement of bidding document.
- 28.2 The Owner / EIL will examine the bids to determine whether they are complete, and whether the bids are generally in order.
- 28.3 Prior to the detailed evaluation, the Owner will determine whether each bid is of acceptable quality, is generally complete and is responsive to the Bidding documents. A substantially responsive Bid is one which conforms to the terms, conditions and specification of the Bidding Documents without material deviation. A material deviation is one which affects in any substantial way the scope, quality or performance of the works, or which limits in any substantial way, inconsistent with the Bidding Documents, the OWNER's rights or the Bidder's obligations as envisaged in the Bidding Documents, and the rectification of which deviation or reservation would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.
- 28.4 The Owner will carry out a detailed evaluation of the bids previously determined to be responsive in order to determine whether the technical aspects are in accordance with the requirements set forth in the Bidding Documents on the basis of details/documents submitted by the bidder in the bid at 1<sup>st</sup> instance. In order to reach such a determination, the Owner / EIL will examine and compare the technical aspects of the bids on the basis of the information supplied by the bidders, taking into account the following factors:



- (a) Overall completeness and compliance with the Technical Specifications; quality, function and operation of any process control concept included in the bid. The bid that does not meet minimum acceptable standard of completeness/ specifications defined in the bid document, consistency and detail will be rejected as non-responsive.
- (b) Any other relevant factor, if any that OWNER / EIL deems necessary or prudent to be taken into consideration.
- 28.5 No stipulation, deviation, terms & conditions, presumption, basis etc. shall be stipulated in the bid. Any conditions, if stipulated, shall be treated as null and void and shall render the bid liable for rejection.
- 28.6 OWNER / EIL, if necessary, will obtain clarifications on the Bid by requesting for such information / clarifications from any or all Bidders, either in writing or through personal contact, All responses shall be in writing, and no change in the price or substance of the bid shall be permitted unless specifically sought by OWNER / EIL.
- 28.7 **UNSOLICITED POST TENDER MODIFICATIONS**
- Bidders are advised to quote strictly as per terms and conditions of the bidding document and not to stipulate any deviations/exceptions. Once quoted, the bidder shall not make any subsequent price changes, whether resulting or arising out of any technical / commercial clarifications sought on any deviations or exceptions mentioned in the bid. Similarly, no revision in quoted price shall be allowed should the deviations stipulated by him are not accepted by Owner and are required to be withdrawn by him in favour of stipulation of the bidding document. Any proposed price changes is likely to render the bid liable for rejection.
- In case of unsolicited price increase, such offer(s) of the Bidders shall be rejected. In case of unsolicited price decrease, the Bidder(s)'s offer shall be compared as per originally quoted prices and if the Bidder happens to be the recommended Bidder, the decrease in prices shall be taken into account for ordering.
- 28.8 **COMPLETE SCOPE OF WORK**
- The complete scope of work has been defined in the bidding document. Only those bidders who take complete responsibility for the complete scope of work as contained in the bidding document shall be considered as acceptable.
- 29.0 ***OPENING OF PRICE BID***
- 29.1 Priced commercial part of only those bidders shall be opened whose bids is determined to be technically and commercially acceptable to the OWNER / EIL. Bidders selected for opening of their price bids shall be informed about the date of price bid opening. Bidders may depute their authorised representative to attend the opening. During price bid opening, only total price and rebate, if any, as quoted by the bidders shall be read out.
- 30.0 ***ARITHMETIC CORRECTIONS***
- The bids will be checked for any arithmetic errors.
- 31.0 ***EVALUATION OF PRICE BIDS***
- 31.1 Based on percentage increase/decrease to the estimated cost as per FORM SP-1, total quoted price will be calculated. Work shall be awarded to the bidder whose total evaluated price is the lowest.
- 31.2 Conditional discount, if offered, shall not be considered for evaluation.

- 31.3 Any uncalled for lump sum / percentage or adhoc reduction / increase in prices, offered by the Bidders after submission of price Bid, shall not be considered. However, if reduction is from the recommended Bidder, such reduction shall be taken into account for arriving at the contract value. The Percentage increase/decrease quoted shall be applicable for all items of the tender without exception. The offers of vendors quoting separate/different rates and/or separate/different percentages for different items, shall be summarily rejected, without reference to/correspondence with the vendor.
- 31.4 In case percentage increase/decrease in prices etc. are not filled up in the Priced Bid (Summary of Prices) and are not as per the requirements of the Bidding document, the same shall not be considered for evaluation.
- 31.5 Optional items shall not be considered for the purpose of arriving at the total cost. However, in case the rates quoted by the selected Bidder for optional items are considered high, the same shall be negotiated.
- 31.6 Purchase Preference to Central Public Sector Undertakings shall be allowed as per existing Government Policy. Price Preference shall be given to Small Scale Industry, registered with the NSIC, as per the provisions mentioned in IFB.
- 32.0 **CONTACTING THE OWNER**
- 32.1 Bidders are advised not to contact OWNER / EIL on any matter relating to its bid from the time of Bid opening to the time Contract is awarded, unless requested to in writing. Any effort by a Bidder to influence OWNER / EIL in any of the decision in respect of Bid evaluations or Award of Contract will result in the rejection of Bid.
- 33.0 **AWARD OF CONTRACT**
- 33.1 **OWNER'S RIGHT TO ACCEPT OR REJECT ANY BID**
- The Owner reserves the right to accept or reject any Bid and to annul the Bidding process and reject all Bids at any time prior to award of contract, without thereby incurring any liability to the affected Bidder or Bidders or without any obligation to inform the affected Bidder or Bidders of the grounds or the reasons for the Owner's action.
- 34.0 **NOTIFICATION OF AWARD**
- 34.1 The Owner will notify the successful Bidder in writing by Fax of Intent/ Acceptance / Letter of Acceptance that their bid has been accepted. The Letter of Acceptance will constitute the formation of a Contract. Contract Commitment Date starts from the date of Letter of Acceptance.
- 34.2 The Purchase Order shall consist of the following:
- i) Original Bidding Document along with its enclosures issued.
  - ii) Amendment/Corrigendum to original Bidding Document issued, if any.
  - iii) Fax/Letter of Intent/ Acceptance.
- 35.0 **CORRUPT AND FRAUDULENT PRACTICES**
- 35.1 Bidders are required to furnish the complete and correct information/ documents required for evaluation of their bids. If the information/ documents forming basis of evaluation is found to be false/ fake/ forged, the same shall be considered adequate ground for rejection of the bids.
- 35.2 EIL requires that the Contractor observes the highest standard of ethics during the execution of Contract. In pursuance of this policy, EIL defines, for the purposes of this provision, the terms set forth below as follows:

- (a) "Corrupt Practice" means the offering, giving, receiving, or soliciting of anything of value to influence the action of public official in contract execution; and
- (b) "Fraudulent Practice" means a misrepresentation of facts in order to influence the execution of a Contract to the detriment of EIL, 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 EIL of the benefits of free and open competition.
- (c) "False/Fake" means to make or construct falsely. "Faked alibi" is a made, manufactured, or false alibi. Something that is not what is purports to be; counterfeit, an imposter.
- (d) "Forgery" means the false making or the material altering of a document with the intent to defraud. A signature of a person that is made without the person's consent and without the person otherwise authorizing it. A person is guilty of forgery if, with the purpose to defraud or injure anyone or with knowledge that he is facilitating a fraud or injury to be perpetrated by anyone, the actor (i) alters any writing of another without his authority (ii) makes, completes, authenticates, executes, issues or transfers any writing, so that it purports to be the act of another who did not authorize that act or to have been executed at a time or place or in a numbered sequence other than was in fact the case, or to, be a copy of an original when no such original exists. Utters any writing which he knows to be false in a manner specified in (i) & (ii) above.
- 35.3 EIL may terminate the Contract if it discovers subsequently that the Contractor had engaged in Corrupt Practices or Fraudulent Practices in competing for the Contract.
- 35.4 The Contractor is required to execute the "Integrity Pact" attached in the Bid Document as a condition precedent to execution of the Contract.
- 35.5 In case, the information/ document furnished by the Contractor forming basis of evaluation of its Bid is found to be false / fake/ forged after the award of the Contract, EIL/HPCL shall have the right to terminate the Contract and get the remaining Works executed by a third party at the risk & Cost of the Contractor and without any prejudice to other rights available to EIL/HPCL under the Contract such as forfeiture of the Contract Performance Bank Guarantee, withholding of payment etc.
- 35.6 In case, this issue of submission of false/fake documents comes to the notice after execution of the Works, EIL/HPCL shall have full right to forfeit any amount due to the Contractor along with forfeiture of the Contract Performance Bank Guarantee furnished by the Contractor.
- 35.7 Further, any Contractor which is found guilty of any Corrupt or Fraudulent Practice or submission of false/fake /forged documents, shall be put on the negative/ holiday list of EIL/HPCL debarring them from future business with EIL.
- 36.0 **COMPOSITE PERFORMANCE BANK GUARANTEE (CPBG)**
- 36.1 Within FIFTEEN (15) days from the date of notification of award of works by the Owner, the successful Bidder shall furnish the required CPBG for an amount equal to ten percent of the total Contract Price in the form of a Bank Guarantee issued by a Nationalized / Scheduled Bank (excluding co-operative banks) in favour of HPCL in accordance with the proforma enclosed with General Conditions of Contract. CPBG shall be valid upto a period of 3 months beyond the expiry of Defect Liability Period.

- 36.2 Failure of the successful bidder to comply with requirement of clauses 34.0 and 36.1 above shall constitute sufficient grounds for annulment of the award of work and forfeiture of EMD.

# **PROPOSAL FORMS**

**FORMAT FOR DETAILS OF SIMILAR WORK DURING PAST .....YEARS**

S. No	Description of the Goods/works/ Services	FOA / LOA/PO/ WO No. and date	Full Postal Address & phone nos. of Client. <i>Name, designation and address of Engineer/ Officer-in-Charge (for cases other than purchase)</i>	Value of Contract/ Order (Specify Currency Amount)	Date of Commencement of Work/ Services or supply of goods	Scheduled Completion Time (Months) Delivery Schedule	Date of Actual Completion/ Supply	Reasons for delay in execution, if any
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PI refer instruction								

Place:  
Date:

[Signature of Authorized Signatory of Bidder]  
Name:  
Designation:  
Seal:

Instructions:

- 1) Bidders are expected to provide details of the work **meeting the Bidder Qualification criteria** which shall be considered for qualification purpose.
- 2) Copies of Letter of awards/ Order/ Work Orders and completion certificate for all the works mentioned above shall be furnished.
- 3) The said documents, as mentioned at Sl.no.2 above, shall be notarised by any Notary Public along with an affidavit from the bidder in the prescribed format or duly certified by the Statutory Auditor of the bidder or a practicing Chartered Accountant (not being an employee or a Director or not having any interest in the bidder's company/ firm) where audited accounts are not mandatory as per law.
- 4) It may be noted that in the absence of above certificates, the details would be considered inadequate and could lead to the bid being considered ineligible for further evaluation.

**AFFIDAVIT**

AFFIDAVIT OF ....., S/o D/o \_\_\_\_\_, resident of \_\_\_\_\_  
EMPLOYED AS \_\_\_\_\_ AS..... WITH.....  
HAVING OFFICE AT..... PIN.....

I, the above named deponent do hereby solemnly affirm and state as under:-

1. That I am the authorized representative and signatory of M/s.....
2. That the document (s) submitted, as mentioned hereunder, by M/s ..... alongwith the Bid Document submitted under covering letter no. .... dated ..... towards Tender No. .... for..... (Project) has / have been submitted under my knowledge.

Sr. No.	Document Reference no. & date	Document subject	Issuing Authority

3. That the document(s) submitted, as mentioned above, by M/s ..... alongwith the Bid Document for meeting the Bid Qualification Criteria thereunder, vide covering letter no. .... dated ....., towards Tender No. .... for ..... are authentic, vide covering letter of their originals and have been issued by the issuing authority mentioned above and no part of the document(s) is false, forged or fabricated.
4. That no part of this affidavit is false and that this affidavit and the above declaration in respect of genuineness of the documents has been made having full knowledge of (i) the provisions of the Indian Panel Code in respect of offences including, but not limited to those pertaining to criminal breach of trust, cheating and fraud and (ii) provisions of bidding conditions which entitle the Owner / EIL to initiate action in the event of such declaration turning out to be a misrepresentation or false representation.
5. I depose accordingly.

**DEPONENT**

**VERIFICATION**

I, ..... the deponent above named do hereby verify that the factual contents of this affidavit are true and correct. No part of it is false and nothing material has been concealed there from.  
Verified at ..... on this ..... day of .....20....

**DEPONENT**

**FORMAT FOR  
FINANCIAL CAPABILITY OF THE BIDDER**

**A. ANNUAL TURNOVER OF LAST 3 YEARS:**

Year	Amount (Currency)
Year 1:	
Year 2:	
Year 3:	

**B. NET WORTH FOR LAST AUDITED FINANCIAL YEAR:**

[Signature of Authorized Signatory]  
Name:  
Designation:  
Seal:



**PRESENT COMMITMENTS** AS ON .....  
(Specify the Date)

SR. NO.	FULL POSTAL ADDRESS OF CLIENT & NAME OF OFFICER- IN- CHARGE	DESCRIPTION OF THE WORK	VALUE OF CONTRACT (IN RUPEES)	DATE OF COMMEN- CEMENT OF WORK	SCHEDULED COMPLETION PERIOD	%AGE COMPLETION AS ON DATE	EXPECTED DATE OF COMPLETION	REMARKS

**SIGNATURE OF BIDDER** : \_\_\_\_\_  
**NAME OF BIDDER** : \_\_\_\_\_  
**COMPANY SEAL** : \_\_\_\_\_

**COMPLIANCE TO BID REQUIREMENT**

We M/s \_\_\_\_\_ hereby agree to fully comply with, abide by and accept without variation, deviation or reservation all technical, commercial and other conditions whatsoever of the Bidding Documents and Addendum to the Bidding Documents, if any, for subject work issued by Engineers India Limited.

We hereby further confirm that any terms and conditions if mentioned in our bid (Un-priced as well as Priced Part), shall not be recognised and shall be treated as null and void.

**SIGNATURE OF BIDDER** : \_\_\_\_\_  
**NAME OF BIDDER** : \_\_\_\_\_  
**COMPANY SEAL** : \_\_\_\_\_

**CHECK LIST FOR SUBMISSION OF BID**

Bidder is requested to fill this check list and ensure that all details/documents have been furnished as called for in the Bidding Document along with duly filled in, signed & stamped check list **with each copy of the "Unpriced bid (Part – I)"**.

**Please tick the box and ensure compliance:**

**(A) UNDER SECTION –I**

(A.1) Bid Forwarding Letter

Submitted

(A.2) BID DOCUMENT FEE (in case of download)

SUBMITTED BY DEMAND DRAFT

DD No. \_\_\_\_\_ Dt. \_\_\_\_\_

Drawn on \_\_\_\_\_

For Rs. \_\_\_\_\_

(A-3) EMD/ BID BOND / BID SECURITY

Bidder to confirm that EMD/ Bid Bond/ Bid Security has been submitted by them as per Tender Proforma.

Submitted

(1) BY BANK GUARANTEE

BG No. \_\_\_\_\_ Dt. \_\_\_\_\_ From

Bank \_\_\_\_\_ Branch \_\_\_\_\_

For Rs. \_\_\_\_\_

Valid till \_\_\_\_\_

(2) BY DEMAND DRAFT

DD No. \_\_\_\_\_ Dt. \_\_\_\_\_

Drawn on \_\_\_\_\_

For Rs. \_\_\_\_\_

(3) Registration Certificate from NSIC for similar works(if applicable)

Submitted

(A.4) Power of Attorney in Favour of the bid signatory.

Submitted

**(B) UNDER SECTION -2**

(B.1) Experience details as per FORM-A

Submitted

(B.2) Financial Details as per FORM-C

Submitted

(B.3) Audited Financial year Statements including Balance Sheet, profit and loss account and all other schedules submitted for the last three years.

YES

NO

(B.4) Present Commitments as per FORM-D

Submitted

(B.6) Partnership Deed in case of partnership firm and Article of Association in case of limited company. In case of a proprietorship firm, the name and address of proprietor, and certified copy of 'Certificate of Registration of firm'

Submitted

(B.8) Declaration regarding PF as per FORM-J.

Submitted

**C) UNDER SECTION - 3**

(C.1) Compliance to Bid Requirement as per FORM-E.

Submitted

(C.3) Reply to commercial questionnaire as per FORM-G with Bidder's reply/ confirmation for each Sl. No.

Submitted

(C.4) Reply to Technical questionnaire (if enclosed in bidding document) with Bidder's Reply/ Confirmation for each Sl. No.

Submitted

(C.5) Declaration by Bidder as per FORM-I.

Submitted

(C.6) Unpriced copy of Price Part i.e. Summary of Prices with prices replaced by word "Quoted"

Submitted

**(D) UNDER SECTION – 4**

(D.1) Technical Details/ Documents specified in Bidding Document.

Submitted

Not Applicable

**(E) CONFIRM THE FOLLOWING**

(E.1) Master Index of Bidding Document, Compliance Letter for Addendum/ Amendment, if any, has been submitted along with offer, duly signed and stamped on each page.

YES

(E.2) All Documents pertaining to experience criteria are duly certified by the Statutory auditor/chartered accountant/notarised by the bidder

YES

(E.3) Integrity Pact duly filled in, signed & stamped

Submitted

YES

**SIGNATURE OF BIDDER** : \_\_\_\_\_  
**NAME OF BIDDER** : \_\_\_\_\_  
**COMPANY SEAL** : \_\_\_\_\_

**COMMERCIAL QUESTIONNAIRE**

Bidder's reply/ confirmation as furnished in the Commercial Questionnaire (CQ) shall supersede the stipulations mentioned elsewhere in their bid.

<b>SL. NO.</b>	<b>EIL'S QUERY</b>	<b>BIDDER'S REPLY/ CONFIRMATION</b>
1.0	Confirm that your Bid is valid for 04 (Four) months from the date of opening of Unpriced Part of Bid.	
2.0	Confirm that Earnest Money Deposit (EMD) as per bid stipulations have been furnished along with bid.	
3.0	Confirm that Integrity Pact as per bid stipulations have been furnished along with bid.	
4.0	Confirm your compliance to total Scope of Work mentioned in the Bidding Document.	
5.0	Confirm that the following documents are submitted with Part-I:	
a)	All documents as per CHECK LIST.	
b)	Master Index as issued is submitted in unpriced part duly signed and stamped on each page.	
c)	Compliance letter for Addendum / Amendments as a token of acceptance (Applicable, if issued).	
6.0	Confirm your compliance to critical stipulations of Bidding Document as mentioned in ITB/NIB	
7.0	Schedule of Rates/Price	
a)	Confirm that the Price Part of Bid as per Price Schedule format enclosed with Bidding Document has been duly filled.	
b)	Confirm that the quoted price is for complete scope of work, supply of all material, labour, consumables etc. construction, erection, testing, commissioning, performance guarantee test run(s) and supply of spare parts as applicable as per the Scope of Work.	
8.0	Confirm that you have studied complete Bidding Document and your Bid is in accordance with the requirements of the Bidding Document.	
9.0	Confirm your acceptance for 'Scope of Supply' mentioned in the Bidding Document and confirm that all materials shall be supplied as per Standards and Specification.	
10.0	Confirm your acceptance for Time Schedule as	

SL. NO.	EIL'S QUERY	BIDDER'S REPLY/ CONFIRMATION
	mentioned in Bidding Document.	
11.0	Confirm that your quoted price includes all taxes, duties as applicable for this Work including Service Tax in accordance with the provision of SCC.	
12.0	Confirm that your quoted price includes all types of insurance as per the provisions of SCC.	
13.0	Confirm that all costs resulting from safe execution of Work, such as safety induction, use of protective clothing, safety glasses and helmet, safety precaution taken during monsoon, or any other safety measures to be undertaken by the Contractor for execution of work are included in the quoted rates.	
14.0	Confirm that adequate numbers of construction equipments, tools, tackles etc. shall be deployed to complete the work as per the time schedule.	
15.0	Confirm that you shall deploy adequate project/site organisation with qualified supervisory personnel having requisite experience including personnel responsible for safety, planning, stores, QA/QC etc.	
16.0	Confirm that while submitting your price, you have taken consideration of scope of supplies, scope of work and technical requirement mentioned in Bidding Document.	
17.0	Confirm that you have your own QA/QC programme for executing this work. In case of award of work, you will submit all QA/QC documents as given in the SCC.	
18.0	Confirm that Bidder is not involved in any Litigation/ Arbitration with OWNER. In case of Litigation / Arbitration, if any, please furnish information about the same.	
19.0	Confirm that Bidder is not under Liquidation, court receivership or similar proceedings.	
20.0	Confirm that the Bidder has not been banned OR delisted by any Government or Quasi Government agencies or Public Sector Units.	

**SIGNATURE OF BIDDER :** \_\_\_\_\_  
**NAME OF BIDDER :** \_\_\_\_\_  
**COMPANY SEAL :** \_\_\_\_\_

**BIDDER'S QUERIES**

SL. NO.	BIDDING DOCUMENT			SUBJECT	BIDDER'S QUERY	OWNER'S REPLY
	PART / VOL.	PAGE NO.	CLAUSE NO.			

**NOTE :**

1. Bidder's Queries may be sent by fax to fax numbers 011-26191714, 26167664 and also by e-mail to [kn.mahapatra@eil.co.in](mailto:kn.mahapatra@eil.co.in) / [vandana@eil.co.in](mailto:vandana@eil.co.in)
2. Technical & Commercial queries, if any, must be submitted separately in editable format as per this format.

**SIGNATURE OF BIDDER** : \_\_\_\_\_  
**NAME OF BIDDER** : \_\_\_\_\_  
**COMPANY SEAL** : \_\_\_\_\_



**DECLARATION BY THE BIDDER**

We \_\_\_\_\_ (Name of the Bidder) hereby confirm that we have gone through and understood the Bidding Document and that our Bid has been prepared accordingly in compliance with the requirement stipulated in the said documents.

We are submitting Master Index of Bidding Document as part of our Bid duly signed and stamped on each page in token of our acceptance. We undertake that the Bidding Document shall be deemed to form part of our bid and in the event of award of work to us, the same shall be considered for constitution of Contract Agreement. Further, we shall sign and stamp each page of this bidding document as a token of Acceptance and as a part of the Contract in the event of award of Contract to us.

We further confirm that we have indicated prices in Summary of Prices, considering detailed description of Items given in Schedule of Rates and submitted in Price Bid in separate envelope. We confirm that rate quoted by us includes price for all works/activities/supply etc. as mentioned in Item Description of the respective Item(s) in Schedule of Rates.

**SIGNATURE OF BIDDER** : \_\_\_\_\_  
**NAME OF BIDDER** : \_\_\_\_\_  
**COMPANY SEAL** : \_\_\_\_\_

**NOTE** : This declaration should be signed by the Bidder's representative who is signing the Bid.

**DETAILS OF P.F. REGISTRATION**

Bidder to furnish details of Provident Fund Registration :

PF REGISTRATION NO. :

DISTRICT & STATE :

We hereby confirm that the above PF Account is under operation presently and shall be used for all PF related activities for the labour engaged by us in the present work (if awarded to us).

**SIGNATURE OF BIDDER** : \_\_\_\_\_  
**NAME OF BIDDER** : \_\_\_\_\_  
**COMPANY SEAL** : \_\_\_\_\_

**BIDDER'S GENERAL INFORMATION**

To  
Engineers India Limited,  
1, Bhikaiji Cama Place,  
R.K. Puram, New Delhi -110066  
India

1-1 Bidder Name: \_\_\_\_\_

1-2 Number of Years in Operation: \_\_\_\_\_

1-3 Address of Registered Office: \_\_\_\_\_

City \_\_\_\_\_ District \_\_\_\_\_

State \_\_\_\_\_ PIN/ZIP \_\_\_\_\_

1-4 Operation Address  
if different from above: \_\_\_\_\_

City \_\_\_\_\_ District \_\_\_\_\_

State \_\_\_\_\_ PIN/ZIP \_\_\_\_\_

1-5 Telephone Number: \_\_\_\_\_

(Country Code) (Area Code) (Telephone Number)

1-6 E-mail address: \_\_\_\_\_

1-7 Website: \_\_\_\_\_

1-8 Fax Number: \_\_\_\_\_

(Country Code) (Area Code) (Telephone Number)

1-9 ISO Certification, if any {If yes, please furnish details}

1-10 Banker's Name : \_\_\_\_\_

1-11 Branch : \_\_\_\_\_

1-12 Branch Code : \_\_\_\_\_

1-13 Bank account number : \_\_\_\_\_

1-14 Excise Registration number : \_\_\_\_\_

1-15 Excise Range : \_\_\_\_\_

1-16 Excise Division : \_\_\_\_\_

1-17 Excise Collectorate : \_\_\_\_\_

1-18 Service Tax Registration No. \_\_\_\_\_

1-19 Local ST No. : \_\_\_\_\_

1-20 CST No. : \_\_\_\_\_

1-21 PAN No. : \_\_\_\_\_

1-22 Whether SSI Registered Or not : \_\_\_\_\_

(SIGNATURE OF BIDDER WITH SEAL)

**BANK ACCOUNT PARTICULARS**

1. BIDDER'S NAME :
2. ADDRESS OF BIDDER :
3. PARTICULAR OF BANK ACCOUNT :
  - a). NAME OF THE BANK
  - b). NAME OF THE BRANCH
  - c). BRANCH CODE
  - d). ADDRESS OF THE BANK
  - e). 9 DIGIT CODE NUMBER OF THE BANK & BRANCH  
(as appearing in MICR Cheque issued by the Bank)
  - f). TYPE OF ACCOUNT (SB, CURRENT, CASH, CREDIT)
  - g). ACCOUNT NUMBER
  - h). WHETHER BRANCH IS RTGS/INTERNET ENABLED  
(if yes, then Bank's IFSC Code number)

I hereby declare that the particulars given above are correct and complete and accord our consent for receiving payment through electronic mechanism.

( \_\_\_\_\_ )  
Signature of the authorised signatory(ies) & Designation

Place:

Date:

Official seal of the company

**BANK CERTIFICATION**

Certified that the particulars furnished above are correct as per our records.

Bank's Stamp

Place:

Date:

bank

Signature of the authorised official of the

## SPECIMEN

## # ARBITRATION CLAUSE

- 1) All disputes and differences of whatsoever nature, whether existing or which shall at any time arise between the parties hereto touching or concerning the agreement, meaning, operation or effect thereof or to the rights and liabilities of the parties or arising out of or in relation thereto whether during or after completion of the contract or whether before after determination, foreclosure, termination or breach of the agreement (other than those in respect of which the decision of any person is, by the contract, expressed to be final and binding) shall, after written notice by either party to the agreement to the other of them and to the Appointing Authority hereinafter mentioned, be referred for adjudication to the Sole Arbitrator to be appointed as hereinafter provided.
- ® 2) **The appointing authority shall either himself act as the Sole Arbitrator or nominate some officer/retired officer of Hindustan Petroleum Corporation Limited (referred to as owner or HPCL) or a retired officer of any other Government Company in the Oil Sector of the rank of Ch. Manager & above or any retired officer of the Central Government not below the rank of a Director, to act as the Sole Arbitrator to adjudicate the disputes and differences between the parties. The contractor/vendor shall not be entitled to raise any objection to the appointment of such person as the Sole Arbitrator on the ground that the said person is/was an officer and/or shareholder of the owner, another Govt. Company or the Central Government or that he/she has to deal or had dealt with the matter to which the contract relates or that in the course of his/her duties, he/she has/had expressed views on all or any of the matters in dispute or difference.**
- ® 3) **In the event of the Arbitrator to whom the matter is referred to, does not accept the appointment, or is unable or unwilling to act or resigns or vacates his office for any reasons whatsoever, the Appointing Authority aforesaid, shall nominate another person as aforesaid, to act as the Sole Arbitrator.**
- ® 4) **Such another person nominated as the Sole Arbitrator shall be entitled to proceed with the arbitration from the stage at which it was left by his predecessor. It is expressly agreed between the parties that no person other than the Appointing Authority or a person nominated by the Appointing Authority as aforesaid, shall act as an Arbitrator. The failure on the part of the Appointing Authority to make an appointment on time shall only give rise to a right to a Contractor to get such an appointment made and not to have any other person appointed as the Sole Arbitrator.**

- 5) The Award of the Sole Arbitrator shall be final and binding on the parties to the Agreement.
- 6) The work under the Contract shall, however, continue during the Arbitration proceedings and no payment due or payable to the concerned party shall be withheld (except to the extent disputed) on account of initiation, commencement or pendency of such proceedings.
- 7) The Arbitrator may give a composite or separate Award(s) in respect of each dispute or difference referred to him and may also make interim award(s) if necessary.
- ® 8) The fees of the Arbitrator and expenses of arbitration, if any, shall be borne equally by the parties unless the Sole Arbitrator otherwise directs in his award with reasons. **The lumpsum fees of the Arbitrator shall be ₹ 40,000/- per case for transportation contracts and ₹ 60,000/- for engineering contracts and if the sole Arbitrator completes the arbitration including his award within 5 months of accepting his appointment, he shall be paid ₹ 10,000/- additionally as bonus. Reasonable actual expenses for stenographer, etc. will be reimbursed. Fees shall be paid stagewise i.e. 25% on acceptance, 25% on completion of pleadings/documentation, 25% on completion of arguments and balance on receipt of award by the parties.**
- 9) Subject to the aforesaid, the provisions of the # Arbitration and Conciliation Act, 1996 or any statutory modification or re-enactment thereof and the rules made thereunder, shall apply to the Arbitration proceedings under this Clause.
- 10) The Contract shall be governed by and constructed according to the laws in force in India. The parties hereby submit to the exclusive jurisdiction of the Courts situated at \_\_\_\_\_ (say Mumbai\*) for all purposes. The Arbitration shall be held at \_\_\_\_\_ (preferably the location where the work is being carried out, or nearest major controlling city or from where PO is placed, say Mumbai\*) and conducted in English language.
- 11) The Appointing Authority is the Functional Director\*\* of Hindustan Petroleum Corporation Limited.

(Note:- \* = Delete the bracketed portions after mentioning the correct place. )

\*\* Purchasing authorities may mention, if considered necessary, the proper designation such as Director-Refineries, etc.

## (SPECIMEN)

**GENERAL TERMS & CONDITIONS OF WORKS CONTRACT****1 PRELIMINARY**

- 1.1 This is a Contract for execution of \_\_\_\_\_ work at \_\_\_\_\_ . (please fill up the blanks)
- 1.2 The tenderer for the abovementioned item of work is \_\_\_\_\_ . (please give the name and address of the tenderer)
- 1.3 The terms and conditions mentioned hereunder are the terms and conditions of the Contract for the execution of the work mentioned under item 1.1 above.
- 1.4 It is the clear understanding between Hindustan Petroleum Corporation Limited and the tenderer \_\_\_\_\_ that (name and address of the tenderer) in case the tender of \_\_\_\_\_ is (name and address of the tenderer) accepted by Hindustan Petroleum Corporation Limited and an intimation to that effect is so issued and also a Purchase Order is placed with \_\_\_\_\_ (name and address of the tenderer) this document will be termed as a Contract between the parties and terms and conditions hereunder would govern the parties interest.
- 1.5 Interpretation of Contract Documents: All documents forming part of the Contract are to be taken mutually explanatory. Should there be any discrepancy, inconsistency, error or omission in the contract, the decision of the Owner/Engineer-in-Charge/Site-in-Charge shall be the final and the contractor shall abide by the decision. The decision shall not be arbitrable. Works shown upon the drawings but not mentioned in the specification or described in the specifications without being shown on the drawings shall nevertheless be deemed to be included in the same manner as if they are shown in the drawings and described in the specifications.



- 1.6 Special conditions of Contract : The special conditions of contract, if any provided and whenever and wherever referred to shall be read in conjunction with General Terms and Conditions of contract, specifications, drawings, and any other documents forming part of this contract wherever the context so requires. Notwithstanding the subdivision of the documents into separate sections, parts volumes, every section, part or volume shall be deemed to be supplementary or complementary to each other and shall be read in whole. In case of any misunderstanding arising the same shall be referred to decision of the Owner/Engineer-in-Charge/Site-in-Charge and their decision shall be final and binding and the decision shall not be arbitrable.

It is the clear understanding that wherever it is mentioned that the Contractor shall do/perform a work and/or provide facilities for the performance of the work, the doing or the performance or the providing of the facilities is at the cost and expenses of the work not liable to be paid or reimbursed by the Owner.

## 2. DEFINITIONS

In this contract unless otherwise specifically provided or defined and unless a contrary intention appears from the contract the following words and expressions are used in the following meanings;

- 2.1 The term "Agreement" wherever appearing in this document shall be read as "Contract".
- 2.2 The "Authority" for the purpose of this Contract shall be the **Chairman and Managing Director** or any other person so appointed or authorised.
- 2.3 The "**Chairman and Managing Director**" shall mean the Chairman and Managing Director of HINDUSTAN PETROLEUM CORPORATION LIMITED or any person so appointed, nominated or designated and holding the office of Chairman & Managing Director.
- 2.4 The "**Change Order**" means an order given in writing by the Engineer-in-Charge or by Owner to effect additions to or deletion from or alterations into the Work.
- 2.5 The "**Construction Equipment**" means all appliances and equipment of whatsoever nature for the use in or for the execution, completion, operation or maintenance of the work except those intended to form part of the Permanent Work.
- 2.6 The "**Contract**" between the Owner and the Contractor shall mean and include all documents like enquiry, tender submitted by the contractor and the purchase order issued by the owner and other documents connected with the issue of the purchase order and orders, instruction, drawings, change orders, directions issued by the Owner/Engineer-in-Charge/Site-in-Charge for the execution, completion and commissioning of the works and the period of contract mentioned in the Contract

including such periods of time extensions as may be granted by the owner at the request of the contractor and such period of time for which the work is continued by the contractor for purposes of completion of the work.

- 2.7 **"The Contractor"** means the person or the persons, firm or Company whose tender has been accepted by the Owner and includes the Contractor's legal heirs, representative, successor(s) and permitted assignees.
- 2.8 The **"Drawings"** shall include maps, plans and tracings or prints thereof with any modifications approved in writing by the Engineer-in-Charge and such other drawings as may, from time to time, be furnished or approved in writing by the Engineer-in-Charge.
- 2.9 The **"Engineer-in-Charge or Site-in-Charge"** shall mean the person appointed or designated as such by the Owner and shall include those who are expressly authorised by the owner to act for and on its behalf.
- 2.10 **"The Owner"** means the **HINDUSTAN PETROLEUM CORPORATION LIMITED** incorporated in India having its Registered office at **PETROLEUM HOUSE, 17, JAMSHEDJI TATA ROAD, BOMBAY - 400020** and Marketing office at \_\_\_\_\_ or their successors or assignees.
- 2.11 The **"Permanent Work"** means and includes works which form a part of the work to be handed over to the Owner by the Contractor on completion of the contract.
- 2.12 The **"Project Manager"** shall mean the Project Manager of **HINDUSTAN PETROLEUM CORPORATION LIMITED**, or any person so appointed, nominated or designated.
- 2.13 The **"Site"** means the land on which the work is to be executed or carried out and such other place(s) for purpose of performing the Contract.
- 2.14 The **"Specifications"** shall mean the various technical and other specifications attached and referred to in the tender documents. It shall also include the latest editions, including all addenda/corrigenda or relevant Indian Standard Specifications and Bureau Of Indian Standards.
- 2.15 The **"Sub-Contractor"** means any person or firm or Company (other than the Contractor) to whom any part of the work has been entrusted by the Contractor with the prior written consent of the Owner/Engineer-in-Charge/Site-in-Charge and their legal heirs, representatives, successors and permitted assignees of such person, firm or Company.
- 2.16 The **"Temporary Work"** means and includes all such works which are a part of the contract for execution of the permanent work but does not form part of the permanent

work confirming to practices, procedures applicable rules and regulations relevant in that behalf.

2.17 The "Tender" means the document submitted by a person or authority for carrying out the work and the Tenderer means a person or authority who submits the tender offering to carry out the work as per the terms and conditions.

2.18 The "Work" shall mean the works to be executed in accordance with the Contract or part thereof as the case may be and shall include extra, additional, altered or substituted works as maybe required for the purposes of completion of the work contemplated under the Contract.

### **3. SUBMISSION OF TENDER**

3.1 Before submitting the Tender, the Tenderer shall at their own cost and expenses visit the site, examine and satisfy as to the nature of the existing roads, means of communications, the character of the soil, state of land and of the excavations, the correct dimensions of the work facilities for procuring various construction and other material and their availability, and shall obtain information on all matters and conditions as they may feel necessary for the execution of the works as intended by the Owners and shall also satisfy of the availability of suitable water for construction of civil works and for drinking purpose and power required for fabrication work etc. Tenderer, whose tender may be accepted and with whom the Contract is entered into shall not be eligible and be able to make any claim on any of the said counts in what so ever manner for what so ever reasons at any point of time and such a claim shall not be raised as a dispute and shall not be arbitrable.

® **A pre-bid meeting may be held as per the schedule mentioned in the tender.**

3.2 The Tenderer shall be deemed to have satisfied fully before tendering as to the correctness and sufficiency of his tender for the works and of the rates and prices quoted in the schedule of quantities which rates and prices shall except as otherwise provided cover all his obligations under the contract.

3.3 It must be clearly understood that the whole of the conditions and specifications are intended to be strictly enforced and that no work will be considered as extra work and allowed and paid for unless they are clearly outside the scope, spirit, meaning of the Contract and intent of the Owner and have been so ordered in writing by Owner and/or Engineer-in-Charge/Site-in-Charge, whose decision shall be final and binding.

3.4 Before filling the Tender the Contractor will check and satisfy all drawings and materials to be procured and the schedule of quantities by obtaining clarification from the Owner on all the items as may be desired by the Tenderer. No claim for any alleged loss or compensation will be entertained on this account, after submission of Tender by the Tenderer/Contractor and such a claim shall not be arbitrable.

- ®3.5 Unless specifically provided for in the tender documents or any Special Conditions, no escalation in the Tender rates or prices quoted will be permitted throughout the period of contract or the period of actual completion of the job whichever is later on account of any variation in prices of materials or cost of labour or due to any other reasons. Claims on account of escalation shall not be arbitrable.**
- 3.6 The quantities indicated in the Tender are approximate. The approved schedule of rates of the contract will be applicable for variations upto plus or minus 25% of the contract value. No revision of schedule of rates will be permitted for such variations in the contract value, including variations of individual quantities, addition of new items, alterations, additions/deletions or substitutions of items, as mentioned above. Quantities etc. mentioned and accepted in the joint measurement sheets shall alone be final and binding on the parties.
- 3.7 Owner reserve their right to award the contract to any tenderer and their decision in this regard shall be final. They also reserve their right to reject any or all tenders received. No disputes could be raised by any tenderer(s) whose tender has been rejected.
- 3.8 The Rates quoted by the Tenderer shall include Costs and expenses on all counts viz. cost of materials, transportation of machine(s), tools, equipments, labour, power, Administration charges, price escalations, profits, etc. etc. except to the extent of the cost of material(s), if any, agreed to be supplied by Owner and mentioned specifically in that regard in condition of Contract, in which case, the cost of such material if taken for preparation of the Contractor's Bill(s) shall be deducted before making payment of the Bill(s) of the Contractor. The description given in the schedule of quantities shall unless otherwise stated be held to include wastage on materials, carriage and cartage, carrying in and return of empties, hoisting, setting, fitting and fixing in position and all other expenses necessary in and for the full and complete execution and completion of works and in accordance with good practice and recognised principles in that regard.
- 3.9 Employees of the State and Central Govt. and employees of the Public Sector Undertakings, including retired employees are covered under their respective service conditions/rules in regard to their submitting the tender. All such persons should ensure compliance to the respective/applicable conditions, rules etc. etc. Any person not complying with those rules etc. but submitting the tender in violation of such rules, after being so noticed shall be liable for the forfeiture of the Earnest Money Deposit made with the tender, termination of Contract and sufferance on account of forfeiture of Security Deposit and sufferance of damages arising as a result of termination of Contract.
- ®3.10 In consideration for having a chance to be considered for entering into a contract with the Owner, the Tenderer agrees that the Tender submitted by him shall remain valid for the period prescribed in the tender conditions, from the date of opening of the tender. The Tenderer shall not be entitled during the said**

**validity period, to revoke or cancel the tender without the consent in writing from the Owner.**

In case the tenderer revokes or cancels the tender or varies any of terms of the tender without the Consent of the Owner, in writing, the Tenderer forfeits the right to the refund of the Earnest Money paid along with the tender.

- ®3.11 The prices quoted by the Tenderer shall be firm during the validity period of the bid and Tenderer agrees to keep the bid alive and valid during the said period. The Tenderers shall particularly take note of this factor before submitting their tender(s).**
- 3.12 The works shall be carried out strictly as per approved specifications. Deviations, if any, shall have to be authorised by the Engineer-in-Charge/Site-in-Charge in writing prior to implementing deviations. The price benefit, if any, arising out of the accepted deviation shall be passed on to the Owner. The decision of Engineer-in-Charge shall be final in this matter.
- 3.13 The contractor shall make all arrangements at his own cost to transport the required materials outside and inside the working places and leaving the premises in a neat and tidy condition after completion of the job to the satisfaction of Owner. All materials except those agreed to be supplied by the Owner shall be supplied by the contractor at his own cost and the rates quoted by the Contractor should be inclusive of all royalties, rents, taxes, duties, octroi, statutory levies, if any, etc. etc.
- 3.14 The Contractor shall not carry on any work other than the work under this Contract within the Owner's premises without prior permission in writing from the Engineer-in-Charge/Site-in-charge.
- 3.15 The Contractor shall be bound to follow and ensure compliance to all the safety and security regulations and other statutory rules applicable to the area. In the event of any damage or loss or sufference caused due to non-observance of such rules and regulations, the contractor shall be solely responsible for the same and shall keep the Owner indemnified against all such losses and claims arising from the same.
- 3.16 At any time after acceptance of tender, the Owner reserves the right to add, amend or delete any work item, the bill of quantities at a later date or reduce the scope of work in the overall interest of the work by prior discussion and intimation to the Contractor. The decision of Owner, with reasons recorded therefor, shall be final and binding on both the Owner and the Contractor. The Contractor shall not have right to claim compensation or damage etc. in that regard. The Owner reserves the right to split the work under this contract between two or more contractors without assigning any reasons.
- 3.17 Contractor shall not be entitled to sublet, sub contract or assign, the work under this Contract without the prior consent of the Owner obtained in writing.

3.18 All signatures in tender document shall be dated as well as all the pages of all sections of the tender documents shall be initialled at the lower position and signed, wherever required in the tender papers by the Tenderer or by a person holding Power of Attorney authorising him to sign on behalf of the tenderer before submission of tender.

3.19 The tender should be quoted in English, both in figures as well as in words. The rates and amounts tendered by the Tenderer in the Schedule of rates for each item and in such a way that insertion is not possible. The total tendered amount should also be indicated both in figures and words with the signature of tenderer.

® **If some discrepancies are found between the rates given in words and figures of the amount shown in the tender, the following procedure shall be applied :**

(a) **When there is a difference between the rates in figures and words, the rate which corresponds to the amount worked out by the tenderer shall be taken as correct.**

(b) **When the rate quoted by the tenderer in figures and words tallies but the amount is incorrect, the rate quoted by the tenderer shall be taken as correct.**

(c) **When it is not possible to ascertain the correct rate in the manner prescribed above the rate as quoted in words shall be adopted.**

3.20 All corrections and alterations in the entries of tender paper will be signed in full by the tenderer with date. No erasures or over writings are permissible.

3.21 Transfer of tender document by one intending tenderer to the another one is not permissible. The tenderer on whose name the tender has been sent only can quote.

# 3.22 The Tender submitted by a tenderer if found to be incomplete in any or all manner is liable to be rejected. The decision of the Owner in this regard is final and binding.

#### 4. **DEPOSITS**

##### a) **EARNEST MONEY DEPOSIT (EMD)**

The tenderer will be required to pay a sum as specified in the covering letter, as earnest money deposit alongwith the tender either thru a crossed demand draft or a non-revokable Bank Guarantee in favour of Hindustan Petroleum Corporation Limited, from any Scheduled Bank (other than a Co-Operative Bank) payable at Mumbai in favour of Hindustan Petroleum Corporation Limited, Mumbai in the proforma enclosed. The earnest money deposit will be refunded after finalisation of the contract.

**Note:** Public sector enterprises and small scale units registered with National Small Scale Industries are exempted from payment of Earnest Money Deposit. Small scale units registered with National Small Scale Industries should enclose a photocopy of their registration certificate with their quotation to make their quotation eligible for consideration. The Registration Certificate should remain valid during the period of the contract that may be entered into with such successful bidder. Such tenderers should ensure validity of the Registration Certificate for the purpose.

® b) **SECURITY DEPOSIT:**

The tenderer, with whom the contract is decided to be entered into and intimation is so given will have to make a security deposit of one percent (1%) of the total contract value in the form of account payee crossed demand draft drawn in favour of the Owner, within 15 days from the date of intimation of acceptance of their tender, failing which the Owner reserves the right to cancel the Contract and forfeit the EMD.

**1% of PO/Contract value as Security deposit will be acceptable in the form of Demand draft upto ₹ 50,000/- and in the form of Demand draft / Bank guarantee beyond ₹ 50,000/-.**

**Composite Performance Bank Guarantee (CPBG) for 10% of PO value towards Performance Bank Guarantee inclusive of Security Deposit shall be accepted (in lieu of deduction of retention money); such CPBG shall be valid upto a period of 3 months beyond the expiry of defect liability period.**

**Demand Draft should be drawn on Scheduled Banks, other than co-operative bank.**

5. **EXECUTION OF WORK**

All the works shall be executed in strict conformity with the provisions of the contract documents and with such explanatory details, drawings, specifications and instructions as may be furnished from time to time to the Contractor by the Engineer-in-Charge/ Site-in-Charge, whether mentioned in the Contract or not. The Contractor shall be responsible for ensuring that works throughout are executed in the most proper and workman- like manner with the quality of material and workmanship in strict accordance with the specifications and to the entire satisfaction of the Engineer-in- Charge/Site-in-Charge.

The completion of work may entail working in monsoon also. The contractor must maintain the necessary work force as may be required during monsoon and plan to execute the job in such a way the entire project is completed within the contracted time schedule. No extra charges shall be payable for such work during monsoon. It shall be the responsibility of the contractor to keep the construction

work site free from water during and off the monsoon period at his own cost and expenses.

For working on Sundays/Holidays, the contractor shall obtain the necessary permission from Engineer Incharge/Site Incharge in advance. The contractor shall be permitted to work beyond the normal hours with prior approval of Engineer-In-Charge/Site-In-Charge and the contractors quoted rate is inclusive of all such extended hours of working and no extra amount shall be payable by the owner on this account.

#### **5.a. SETTING OUT OF WORKS AND SITE INSTRUCTIONS**

- 5.a.1. The Engineer-in-Charge/Site-in-Charge shall furnish the Contractor with only the four corners of the work site and a level bench mark and the Contractor shall set out the works and shall provide an efficient staff for the purpose and shall be solely responsible for the accuracy of such setting out.
- 5.a.2. The Contractor shall provide, fix and be responsible for the maintenance of all necessary stakes, templates, level marks, profiles and other similar things and shall take all necessary precautions to prevent their removal or disturbance and shall be responsible for consequences of such removal or disturbance should the same take place and for their efficient and timely reinstatement. The Contractor shall also be responsible for the maintenance of all existing survey marks, either existing or supplied and fixed by the Contractor. The work shall be set out to the satisfaction of the Engineer-in-Charge/Site-in-Charge. The approval thereof or joining in setting out the work shall not relieve the Contractor of his responsibility.
- 5.a.3. Before beginning the works, the Contractor shall, at his own cost, provide all necessary reference and level posts, pegs, bamboos, flags ranging rods, strings and other materials for proper layout of the work in accordance with the scheme, for bearing marks acceptable to the Engineer-in-Charge/Site-in-Charge. The Centre longitudinal or face lines and cross lines shall be marked by means of small masonry pillars. Each pillar shall have distinct marks at the centre to enable theodolite to be set over it. No work shall be started until all these points are checked and approved by the Engineer-in-Charge/Site-in-Charge in writing. But such approval shall not relieve the contractor of any of his responsibilities. The Contractor shall also provide all labour, materials and other facilities, as necessary, for the proper checking of layout and inspection of the points during construction.
- 5.a.4. Pillars bearing geodetic marks located at the sites of units of works under construction should be protected and fenced by the Contractor.
- 5.a.5. On completion of works, the contractor shall submit the geodetic documents according to which the work was carried out.



- 5.a.6. The Engineer-in-Charge/Site-in-Charge shall communicate or confirm his instructions to the contractor in respect of the executions of work in a "work site order book" maintained in the office having duplicate sheet and the authorised representative of the contractor shall confirm receipt of such instructions by signing the relevant entries in the book.
- 5.a.7. All instructions issued by the Engineer-in-Charge/Site-in-Charge shall be in writing. The Contractor shall be liable to carry out the instructions without fail.
- 5.a.8. If the Contractor after receipt of written instruction from the Engineer-in-Charge/Site-in-Charge requiring compliance within seven days fails to comply with such drawings or 'instructions' or both as the Engineer-in-Charge/Site-in-Charge may issue, owner may employ and pay other persons to execute any such work whatsoever that may be necessary to give effect to such drawings or 'instructions' and all cost and expenses incurred in connection therewith as certified by the Engineer-in-Charge/ Site-in-Charge shall be borne by the contractor or may be deducted from amounts due or that may become due to the contractor under the contract or may be recovered as a debt.
- 5.a.9. The Contractor shall be entirely and exclusively responsible for the horizontal and vertical alignment, the levels and correctness of every part of the work and shall rectify effectually any errors or imperfections therein. Such rectifications shall be carried out by the Contractor, at his own cost.
- 5.a.10. In case any doubts arise in the mind of the Contractor in regard to any expressions, interpretations, statements, calculations of quantities, supply of material rates, etc. etc., the contractor shall refer the same to the Site-in-Charge/ Engineer-in-Charge for his clarification, instructions, guidance or clearing of doubts. The decision of the Engineer-in-Charge/Site-in-Charge shall be final and the contractor shall be bound by such a decision.
- 5.a.11. "The Contractor shall take adequate precautions, to ensure that his operations do not create nuisance or misuse of the work space that shall cause unnecessary disturbance or inconvenience to others at the work site".
- 5.a.12. "All fossils, coins articles of value of antiquity and structure or other remains of geological or archaeological discovered on the site of works shall be declared to be the property of the Owner and Contractor shall take reasonable precautions to prevent his workmen or any other persons from removing or damaging any such articles or thing and shall immediately inform the Owner/ Engineer-in-Charge/Site-in-Charge."
- 5.a.13. "Contractor will be entirely and exclusively responsible to provide and maintain at his expenses all lights, guards, fencing, etc. when and where even necessary or/as required by the Engineer-in-Charge/Site-in-Charge for the

protection of works or safety and convenience to all the members employed at the site or general public."

#### **5.b. COMMENCEMENT OF WORK**

The contractor shall after paying the requisite security deposit, commence work within 15 days from the date of receipt of the intimation of intent from the Owner informing that the contract is being awarded. The date of intimation shall be the date/day for counting the starting day/date and the ending day/date will be accordingly calculated. Penalty, if any, for the delay in execution shall be calculated accordingly.

Contractor should prepare detailed fortnightly construction programme for approval by the Engineer-in-Charge within one month of receipt of Letter Of Intent. The work shall be executed strictly as per such time schedule. The period of Contract includes the time required for testing, rectifications, if any, re-testing and completion of work in all respects to the entire satisfaction of the Engineer-in-Charge.

A Letter of Intent is an acceptance of offer by the Owner and it need not be accepted by the contractor. But the contractor should acknowledge a receipt of the purchase order within 15 days of mailing of Purchase Order and any delay in acknowledging the receipt will be a breach of contract and compensation for the loss caused by such breach will be recovered by the Owner by forfeiting earnest money deposit/bid bond.

#### **5.c. SUBLETTING OF WORK**

- 5.c.1. No part of the contract nor any share or interest thereof shall in any manner or degree be transferred, assigned or sublet, by the Contractor, directly or indirectly to any firm or corporation whatsoever, without the prior consent in writing of the Owner.
- 5.c.2. At the commencement of every month the Contractor shall furnish to the Engineer-in-charge/Site-in-Charge list of all sub-contractors or other persons or firms engaged by the Contractor.
- 5.c.3. The contract agreement will specify major items of supply or services for which the Contractor proposes to engage sub-Contractor/sub-Vendor. The contractor may from time to time propose any addition or deletion from any such list and will submit the proposals in this regard to the Engineer-in-charge/Designated officer-in-charge for approval well in advance so as not to impede the progress of work. Such approval of the Engineer-in-charge/Designated officer-in-charge will not relieve the contractor from any of his obligations, duties and responsibilities under the contract.
- 5.c.4. Notwithstanding any sub-letting with such approval as resaid and notwithstanding that the Engineer-in-Charge shall have received copies of any sub-contract, the

Contractor shall be and shall remain solely to be responsible for the quality and proper and expeditious execution of the works and the performance of all the conditions of the contract in all respects as if such subletting or sub-contracting had not taken place and as if such work had been done directly by the Contractor.

5.c.5 Prior approval in writing of the Owner shall be obtained before any change is made in the constitution of the contractor/Contracting agency otherwise contract shall be deemed to have been allotted in contravention of clause entitled "sub-letting of works" and the same action may be taken and the same consequence shall ensue as provided in the clause of "sub-letting of works".

#### 5.d EXTENSION OF TIME

- ® 1) **If the Contractor anticipates that he will not be able to complete the work within the contractual delivery/ completion date (CDD), then the Contractor shall make a request for grant of time extension clearly specifying the reasons for which he seeks extension of time and demonstrating as to how these reasons were beyond the control of the contractor or attributable to the Owner. This request should be made well before the expiry of the Contractual Delivery/ Completion Date (CDD).**
- 2) **If such a request for extension is received with a Bank Guarantee for the full Liquidated Damages amount calculated on the Total Contract Value, the concerned General Manager of the Owner shall grant a Provisional extension of time, pending a decision on the request.**
- 3) **The concerned General Manager of the Owner shall expeditiously decide upon the request for time extension and decide the levy of liquidated damages within a maximum period of 6 months from the CDD or date of receipt of the request, whichever is later.**
- 4) **Grant of any extension of time shall be by means of issuance of a Change Order.**
- 5) **In order to avoid any cash crunch to the Contractor, a Bank Guarantee could be accepted against LD, as stated above. Once a decision is taken, the LD shall be recovered from any pending bills or by encashment of the BG. Any balance sum of Contractor or the BG (if LD is fully recovered from the bills) shall be promptly refunded/returned to the Contractor.**

#### 5.e. SUSPENSION OF WORKS

5.e.1. Subject to the provisions of this contract, the contractor shall if ordered in writing by the Engineer- in-Charge/Site-in-Charge for reasons recorded suspend the works or any part thereof for such period and such time so ordered and shall not, after receiving such, proceed with the work therein ordered to be suspended until he shall have

received a written order to re-start. The Contractor shall be entitled to claim extension of time for that period of time the work was ordered to be suspended. Neither the Owner nor the Contractor shall be entitled to claim compensation or damages on account of such an extension of time.

5.e.2. In case of suspension of entire work, ordered in writing by Engineer-in-Charge/Site-in-Charge, for a period of 30 days, the Owner shall have the option to terminate the Contract as provided under the clause for termination. The Contractor shall not be at liberty to remove from the site of the works any plant or materials belonging to him and the Employer shall have lien upon all such plant and materials.

5.e.3. The contractor shall, in case of suspension have the right to raise a dispute and have the same arbitrated but however, shall not have the right to have the work stopped from further progress and completion either by the owner or through other contractor appointed by the owner.

5.f. **OWNER MAY DO PART OF WORK**

Notwithstanding anything contained elsewhere in this contract, the owner upon failure of the Contractor to comply with any instructions given in accordance with the provisions of this contract, may instead of Contract and undertaking charge of entire work, place additional labour force, tools, equipment and materials on such parts of the work, as the Owner may decide or engage another Contractor to carry out the balance of work. In such cases, the Owner shall have the right to deduct from the amounts payable to the Contractor the difference in cost of such work and materials with ten percent overhead added to cover all departmental charges. Should the total amount thereof exceed the amount due to the contractor, the Contractor shall pay the difference to the Owner within 15 days of making demand for payment failing which the Contractor shall be liable to pay interest at 24% p.a. on such amounts till the date of payment.

5.g. **INSPECTION OF WORKS**

5.g.1. The Engineer-in-Charge/Site-in-Charge and Officers from Central or State Government will have full power and authority to inspect the works at any time wherever in progress, either on the site or at the Contractor's premises/workshops of any person, firm or corporation where work in connection with the contract may be in hand or where the materials are being or are to be supplied, and the Contractor shall afford or procure for the Engineer-in-Charge/Site-in-Charge every facility and assistance to carry out such inspection. The Contractor shall, at all times during the usual working hours and at all other times at which reasonable notice of the intention of the Engineer-in-Charge/Site-in-Charge or his representative to visit the works shall have been given to the Contractor, either himself be present to receive orders and instructions, or have a responsible agent, duly accredited in writing, present for the purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the Contractor himself. The Contractor shall give not less than seven days notice in writing to the

Engineer-in-Charge/Site-in-Charge before covering up or otherwise placing beyond reach of inspection and measurement any work in order that the same may be inspected and measured. In the event of breach of above, the same shall be uncovered at Contractor's expense for carrying out such measurement and/or inspection.

5.g.2. No material shall be removed and despatched by the Contractor from the site without the prior approval in writing of the Engineer-in-charge. The contractor is to provide at all times during the progress of the work and the maintenance period proper means of access with ladders, gangways, etc. and the necessary attendance to move and adapt as directed for inspection or measurements of the works by the Engineer-in-Charge/Site-in-Charge.

#### 5.h. **SAMPLES**

5.h.1. The contractor shall furnish to the Engineer-in-charge/Site-in-Charge for approval when requested or required adequate samples of all materials and finishes to be used in the work.

5.h.2. Samples shall be furnished by the Contractor sufficiently in advance and before commencement of the work so as the Owner can carry out tests and examinations thereof and approve or reject the samples for use in the works. All material samples furnished and finally used/applied in actual work shall fully be of the same quality of the approved samples.

#### 5.i. **TESTS FOR QUALITY OF WORK**

5.i.1. All workmanship shall be of the respective kinds described in the contract documents and in accordance with the instructions of the Engineer-in-Charge / Site-in-Charge and shall be subjected from time to time to such tests at Contractor's cost as the Engineer-in-Charge/Site-in-Charge may direct at the place of manufacture or fabrication or on the site or at all or any such places. The Contractor shall provide assistance, instruments, labour and materials as are normally required for examining, measuring and testing any workmanship as may be selected and required by the Engineer-in-Charge/Site-in-Charge.

5.i.2. All the tests that will be necessary in connection with the execution of the work as decided by the Engineer-in-charge/Site-in-Charge shall be carried out at the contractors cost and expenses.

5.i.3. If any tests are required to be carried out in connection with the work or materials or workmanship to be supplied by the owner, such tests shall be carried out by the Contractor as per instructions of Engineer-in-Charge/Site-in-Charge and expenses for such tests, if any, incurred by the contractor shall be reimbursed by the Owner. The contractor should file his claim with the owner within 15

(fifteen) days of inspection/test and any claim made beyond that period shall lapse and be not payable.

**5.j. ALTERATIONS AND ADDITIONS TO SPECIFICATIONS, DESIGNS AND WORKS**

- 5.j.1. The Engineer-in-Charge/Site-in-Charge shall have powers to make any alterations, additions and/or substitutions to the schedule of quantities, the original specifications, drawings, designs and instructions that may become necessary or advisable or during the progress of the work and the Contractor shall be bound to carryout such altered/extra/new items of work in accordance with instructions which may be given to him in writing signed by the Engineer-in-Charge/Site- in-Charge. Such alterations, omissions, additions or substitutions shall not invalidate the contract. The altered, additional or substituted work which the Contractor may be directed to carryon in the manner as part of the work shall be carried out by the Contractor on the same conditions in all respects on which he has agreed to do the work. The time for completion of such altered added and/or substituted work may be extended for that part of the particular job. The rates for such additional altered or substituted work under this Clause shall, be worked out in accordance with the following provisions:
- 5.j.2. If the rates for the additional, altered or substituted work are specified in the contract for similar class of work, the Contractor is bound to carryout the additional, altered or substituted work at the same rates as are specified in the contract.
- 5.j.3. If the rates for the additional, altered or substituted work are not specifically provided in the contract for the work, the rates will be derived from the rates for similar class of work as are specified in the contract for the work. In the opinion of the Engineer-in- Charge/Site-in-Charge as to whether or not the rates can be reasonably so derived from the items in this contract, will be final and binding on the Contractor.
- 5.j.4. If the rates for the altered, additional or substituted work cannot be determined in the manner specified above, then the Contractor shall, within seven days of the date of receipt of order to carry out the work, inform the Engineer-in-Charge/ Site-in-Charge of the rate at which he intends to charge for such class of work, supported by analysis of the rate or rates claimed and the Engineer-In-Charge/ Site-in-Charge shall determine the rates on the basis of the prevailing market rates for both material and labour plus 10% to cover overhead and profit of labour rates and pay the Contractor accordingly. The opinion of the Engineer-in- Charge/Site-in-Charge as to current market rates of materials and the quantum of labour involved per unit of measurement will be final and binding on the contractor.

5.j.5. In case of any item of work for which there is no specification supplied by the Owner and is mentioned in the tender documents, such work shall be carried out in accordance with Indian Standard Specifications and if the Indian Standard Specifications do not cover the same, the work should be carried out as per standard Engineering Practice subject to the approval of the Engineer-in-Charge/ Site-in-Charge.

5.k. **PROVISIONAL ACCEPTANCE**

Acceptance of sections of the works for purposes of equipment erection, piping, electrical work and similar usages by the Owner and payment for such work or parts of work shall not constitute a waiver of any portion of this contract and shall not be construed so as to prevent the Engineer from requiring replacement of defective work that may become apparent after the said acceptance and also shall not absolve the Contractor of the obligations under this contract. It is made clear that such an acceptance does not indicate or denote or establish to the fact of execution of that work or the Contract until the work is completed in full in accordance with the provisions of this Contract.

5.l. **COMPLETION OF WORK AND COMPLETION CERTIFICATE**

As soon as the work is completed in all respects, the contractor shall give notice of such completion to the site in charge or the Owner and within thirty days of receipt of such notice the site in charge shall inspect the work and shall furnish the contractor with a certificate of completion indicating:

- a) defects, if any, to be rectified by the contractor
- b) items, if any, for which payment shall be made in reduced rates
- c) the date of completion.

5.m. **USE OF MATERIALS AND RETURN OF SURPLUS MATERIALS**

5.m.1. Notwithstanding anything contained to the contrary in any or all of the clauses of this contract, where any materials for the execution of the contract are procured with the assistance of Government either by issue from Government stocks or purchase made under orders or permits or licences issued by Government, the contractor shall use the said materials economically and solely for the purpose of the contract and shall not dispose them of without the permission of the Owner.

5.m.2. All surplus(serviceable) or unserviceable materials that may be left over after the completion of the contract or at its termination for any reason whatsoever, the Contractor shall deliver the said product to the Owner without any demur. The price to be paid to the Contractor, if not already paid either in full or in part, however, shall not exceed the amount mentioned in the Schedule of Rates for such material and in cases where such rates are not so mentioned, shall not exceed the CPWD scheduled rates. In the event of breach of the aforesaid condition the contractor shall become liable for contravention of the terms of the Contract.

5.m.3. The surplus (serviceable) and unserviceable products shall be determined by joint measurement. In case where joint measurement has failed to take place, the Owner may measure the same and determine the quantity.

5.m.4. It is made clear that the Owner shall not be liable to take stock and keep possession and pay for the surplus and unserviceable stocks and the Owner may direct the Contractor to take back such material brought by the Contractor and becoming surplus and which the Owner may decide to keep and not to pay for the same.

5.n. **DEFECT LIABILITY PERIOD**

The contractor shall guarantee the work executed for a period of 12 months from the date of completion of the job. Any damage or defect that may arise or lie undiscovered at the time of completion of the job shall be rectified or replaced by the contractor at his own cost. The decision of the Engineer In-charge/Site-Incharge/Owner shall be the final in deciding whether the defect has to be rectified or replaced.

Equipment or spare parts replaced under warranty/guarantees shall have further warranty for a mutually agreed period from the date of acceptance.

The owner shall intimate the defects noticed in writing by a Registered A.D. letter or otherwise and the contractor within 15 days of receipt of the intimation shall start the rectification work and complete within the time specified by the owner failing which the owner will get the defects rectified by themselves or by any other contractor and the expenses incurred in getting the same done shall be paid by the Contractor under the provision of the Contract.

Thus, defect liability is applicable only in case of job/works contract (civil, mechanical, electrical, maintenance etc. ) where any damage or defect may arise in future (i.e. within 12 months from the date of completion of job) or lie undiscovered at the time of completion of job.

In other words, in case of service contracts (like car hire etc.) where there is no question of damage or defect arising in future, the defect liability clause is not applicable.

5.o. **DAMAGE TO PROPERTY**

5.o.1. Contractor shall be responsible for making good to the satisfaction of the Owner any loss of and any damage to all structures and properties belonging to the Owner or being executed or procured by the Owner or of other agencies within the premises of the work of the Owner, if such loss or damage is due to fault and/or the negligence or willful acts or omission of the Contractor, his employees, agents, representatives or sub-contractors.



5.o.2. The Contractors shall indemnify and keep the Owner harmless of all claims for damage to Owner's property arising under or by reason of this contract.

**6. DUTIES AND RESPONSIBILITIES OF CONTRACTOR**

**6.a. EMPLOYMENT LIABILITY TOWARDS WORKERS EMPLOYED BY THE CONTRACTOR**

6.a.1 The Contractor shall be solely and exclusively responsible for engaging or employing persons for the execution of work. All persons engaged by the contractor shall be on Contractor's payroll and paid by Contractor. All disputes or differences between the Contractor and his/their employees shall be settled by Contractor.

6.a.2. Owner has absolutely no liability whatsoever concerning the employees of the Contractor. The Contractor shall indemnify Owner against any loss or damage or liability arising out of or in the course of his/their employing persons or relation with his/their employees. The Contractor shall make regular and full payment of wages and on any complaint by any employee of the Contractor or his sub contractor regarding non-payment of wages, salaries or other dues, Owner reserves the right to make payments directly to such employees or sub-contractor of the Contractor and recover the amount in full from the bills of the Contractor and the contractor shall not claim any compensation or reimbursement thereof. The Contractor shall comply with the Minimum Wages Act applicable to the area of work site with regard to payment of wages to his employees and also to employees of his sub contractor.

6.a.3. The Contractor shall advise in writing or in such appropriate way to all of his employees and employees of sub-contractors and any other person engaged by him that their appointment/employment is not by the Owner but by the Contractor and that their present appointment is only in connection with the construction contract with Owner and that therefore, such an employment/appointment would not enable or make them eligible for any employment/appointment with the Owner either temporarily or/and permanent basis.

**6.b. NOTICE TO LOCAL BODIES**

The contractor shall comply with and give all notices required under any Government authority, instruction, rule or order made under any act of parliament, state laws or any regulations or by-laws of any local authority relating to the works.

**6.c. FIRST AID AND INDUSTRIAL INJURIES**

- 6.c.1 Contractor shall maintain first aid facility for his employees and those of his sub-contractors.
- 6.c.2. Contractor shall make arrangements for ambulance service and for the treatment of all types of injuries. Names and telephone numbers of those providing such services shall be furnished to Owner prior to start of construction and their name board shall be prominently displayed in Contractor's field office.
- 6.c.3. All industrial injuries shall be reported promptly to owner and a copy of contractor's report covering each personal injury requiring the attention of a physician shall be furnished to the Owner.

6.d. **SAFETY CODE**

- 6.d.1. The Contractor shall at his own expenses arrange for the Safety provisions as may be necessary for the execution of the work or as required by the Engineer-in-Charge in respect of all labours directly or indirectly employed for performance of the works and shall provide all facilities in connections therewith. In case the contractor fails to make arrangements and provide necessary facilities as aforesaid, the Owner shall be entitled to do so and recover the cost thereof from the Contractor.
- 6.d.2. From the commencement to the completion of the works, the contractor shall take full responsibility for the care thereof and of all the temporary works (defined as meaning all temporary works of every kind required in or for the execution, completion or maintenance of the works). In case damage, loss or injury shall happen to the works or to any part thereof or to temporary works or to any cause whatsoever repair at his (Contractor's) own cost and make good the same so that at the time of completion, the works shall be in good order and condition and in conformity in every respect with the requirement of the contract and Engineer-in-Charge's instructions.
- 6.d.3. In respect of all labour, directly or indirectly employed in the work for the performance of the Contractor's part of this agreement, the contractor shall at his own expense arrange for all the safety provisions as per relevant Safety Codes of C.P.W.D Bureau of Indian Standards, the Electricity Act/I.E. Rules. The Mines Act and such other Acts as applicable.
- 6.d.4. The Contractor shall observe and abide by all fire and safety regulations of the Owner. Before starting construction work, the Contractor shall consult with Owner's Safety Engineer or Engineer-in-Charge/Site-in-Charge and must make good to the satisfaction of the Owner any loss or damage due to fire to any portion of the work done or to be done under this agreement or to any of the Owner's existing property.

- 6.d.5. The Contractor will be fully responsible for complying with all relevant provisions of the Contract Labour Act and shall pay rates of Wages and observe hours of work/conditions of employment according to the rules in force from time to time.
- 6.d.6. The Contractor will be fully responsible for complying with the provision including documentation and submission of reports on the above to the concerned authorities and shall indemnify the Corporation from any such lapse for which the Government will be taking action against them.
- 6.d.7. Owner shall on a report having been made by an inspecting Office as defined in the Contract Labour Regulations have the power to deduct from the money due to the Contractor any sum required or estimated to be required for making good the loss suffered by a worker(s) by reasons of non-fulfillment of conditions of contract for the benefit of workers no-payment of wages or of deductions made from his or their wages which are not justified by the terms of contract or non observance of the said contractor's labour Regulation.

6.e. **INSURANCE AND LABOUR**

Contractor shall at his own expense obtain and maintain an insurance policy with a Nationalised Insurance Company to the satisfaction of the Owner as provided hereunder.

6.e.1. **EMPLOYEES STATE INSURANCE ACT**

- i. The Contractor agrees to and does hereby accept full and exclusive liability for the compliance with all obligations imposed by Employees State Insurance Act, 1948, and the Contractor further agrees to defend indemnify and hold Owner harmless from any liability or penalty which may be imposed by the Central, State or local authority by reason of any asserted violation by Contractor, or sub-contractor of the Employees' State Insurance Act, 1948 and also from all claims, suits or proceedings that may be brought against the Owner arising under, growing out of or by reason of the work provided for by this contract whether brought by employees of the Contractor, by third parties or by Central or State Government authority or any political sub-division thereof.
- ii. The Contractor agrees to file with the Employees State Insurance Corporation, the Declaration forms and all forms which may be required in respect of the Contractor's or sub-contractor's employee whose aggregate emuneration is within the specified limit and who are employed in the work provided or those covered by ESI Act under any amendment to the Act from time to time.

The Contractor shall deduct and secure the agreement of the sub-contractor to deduct the employee's contribution as per the first schedule of the Employee's State Insurance Act from wages and affix the employee's contribution cards at wages payment intervals. The Contractor shall remit and secure the agreement of the sub contractor to remit to the State Bank of India, Employee's State

Insurance Corporation Account, the Employee's contribution as required by the Act.

- iii. The Contractor agrees to maintain all records as required under the Act in respect of employees and payments and the Contractor shall secure the agreement of the sub contractor to maintain such records. Any expenses incurred for the contributions, making contribution or maintaining records shall be to the Contractor's or sub-contractor's account.
- iv. The Owner shall retain such sum as may be necessary from the total contract value until the Contractor shall furnish satisfactory proof that all contributions as required by the Employees State Insurance Act, 1948, have been paid.

v. **WORKMAN'S COMPENSATION AND EMPLOYEE'S LIABILITY INSURANCE**

Provide Insurance for all the Contractor's employees engaged in the performance of this contract. If any of the work is sublet, the Contractor shall ensure that the sub contractor provides workmen's compensation and Employer's Liability Insurance for the latter's employees who are not covered under the Contractor's insurance.

vi. **AUTOMOBILE LIABILITY INSURANCE**

Contractor shall take out an Insurance to cover all risks to Owner for each of his vehicles plying on works of this contract and these insurances shall be valid for the total contract period. No extra payment will be made for this insurance. Owner shall not be liable for any damage or loss not made good by the Insurance Company, should such damage or loss result from unauthorised use of the vehicle. The provisions of the Motor Vehicle Act would apply.

vii. **FIRE INSURANCE**

Contractor shall within two weeks after award of contract insure the Works, Plant and Equipment and keep them insured until the final completion of the Contract against loss or damage by accident, fire or any other cause with an insurance company to be approved by the Employer/Consultant in the joint names of the Employer and the Contractor (name of the former being placed first in the Policy). Such Policy shall cover the property of the Employer only.

6.e.2. **ANY OTHER INSURANCE REQUIRED UNDER LAW OR REGULATION OR BY OWNER**

- i. Contractor shall also provide and maintain any and all other insurance which may be required under any law or regulations from time to time. He shall also carry and maintain any other insurance which may be required by the Owner.

- ii. The aforesaid insurance policy/policies shall provide that they shall not be cancelled till the Engineer-in-Charge has agreed to their cancellation.
- iii. The Contractor shall satisfy to the Engineer-in-Charge/Site-in-Charge from time to time that he has taken out all insurance policies referred to above and has paid the necessary premium for keeping the policies alive till the expiry of the defects liability period.
- iv. The contractor shall ensure that similar insurance policies are taken out by his sub-contractor (if any) and shall be responsible for any claims or losses to the Owner resulting from their failure to obtain adequate insurance protections in connection thereof. The contractor shall produce or cause to be produced by his sub-contractor (if any) as the case may be, the relevant policy or policies and premium receipts as and when required by the Engineer-in-Charge/Site-in-Charge.

### 6.e.3. LABOUR AND LABOUR LAWS

- i. The contractor shall at his own cost employ persons during the period of contract and the persons so appointed shall not be construed under any circumstances to be in the employment of the Owner.
- ii. All payments shall be made by the contractor to the labour employed by him in accordance with the various rules and regulations stated above. The contractor shall keep the Owner indemnified from any claims whatsoever inclusive of damages/costs or otherwise arising from injuries or alleged injuries to or death of a person employed by the contractor or damages or alleged damages to the property.
- iii. No labour below the age of eighteen years shall be employed on the work. The Contractor shall not pay less than what is provided under the provisions of the contract labour (Regulations and Abolition) Act, 1970 and the rules made thereunder and as may be amended from time to time. He shall pay the required deposit under the Act appropriate to the number of workman to be employed by him or through sub contractor and get himself registered under the Act. He shall produce the required Certificates to the Owner before commencement of the work. The Owner recognises only the Contractor and not his sub contractor under the provisions of the Act. The Contractor will have to submit daily a list of his workforce. He will also keep the wage register at the work site or/and produce the same to the Owner, whenever desired. A deposit may be taken by the Owner from the Contractor to be refunded only after the Owner is satisfied that all workmen employed by the Contractor have been fully paid for the period of work in Owner's premises at rates equal to or better than wages provided for under the Minimum Wages Act. The contractor shall be responsible and liable for any complaints that may arise in this regard and the consequences thereto.

iv. The Contractor will comply with the provisions of the Employee's Provident Fund Act and the Family Pension Act as may be applicable and as amended from time to time.

v. The Contractor will comply with the provisions of the payment of Gratuity Act, 1972, as may be applicable and as amended from time to time.

vi. **IMPLEMENTATION OF APPRENTICES ACT, 1961**

The Contractor shall comply with the provisions of the Apprentices Act, 1961 and the Rules and Orders issued thereunder from time to time. If he fails to do so, his failure will be a breach of the contract and the Engineer-in-Charge may, at his discretion, cancel the contract. The Contractor shall also be liable for any pecuniary liability arising on account of any violation by him of the provision of the Act.

vii. **MODEL RULES FOR LABOUR WELFARE**

The Contractor shall at his own expenses comply with or cause to be complied with Model rules for Labour Welfare as appended to those conditions or rules framed by the Government from time to time for the protection of health and for making sanitary arrangements for worker employed directly or indirectly on the works. In case the contractor fails to make arrangements as aforesaid the Engineer-in-Charge/Site-in-Charge shall be entitled to do so and recover the cost thereof from the contractor.

6.f. **DOCUMENTS CONCERNING WORKS**

6.f.1. All documents including drawings, blue prints, tracings, reproducible models, plans, specifications and copies, thereof furnished by the Owner as well as all drawings, tracings, reproductions, plans, specifications design calculations etc. prepared by the contractor for the purpose of execution of works covered in or connected with this contract shall be the property of the Owner and shall not be used by the contractor for any other work but are to be delivered to the Owner at the completion or otherwise of the contract.

6.f.2. The Contractor shall keep and maintain secrecy of the documents, drawings etc. issued to him for the execution of this contract and restrict access to such documents, drawings etc. and further the Contractor shall execute a SECRECY agreement from each or any person employed by the Contractor having access to such documents, drawings etc. The Contractor shall not issue drawings and documents to any other agency or individual without the written approval by the Engineer-in-Charge/Site-in-Charge.

6.f.3. Contractor will not give any information or document etc. concerning details of the work to the press or a news disseminating agency without prior written approval

from Engineer-in-charge/Site-in-Charge. Contractor shall not take any pictures on site without written approval of Engineer-in-Charge/Site-in-Charge.

## 7. PAYMENT OF CONTRACTOR'S BILLS

®7.1. **Payments will be made against Running Accounts bills certified by the Owner's Engineer-in-Charge/Site-in-Charge within 15 days from the date of receipt of the bill.**

7.2. Running Account Bills and the final bill shall be submitted by the Contractor together with the duly signed measurements sheet(s) to the Engineer-in-Charge/Site-in-Charge of the Owner in quadruplicate for certification.

The Bills shall also be accompanied by quantity calculations in support of the quantities contained in the bill along with cement consumption statement, actual/theoretical, wherever applicable duly certified by the Engineer-in-Charge/ Site-in-Charge of the Owner.

7.3. All running account payments shall be regarded as on account payment(s) to be finally adjusted against the final bill payment. Payment of Running Account Bill(s) shall not determine or affect in any way the rights of the Owner under this Contract to make the final adjustments of the quantities of material, measurements of work and adjustments of amounts etc.etc. in the final bill.

7.4. The final bill shall be submitted by the Contractor within one month of the date of completion of the work fully and completely in all respects. If the Contractor fails to submit the final bill accordingly Engineer-in-Charge/Site-in-Charge may make the measurement and determine the total amount payable for the work carried out by the Contractor and such a certification shall be final and binding on the Contractor. The Owner/Engineer- in-Charge/Site-in-Charge may take the assistance of an outside party for taking the measurement, the expenses of which shall be payable by the Contractor.

7.5. Payment of final bill shall be made within 30 days from the date of receipt of the certified bill by the Disbursement Section of the owner.

®7.6 **Wherever possible, payment shall be tendered to the contractor in electronic mode (e-payment) through any of the designated banks. The contractor will comply by furnishing full particulars of Bank account (mandate) to which the payments will be routed. Owner reserves the right to make payment in any alternate mode also.**

## 7.a. MEASUREMENT OF WORKS

7.a.1. All measurements shall be in metric system. All the works will be jointly measured by the representative of the Engineer-in-Charge/Site-in-Charge and the Contractor or their authorised agent progressively. Such measurement will be recorded in the Measurement Book/Measurement Sheet by the Contractor or his authorised representative and signed in token of acceptance by the Owner or their authorised representative.

7.a.2. For the purpose of taking joint measurement, the Contractor/representative shall be bound to be present whenever required by the Engineer-in-Charge/Site-in-Charge.

If, however, they are absent for any reasons whatsoever, the measurement will be taken by the Engineer-in-Charge/Site-in-Charge or his representative and the same would be deemed to be correct and binding on the Contractor.

7.a.3. In case of any dispute as to the mode of measurement for any item of work, the latest Indian Standard Specifications shall be followed. In case of any further dispute on the same the same shall be as per the certification of an outside qualified Engineer/ Consultant. Such a measurement shall be final and binding on the Owner and the Contractor.

#### 7.b. **BILLING OF WORKS EXECUTED**

The Contractor will submit a bill in approved proforma in quadruplicate to the Engineer-in-Charge/Site-in-Charge of the work giving abstract and detailed measurement for the various items executed during a month, before the expiry of the first week of the succeeding month. The Engineer-in-Charge/Site-in-Charge shall take or cause to be taken the requisite measurements for the purpose of having the bill verified and/or checked before forwarding the same to the disbursement office of the Owner for further action in terms of the Contract and payment thereafter. The Engineer-in-Charge/Site-in-Charge shall verify the bills within 7 days of submission of the Bill by the Contractor.

#### 7.c. **RETENTION MONEY**

10% of the total value of the Running Account and Final Bill will be deducted and retained by the Owner as retention money on account of any damage/defect liability that may arise for the period covered under the defect liability period clause of the Contract free of interest. Any damage or defect that may arise or lie undiscovered at the time of issue of completion certificate connected in any way with the equipment or materials supplied by contractor or in workmanship shall be rectified or replaced by the contractor at his own expense failing which the Owner shall be entitled to rectify the said damage/defect from the retention money. Any excess of expenditure incurred by the Owner on account of damage or defect shall be payable by the Contractor. The decision of the Owner in this behalf shall not be liable to be questioned but shall be final and binding on the Contractor.



Thus, deduction towards retention money is applicable only in case of job/works contracts (civil, mechanical, electrical, maintenance etc.) where any damage or defect may arise in future (i.e. within 12 months from the date of completion of job) or lie undiscovered at the time of issue of completion certificate.

®7.d. **STATUTORY LEVIES**

7.d.1 The Contractor accepts full and exclusive liability for the payment of any and all taxes, duties, octroi, rates, cess, levies and statutory payments payable under all or any of the statutes etc.

® **Variations of taxes and duties arising out of the amendments to the Central / State enactments, in respect of sale of goods / services covered under this bid shall be to HPCL's account, so long as :**

- **They relate to the period after the opening of the price bid, but before the contracted completion period ( excluding permitted extensions due to delay on account of the contractors, if any) or the actual completion period, whichever is earlier; and**
- The vendor furnishes documentary evidence of incurrence of such variations, in addition to the invoices/documents for claiming Cenvat /Input Tax credit, wherever applicable.

All contributions and taxes for unemployment compensation, insurance and old age pensions or annuities now or hereafter imposed by Central or State Governmental authorities which are imposed with respect to or covered by the wages, salaries or other compensations paid to the persons employed by the Contractor and the Contractor shall be responsible for the compliance with all obligations and restrictions imposed by the Labour Law or any other law affecting employer-employee relationship and the Contractor further agrees to comply and to secure the compliance of all sub-contractors with all applicable Central, State, Municipal and local laws, and regulations and requirements of any Central, State or Local Government agency or authority.

Contractor further agrees to defend, indemnify and hold harmless from any liability or penalty which may be imposed by the Central, State or Local authorities by reason of any violation by Contractor or sub-contractor of such laws, regulations or requirements and also from all claims, suits or proceedings that may be brought against the Owner arising under, growing out of, or by reasons of the work provided for by this contract by third parties, or by Central or State Government authority or any administrative sub-division thereof. The Contractor further agrees that in case any such demand is raised against the Owner, and Owner has no way but to pay and pays/makes payment of the same, the Owner shall have the right to deduct the same from the amounts due and payable to the Contractor. The Contractor shall not raise any demand or dispute in respect of the same but may have recourse to

recover/receive from the concerned authorities on the basis of the Certificate of the Owner issued in that behalf.

7.d.2. The rates quoted should be inclusive of all rates, cess, taxes and sales tax on works contracts wherever applicable. However, wherever the sales tax on works contract is applicable and is to be deducted at source, the same will be deducted from the bills of the Contractor and paid to the concerned authorities. The proof of such payments of sales tax on works contract will be furnished to the contractor.

7.d.3. Income tax will be deducted at source as per rules at prevailing rates, unless certificate, if any, for deduction at lesser rate or nil deduction is submitted by the Contractor from appropriate authority.

# **7.d.4 The contractor shall provide accurate particulars of PAN number as required, under Section 206AA of Income Tax Act 1961.**

7.e. **MATERIALS TO BE SUPPLIED BY CONTRACTOR**

7.e.1. The Contractor shall procure and provide the whole of the materials required for construction including tools, tackles, construction plant and equipment for the completion and maintenance of the works except the materials viz. steel and cement which may be agreed to be supplied as provided elsewhere in the contract. The contractor shall make arrangement for procuring such materials and for the transport thereof at their own cost and expenses.

7.e.2. The Owner may give necessary recommendation to the respective authority if so desired by the Contractor but assumes no responsibility of any nature. The Contractor shall procure materials of ISI stamp/certification and supplied by reputed suppliers borne on DGS&D list.

7.e.3. All materials procured should meet the specifications given in the tender document. The Engineer-in-charge may, at his discretion, ask for samples and test certificates for any batch of any materials procured. Before procuring, the Contractor should get the approval of Engineer-in-Charge/Site-in-Charge for any materials to be used for the works.

7.e.4. Manufacturer's certificate shall be submitted for all materials supplied by the Contractor. If, however, in the opinion of the Engineer-in-Charge/Site-in-Charge any tests are required to be conducted on the material supplied by the Contractor, these will be arranged by the Contractor promptly at his own cost.

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7.f. **MATERIALS TO BE SUPPLIED BY THE OWNER**

- 7.f.1. Steel and Cement may be supplied by the Owner to the contractor against payment by Contractor from either godown or from the site or within work premises itself and the contractor shall arrange for all transport to actual work site at no extra cost.
- 7.f.2. The contractor shall bear all the costs including loading and unloading, carting from issue points to work spot storage, unloading, custody and handling and stacking the same and return the surplus steel and cement to the Owner's storage point after completion of job.
- 7.f.3. The contractor will be fully accountable for the steel and cement received from the Owner and contractor will give acknowledgement/receipt for quantity of steel and cement received by him each time he uplifts cement from Owner's custody.
- 7.f.4. For all computation purposes, the theoretical cement consumption shall be considered as per CPWD standards.
- 7.f.5. Steel and Cement as received from the manufacturer/stockists will be issued to the contractor. Theoretical weight of cement in a bag will be considered as 50 Kg. Bags weighing upto 4% less shall be accepted by the contractor and considered as 50 Kg. per bag. Any shortage in the weight of any cement bag by more than 4% will be to the Owner's account only when pointed out by the Contractor and verified by Engineer-in-Charge/Site in Charge at the time of Contract or taking delivery.
- 7.f.6. The contractor will be required to maintain a stock register for receipt, issuance and consumption of steel and cement at site. Cement will be stored in a warehouse at site. Requirement of cement on any day will be taken out of the warehouse. Cement issued shall be regulated on the basis of FIRST RECEIPT to go as FIRST ISSUE.
- 7.f.7. Empty cement bag shall be the property of the Contractor. Contractor shall be penalised for any excess/under consumption of cement. The penal rate will be twice the rate of issue of cement for this work.
- 7.f.8. All the running bills as well as the final bills will be accompanied by cement consumption statements giving the detailed working of the cement used, cement received and stock-on-hand.
- 7.f.9. The Contractor will be fully responsible for safe custody of cement once it is received by him and during transport. Owner will not entertain any claims of the contractor for theft, loss or damage to cement while in their custody.
- 7.f.10. The contractor shall not remove from the site any cement bags at any time.
- 7.f.11. The Contractor shall advise Engineer-in-charge/Site-in-charge in writing atleast 21 days before exhausting the Cement stocks already held by Contractor to ensure that such delays do not lead to interruptions in the progress of work.

7.f.12. Cement shall not be supplied by the Owner for manufacturing of mosaic tiles, precast cement jali and any other bought out items which consume cement and for temporary works.

7.f.13. Cement in bags and in good usable condition left over after the completion of work shall be returned by the contractor to the Owner. The Owner shall make payment to the Contractor at the supply rate for such stocks of cement they accept and receive. Any refused stock of cement shall be removed by the Contractor from the site at his cost and expenses within 15 days of completion of the work.

## 8. PAYMENT OF CLAIMS AND DAMAGES

8.1. Should the Owner have to pay money in respect of claims or demands as aforesaid the amount so paid and the costs incurred by the Owner shall be charged to and paid by the Contractor and the Contractor shall not be entitled to dispute or question the right of the Owner to make such payments notwithstanding the same may have been without his consent or authority or in law or otherwise to the contrary.

8.2. In every case in which by virtue of the provisions of Workmen's Compensation Act, 1923, or other Acts, the Owner is obliged to pay Compensation to a Workman employed by the Contractor in execution of the works, the Owner will recover from the Contractor the amount of compensation so paid and without prejudice to the rights of Owner under the said Act. Owner shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due to the Contractor whether under this contract or otherwise. The Owner shall not be bound to contest any claim made under Section 12 sub section (1) of the said Act, except on the written request of the Contractor and upon his giving to the Owner full security for all costs for which the owner might become liable in consequence of contesting such claim.

### 8.a. ACTION AND COMPENSATION IN CASE OF BAD WORK

If it shall appear to the Engineer-in-Charge/Site-in-Charge that any work has been executed with bad, imperfect or unskilled workmanship, or with materials, or that any materials or articles provided by the Contractor for execution of the work are not of standards specified/inferior quality to that contracted for, or otherwise not in accordance with the contract, the CONTRACTOR shall on demand in writing from the Engineer-in-Charge/Site-in-Charge or his authorised representative specifying the work, materials or articles complained of, notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith rectify or remove and reconstruct the work so specified and at his own charge and cost and expenses and in the event of failure to do so within a period of 15 days of such intimation/information/knowledge, the Contractor shall be liable to pay compensation equivalent to the cost of reconstruction by the Owner. On expiry of 15 days period mentioned above, the Owner may by themselves or otherwise rectify or remove and re-execute the work or remove and replace with others, the materials or articles complained

of as the case may be at the risk and expenses in all respects of the Contractor. The decision of the Engineer-in-Charge/ Site-in-Charge as to any question arising under this clause shall be final and conclusive and shall not be raised as a dispute or shall be arbitrable.

#### 8.b. **INSPECTION AND AUDIT OF CONTRACT AND WORKS**

This project is subject to inspection by various Government agencies of Government of India. The contractor shall extend full cooperation to all the Government and other agencies in the inspection of the works, audit of the Contract and the documents of Contract Bills, measurements sheets etc. etc. and examination of the records of works and make enquiries interrogation as they may deem fit, proper and necessary. Upon inspection etc. by such agencies if it is pointed out that the contract work has not been carried out according to the prescribed terms and conditions as laid down in the tender documents and if any recoveries are recommended, the same shall be recovered from the contractors running bills/final bill/from ordered/suggested Security Deposit/retention money. The Contractor shall not rise any dispute on any such account and the same shall not be arbitrable.

#### 9. **CONTRACTOR TO INDEMNIFY THE OWNER**

The Contractor shall indemnify the Owner and every member, officer and employee of the Owner, also the Engineer-in-Charge/Site-in-Charge and his staff against all the actions, proceedings, claims, demands, costs, expenses, whatsoever arising out of or in connection with the works and all actions, proceedings, claims, demands, costs, expenses which may be made against the Owner for or in respect of or arising out of any failure by the Contractor in the performance of his obligations under the contract. The Contractor shall be liable for or in respect of or in consequence of any accident or injury to any workmen or other person in the employment of the Contractor or his sub contractor and Contractor shall indemnify and keep indemnified the Owner against all such damages, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

#### 10. **LIQUIDATED DAMAGES**

- ® i) **In case of any delay in completion of the work beyond the CDD, the Owner shall be entitled to be paid Liquidated Damages by the Contractor. The liquidated damages shall be initially at the rate of 0.5% (half percent) of the total contract value for every week of the delay subject to a maximum of 5% of the total contract value. The liquidated damages shall be recovered by the Owner out of the amounts payable to the Contractor or from any Bank Guarantees or Deposits furnished by the Contractor or the Retention Money retained from the Bills of the Contractor, either under this contract or any other contract.**

- ii) **The Contractor shall be entitled to give an acceptable unconditional Bank Guarantee in lieu of such a deduction if Contractor desires any decision on a request for time extension.**
- iii) **Once a final decision is taken on the request of the Contractor or otherwise, the LD shall be applicable only on the basic cost of the contract and on each full completed week(s) of delay (and for part of the week, a pro-rata LD amount shall be applicable).**
- iv) **This final calculation of LD shall be only on the value of the unexecuted portion/quantity of work as on the CDD.**
- v) **Contractor agrees with the Owner, that the above represents a genuine pre-estimate of the damages which the Owner will suffer on account of delay in the performance of the work by Contractor. The Contractor further agrees that the LD amount is over and above any right which owner has to risk purchase under Clause 12.4 and any right to get the defects in the work rectified at the cost of the contractor.**

#### 11. **DEFECTS AFTER TAKING OVER OR TERMINATION OF WORK CONTRACT BY OWNER**

The Contractor shall remain responsible and liable to make good all losses or damages that may occur/appear to the work carried out under this Contract within a period of 12 months from date of issue of the Completion Certificate and/or the date of Owner taking over the work, whichever is earlier. The Contractor shall issue a Bank Guarantee to the Owner in the sum of 10% of the work entrusted in the Contract, **from any Scheduled Bank (other than a Co-Operative Bank)** acceptable to the Owner and if however, the Contractor fails to furnish such a Bank Guarantee the Owner shall have right to retain the Security Deposit and Retention Money to cover the 10% of the Guarantee amount under this clause and to return/refund the same after the expiry of the period of 12 months without any interest thereon. **(Please refer to clause 4. Deposits)**

#### 12. **TERMINATION OF CONTRACT**

- 12.1 The owner may terminate the contract at any stage of the construction for reasons to be recorded in the letter of termination.
- 12.2 The Owner inter alia may terminate the Contract for any or all of the following reasons that the contractor
  - a) has abandoned the work/Contract.
  - b) has failed to commence the works, or has without any lawful excuse under these conditions suspended the work for 15 consecutive days.

- c) has failed to remove materials from the site or to pull down and replace the work within 15 days after receiving from the Engineer written notice that the said materials or work were condemned and/or rejected by the Engineer under specified conditions.
- d) has neglected or failed to observe and perform all or any of the terms acts, matters or things under this Contract to be observed and performed by the Contractor.
- e) has to the detriment of good workmanship or in defiance of the Engineer's instructions to the contrary sub-let any part of the Contract.
- f) has acted in any manner to the detrimental interest, reputation, dignity, name or prestige of the Owner.
- g) has stopped attending to work without any prior notice and prior permission for a period of 15 days.
- h) has become untraceable.
- i) has without authority acted in violation of the terms and conditions of this contract and has committed breach of terms of the contract in best judgement of the owner.
- j) has been declared insolvent/bankrupt.
- k) in the event of sudden death of the Contractor.

12.3 The owner on termination of such contract shall have the right to appropriate the Security Deposit, Retention Money and invoke the Bank Guarantee furnished by the contractor and to appropriate the same towards the amounts due and payable by the contractor as per the conditions of Contract and return to the contractor excess money, if any, left over.

**® 12.4 In case of Termination of the contract, Owner shall have the right to carry out the unexecuted portion of the work either by themselves or through any other contractor(s) at the risk and cost of the Contractor. In view of paucity of time, Owner shall have the right to place such unexecuted portion of the work on any nominated contractor(s). However, the overall liability of the Contractor shall be restricted to 100 % of the total contract value.**

12.5 The contractor within or at the time fixed by the Owner shall depute his authorised representative for taking joint final measurements of the works executed thus far and submit the final bill for the work as per joint final measurement within 15 days of the date of joint final measurement. If the contractor fails to depute their representative for joint measurement, the owner shall take the measurement with

their Engineer-in-Charge/Site-in-Charge or any other outside representatives. Such a measurement shall not be questioned by the Contractor and no dispute can be raised by the Contractor for purpose of Arbitration.

12.6 The Owner may enter upon and take possession of the works and all plant, tools, scaffoldings, sheds, machinery, power operated tools and steel, cement and other materials of the Contract at the site or around the site and use or employ the same for completion of the work or employ any other contractor or other person or persons to complete the works. The Contractor shall not in any way object or interrupt or do any act, matter or thing to prevent or hinder such actions, other Contractor or other persons employed for completing and finishing or using the materials and plant for the works. When the works shall be completed or as soon thereafter the Engineer shall give a notice in writing to the Contractor to remove surplus materials and plant, if any, and belonging to the Contractor except as provided elsewhere in the Contract and should the Contractor fail to do so within a period of 15 days after receipt thereof the Owner may sell the same by public auction and shall give credit to the contractor for the amount realised. The Owner shall thereafter ascertain and certify in writing under his hand what (if anything) shall be due or payable to or by the Owner for the value of the plant and materials so taken possession and the expense or loss which the Owner shall have been put to in procuring the works, to be so completed, and the amount if any, owing to the Contractor and the amount which shall be so certified shall thereupon be paid by the Owner to the Contractor or by the Contractor to the Owner, as the case may, and the Certificate of the Owner shall be final and conclusive between the parties.

12.7 When the contract is terminated by the Owner for all or any of the reasons mentioned above the Contractor shall not have any right to claim compensation on account of such termination.

### 13. **FORCE MAJEURE**

13.1. Any delay in or failure of the performance of either part hereto shall not constitute default hereunder or give rise to any claims for damage, if any, to the extent such delays or failure of performance is caused by occurrences such as Acts of God or an enemy, expropriation or confiscation of facilities by Government authorities, acts of war, rebellion, sabotage or fires, floods, explosions, riots, or strikes. The Contractor shall keep records of the circumstances referred to above and bring these to the notice of the Engineer-in-Charge/Site-in-Charge in writing immediately on such occurrences. The amount of time, if any, lost on any of these counts shall not be counted for the Contract period. Once decision of the Owner arrived at after consultation with the Contractor, shall be final and binding. Such a determined period of time be extended by the Owner to enable the Contractor to complete the job within such extended period of time.

13.2. If Contractor is prevented or delayed from the performing any of its obligations under this Agreement by Force Majeure, then Contractor shall notify Owner the



circumstances constituting the Force Majeure and the obligations performance of which is thereby delayed or prevented, within seven days of the occurrence of the events.

## **14. ARBITRATION**

14.1 All disputes and differences of whatsoever nature, whether existing or which shall at any time arise between the parties hereto touching or concerning the agreement, meaning, operation or effect thereof or to the rights and liabilities of the parties or arising out of or in relation thereto whether during or after completion of the contract or whether before after determination, foreclosure, termination or breach of the agreement (other than those in respect of which the decision of any person is, by the contract, expressed to be final and binding) shall, after written notice by either party to the agreement to the other of them and to the Appointing Authority hereinafter mentioned, be referred for adjudication to the Sole Arbitrator to be appointed as hereinafter provided.

**®14.2 The appointing authority shall either himself act as the Sole Arbitrator or nominate some officer/retired officer of Hindustan Petroleum Corporation Limited (referred to as owner or HPCL) or a retired officer of any other Government Company in the Oil Sector of the rank of Ch. Manager & above or any retired officer of the Central Government not below the rank of a Director, to act as the Sole Arbitrator to adjudicate the disputes and differences between the parties. The contractor/vendor shall not be entitled to raise any objection to the appointment of such person as the Sole Arbitrator on the ground that the said person is/was an officer and/or shareholder of the owner, another Govt. Company or the Central Government or that he/she has to deal or had dealt with the matter to which the contract relates or that in the course of his/her duties, he/she has/had expressed views on all or any of the matters in dispute or difference.**

**14.3 In the event of the Arbitrator to whom the matter is referred to, does not accept the appointment, or is unable or unwilling to act or resigns or vacates his office for any reasons whatsoever, the Appointing Authority aforesaid, shall nominate another person as aforesaid, to act as the Sole Arbitrator.**

**14.4 Such another person nominated as the Sole Arbitrator shall be entitled to proceed with the arbitration from the stage at which it was left by his predecessor. It is expressly agreed between the parties that no person other than the Appointing Authority or a person nominated by the Appointing Authority as aforesaid, shall act as an Arbitrator. The failure on the part of the Appointing Authority to make an appointment on time shall only give rise to a right to a Contractor to get such an appointment made and not to have any other person appointed as the Sole Arbitrator.**

14.5 The Award of the Sole Arbitrator shall be final and binding on the parties to the Agreement.

14.6 The work under the Contract shall, however, continue during the Arbitration proceedings and no payment due or payable to the concerned party shall be withheld (except to the

extent disputed) on account of initiation, commencement or pendency of such proceedings.

14.7 The Arbitrator may give a composite or separate Award(s) in respect of each dispute or difference referred to him and may also make interim award(s) if necessary.

®14.8 The fees of the Arbitrator and expenses of arbitration, if any, shall be borne equally by the parties unless the Sole Arbitrator otherwise directs in his award with reasons. **The lumpsum fees of the Arbitrator shall be ₹ 40,000/- per case for transportation contracts and ₹ 60,000/- for engineering contracts and if the sole Arbitrator completes the arbitration including his award within 5 months of accepting his appointment, he shall be paid ₹ 10,000/- additionally as bonus. Reasonable actual expenses for stenographer, etc. will be reimbursed. Fees shall be paid stagewise i.e. 25% on acceptance, 25% on completion of pleadings/documentation, 25% on completion of arguments and balance on receipt of award by the parties**

14.9 Subject to the aforesaid, the provisions of the Arbitration and Conciliation Act, 1996 or any statutory modification or re-enactment thereof and the rules made thereunder, shall apply to the Arbitration proceedings under this Clause.

14.10 The Contract shall be governed by and constructed according to the laws in force in India. The parties hereby submit to the exclusive jurisdiction of the Courts situated at \_\_\_\_\_ (say Mumbai\*) for all purposes. The Arbitration shall be held at \_\_\_\_\_ (say Mumbai\*) and conducted in English language.

14.11 The Appointing Authority is the Functional Director of Hindustan Petroleum Corporation Limited.

(Note:- \* = While printing the GTCs, each Purchasing Authorities at various location, may mention the correct place before printing the GTC and not leave Clause 14.10 blank or as stated above. Bracketed portion is to be removed.

## 15. GENERAL

15.1. Materials required for the works whether brought by the or supplied by the Owner shall be stored by the contractor only at places approved by Engineer-in-Charge/Site-in-Charge. Storage and safe custody of the material shall be the responsibility of the Contractor.

15.2. Owner and/or Engineer-in-Charge/Site-in-Charge connected with the contract, 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 at other place(s) manufactured or at any places where these are laying or from which these are being obtained and the contractor shall give facilities as may be required for such inspection and examination.

- 15.3. In case of any class of work for which there is no such specification supplied by the owner as is mentioned in the tender documents, such work shall be carried out in accordance with Indian Standard Specifications and if the Indian Standard Specifications do not cover the same the work should be carried out as per standard Engineering practice subject to the approval of the Engineer-in-Charge/Site-in-Charge.
- 15.4. Should the work be suspended by reason of rain, strike, lockouts or other cause the contractor shall take all precautions necessary for the protection of the work and at his own expense shall make good any damages arising from any of these causes.
- 15.5 The contractor shall cover up and protect from injury from any cause all new work also for supplying all temporary doors, protection to windows and any other requisite protection for the whole of the works executed whether by himself or special tradesmen or sub- contractors and any damage caused must be made good by the contractors at his own expense.
- 15.6 If the contractor has quoted the items under the deemed exports, then it will be the responsibility of the contractor to get all the benefits under deemed exports from the Government. The Owner's responsibility shall only be limited to the issuance of required certificates. The quotation will be unconditional and phrases like "subject to availability of deemed exports benefit" etc. will not find place in it.
- ®16. Integrity Pact : Effective 1<sup>st</sup> September, 2007, all tenders and contracts shall comply with the requirements of the Integrity Pact (IP) if the value of such tenders or contracts is ₹ 1 crore & above. Failure to sign the Integrity Pact shall lead to outright rejection of bid.
- # 17. Grievances of parties participating or intend to participate in the tender shall be addressed in writing to the officer designate of the Grievance Redressal Cell where the tenders have to be submitted within the stipulated period. Detailed mechanism of Grievance Redressal is available on the HPCL website.**

**ANNEXURE - 8**

**(SPECIMEN)**

**BANK GUARANTEE FOR MOBILISATION ADVANCE**

(On Non-Judicial stamp paper of appropriate value)

Hindustan Petroleum Corporation Ltd.,

(Address as applicable)

1. In consideration of M/s Hindustan Petroleum Corporation Ltd., Government of India Company registered under the Companies Act, 1956 having its Registered Office at 17, Jamshedji Tata Road, Bombay - 400 020 (hereinafter called the "Corporation" which expression shall include its successors in business and assigns having placed an order on M/s \_\_\_\_\_ a partnership firm/sole proprietor/a Company registered under the Companies Act 1956, having its office at \_\_\_\_\_(complete address) \_\_\_\_\_ (hereinafter called "the supplier/contractor" (which expression shall include its successors in business and assigns) vide Purchase Order No. \_\_\_\_\_ dated \_\_\_\_\_ for (specify nature of job) \_\_\_\_\_ (hereinafter called "the Order" which expression shall include any amendments / alterations thereto as issued by "the Corporation") for the supply of goods to/the execution of service for "the Corporation" and having agreed to pay the suppliers as and by way of advance upto a sum of Rupees \_\_\_\_\_ being \_\_\_\_\_ % of the value of "the Order" in terms of "the order" on production of an acceptable Bank Guarantee for an amount of ₹ \_\_\_\_\_.
2. We, \_\_\_\_\_ Bank (hereinafter referred to as "the Bank") , do at the request and on behalf of "The Suppliers / Contractor" hereby agree to pay to "the Corporation" without any demur on first demand an amount not exceeding ₹ \_\_\_\_\_ (in words) against any loss or damage, costs, to or suffered by "the Corporation" by reason of any breach on the part of "the Supplier/Contractor" of any of the terms and conditions of the said "Order".

3. We, \_\_\_\_\_ Bank, further agree that "the Corporation" shall be the sole judge whether the said "Supplier/Contractor" has committed breach of any of the terms and conditions of "the Order" and the extent of loss, damage, cost, charges and expenses suffered or incurred or would be suffered or incurred by "the Corporation" on account thereof and we waive in favour of "the Corporation" all the rights and defense to which we as guarantors and/or the supplier may be entitled to.
  
4. We, \_\_\_\_\_ Bank, further agree that the amount demanded by "the Corporation" as such shall be final and binding on "the Bank" as to "the Bank's" liability to pay the amount demanded and "the Bank" undertake to pay "the Corporation" the amount so demanded on first demand without any demur notwithstanding any dispute raised by "the Supplier/Contractor" or any suit or other legal proceedings including arbitration pending before any court, tribunal or arbitrator relating thereto, our liability under this guarantee being absolute and unconditional.
  
5. We, \_\_\_\_\_ Bank, further agree that the guarantee herein contained shall remain in full force and continue to have full effect so long as the said amount remains unadjusted.
  
6. We, \_\_\_\_\_ Bank, further agree with "the Corporation" that "the Corporation" shall have the fullest liberty without any consent and without affecting in any manner our obligations hereunder to vary any of the terms and condition of the said "Order" or to extended time of performance by "the Supplier/Contractor" from time to time or to postpone for any time or from time to time any of the powers exercisable by "the Corporation" against "the Supplier / Contractor" and to forbear to enforce any of the terms and conditions relating to "the Order" and we shall not be relieved from our liability by reason of any such variation or extension being granted to "the Corporation" or for any forbearance, act or omission of "the Supplier/Contractor" or any such matter of things, whatsoever which under the law relating to sureties would, but for these provisions, have the effect of relieving us.
  
7. We, \_\_\_\_\_ Bank, hereby lastly undertake not to revoke this guarantee during its currency except with the previous consent of "the Corporation" in writing.
  
8. Not withstanding anything contained herein above :
  - i) Our liability under this guarantee shall not exceed ₹ .....

- ii) This Bank Guarantee shall be valid upto and including .....; and
  - iii) We are liable to pay the guarantee amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or # before the expiry of 30 days from the date of expiry of this guarantee.
9. This guarantee shall not be determined or affected by the liquidation or winding up, dissolution or change of constitution or insolvency of "the Supplier/Contractor", but shall in all respects and/or for all purposes be binding and operative on "the Bank" until payment of all moneys payable by "the Supplier/Contractor" in terms thereof.
10. "The Bank" has power to issue this guarantor in favour of "the Corporation" in terms of the documents and/or the agreement/contract or MOU entered into between "the Supplier/Contractor" and "the Bank" in this regard.

IN WITNESS whereof, Bank of \_\_\_\_\_, has executed this document at \_\_\_\_\_ on \_\_\_\_\_ 199 .

\_\_\_\_\_  
(FOR \_\_\_\_\_ BANK)  
(by its constituted attorney)  
(signature of a person authorized  
to sign on behalf of "the Bank")

(SPECIMEN)

**BANK GUARANTEE FOR ADVANCES**

(on non-judicial stamp paper of appropriate value)

To,  
Hindustan Petroleum Corporation Ltd.,

(Address as applicable)

In CONSIDERATION OF MESSRS. HINDUSTAN PETROLEUM CORPORATION LIMITED, a Government of India Company registered under the Companies Act 1956, having its registered office at 17, Jamshedji Tata Road, Bombay - 400 020 (hereinafter called "the Corporation" which expression shall include its successors in business and assigns) having placed an order on Messrs \_\_\_\_\_ a partnership firm/sole proprietor business/ a company registered under the Companies Act, 1956 having its office at \_\_\_\_\_ (hereinafter called "the Supplier" which expression shall include its successors and assigns) vide Order No. \_\_\_\_\_ dated \_\_\_\_\_ (hereinafter called "the Order" which expression shall include any amendments/alterations thereto as issued by "the Corporation") for the supply of goods/to the execution of Service for "the Corporation" and having agreed to pay the supplier as and by way of advance upto a sum of ₹ \_\_\_\_\_ (Rupees \_\_\_\_\_ only ) being \_\_\_\_ % of the value of the order in terms of "the Order" on production of an acceptable Bank Guarantee for an amount of ₹ \_\_\_\_\_ (Rupees \_\_\_\_\_ only)

1. We, \_\_\_\_\_ Bank having office at \_\_\_\_\_ (hereafter referred to as "the Bank") do at the request and on behalf of "the Supplier's" hereby agree to pay "the Corporation" without any demur on first demand an amount not exceeding ₹ \_\_\_\_\_ (Rupees \_\_\_\_\_ only) against any loss or damage, costs, charges and expenses caused to or suffered or would be caused to or suffered by "the Corporation" by reason of any breach on the part of "the Supplier" of any of the terms and conditions of the said order.

2. We, \_\_\_\_\_ Bank further agree that "the Corporation" shall be sole judge whether the said "Supplier" has committed breach of any of the terms and conditions of "the Order" and the extent of loss, damage, cost charges and expenses suffered or incurred or would be suffered or incurred by "the Corporation" on account thereof and we waive in favour of "the Corporation" all the rights and defences to which we as guarantors and/or "the Supplier" may be entitled to.
  
3. We, \_\_\_\_\_ Bank further agree that the amount demanded by "the Corporation" as such shall be final and binding on "the Bank" as to "the Bank's" liability to pay and amount demanded and "the Bank" undertake to pay "the Corporation" the amount so demanded on first demand and without any demur notwithstanding any dispute raised by "the Supplier" or any suit or other legal proceedings including arbitration pending before any court tribunal or arbitrator relating thereto, our liability under this guarantee being absolute and unconditional. (We \_\_\_\_\_ Bank further agree that the guarantee herein contained shall remain in full force and continue to have full effect so long as the said amount remains unadjusted, provided, however, the value of the guarantee shall progressively reduce upon any adjustments being made by "the Corporation" against the said advance and "the Corporation" rights shall extend only to the value of the unadjusted amount.
  
4. We, \_\_\_\_\_ Bank further agree with "the Corporation" that "the Corporation" shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said "order"/or to extend time of performance by "the Supplier" from time to time or to postpone for any time or from time to time any of the powers exercisable by "the Corporation" against "the Supplier" and to forbear to enforce any of the terms and conditions relating to "the Order" and we shall not be relieved from our liability by reason of any such variation or extension being granted to "the Supplier" or for any forbearance, act or omission on "the Supplier" or by any such matter or things whatsoever which under the law relating to sureties would be for this provisions have the effect of relieving us.
  
5. Notwithstanding anything contained herein above :
  - i) Our liability under this guarantee shall not exceed ₹.....
  - ii) This Bank Guarantee shall be valid upto and including .....; and
  - iii) We are liable to pay the guarantee amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or # *before the expiry of 30 days from the date of expiry of this guarantee*
  
6. We, \_\_\_\_\_ Bank further undertake not to revoke this guarantee during its currency except with the previous consent of "the Corporation" in writing.



7. We, \_\_\_\_\_ Bank lastly agree that "the Bank" liability under this guarantee shall not be affected by any change in the constitution of "the Supplier".
8. We, \_\_\_\_\_ Bank has power to issue this guarantee in favour of "the Corporation" in terms of the documents and/or the agreement/contract or MOU entered into between "the supplier" and "the Bank" in this regard.

IN WITNESS WHEREOF the Bank has executed this document on this \_\_\_\_\_ day of \_\_\_\_\_

\_\_\_\_\_  
(FOR \_\_\_\_\_ BANK)  
(by its constituted attorney)  
(signature of a person authorized  
to sign on behalf of "the Bank")

ANNEXURE - 10

(SPECIMEN)

**BANK GUARANTEE FOR PERFORMANCE OF THE OBLIGATIONS OF SUPPLIER / CONTRACTOR**

(on non-judicial stamp paper of appropriate value)

To,

Hindustan Petroleum Corporation Ltd.,  
(Address as applicable)

IN CONSIDERATION OF THE HINDUSTAN PETROLEUM CORPORATION LTD. a Government of India Company registered under the Companies Act, 1956, having its registered office at 17, Jamshedji Tata Road, Bombay - 400 020 (hereinafter called "the Corporation" which expression shall include its successors and assigns) having awarded \_\_\_\_\_ to \_\_\_\_\_ M/s \_\_\_\_\_ a partnership firm/sole proprietor business/a company registered under the Companies Act, 1956 having its office at \_\_\_\_\_ (hereinafter referred to as "the Supplier" which expression shall wherever the subject or context so permits includes its successors and assigns) a supply contract in terms inter alia, of "the Corporation's" Order No. \_\_\_\_\_ dated \_\_\_\_\_ and the General purchase conditions of "the Corporation" and upon the condition of "supplier's" furnishing security for the performance of "the Supplier's" obligations and/or discharge of "the supplier's" liability under and/or in connection with the said supply contract upto a sum of ₹ \_\_\_\_\_ (Rupees \_\_\_\_\_) amounting to 10% (ten percent) of the total contract value.

We, \_\_\_\_\_ (hereinafter called "the Bank" which expression shall include its successors and assigns) hereby jointly and severally undertake and guarantee to pay to "the Corporation" in rupees forthwith on demand in writing and without protest or demur of any and all moneys anywise payable by "the Supplier" to "the Corporation" under, in respect of or in connection with the said supply contract inclusive of all the Corporation's losses and damage and costs, (inclusive between attorney and client) charges, and expenses and other moneys anywise payable in respect of the above as specified in any

notice of demand made by "the Corporation" to the Bank with reference to this Guarantee upto and aggregate limit of ₹ \_\_\_\_\_ (Rupees \_\_\_\_\_) and "the Bank" hereby agrees with "the Corporation" that:

1. This Guarantee/Undertaking shall be a continuing Guarantee / Undertaking and shall remain valid and irrecoverable for all claims of "the Corporation" and liabilities of "the Supplier" arising upto and until midnight of \_\_\_\_\_
2. This Guarantee/Undertaking shall be in addition to any other guarantee or security whatsoever that "the Corporation" may now or any time anywise have in relation to "the Supplier's obligation/liabilities under and/or connection with the said supply contract, and "the Corporation" shall have full authority to take recourse to or enforce this security in preference to the other security(ies) at its sole discretion and no failure on the part of "the Corporation" to enforcing or requiring enforcement to any other security shall have the effect of releasing "the Bank" from its full liability hereunder.
3. "The Corporation" shall be at liberty without reference to "the Bank" and without affecting the full liability of "the Bank" hereunder to take any other security in respect of "the Supplier's" obligation and/or liabilities under or in connection with the said supply contract and to vary the term vis-a-vis "the supplier" of the said supply contract or to grant time and/or indulgence to "the Supplier" or to reduce or to increase or otherwise vary the prices of the total contract value or to release or to forebear from enforcement of all or any of the obligations of "the supplier" under the said supply contract and/or the remedies of "the Corporation" under any other security(ies) now or hereafter held by "the Corporation" and no such dealing(s), variation(s) or other indulgence(s) or agreement(s) with "the supplier" or release of forbearance whatsoever shall have the effect of releasing "the Bank" from its full liability to "the Corporation" hereunder or of prejudicing rights of "the Corporation" against "the Bank".
4. This Guarantee/Undertaking shall not be determined or affected by the liquidation or winding up, dissolution or change of constitution or insolvency of "the supplier" but shall in all respects and for all purposes be binding and operative until payment of all moneys payable to "the Corporation" in terms hereof.
5. "The Bank" hereby waives all rights at any time inconsistent with the terms of this Guarantee/Undertaking and the obligations of "the Bank" in terms hereof shall not be anywise affected or suspended by reason of any dispute having been raised by "the suppliers" (whether or not pending before any arbitrator, officer, tribunal or court)

or any denial of liability by "the supplier" or any other order of communication whatsoever by "the supplier" stopping or preventing or purporting to stop or prevent any payment by "the Bank" to "the Corporation" in terms hereof.

6. The amount stated in any notice of demand addressed by "the Corporation" to "the Bank" as liable to be paid to "the Corporation" by "the supplier" or as suffered or incurred by "the Corporation" on account of any losses or damages or costs, charges/and/or expenses shall be as between "the Bank" and "the Corporation" be conclusive of the amount so liable to be paid to "the Corporation" or suffered or incurred by "the Corporation", as the case may be, and payable by "the Bank" to "the Corporation", in terms hereof.

7. Notwithstanding anything contained herein above :

i) Our liability under this guarantee shall not exceed ₹.....

ii) This Bank Guarantee shall be valid upto and including .....; and

iii) We are liable to pay the guarantee amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or # *before the expiry of 30 days from the date of expiry of this guarantee.*

8. "The Bank" has power to issue this guarantee in favour of "the Corporation" in terms of the documents and/or the agreement/contract or MOU entered into between "the supplier" and "the Bank" in this regard.

IN WITNESS Where of \_\_\_\_\_ Bank, has executed this document at \_\_\_\_\_ on \_\_\_\_\_ 199 .

\_\_\_\_\_ Bank  
(by its constituted attorney) (signature of a person authorized to sign on behalf of "the Bank")

ANNEXURE - 11

(SPECIMEN)

COMPOSITE BANK GUARANTEE FOR MOBILISATION ADVANCE, SECURITY DEPOSIT/RETENTION MONEY/PERFORMANCE GUARANTEE

(On Non-Judicial stamp paper of appropriate value)

TO : Hindustan Petroleum Corporation Limited  
(Address as applicable)

IN CONSIDERATION OF MESSRS. HINDUSTAN PETROLEUM CORPORATION LIMITED, a Government of India Company registered under the Companies Act, 1956, having its registered office at 17, Jamshedji Tata Road, Bombay-20 (hereinafter called "The Corporation" (which expression shall include its successor in business and assigns) having placed an order on Messers ..... a partnership firm/sole proprietor business/a company registered under the Companies Act, 1956 having its office at ..... (hereinafter called "the supplier" (which expression shall include executors, administrators and assigns) vide order No..... dated..... (hereinafter called "the order" which expression shall include any amendments/alterations to "the order" issued by "the Corporation") for the supply of goods to/execution of services for "the Corporation" and "the Corporation" having agreed :

- a) not to insist upon immediate payment of Security deposit for the fulfilment and performance of the said order
- b) to pay "the supplier" as and by way of advance upto a sum of Rupees\_\_\_\_\_ (Rupees \_\_\_\_\_ only) being \_\_\_\_% of the value of "the order";
- c) that "the supplier" shall furnish a security for the performance of "the supplier's" obligations and/or discharge of "the supplier's" liability in connection with the said "order"; and "the Corporation" having agreed with "the supplier" to accept a composite Bank Guarantee for the mobilisation advance, security deposit, retention money and performance guarantee.

We, ..... Bank having office at ..... (hereinafter referred to as "the Bank" which expression shall includes its successors and assigns) at the request and on behalf of "the supplier" hereby agree to pay to "the Corporation" without any demur on first demand an amount not exceeding ₹..... (Rupees.....only) against any loss or damage, costs, charges and expenses caused to or suffered by "the Corporation" by reason of non performance and fulfilment or for any breach on the part of "the supplier" of any of the terms and conditions of the said "order".

2. We, ..... Bank further agree that "the Corporation" shall be sole judge whether the said "Supplier" has failed to perform or fulfill the said "order" in terms thereof or committed breach of any terms and conditions of "the order" and the extent of loss, damage, cost, charges and expenses suffered or incurred or would be suffered or incurred by "the Corporation" on account thereof and we waive in the favour of "the Corporation" all the rights and defences to which we as guarantors and/or "the Supplier" may be entitled to.

3. We, ..... Bank further agree that the amount demanded by "the Corporation" as such shall be final and binding on "the Bank" as to "the Bank" 's liability to pay and the amount demanded and "the Bank" undertake to pay "the Corporation" the amount so demanded on first demand and without any demur notwithstanding any dispute raised by "the Supplier" or any suit or other legal proceedings including arbitration pending before any court, tribunal or arbitrator relating thereto, our liability under this guarantee being absolute and unconditional.

4. We, ..... Bank further agree with "the Corporation" that "the Corporation" shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said "order"/or to extend time of performance by "the Supplier" from time to time or to

postpone for any time to time any of the powers exercisable by "the Corporation" against "the Supplier" and to forbear to enforce any of the terms and conditions relating to "the order" and we shall not be relieved from our liability by reason of any such variation or extension being granted to "the Supplier" or for any forbearance, act or omission on the part of "the Corporation" or any indulgence by "the Corporation" to "the Supplier" or by any such matter or things whatsoever which under the law relating to sureties would but for this provision have the effect of relieving us.

5. However, it has been agreed between "the Supplier" and "the Corporation" that there shall be only one Composite Bank Guarantee for both the advance and security deposit performance guarantee/Retention Money @ of \_\_\_\_% valid till the end of the defects liability period as per the terms of the P.O. No. \_\_\_\_\_ dated \_\_\_\_\_ and that in proportion with the recovery of advance @ \_\_\_\_% per bill the same amount/value automatically stands credited to the defects liability account/security deposit or retention money as the case may be and will continue to be credited/treated till the entire advance of ₹ \_\_\_\_\_ is fully recovered from the running bills and from the date of full recovery of the advance of ₹ \_\_\_\_\_ this guarantee automatically, shall stand valid towards the \_\_\_\_% retention money/defects liability, fully valid in all respects unto a further period of **3 (three)** months, as

®

6. Notwithstanding anything contained herein above :
- i) Our liability under this guarantee shall not exceed ₹.....
- ii) This Bank Guarantee shall be valid upto and including .....; and
- iii) We are liable to pay the guarantee amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before the expiry of 30 days from the date of expiry of this guarantee.

7. We, ..... Bank further undertake not to revoke this guarantee during its currency except with the previous consent of "the Corporation" in writing.
8. We, ..... Bank lastly agree that "the Bank"'s liability under this guarantee shall not be affected by any change in the constitution of "the Supplier".
9. "The Bank" has power to issue this guarantee in favour of "the Corporation" in terms of the documents and/or the Agreement/Contract or MOU entered into between "the Supplier" and "the Bank" in this regard.

IN WITNESS WHEREOF the Bank has executed this document on this  
 ..... day of .....

For ..... Bank  
 (by its constituted attorney)  
 (Signature of a person authorised  
 to sign on behalf of "the Bank")\*



(SPECIMEN)

(INDEMNITY BOND)

(TO BE NOTORISED AND ON STAMP PAPER OF APPROPRIATE VALUE)

TO,

HINDUSTAN PETROLEUM CORPN. LTD.

(Address as applicable)

Dear Sirs,

WHEREAS Hindustan Petroleum Corporation Limited, a Government of India Company, registered under the Companies Act, 1956, having its Registered Office at 17, Jamshedji Tata Road, Bombay - 400020 (hereinafter called "the Indemnified" which expression shall include its successors and assigns) has awarded to M/s. .... a Partnership Firm/Sole Proprietor Business/a company having its Registered Office at ..... (hereinafter called "the Indemnifier", which expression shall include its successors and assigns) a contract for conditions set out, inter-alia, in "the Indemnified" 's Purchase Order No. .... dated ..... (hereinafter referred to as "The Said Contract") to "the Indemnifier".

AND WHEREAS "the Indemnified" has agreed to supply to "the Indemnifier" raw material/components to the value of ₹..... (Rupees ..... only) for incorporation in fabrication by "the Indemnifier" in terms of "the said contract", the components/raw material to be supplied by "the Indemnified" to "the Indemnifier" for the said fabrication, (hereinafter, for the sake of brevity, referred to as "the said material") and pending fabrication and delivery at job-site of the completed fabricated work(s) incorporating "the said material" and accounting for "the said material" shall be under the sole custody and charge of "the Indemnifier" and shall be kept, stored, altered, worked upon and/or fabricated at the sole risk and expenses of "the Indemnifier" ;

As a Pre-condition to the supply of "the said material" by "the Indemnified" to "the Indemnifier", the Indemnified" has required "the Indemnifier" to furnish to "the Indemnified" security in the manner and upon terms and conditions hereinafter indicated :

NOW THEREFORE, in consideration of the premises aforesaid "the Indemnifier" Shri ....., Shri ..... all directors/partners/sole proprietor of "the Indemnifier" in consideration of aforesaid "contract" hereby irrevocably and unconditionally and jointly and severally undertake to indemnify and always keep "the Indemnified" from and against all loss, damage and destruction (inclusive but not limited to any or all loss or damage or destruction to or of "the said material" or any item or part thereof) by theft, fire, flood, storm, tempest, lightning, explosion, storage, chemical or physical action or reaction, bending, wrapping, exposure, rusting, faulty workmanship, faulty fabrication or faulty method of technique of fabrication, riot, civil commotion or other act of omission or commission whatsoever within or beyond the control of "the Indemnifier", misuse and misappropriation by "the Indemnifier's" servants and/or agents whatsoever to, of or in "the said material" or any part or item thereof between the date that the same or relative part or item thereof was supplied to "the Indemnifier" upto and until the return to "the Indemnified" on due dates of "the said material" or relative part or item thereof or completed fabricated work(s) incorporating the said material AND jointly and severally undertake to pay to "the Indemnified" forthwith on first demand in writing without protest or demur the value of "the said material" or item part thereof lost, damaged, destroyed, misused and/or misappropriated, as the case may be, inclusive of "the Indemnified" 's cost and expenses (inclusive but not limited to handling, transportation, cartage, insurance, freight, packing and inspection costs and/or expenses) as specified in the said demand.

AND "the Indemnifier" hereby agree with "the Indemnified" that :

1. This Indemnity shall remain valid and irrevocable until the settlement of all claims of "the Indemnified" arising hereunder :
2. This Indemnity shall be in addition to any other Indemnity, Guarantee or Security whatsoever that "the Indemnified" may now or any time anywise have in relation to "the Indemnifier" 's obligations/liabilities under and/or in connection with the said contract inclusive of "the said material" and "the Indemnified" shall have full authority to

take recourse to or enforce this security in preference to the other security (ies) at its sole discretion, and no failure on the part of "the Indemnified" in enforcing or requiring enforcement of any other security shall have the effect of releasing "the Indemnifier" from its full liability hereunder :

3. "The Indemnified" shall be at liberty without reference to "the Indemnifier" and without affecting the full liability of "the Indemnifier" hereunder to take any other such security in respect of "the Indemnifier" 's obligations and/or liabilities under or in connection with the "said contract" inclusive of "the said material" and to vary the terms vis-a-vis "the Indemnifier" of "the said contract" or to grant time and/or indulgence to "the Indemnifier" or to reduce or to increase or otherwise vary the prices or the total contract value or the quantity, quality, description or value of the said material or to release or to forbear from endorsement of all or any of the obligations of "the Indemnifier" under the said contract (inclusive of anything in respect of "the said material") and/or the remedies of "the Indemnified" under any other security(ies) now or hereinafter held by "the Indemnified" and no such dealing(s), variations(s), reduction(s), increase(s) or other indulgence(s) or arrangement(s) with "the Indemnifier" or release or forbearance whatsoever shall have the effect of releasing "the Indemnifier" from their full liability to "the Indemnified" hereunder or of anywise prejudicing rights of "the Indemnified" against "the Indemnifier" and "the Indemnifier" hereby waive all rights, if any, at any time, inconsistent with the terms of this Indemnity.
4. This Indemnity shall not be determined or affected by the liquidation or winding up, dissolution, or change of constitution or insolvency of "the Indemnifier" and the obligations of "the Indemnifier" in terms hereof shall not be anywise affected or suspended by reason of any dispute or disputes having been raised by "the Indemnifier" (whether now pending before any Arbitrator, Officer, Tribunal or Court) or any denial of liability by "the Indemnifier" or any other order or communication whatsoever by "the Indemnifier" stopping or preventing or purporting to stop or prevent any payment by "the Indemnifier" to "the Indemnified" in terms hereof :

5. The mere statement made by or on behalf of "the Indemnified" in any notice or demand or other writing addressed to "the Indemnifier" as to any of "the said material" or item or part thereof supplied to "the Indemnifier" having been lost, damaged, destroyed, misused or misappropriated while in the custody of "the Indemnifier" before or after completion of the completed fabricated work(s) incorporating "the said material" and delivery at job site thereof shall as between "the Indemnifier" and "the Indemnified" be conclusive of the factum of "the said material" or item or part thereof having been supplied to "the Indemnifier" and/or the loss, damage, destruction, misuse or misappropriation thereof, as the case may be, while in the custody of "the Indemnifier" and/or prior to the completion of the completed fabricated work(s) and delivery to job site thereof without necessity on the part of "the Indemnified" to produce any documentary proof or other evidence whatsoever in support of this;
6. The amount stated in any notice of demand addressed by "the Indemnified" to "the Indemnifier" as the value of any of "the said material", lost, damaged, destroyed or misused or misappropriated, inclusive relative to the cost and expenses incurred by "the Indemnified" in connection therewith shall as between "the Indemnifier" and "the Indemnified" be conclusive of the value of such "said material" and the said costs and expenses as also of the amount liable to be paid by "the Indemnifier" to "the Indemnified" in terms and for the purpose of, without necessity for "the Indemnified" to produce any voucher, bill or other documentation or evidence whatsoever in support thereof.

In witness whereof "the Indemnifier" have hereunto set and subscribed his hand this day and year first hereinabove written in the presence of witnesses.

Yours faithfully,

1)

2)

3)

WITNESSES

1.

2.

(SPECIMEN)

**BANK GUARANTEE IN LIEU OF EARNEST MONEY**  
(On Non-Judicial stamp paper of appropriate value)

TO : Hindustan Petroleum Corporation Limited

(Address as applicable)

IN CONSIDERATION OF MESSRS. HINDUSTAN PETROLEUM CORPORATION LIMITED a Government of India Company registered under the Companies Act, 1956, having its registered office at 17, Jamshedji Tata Road, Bombay-20 (hereinafter called "The Corporation" which expression shall include its successor in business and assigns) issued a tender on Messrs. .... a partnership firm/sole proprietor business/a company registered under the Companies Act, 1956 having its office at (hereinafter called "the Tenderer" which expression shall include its executors, administrators and assigns) against Tender no..... dated ..... (hereinafter called "the tender" which expression shall include any amendments/alterations to "the tender" issued by "the Corporation") for the supply of goods to/execution of services for "the Corporation" and "the Corporation" having agreed not to insist upon immediate payment of Earnest Money for the fulfilment of the said tender in terms thereof on production of an acceptable Bank Guarantee for an amount of ₹..... (Rupees ..... only).

We, ..... Bank having office at ..... Bombay (hereinafter referred to as "the Bank" which expression shall include its successors and assigns) at the request and on behalf of "the Tenderer" hereby agree to pay to the Corporation without any demur on first demand an amount not exceeding ₹..... (Rupees ..... only) against any loss or damage, costs, charges and expenses caused to or suffered by "the Corporation" by reason of non performance and fulfilment or for any breach on the part of "the Tenderer" of any of the terms and conditions of the said "tender".

2. We, ..... Bank further agree that "the Corporation" shall be sole Judge whether the said "Tenderer" has failed to perform or fulfill the said "tender" in terms thereof or committed breach of any of the terms and conditions of "the order" and the extent of loss, damage, cost, charges and expenses suffered or incurred or would be suffered or incurred by "the Corporation" on account thereof and we waive in favour of "the Corporation" all the rights and defences to which we as guarantors and/or "the Tenderer" may be entitled to.
  
3. We, ..... Bank further agree that the amount demanded by "the Corporation" as such shall be final and binding on "the Bank" as to "the Bank" 's liability to pay and the amount demanded and "the Bank" to undertake to pay "the Corporation" the amount so demanded on first demand and without any demur notwithstanding any dispute raised by "the Tenderer" or any suit or other legal proceedings including arbitration pending before any court, tribunal or arbitrator relating thereto, our liability under this guarantee being absolute and unconditional.
  
4. We, ..... Bank further agree with "the Corporation" that "the Corporation" shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said "tender"/or to extend time of performance by "the Tenderer" from time to time or to postpone for any time to time any of the powers exercisable by "the Corporation" against "the Tenderer" and to forbear to enforce any of the terms and conditions relating to "the tender" and we shall not be relieved from our liability by reason of any such variation or extension being granted to "the Tenderer" or for any forbearance, act or omission on the part of "the Corporation" or any indulgence by "the Corporation" to "the tenderer" or by any such matter or things whatsoever which under the law relating to sureties would but for this provision have the effect of relieving us.

5. NOTWITHSTANDING anything hereinbefore contained, our liability under this Guarantee is restricted to ₹ ..... (Rupees..... only). Our liability under this guarantee shall remain in force until expiration of six months from the due date of opening of the said "tender". Unless a demand or claim under this guarantee is made on us in writing within said period, that is, on or before ..... all rights of "the Corporation" under the said guarantee shall be forfeited and we shall be relieved and discharged from all liabilities thereunder.
  
6. We, ..... Bank further undertake not to revoke this guarantee during its currency except with the previous consent of "the Corporation" in Writing.
  
7. We, ..... Bank lastly agree that "the Bank" 's liability under this guarantee shall not be affected by any change in the constitution of "the Tenderer".
  
8. "The Bank" has power to issue this guarantee in favour of "the Corporation" in terms of the documents and/or the Agreement/Contract or MOU entered into between "the Tenderer" and "the Bank" in this regard.

IN WITNESS WHEREOF the Bank has executed this document on this ..... day of .....

For ..... Bank  
(by its constituted attorney)

(Signature of a person authorised  
to sign on behalf of "the Bank")

(SPECIMEN)

# BANK GUARANTEE IN LIEU OF LIQUIDATED DAMAGES  
(On Non-Judicial stamp paper of appropriate value) (Clause B.11.1 of Chapter IV)

To: Hindustan Petroleum Corporation Limited  
(Address as applicable)

IN CONSIDERATION OF MESS. HINDUSTAN PETROLEUM CORPORATION LIMITED a Government of India Company registered under the Companies Act, 1956, having its registered office at 17, Jamshedji Tata Road, Churchgate, Mumbai – 400 020 (hereinafter called "The Corporation" which expression shall include its successor in business and assigns) agreeing to grant a provisional extension of time in respect of the contract entered into with Mess. .... a sole proprietorship business/ partnehip firm/ a company registered under the Companies Act, 1956 having its office at ..... (hereinafter called "the Contractor", which expression shall include its executo, administrato and assigns) against Purchase Order No. .... dated ..... (hereinafter called "the Contract" which expression shall include any amendments/ alterations to "the contract" issued by "the Corporation") for ..... (state the purpose of the Contract), and the Contractor having requested for extension of time without deduction of any Liquidated Damages from the bills in terms of the Contract and "the Corporation" having agreed to grant provisional extension of time pending a decision on the request for extension of time and not to insist upon immediate deduction/payment of Liquidated Damages upon receipt of this unconditional irrevocable Bank Guarantee for an amount of .....(Rupees ..... only).

We, ..... Bank having our office at ..... Bombay (hereinafter referred to as "the Bank" which expression shall include its successo and assigns) at the request and on behalf of "the Contractor" hereby agree to pay to the Corporation without any demur and on fit demand an amount not exceeding ..... (Rupees ..... only) against any loss or damage, costs, charges and expenses caused to or suffered by or likely to be caused to or suffered by "the Corporation" by reason of the delay in performance of work or the Corporation agreeing to grant such provisional extension of time without insisting on deduction of Liquidated Damages.

2. We, ..... Bank further agree that "the Corporation" shall be sole Judge whether the said "Contractor" has failed to perform or fulfill the said "Contract" in terms thereof or committed breach of any of the terms and conditions of "the purchase



order/Contract" or was not entitled to any extension of time and also the extent of loss, damage, cost, charges and expenses suffered or incurred or would be suffered or incurred by "the Corporation" on account thereof and we waive in favour of "the Corporation" all the rights and defences to which we as guarantor and/or "the Contractor" may be entitled to.

3. We, ..... Bank further agree that the amount demanded by "the Corporation" as such shall be final and binding on "the Bank" as to "the Bank" 's liability to pay the amount demanded and "the Bank" undertakes to pay to "the Corporation" the amount so demanded on fit demand without further proof or conditions and without any demur, reservation, contest, recoupe or protest and without any enquiry of you or the Contractor, forthwith and in full without any deductions or set-offs or counterclaim whatsoever, the sum claimed by you in such Demand, notwithstanding any dispute raised by "the Contractor" or the pendency of any suit or other legal proceedings including arbitration pending before any court, tribunal or arbitrator relating thereto, our liability under this guarantee being absolute and unconditional. We further agree that the Corporation shall not be bound to disclose any reasons while demanding any amount under the Bank Guarantee.
  
4. We, ..... Bank further agree with "the Corporation" that "the Corporation" shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder, to vary any of the terms and conditions of the said "Contract"/or to extend time of performance by "the Contractor" from time to time or to postpone for any time or from time to time any of the powers exercisable by "the Corporation" against "the Contractor" and to forbear to enforce any of the terms and conditions relating to "the Contract" and we shall not be relieved from our liability by reason of any such variation or extension being granted to "the Contractor" or for any forbearance, act or omission on the part of "the Corporation" or any indulgence by "the Corporation" to "the Contractor" or by any such matter or things whatsoever which under the law relating to sureties would, but for this provision, have the effect of relieving us. Any waiver or other forbearance given or variations required under the Contract or any invalidity, unenforceability or illegality of the whole or any part of the Contract or rights of any party thereto, or amendment or other modification of the Contract or any other fact, circumstance, provision of statute or law which might, were our liability to be secondary and not primary, entitle us to be released in whole or in part from our undertaking, shall not in any way release us from our obligations under this Guarantee. Our obligations hereunder in respect of the sum or sums demanded by the Corporation under this Guarantee are primary, independent and absolute and not by way of surety only. The Corporation may make an unlimited number of Demands under this Guarantee provided that the aggregate of all sums paid shall not exceed the entire Guarantee Amount.

5. Notwithstanding anything hereinbefore contained, our liability under this Guarantee is restricted to . ..... (Rupees..... only). Our liability under this guarantee shall remain in force until expiration of six months from the expiry of the said "Contract". Unless a demand or claim under this guarantee is made on us in writing within said period, that is, on or before ..... all rights of "the Corporation" under the said guarantee shall be forfeited and we shall be relieved and discharged from all liabilities thereunder.
6. We, ..... Bank further undertake not to revoke this guarantee during its currency except with the previous consent of "the Corporation" in Writing.
7. We, ..... Bank lastly agree that "the Bank" 's liability under this guarantee shall not be affected by any change in the constitution of "the Contractor" or its insolvency winding up, reorganisation, amalgamation or liquidation (including any appointment of a receiver, administrator, administrative receiver or supervisor of the Contractor or any of its assets) nor in case of any dispute or disagreement whatsoever under the Agreement. We shall indemnify you immediately on demand against any cost, loss or liability suffered by you as a result of our this obligation being or becoming unenforceable, invalid or contrary to the laws of India (except in the case of a fraud by you).
8. "The Bank" has power to issue this guarantee in favour of "the Corporation" in terms of the documents and/or the Agreement/Contract or MOU entered into between "the Contractor" and "the Bank" in this regard. This Guarantee shall be governed by and construed in accordance with the laws of the Republic of India.
9. Any demand, notice or other communication given in connection with or required by this Guarantee shall be made in writing in English be delivered by hand to, or sent by pre-paid registered post, or facsimile transmission to:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

IN WITNESS WHEREOF the Bank has executed this document on this ..... day of .....

For ..... Bank (by its constituted attorney) Signature of a peon authorised to sign on behalf of the bank")

( SPECIMEN )

® BANK GUARANTEE FOR SECURITY DEPOSIT

(On Non-Judicial stamp paper of appropriate value)

TO : Hindustan Petroleum Corporation Limited  
(Address as applicable)

IN CONSIDERATION OF MESSRS. HINDUSTAN PETROLEUM CORPORATION LIMITED, a Government of India Company registered under the Companies Act, 1956, having its registered office at 17, Jamshedji Tata Road, Bombay-20 (hereinafter called "The Corporation" (which expression shall include its successor in business and assigns) having placed an order on Messers ..... a partnership firm/sole proprietor business/a company registered under the Companies Act, 1956 having its office at ..... (hereinafter called "the supplier") (which expression shall include executors, administrators and assigns) vide order No..... dated..... (hereinafter called "the order" which expression shall include any amendments/alterations to "the order" issued by "the Corporation") for the supply of goods to/execution of services for "the Corporation" and "the Corporation" having agreed :

- a) not to insist upon immediate payment of Security Deposit for the fulfilment and performance of the said order
  
- b) that "the supplier" shall furnish a security for the performance of "the supplier's" obligations and/or discharge of "the supplier's" liability in connection with the said "order"; and "the Corporation" having agreed with "the supplier" to accept Bank Guarantee for the security

We, ..... Bank having office at ..... (hereinafter referred to as "the Bank" which expression shall include its successors and assigns) at the request and on behalf of "the supplier" hereby agree to pay to "the Corporation" without any demur on first demand an amount not exceeding ₹..... (Rupees.....only) against any loss or damage, costs, charges and expenses caused to or suffered by "the Corporation" by reason of non performance and fulfilment or for any breach on the part of "the supplier" of any of the terms and conditions of the said "order".

2. We, ..... Bank further agree that "the Corporation" shall be sole judge whether the said "Supplier" has failed to perform or fulfill the said "order" in terms thereof or committed breach of any terms and conditions of "the order" and the extent of loss, damage, cost, charges and expenses suffered or incurred or would be suffered or incurred by "the Corporation" on account thereof and we waive in the favour of "the Corporation" all the rights and defences to which we as guarantors and/or "the Supplier" may be entitled to.

3. We, ..... Bank further agree that the amount demanded by "the Corporation" as such shall be final and binding on "the Bank" as to "the Bank's" liability to pay and the amount demanded and "the Bank" undertake to pay "the Corporation" the amount so demanded on first demand and without any demur notwithstanding any dispute raised by "the Supplier" or any suit or other legal proceedings including arbitration pending before any court, tribunal or arbitrator relating thereto, our liability under this guarantee being absolute and unconditional.

4. We, ..... Bank further agree with "the Corporation" that "the Corporation" shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said "order"/or to extend time of performance by "the Supplier" from time to time or to

postpone for any time to time any of the powers exercisable by "the Corporation" against "the Supplier" and to forbear to enforce any of the terms and conditions relating to "the order" and we shall not be relieved from our liability by reason of any such variation or extension being granted to "the Supplier" or for any forbearance, act or omission on the part of "the Corporation" or any indulgence by "the Corporation" to "the Supplier" or by any such matter or things whatsoever which under the law relating to sureties would but for this provision have the effect of relieving us.

5. However, it has been agreed between "the Supplier" and "the Corporation" Bank Guarantee for security deposit is Valid upto a period of 3 (Three) months beyond the expiry

6. Notwithstanding anything contained herein above :

i) Our liability under this guarantee shall not exceed ₹.....

ii) This Bank Guarantee shall be valid upto and including .....; and

iii) We are liable to pay the guarantee amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or # *before the expiry of 30 days from the date of expiry of this guarantee.*

7. We, ..... Bank further undertake not to revoke this guarantee during its currency except with the previous consent of "the Corporation" in writing.

8. We, ..... Bank lastly agree that "the Bank"'s liability under this guarantee shall not be affected by any change in the constitution of "the Supplier".

9. "The Bank" has power to issue this guarantee in favour of "the Corporation" in terms of the documents and/or the Agreement/Contract or MOU entered into between "the Supplier" and "the Bank" in this regard.

IN WITNESS WHEREOF the Bank has executed this document on this  
..... day of .....

For ..... Bank

(by its constituted attorney)

(Signature of a person authorised

to sign on behalf of "the Bank")\*

**AGREEMENT (Under Integrity Pact)**

No.

Dated

To,

**HINDUSTAN PETROLEUM CORPORATION LIMITED**

**Sub : Purchase of Bidding Documents**

Ref. Tender no.

HPCL and the Bidder agree that the Notice Inviting Tender (NIT) is an offer made on the condition that the bidder will sign the Integrity Pact and the Bid would be kept open in its original form without variation or modification for a period of (state the number of days from the last date for the receipt of tenders stated in the NIT) days and the making of the bid shall be regarded as an unconditional and absolute acceptance of this condition of the NIT.

We confirm acceptance and compliance with the Integrity Pact in letter and spirit. We further agree that the contract consisting of the above conditions of NIT as the offer and the submission of Bid as the Acceptance shall be separate and distinct from the contract which will come into existence when bid is finally accepted by HPCL.

The consideration for this separate initial contract preceding the main contract is that HPCL is not agreeable to sell the NIT to the Bidder and to consider the bid to be made except on the condition that the bid shall be kept open for days after the last date fixed for the receipt of the bids and the Bidder desires to make a bid on this condition and after entering into this separate initial contract with HPCL.

HPCL promises to consider the bid on this condition and the Bidder agrees to keep the bid open for the required period. These reciprocal promises form the consideration for this separate initial contract between the parties.

If Bidder fails to honour the above terms and conditions , HPCL shall have unqualified , absolute and unfettered right to encash / forfeit the bid security submitted in this behalf.

Yours faithfully,

Yours faithfully

(BIDDER)

(PURCHASER)

## **INTEGRITY PACT**

### **Between**

Hindustan Petroleum Corporation Limited (HPCL) hereinafter referred to as "The Principal",

and

..... hereinafter referred to as "The Bidder/  
Contractor"

### **Preamble**

The Principal intends to award, under laid down organization procedures, contract/s for ..... The Principal values full compliance with all relevant laws and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidders/s and Contractor/s.

In order to achieve these goals, the Principal cooperates with the renowned international Non-Governmental Organisation "Transparency International" (TI). Following TFs national and international experience, the Principal will appoint an external independent Monitor who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

### **Section 1 - Commitments of the Principal**

- (1) The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:
  - No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for him/herself or third person, any material or immaterial benefit which he/she is not legally entitled to.
  - The principal will, during the tender process treat all Bidders with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidders the same information and will not provide to any Bidder confidential / additional information through which the Bidder could obtain an advantage in relation to the tender process or the contract execution.
  - The principal will exclude from the process all known prejudiced persons.
- (2) If the Principal obtains information on the conduct of any of its employees which is a criminal offense under the relevant Anti-Corruption Laws of India, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

### **Section 2 - Commitments of the Bidder / Contractor**

- (1) The Bidder / Contractor commits itself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
  - The Bidder / Contractor will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or immaterial benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.



- The Bidder / Contractor will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelisation in the bidding process.
  - The Bidder / Contractor will not commit any offense under the relevant Anti-corruption Laws of India; further the Bidder / Contractor will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
  - The Bidder / Contractor will, when presenting his bid, disclose any and all payment he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- (2) The Bidder / Contractor will not instigate third persons to commit offenses outlined above or be an accessory to such offenses.

### **Section 3-Disqualification from tender process and exclusion from future contracts**

If the Bidder, before contract award has committed a transgression through a violation of Section 2 or in any other form such as to put his reliability or credibility as Bidder into question, the Principal is entitled to disqualify the Bidder from the tender process or to terminate the contract, if already signed, for such reason.

- (1) If the Bidder/Contractor has committed a transgression through a violation of Section 2 such as to put his reliability or credibility into question the Principal is entitled also to exclude the Bidder/Contractor from future contract award processes. The severity will be determined by the circumstances of the case, in particular the number of transgressions, the position of the transgressors within the company hierarchy of the Bidder and the amount of the damage. The exclusion will be imposed for a minimum of 6 months and maximum of 3 years.
- (2) A transgression is considered to have occurred if the Principal after due consideration of the available evidence, concludes that no reasonable doubt is possible.
- (3) The Bidder accepts and undertakes to respect and uphold the Principal's absolute right to resort to and impose such exclusion and further accepts and undertakes not to challenge or question such exclusion on any ground, including the lack of any hearing before the decision to resort to such exclusion is taken. This undertaking is given freely and after obtaining independent legal advice.
- (4) If the Bidder / Contractor can prove that he has restored / recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal may revoke the exclusion prematurely.

### **Section 4 - Compensation for Damages**

- (1) If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover from the Bidder liquidated damages equivalent to Earnest Money Deposit/Bid Security.

- (2) If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to Security Deposit / Performance Bank Guarantee.
- (3) The bidder agrees and undertakes to pay the said amounts without protest or demur subject only to condition that if the Bidder / Contractor can prove and establish that the exclusion of the Bidder from the tender process or the termination of the contract after the contract award has caused no damage or less damage than the amount of the liquidated damages, the Bidder / Contractor shall compensate the Principal only to the extent of the damage in the amount proved.

#### **Section 5 - Previous Transgression**

- (1) The Bidder declares that no previous transgression occurred in the last 3 years with any other Company in any country conforming to the TI approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- (2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

#### **Section 6 - Equal treatment of all Bidders / Contractors / Subcontractors**

- (1) The Bidder / Contractor undertakes to demand from all subcontractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.
- (2) The Principal will enter into agreements with identical conditions as this one with all Bidders, Contractors and Subcontractors.
- (3) The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

#### **Section 7 - Criminal charges against violating Bidders/Contractors/Subcontractors**

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

#### **Section 8 - External Independent Monitor / Monitors (to be decided by the Chairperson of the Principal)**

- (1) The Principal appoints competent and credible External Independent Monitor for this Pact.
- # The Principal has nominated **Smt. RANJANA KUMAR & Shri D. CHATTERJEE [ C/O HINDUSTAN PETROLEUM CORPORATION LIMITED, PETROLEUM HOUSE, 17, Jamshedji TATA Road, Mumbai - 400020]** as two External Independent Monitor(s) for the purpose of administration of this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- (2) The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the Chairperson of the Board of the Principal.

- (3) The Contractor accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to this project documentation.

The same is applicable to Subcontractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder / Contractor / Subcontractor with confidentiality.

- (4) The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
- (5) As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or heal the violation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendation. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action. However, the Independent External Monitor shall give an opportunity to the bidder / contractor to present its case before making its recommendations to the Principal.
- (6) The Monitor will submit a written report to the Chairperson of the Board of the Principal within 8 to 10 weeks from the date of reference or intimation to him by the 'Principal' and, should the occasion arise, submit proposals for correcting problematic situations.
- (7) Monitor shall be entitled to compensation on the same terms as being extended to / provided to Outside Expert Committee members / Chairman as prevailing with Principal.
- (8) If the Monitor has reported to the Chairperson of the Board a substantiated suspicion of an offense under relevant Anti-Corruption Laws of India, and the Chairperson has not, within reasonable time, taken visible action to proceed against such offense or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- (9) The word 'Monitor' would include both singular and plural.

#### **Section 9 - Pact Duration**

This Pact begins when both parties have legally signed it. It expires for the Contractor 12 months after the last payment under the respective contract, and for all other Bidders 6 months after the contract has been awarded.

If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged / determined by Chairperson of the Principal.

#### **Section 10 - Other provisions**

#### **Section 10 - Other provisions**

- (1) This agreement is subject to Indian Law. Place of performance and jurisdiction is the Registered Office of the Principal, i.e. Mumbai. The Arbitration clause provided in the main

tender document / contract shall not be applicable for any issue / dispute arising under Integrity Pact.

- (2) Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
- (3) If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
- (4) Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

\_\_\_\_\_  
For the Principal

Place .....

Date .....

\_\_\_\_\_  
For the Bidder/Contractor

Witness 1: .....

Witness 2: .....

**SPECIAL CONDITIONS  
OF  
CONTRACT  
(SCC)**

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1.0 **GENERAL**

- 1.1 Special Conditions of Contract shall be read in Conjunction with the General conditions of Contract, specification of work, Drawings and any other documents forming part of this Contract wherever the context so requires.
- 1.2 Notwithstanding the sub-division of the documents into these separate sections and volumes every part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into the Contract so far as it may be practicable to do so.
- 1.3 Where any portion of the General Condition of Contract (GCC) is repugnant to or at variance with any provisions of the Special Conditions of Contract, unless a different intention appears, the provisions of the special Conditions of Contract (SCC) shall be deemed to over-ride the provisions of the General Conditions of Contract and shall to the extent of such repugnancy, or variations, prevail.
- 1.4 Wherever it is mentioned in the specifications that the Contractor shall perform certain Work or provide certain facilities, it is understood that the Contractor shall do so at his cost and the Value of Contract shall be deemed to have included cost of such performance and provisions, so mentioned.
- 1.5 The materials, design, and workmanship shall satisfy the relevant Indian Standards, the Job Specifications contained herein and Codes referred to. Where the job specification stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied.
- 1.6 In case of an irreconcilable conflict between Indian or other applicable standards, General Conditions of Contract, Special Conditions of Contract, Specifications, Drawings or Schedule of Rates and any other portion of Bidding Document the following shall prevail to the extent of such irreconcilable conflict in order of precedence.
- i) Letter of Acceptance along with enclosures.
  - ii) Letter / Fax of Acceptance.
  - iii) Schedule of Rates as enclosures to Letter of Acceptance.
  - iv) Special Conditions of Contract.
  - v) Job / Particular Specifications.
  - vi) Scope of Work.
  - vii) Drawings.
  - viii) Technical / Material Specifications.
  - ix) General Conditions of Contract.
  - x) Indian Standards.
  - xi) Other applicable Standards.
- 1.7 It will be the Contractor's responsibility to bring to the notice of Engineer-in-Charge any irreconcilable conflict in the contract documents, before starting the work (s) or making the supply with reference, which the conflict exists.
- 1.8 In the absence of any Specifications covering any material, design of work (s) the same shall be performed / supplies / executed in accordance with Standard Engineering Practice as per the instructions / directions of the Engineer-in-Charge, which will be binding on the Contractor.
- 1.9 **LOCATION OF SITE:**  
The location of the proposed site is at Tarabahalli (village), Devanagonthi, Hosakote (Taluk) of Bengaluru in the State of Karnataka.
- Nearest Railway Station: Devanagonthi.  
Nearest Airport: Bengaluru International Airport.

**Site:**

Site area is but not limited to

- HPCL Green R&D Centre
- Gurukul (Guest House)

2.0 **SCOPE OF WORK & SCOPE OF SUPPLY**

2.1 Scope of work and supply shall be as specified in Technical Section of the bidding document. (**Appendix – I & Appendix - II**)

3.0 **SUPPLY OF CONSTRUCTION WATER, POWER & OTHER UTILITIES**

3.1 Construction Water and Construction Power shall not be provided to the Contractor by the Owner. The Contractor shall make his own arrangements for construction water and construction power at his own cost. Water and electricity during maintenance period only shall be provided by client free of cost at available points in the premises. Contractor shall make his own arrangements for establishing distribution network of Construction Power and water within the quoted rates.

3.2 All supply & installations / fixtures & fittings / cabling for construction power shall be in the scope of the contractor without any additional cost to the Owner.

3.3 The Contractor shall keep acoustic DG sets of adequate capacity at his cost at different locations to keep the work in progress.

3.4 OWNER shall provide Open Space for Contractor field office, stores & storage yard at site as per availability of land free of cost to the Contractor.

3.5 The CONTRACTOR shall remove all temporary buildings / facilities etc, before leaving the site after completion of works in all respect and handing over to Owner.

4.0 **TIME OF COMPLETION**

4.1 The work shall be executed strictly as per Time Schedule mentioned in the Bidding Document. (Ref: **Appendix – X**) The period of completion given includes the time required for mobilization as well as testing, rectifications, if any, retesting and completion in all respects to the entire satisfaction of the Engineer-in-Charge.

4.2 Contractor shall submit Overall schedule, Procurement Schedule and Resource Mobilization Schedule for approval of Engineer-In-Charge within 2 weeks after award of work.

4.3 Monthly/ weekly construction programme will be drawn up by the Contractor based on availability of work fronts and the construction programmes. The programme shall be approved by Engineer-in-Charge. The Contractor shall strictly adhere to this Targets/ Programme.

4.4 Contractor shall submit daily progress report highlighting category wise labour and equipment deployed along with the progress of work done on previous day in the proforma approved by the Engineer-in-Charge.

4.5 Contractor shall submit the Monthly/Weekly Progress Reports, format for the reports shall be finalized in consultation with Engineer-In-Charge.

5.0 **SITE CLEANING**

5.1 The Contractor shall clean and keep clean the work site from time to time to the satisfaction of the Engineer-in-Charge for easy access to work site and to ensure safe passage, movement and working.

5.2 If the work involves dismantling of any existing structure in whole or part, care shall

be taken to limit the dismantling up to the exact point and/or lines as directed by the Engineer-in-Charge and any damage caused to the existing structure beyond the said line or point shall be repaired and restored to the original condition at the Contractor's cost and risks to the satisfaction of the Engineer-in-Charge, whose decision shall be final and binding upon the Contractor.

5.3 The Contractor shall be the custodian of the dismantled materials till the Engineer-in-Charge takes over thereof or handed over to Owner.

5.4 The Contractor shall dispose off the unserviceable materials, debris etc. to any area as decided by the Engineer-in-Charge.

5.5 The Contractor shall sort out, clear and stack the recyclable/ serviceable materials obtained from the dismantling/renewal at places and dispose off safely, the hazardous waste as directed by the Engineer-in-Charge.

5.6 No extra payment shall be paid on this account. The rates quoted are deemed to be inclusive of all the costs towards all the above activities as well.

#### 6.0 **MEASUREMENT OF WORKS**

6.1 In addition to the provisions of relevant clause of General Conditions of Contract (GCC) and associated provisions thereof, the provisions of **Appendix - V** to SCC shall also apply.

#### 7.0 **SECURITY**

7.1 The responsibility of safe custody of plants, tools, tackles and nursery etc (material supplied by the Contractor) lies with Contractor till handing over to owner. Contractor shall follow strictly to the security procedures, rules and regulations laid down by the Owner. Contractor shall ensure adequate illumination of worksite on a continuous basis to ensure safe working and to avoid pilferage/theft of materials. The rates quoted shall be deemed to be inclusive of this scope and the CONTRACTOR is not eligible for any additional payment in this regard.

#### 8.0 **INSTALLATION OF SIGN BOARDS**

The Contractor shall fix/ install Construction sign boards of suitable sizes as per the instructions of Engineer-in-Charge before/during the execution of work. No additional payment shall be made to the contractor on this account.

#### 9.0 **EXECUTION OF WORK**

9.1 The work shall be executed as per AFC drawings, Tender specifications, BIS codes or/and as per instruction of Engineer-in-Charge.

9.2 All drawings viz. Architectural, structural, Electrical, etc. and other services drawings for the work shall at all time be properly correlated before executing any work and mismatches if any shall be brought to the notice of Engineer-in-Charge promptly to avoid any re-work. No extra claim whatsoever shall be entertained in this respect.

9.3 The contractor, through his engineers, shall ensure quality of construction in a planned and time bound manner. Any sub-standard Material / work beyond set out tolerance limits shall be summarily rejected by the Engineer-in-Charge and shall be removed forthwith by the contractor.

9.4 Rates for all the items of Schedule of Rates include all cost involved for the performance of the complete item considering all parts of the Bidding Document. In case any activity though specifically not covered in description of item under 'Schedule of Rates' but is required to complete the work which could be reasonably implied/ inferred from the contents of the Bidding Document, the cost for carrying out such activity of work shall be deemed to be included in the item rate.

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10.0 **ROUNDING OFF**

All payments to and recoveries from the bill of CONTRACTOR shall be rounded off to the nearest Rupee. Wherever the amount to be paid/ recovered consists of a fraction of a Rupee (Paise), the amount shall be rounded off to the next higher rupee if the fraction consists of 50 (fifty) paise or more and if the fraction of a Rupee is less than 50 (fifty) paise, the same shall be ignored.

11.0 **TAXES, DUTIES AND LEVIES**

11.1 The quoted prices shall be inclusive of all applicable Taxes, Duties, Service Tax, WCT/VAT, Cess etc except Labour Cess/Construction worker cess. Labour cess/Construction worker cess (as applicable) shall be reimbursed extra at actual on furnishing of necessary documentary evidences. HPCL/EIL reserves the right to seek proof of payment of the taxes, duties, cess etc., if required. In such cases, further payment due to the contractor shall be released after furnishing documentary proof of the same. Statutory variations in taxes, duties and cess shall be to Contractor's account. Owner shall make from Contractor's bills such tax deductions as are required as per rules and regulations in force from time to time.

The Service Tax amount considered by the bidder in their bid shall include the amount of Service Tax payable by the bidder and the amount of Service Tax, if any, directly payable by Owner, as applicable to recipient of service, as per the reverse charge rule of Service Tax. The Service Tax, if any, to be payable by the Owner under reverse charge rule shall be directly submitted to the Service Tax Authorities by Owner and shall be deducted / recovered / adjusted from the payment due to the Contractor.

Any new taxes/duties/cess/levies notified/imposed after the submission of last/final price bid but before the contractual date of completion of work shall be to OWNER's account.

11.2 It is for the bidder to assess and ascertain the rates of applicable Taxes & Duties for the tendered work. It is clearly understood that HPCL/EIL will not have any additional liability towards payment of applicable Taxes & Duties as a result of Bidder's wrong assessment / interpretation of applicable taxes & duties. Bidder must note that HPCL shall not issue any concessional form (C - Form) against Sales Tax / CST / VAT.

11.3 Prices quoted by the bidder, shall remain firm and fixed and valid until completion of the Contract and will not be subject to variation on any account.

11.4 The CONTRACTOR is fully and exclusively liable at his own cost for the payment of any and all taxes, duties, cesses and levies howsoever designated, as are payable to any government, local or statutory authority in any country other than India as are now in force or as are hereafter imposed, increased or modified and as are payable by CONTRACTOR, his agents, Sub-CONTRACTORS and its/their respective employees for or in relation to the performance of this contract. The CONTRACTOR shall be deemed to have been fully informed with respect to all such liabilities and considered and included in the same in its bid and the Contract Price shall not be varied in any way on this account.

12.0 **STATUTORY APPROVALS**

12.1 The approval from any authority required as per statutory rules and regulations of Central/State Government/Local Bodies shall be the contractor's responsibility unless otherwise specified in the bid document. The application on behalf of the Owner for submission to relevant authorities along with copies of required certificates complete in all respects shall be prepared and submitted by the Contractor well ahead of time

so that the actual construction/ commissioning of the work is not delayed for want of the approval/inspection by concerned authorities.

12.2 The Contractor shall arrange the inspection of the works by the authorities and necessary co-ordination and liaison work in this respect shall be the responsibility of the contractor and no additional payment shall be made to Contractor on this account by the Owner. However statutory fees paid, if any, for all inspections and approvals to such authorities shall be reimbursed at actual by the Owner to the contractor on production of documentary evidence.

12.3 Any change/ addition required to be made to meet the requirements of the statutory authorities shall be carried out by the contractor without additional cost to Owner/. The inspection and acceptance of the work by statutory authorities shall however, not absolve the contractor from any of his responsibilities under this contract.

### 13.0 **PROVIDENT FUND**

13.1 The Contractor shall strictly comply with the provisions of Employees Provident Fund Act and register themselves with RPFC before commencing work. The Contractor shall deposit Employees and Employers contributions to the RPFC every month. The Contractor shall furnish along with each running bill, the challan/ receipt for the payment made to the RPFC for the preceding months.

13.2 In case the Provident Fund Authority's receipted challan referred to above is not furnished, the OWNER shall deduct 5% (five percent) of the payable amount from the CONTRACTOR's running bill and retain the same as a security for the payment of the Provident Fund. Such retained amounts shall be refunded to the CONTRACTOR only on production of challan/ receipt of the Provident Fund Authority for the period covered by the related deduction.

### 14.0 **LABOUR RELATIONS**

14.1 In case of labour unrest/labour dispute arising out of non-implementation of any law, the responsibility shall solely lie with the CONTRACTOR and the CONTRACTOR shall remove/resolve the same satisfactorily at his own cost and risk.

14.2 The CONTRACTOR shall deploy only duly qualified and competent personnel for carrying out the various jobs as assigned by the Engineer-in-Charge from time to time. The workmen deployed by the CONTRACTOR should also possess the necessary license etc.,if required, under any law, rules and regulations.

### 15.0 **EMPLOYMENT OF LOCAL LABOUR**

15.1 The CONTRACTOR shall ensure that local labour; skilled and/or unskilled, to the extent available shall be employed in this work. In case of non-availability of suitable labour in any category out of the above persons, labour from outside may be employed.

15.2 The CONTRACTOR shall not recruit personnel of any category from among those who are already employed by the other agencies working at site but shall make maximum use of local labour available.

### 16.0 **TEMPORARY WORKS**

16.1 All temporary and ancillary works including enabling works connected with the work shall be responsibility of the CONTRACTOR and the price quoted shall be deemed to have included the cost of such works, which shall be removed by the CONTRACTOR, as required, at his cost, immediately after completion of the work.

### 17.0 **REGISTRATION OF THE CONTRACT WITH STATUTORY AUTHORITIES**

17.1 Before submission of their first invoice for Running payment, the Contractor shall register themselves and the contract at their own cost with the Reserve Bank of India, Income Tax, Sales Tax and such other statutory authorities, as may be

required under the rules and regulations governing in India. The Contract Price shall be deemed to include all costs towards the same. A copy of all documents related to all such registration shall be submitted to Owner for record.

18.0 **UNDERGROUND AND OVERHEAD STRUCTURES**

18.1 The information to possible extent regarding existing structures/ overhead lines, existing pipelines and utilities are already indicated on alignment sheets. Over and above, Contractor may encounter other structures/ pipelines/ OFC etc. that may not be appearing on alignment sheet, the Contractor is required to collect such information on his own before commencing the work. The Contractor shall execute the work in such a manner that the said structures, utilities, pipelines etc. are not disturbed or damaged, and shall indemnify and keep indemnified the Owner from and against any destruction thereof or damages thereto.

19.0 **WORK FRONT**

19.1 The work involved under this contract include such works as have to be taken up and completed after other agencies have completed their jobs. The CONTRACTOR will be required and bound to take up and complete such works as and when the fronts are available for the same and no claim of any sort whatsoever shall be admissible to the CONTRACTOR on this account. Only extension of time limit shall be admissible, if the availabilities of work fronts to the CONTRACTOR are delayed due to any reason not attributable to the CONTRACTOR.

20.0 **COMPLIANCE WITH LAWS**

20.1 The Contractor shall abide by all applicable rules, regulations, statutes, laws governing the performance of works in India, including but not limited to the following:

- i) Contract Labour (Regulation & Abolition) Act 1970 & the centre rules 1971 framed there under.
- ii) Payment of Wages Act.
- iii) Minimum Wages Act.
- iv) Employer's Liability Act.
- v) Factory Act.
- vi) Apprentices Act.
- vii) Workman's Compensation Act.
- viii) Industrial Dispute Act.
- ix) Environment Protection Act.
- x) Wild life Act.
- xi) Maritime Act.
- xii) Any other Statute, Act, Law as may be applicable.

21.0 **FIRM PRICE**

21.1 The contracted price shall be **FIRM** and **FIXED** till completion of work and no escalation in prices on any account shall be admissible to the Contractor.

22.0 **WORKS CONTRACT**

22.1 The entire work covered under this contract shall be treated as "Works Contract".

23.0 **SETTLEMENT OF DISPUTE BETWEEN GOVT. DEPT./ PUBLIC SECTOR UNDERTAKINGS**

23.1 If the CONTRACTOR is a PSU or Enterprise or is a Govt. Deptt. any disputes or differences between the CONTRACTOR and the OWNER hereto arising out of any notified claim of the CONTRACTOR in terms hereof and/or arising out of any amount claimed by the OWNER (whether or not the amount claimed by the OWNER or any part thereof shall have been deducted from the final bill of the CONTRACTOR or any amount paid by the OWNER to the CONTRACTOR in respect of the work), then in suppression of the provisions of Section 9 of the General Terms and Conditions of Contract, the following provisions shall apply, namely; such disputes or differences

shall be resolved amicably by mutual consultation or through the good offices or empowered agencies of the Government. If such resolution is not possible, then the unresolved disputes or differences shall be referred to arbitration of an arbitrator to be nominated by the Secretary, Department of legal affairs (Law Secretary) in terms of the Office Memorandum No. 55/3/1/75-CF dated 19th December, 1975 issued by the Cabinet Secretariat (Department of Cabinet Affairs) as modified from time to time. The Arbitration Act shall not be applicable to the arbitrator under this clause. The award of the arbitrator shall be binding upon parties to the dispute, provided, however any party aggrieved by such award may make a further reference for setting aside or revision of the award to Law Secretary whose decision shall bind the parties finally and conclusively. The parties to the dispute will share equally the cost of Arbitration as intimated by the Arbitrator.

23.2 Notwithstanding the existence of any dispute or arbitration in terms hereof or otherwise, the CONTRACTOR shall continue and be bound to continue and perform the works to completion in all respects according to the Contract (unless the Contract or Works be determined by the OWNER) and the CONTRACTOR shall remain liable and bound in all respects under the Contract.

24.0 **RESPONSIBILITY OF CONTRACTOR**

24.1 The entire work as per scope of work covered under this contract shall be awarded on single point responsibility basis.

24.2 It shall be the responsibility of the Contractor to obtain the approval for any revision and/or modifications proposed by the Contractor from the Owner/ Engineer-in-charge before implementation. Also such revisions and/or modifications if accepted/approved by the Owner/Engineer-in-charge shall be carried out at no extra cost to the Owner. Any changes required during and/or after approval of detailed construction drawings due to functional requirements or for safe and efficient running of system keeping the basic parameters unchanged and which has not been indicated by the Contractor in the data/drawings furnished along with the offer will be carried out by the Contractor at no extra cost and implication of time to the Owner.

24.3 All expenses towards mobilisation at site and demobilisation including bringing in equipment, clearing the site etc. shall be deemed to be included in the prices quoted and no separate payments on account of such expenses shall be entertained.

24.4 It shall be entirely the Contractor's responsibility to provide, operate and maintain all necessary construction equipments, scaffoldings and safety gadgets, cranes and other lifting tackles, tools and appliances to perform the work in a workman like and efficient manner and complete all the jobs as per time schedules without any extra cost to the owner.

24.5 Preparing approaches/access roads and working areas for the movement and operation of the cranes, earth moving equipments, tipper etc, levelling the areas for assembly and erection shall also be responsibility of the CONTRACTOR. The CONTRACTOR shall acquaint himself with access availability facilities, such as railway siding, local labour etc., to provide suitable allowances in his quotation. The CONTRACTOR may have to build temporary access roads to aid his own work, which shall also be taken care of while quoting for the work.

24.6 The procurement and supply in sequence and at the appropriate time of all materials and consumables shall be entirely the Contractor's responsibility and his rates for execution of work will be inclusive of supply of all these items.

24.7 The CONTRACTOR shall make all provisions for monsoon protection cover to ensure that there shall not be any stoppage/hindrance in working during monsoon season.

25.0 **INCOME TAX & CORPORATE TAX, WCT UNDER VAT LAW**

25.1 Income Tax deductions shall be made from all payments made to the Contractor as per the rules and regulations in force in accordance with the Income Tax Act prevailing from time to time. WCT deduction shall be made from all payments made to the contractor as per the VAT Act prevailing in the State. WCT certificate will be issued for the same as per VAT provision.

25.2 Corporate Tax Liability if any shall be to Contractor's account.

26.0 **ROYALTY**

26.1 Contractor's quoted rate should include the royalty on different applicable items as per the prevailing Government rates. In case, owner is able to obtain the exemption of Royalty from the State Government, the Contractor shall pass on the same to owner for all the items involving Royalty. Any increase in prevailing rate of Royalty shall be borne by the Contractor at no extra cost to the owner. Owner/EIL may seek proof of payment of royalty, if required. On failure of submission of the same by the contractor, Owner/EIL on his own discretion may hold the payments against the R. A bills submitted by Contractor till the submission of same.

27.0 **MOBILISATION ADVANCE**

27.1 Interest bearing Mobilisation Advance up to a **maximum of 10%** (ten percent) **of the accepted estimated contract value** shall be paid to the contractor on acceptance of LOI/FOI subject to fulfilling the following conditions. The Bank guarantee towards security of "Mobilisation Advance" should be at least 110% of the advance.

- i) Mobilisation advance shall be paid in two stages; the **first instalment of 50%** of the amount due on account of mobilization advance shall be paid **against submission of Bank Guarantee of 110% of the equivalent amount to cover the mobilization advance of first instalment.**
- ii) The **second instalment** of the mobilisation advance i.e. **50%** of mobilization advance shall be released by the Engineer-in-charge only **after the mobilisation of contractor at site** along with the equipment, tools & tackles to take up construction activities to the entire satisfaction of the Engineer-in-charge and **against submission of separate Bank Guarantee of 110% of equivalent amount to cover the mobilization advance for second instalment. The minimum mobilization that shall be completed to qualify for this instalment shall be jointly agreed upon before release of the first instalment of the advance.** Before the release of 2<sup>nd</sup> instalment, the Contractor shall sign the LOA and Contract Agreement also.
- iii) Alternatively, the Contractor may submit a single Bank Guarantee equivalent to 11% of the accepted estimated contract value but the Mobilisation Advance shall be released in two instalments as mentioned above subject to fulfilling the conditions of mobilisation of manpower and equipment at site to the satisfaction of Engineer-in-Charge and decision of Engineer-in-Charge in this matter shall be final and binding on the Contractor. The Bank Guarantee for Mobilisation Advance shall be valid till such time the complete recovery of Mobilisation Advance is made.
- iv) The mobilization advance shall bear **simple interest @ SBI's PLR rate + 1 % per annum** and shall be calculated from the date of payment to the date of recovery, both days inclusive, on the outstanding amount of advance. Recovery of such amount shall be made by the deduction from the Contractor's bills on



pro-rata basis to the gross value of the work billed in such a way that the entire advance is recovered by the time eighty percent of gross value of the contract is executed and paid, together with interest due on the entire outstanding amount up to the date of recovery of the instalment.

- v) The mobilization advance paid to the contractor shall be used for execution of this contract only and the contractor shall be required to furnish details of expenditure incurred towards mobilization within two months of receipt of the mobilization advance, failing which Owner/ EIL reserve the right to deduct/ encash the Bank Guarantee to the extent mobilization advance has not been utilized.

Public Sector Enterprises and Central/State Government Department are exempted from furnishing Bank Guarantee against advance payment.

## 28.0 **TERMS OF PAYMENT**

- 28.1 Basis and terms of payment for making "On Account Payment" shall be as set out in **Appendix - VI** to SCC. All payments will be made through EFT.

## 29.0 **COMPUTERIZED CONTRACTORS BILLING SYSTEM**

- 29.1 Without prejudice to stipulation in Terms and Conditions of Works Contract, Contractor should follow the following billing system.

- 29.2 The bills will be prepared by the Contractor on their own PCs as per the standard formats and codification scheme proposed by Owner/EIL. The Contractor shall have to be equipped with data entry software to capture the relevant billing data for subsequent processing. Contractor will submit these data to Owner/EIL in an electronic media along with the hard copy of the bill, necessary enclosures and documents. The Contractor will also ensure the correctness and consistency of data so entered with the hard copy of the bill submitted for payment.

- 29.3 Owner/EIL will utilize these data for processing and verification of the contractor's bill and payment.

## 30.0 **QUALITY ASSURANCE/ QUALITY CONTROL**

- 30.1 Bidder shall include in his offer the Quality Assurance Programme containing the overall quality management and procedures, which is required to be adhered to during the execution of contract. After the award of the contract, detailed Quality Assurance Programme shall be prepared by the contractor for the execution of contract for various works, which will be mutually discussed and agreed to.

- 30.2 The Contractor shall establish document and maintain an effective quality assurance system outlined in recognised codes.

- 30.3 Quality Assurance plans/procedures of the Contractor shall be furnished in the form of a QA manual. This document should cover details of the Quality Assurance Plan (testing & inspection details), Procedures, Factory inspection details and ITP's (Inspection & Test Plans) to be followed for quality control in respect of works. The quality assurance system should indicate organizational approach for quality control and quality assurance of the construction activities, at all stages of work at site as well as at manufacture's works and dispatch of materials.

- 30.4 The Owner/EIL or their representative shall reserve the right to inspect/witness, review any or all stages of work at shop/site as deemed necessary for quality assurance.

- 30.5 The contractor has to ensure the deployment of quality Assurance and Quality Control Engineer(s) depending upon the quantum of work. This QA/QC group shall be fully responsible to carry out the work as per standards and all code requirements.

In case Engineer-in-charge feels that contractor's QA/QC Engineer(s) are incompetent or insufficient, contractor has to deploy other experienced Engineer(s) as per site requirement and to the full satisfaction of Engineer-In-Charge.

30.6 In case contractor fails to follow the instructions of Engineer-in-charge with respect to above clauses, next payment due to him shall not be released unless until he complies with the instructions to the full satisfaction of Engineer-in-charge.

30.7 The Contractor shall adhere to the quality assurance system as per EIL Specification No. 6-78-0001 for item rate Bidding Document enclosed in the Bidding Document as **Appendix - III**.

### 31.0 **HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT**

31.1 The Contractor, during entire duration of the Contract, shall adhere to HSE requirement as per Specification Number 6-82-0001 as enclosed in the Bidding Document. (**Appendix – IV**)

### 32.0 **MECHANISED CONSTRUCTION**

32.1 Contractor shall without prejudice to his overall responsibility to execute and complete the work as per specifications and time schedule adopt as far as practicable, mechanised construction techniques for major site activities. Contractor agrees that he will deploy the required numbers and types of the plant & machinery applicable for different activities in consultation with the Engineer-in-charge during execution of works.

32.2 Contractor further agrees that Contract price is inclusive of all the associated costs, which he may incur for actual mobilization, required in respect of use of mechanised construction techniques and that the Owner/Consultant in this regard shall entertain no claim whatsoever.

### 33.0 **COMPLETION DOCUMENTS**

33.1 a) The following documents shall be submitted in soft copy and in hard binder by the Contractor in 6 (Six) sets, as a part of completion documents:

- i) Test Certificate, Warrantee/Guarantee certificates, Work manuals/ User Manuals and copies of Purchase Order with Prices blank from manufacturers for all supply material.
- ii) All other requirements as specified in the respective specifications.
- iii) As-built drawings (soft copy – 1 set)(Hard copy-6 sets)
- iv) Any other drawing/document/report specified elsewhere in the bidding document.

b) One set of reproducible on polyester film of construction drawings showing therein the execution of the work duly approved by the Engineer-in-Charge.

### 34.0 **TESTS AND INSPECTION**

34.1 The Contractor shall carry out the various tests as enumerated in the technical specifications of this bidding document and the technical documents that will be furnished to him during the performance of the work and relevant codes of practice.

34.2 All the tests either on the field or at outside laboratories concerning the execution of the work and supply of materials by the Contractor shall be carried out by Contractor at his own cost.

34.3 The work is subject to inspection at all times by the Engineer-in-Charge. The contractor shall carry out all instructions given during inspection and shall ensure that the work is being carried out according to the technical specifications of this bid document, the technical documents, if any, will be furnished to him during the

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performance of the work.

- 34.4 The Contractor shall provide for purposes of inspection access ladders, lighting and necessary instruments at his own cost.
- 34.5 For materials supplied by Owner, Contractor shall carryout the tests, if required by the Engineer-in-Charge, and the Owner shall reimburse the cost of such tests at actual to the Contractor on production of documentary evidence.
- 34.6 All results of inspection and tests will be recorded in the inspection reports, pro-forma of which will be approved by the Engineer-in-Charge. These reports shall form part of the completion documents.
- 34.7 Any work not conforming to execution drawings, specifications or codes shall be rejected forthwith and the Contractor shall carryout the rectifications at his own cost.
- 34.8 Cost towards repeat tests and inspection due to failures, repairs etc, for reasons attributable to the CONTRACTOR shall be borne by the CONTRACTOR.
- 34.9 Various tests as specified in specifications shall be carried out to the entire satisfaction of OWNER/Engineer-in-Charge.
- 34.10 Inspection and acceptance of work shall not relieve the Contractor from any of his responsibilities under this Contract.
- 34.11 All the expenses towards inspection and testing shall be borne by the contractor.

35.0 **SAMPLES OF MATERIALS**

- 35.1 The contractor shall submit to the Engineer-in-Charge samples of all materials/ to be used in the work for approval before bringing bulk supplies and before commencing the work. These approved samples shall be preserved and retained in the custody of the Engineer-in-Charge as standard of materials till the completion of the work. The cost of such samples shall be borne by the contractor and nothing shall be payable on this account.
- 35.2 Sub-standard Material/Work: In case any material/ work is found substandard, the same shall be rejected by the Engineer-in-Charge and the same shall be removed from the site of work within 48 hours, failing which the same shall be got removed by the Engineer-in-Charge at the risk and cost of the contractor without giving any further notice and time.
- 35.3 Testing of Materials: Even ISI marked materials may be subjected to quality test at the discretion of the Engineer-in-Charge besides testing of other materials as per the specifications described for the item/ material. Whenever ISI marked materials are brought to the site of work the contractor shall, if required by the Engineer-in-Charge, furnish manufacturer test certificate or test certificate from approved testing laboratory to establish that the material procured by the contractor for incorporation in the work satisfy the provisions of IS Codes relevant to the material and/ or the work done.
- 35.4 The contractor shall arrange carrying out of all tests required under the agreement through the laboratory as approved by the Engineer-in-Charge. The cost of tests shall be borne by the contractor.

36.0 **FINAL INSPECTION**

- 36.1 After completion of all tests as per specification the whole work will be subject to a final inspection to ensure that job has been completed as per requirement. If any defect is noticed, the CONTRACTOR will be notified by OWNER/Engineer-In-Charge and he shall make good the defects with utmost speed. If however the CONTRACTOR fails to attend to these defects within a reasonable time (time period

shall be fixed by OWNER/ Engineer-In-Charge) then OWNER/Engineer-In-Charge may have defects rectified at CONTRACTOR's cost.

37.0 **TEST CERTIFICATES**

37.1 The Contractor shall be required to submit recent test certificates for the material being used in works from the recognised laboratories. These certificates should indicate all properties of the materials as required in relevant IS Standards or International Standards.

37.2 Contractor shall also submit the test certificate with every batch of material supplied which will be approved by Engineer-in-Charge. No secured advance will be given for the materials not having test certificate. In case any test is to be carried out, the same shall be got done in the approved laboratory (accredited by NABL and approved by the Engineer-in-charge) at the cost of contractor.

38.0 **INSPECTION OF SUPPLY ITEMS / MATERIALS**

38.1 All inspection and tests on bought out items/ materials shall be made as per the specifications forming part of this contract. Various stages of inspection and testing shall be identified after receipt of Quality Assurance Programme from the Contractor/Manufacturer. Contractor shall submit a Inspection Categorization Plan for approval of Engineer-In-charge.

38.2 Inspection calls shall be given for associations of Owner /EIL's representative as per mutually agreed programme in prescribed proforma with 15 days margin, giving details of equipment and attaching relevant test certificates and internal inspection report of the Contractor. All drawings, General arrangement and other contract drawings, specifications, catalogues etc. pertaining to equipment offered for inspection shall be got approved from Owner /EIL and copies shall be made available to Owner/EIL before hand for undertaking inspection.

38.3 The Contractor shall ensure full and free access to the inspection engineer of Owner/EIL at the Contractor's or their sub-contractor's premises at any time during contract period to facilitate him to carry out inspection and testing assignments.

38.4 The Contractor/sub-contractor shall provide all instruments, tools, necessary testing and other inspection facilities to inspection engineer of Owner/EIL free of cost for carrying out inspection.

38.5 Where facilities for testing do not exist in the Contractor's/sub-contractor's laboratories, samples and test pieces shall be drawn by the Contractor/Sub-Contractor in presence of Inspection Engineer of Owner /EIL and duly sealed by the later and sent for testing in Government approved Test House or any other testing laboratories approved by the Inspection Engineer at the Contractor's cost.

38.6 Contractor shall give sufficient notice(s) in advance to Owner/EIL for stage inspection or witnessing the Factory Acceptance Test (FAT) of equipments identified/mutually agreed before despatch of the materials to site. The Owner/EIL reserves the right to inspect the equipments & witness the factory tests (indigenous or imported) and any waiver to inspect the same by Owner/EIL shall not relieve the contractor of his responsibilities to fulfil all contractual obligations. As such, the Contractor shall stand guarantee to the performance of equipments/machineries supplied irrespective of the condition that whether the equipment/materials have been physically inspected by the Owner/EIL or not prior to despatch to site.

38.7 All the expenses towards inspection and testing shall be borne by the contractor.

39.0 **CERTIFICATE OF VERIFICATION AND GOOD CONDITION**

39.1 The CONTRACTOR shall, before supply of material covered within the scope of supply, at his own risks, costs and initiative, undertake or cause to be undertaken all

- tests, analysis and inspections as shall be required to be undertaken with regard to the materials under the specifications and any codes, practices, orders and instructions with respect there to and shall cause the results thereof to be recorded, reported or certified, as the case maybe, and shall not offer for delivery or deliver any material(s) which has/have not passed such tests/analysis or inspection and which are not accompanied by the tests results, reports and/or certificates in this behalf provided in the applicable specifications, code(s)and/or practices.
- 39.2 On arrival of the material at site the CONTRACTOR shall give written notice thereof to the Engineer-in-Charge or Inspection Agency notified by the OWNER in this behalf, to inspect the materials, and shall keep in readiness for inspection, the materials and the relevant tests results, reports and certificates hereto.
- 39.3 Notwithstanding any other provisions in the contract documents for analysis or tests of materials and in addition thereto, the CONTRACTOR shall, if so required by the Engineer-in-Charge or Inspection Agency in writing at his own risks and costs, analyse, test, prove and weigh all materials (including materials incorporated in the works) required to be analysed, tested, proved and/or weighed by the Engineer-in-Charge or Inspection Agency in this behalf and shall have such analysis or tests conducted by the agency(ies), or authority(ies) if any specified by the Engineer-in-Charge or Inspection Agency. The CONTRACTOR shall provide all equipment, labour, materials and other things whatsoever required for testing, preparation of the samples, measurement of work and/or proof of weightment of the materials as directed by the Engineer-in-Charge or Inspection Agency.
- 39.4 If on Inspection or proof, analysis or tests as aforesaid the Engineer-in-Charge or Inspection Agency nominated by the OWNER in this behalf is prima facie satisfied that the material received is in conformity with the material requirements of the Bill of Materials and description given in the shipping documents and in the Contractor's invoices in this behalf and that the test reports/results/certificates given in respect thereof are prima facie inconformity with the relevant result/reports/certificates required in respect thereof in terms of the specifications and/or relevant codes and practices, and that the material appears to be prima facie in good order and condition, the Engineer-in-Charge shall issue to CONTRACTOR, a Certificate of Verification and Good Condition in respect of such material, and this shall constitute the Certificate of Verification and Good Condition elsewhere envisaged in the contract documents.
- 39.5 Such certificate is only intended to satisfy the OWNER that prima facie the material supplied by the CONTRACTOR is in order and shall not anywise absolve the CONTRACTOR of his/its full responsibility under the contract in relation thereto, including in relation to specification fulfilment and/or performance or other guarantees.
- 39.6 Notwithstanding that any area(s) or source(s) has/have been suggested by the OWNER to the CONTRACTOR from which any material for incorporation in the works can be obtained, the CONTRACTOR shall independently satisfy himself of the suitability, accessibility and sufficiency of the source(s) of supply suggested by the OWNER and suitability of the material available from such source(s) with the intent that any suggestion as aforesaid shall not anywise relieve the CONTRACTOR of his full liability in respect of the suitability and quality of the material(s) obtained from said source(s) and the Contractor shall obtain material(s) there from and incorporate the same within the permanent works entirely at his own risks and costs in all respects, with the intent that any such suggestion by the Owners hall only be by way of assistance to the Contractor and shall not entail any legal responsibility or liability upon the OWNER.

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40.0 **COORDINATION WITH OTHER AGENCIES**

40.1 Work shall be carried out in such a manner that the work of other agencies operating at the site is not hampered due to any action of the Contractor. Proper coordination with other agencies will be Contractor's responsibility. In case of any dispute, the decision of Engineer-in-Charge shall be final and binding on the Contractor

41.0 **DRAWINGS AND DOCUMENTS**

41.1 The drawings accompanying the bid document are of indicative nature and issued for bidding purpose only. Purpose of these drawings is to enable the bidder to make an offer in line with the requirements of the Owner. However, no extra claim whatsoever shall be entertained for variation in the "Approved for Construction" and "Bid document drawings" regarding any changes/units. Construction shall be as per drawings/specifications issued / approved by the Engineer-in-Charge during the course of execution of work. Detailed construction/fabrication drawings (wherever required) on the basis of which actual execution of work is to proceed will be prepared by the contractor.

42.0 **PHOTOGRAPHS**

42.1 The contractor shall take adequate number of photographs of the work as directed by the Engineer-in-Charge and submit a set each month along with weekly/monthly progress report in the formats approved by Engineer-In-Charge. In addition, the contractor shall also develop Video photography of the project showing progress of work at regular intervals as decided by the Engineer-in-Charge. Nothing extra shall be payable to the contractor on this account.

43.0 **EXCAVATION BY BLASTING**

43.1 No excavation by blasting is permitted.

44.0 **CONSTRUCTION EQUIPMENT AND ORGANIZATION**

44.1 **CONSTRUCTION EQUIPMENT**

44.1.1 The Contractor shall without prejudice to his overall responsibility to execute and complete the work as per specifications and time schedule, progressively deploy **construction equipments and tools & tackles** in line with **Appendix - IX** to Special Conditions of Contract (SCC) and as and when required augment the same as decided by the Engineer-in-Charge depending on the exigencies of the work so as to complete all works within the contracted time schedule and without any additional cost to Owner. No construction equipment shall be supplied by the Owner.

44.2 **SITE ORGANISATION**

44.2.1 Subject to the provisions in the contract document and without prejudice to Contractor's liabilities and responsibilities to provide adequate qualified personnel on the work, contractor shall deploy **minimum supervisory personnel** as specified in **Appendix - VIII** to Special Conditions of Contract (SCC) and augment the same as decided by the Engineer-in-Charge depending upon the site requirement & the exigencies of work so as to complete all works within the contracted time schedule and without any additional cost to OWNER.

44.2.2 Qualification and experience of Key Supervisory Personnel to be deployed for this work shall be as per **Appendix - VII** to Special Conditions of Contract (SCC).

45.0 **MAKE OF MATERIALS**

45.1 The materials required to be supplied by the Contractor under this contract shall be procured only from the vendors specified in the list of makes attached with the tender document.

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- 45.2      **Structural steel**  
Structural steel shall be allowed to be procured from manufacturers having valid BIS license. Structural steel shall conform to IS:2062 & IS:808 and will meet the technical specifications of the contract.
- 45.3      **Cement**  
The list of approved manufacturers of cement and the methodology for procurement of cement by the contractor from manufacturers other than the approved manufacturers, shall be as per **Appendix-XI to SCC**.
- 45.4      **HSD re-bars/ TMT bars**  
The list of approved manufacturers and the methodology for obtaining rebate, in case TMT bars are procured by the contractors from manufacturers other than the approved manufacturers, shall be as per **Appendix-XI to SCC**.
- 45.5      Where the makes of materials are not indicated in the Bidding document, Contractor shall furnish the details of makes and shall obtain prior approval of Engineer-in-Charge of vendors/sub-vendors before placing order.
- 46.0      **SECURED ADVANCE ON MATERIALS**
- 46.1      CONTRACTOR may be allowed Secured Advance on the materials brought to site for execution of contracted items of work to the extent of 75% of the value of materials against documentary evidence with test & inspection certificate and after furnishing an Indemnity Bond in the format prescribed in GCC, on non-judicial stamp paper of appropriate value and shall provide the Owner satisfactory evidence of insurance of insurable materials specified in SCC for full value of the material during storage and erection against all insurable risks (including explosion) in the joint names of Owner and the CONTRACTOR. Items qualifying for Secured Advance are listed in **Appendix – XII** of Special Conditions of Contract (SCC). However, Secured Advance shall not be payable for such items against which payment on supply is released as per the Payment Terms.
- 46.2      Decision of Engineer-in-Charge regarding the extent of materials required for incorporation in permanent works as well as the cost of materials, shall be final and binding on the CONTRACTOR.
- 46.3      The Secured Advance so paid shall be recovered from CONTRACTOR's R.A. Bills proportionately to the extent that the concerned materials are incorporated in the works and billed for. Balance amount, if any, will be recovered in full from the pre final bill of the CONTRACTOR / any other dues or shall be recovered completely when 90% of the Contract Value gets paid, whichever is earlier.
- 47.0      **EXECUTION OF ELECTRICAL WORKS**
- 47.1      The Contractor shall engage an approved electrical agency for execution of electrical works, holding valid electrical Contractor licence for working in the state in which the job site is located. In case Contractor himself executes electrical works then he shall possess valid electrical Contractor licence before start of electrical works at site.
- 48.0      **LIMITATION OF LIABILITIES**
- 48.1      The final payment by the Owner in pursuance of the contract terms shall not mean release of the Contractor from all his liabilities under the contract. The Contractor will be liable and committed under this contract to fulfil all his liabilities and responsibilities, till such time the Owner releases Contract Performance Guarantee.
- 49.0      **GUARANTEE/DEFECT LIABILITY PERIOD**
- 49.1      In partial modification to clause no: 5.n of General Conditions of Contract, the Defect Liability Period (DLP) will be 1 year from the date of completion. The decision of

Engineer-in-charge shall be final and binding on the Contractor.

49.2 Contractor shall replace at his own cost if any item found defective or missed before handing over the system to Owner. The decision of Engineer-in-Charge shall be final and binding in this regard.

50.0 **INSURANCE POLICY FOR CONTRACTOR SUPPLIED MATERIALS**

50.1 Insurance coverage for Contractor's supplied materials shall also be arranged by the Contractor at no additional cost to the Owner. In the event of any damage due to fire, pilferage or theft, contractor shall raise the claim with Insurance Company and take immediate procurement actions without affecting the completion schedule of the Project.

50.2 The Contractor shall indemnify and keep the Owner indemnified against any damage/theft/loss of items etc and subsequent insurance claims if any lodged by them.

51.0 **WORK TO BE CARRIED OUT BY SPECIALISED AGENCIES:**

51.1 The contractor, after obtaining approval from Engineer-in-Charge shall engage specialized agencies in respect of the following works at site.

- Swimming & Still Pool.
- Irrigation Works.
- Water proofing works.
- Any other work as directed by Engineer-in-Charge.

Following the notification of Acceptance of Bid the CONTRACTOR will submit to EIL/ OWNER for approval the details of Sub-Contractors. CONTRACTOR shall ensure that very competent and resourceful agencies with proven track record and performance should be proposed for the work to be sub-contracted for above specialized works.

The specialized agency executing the work of Anti-termite treatment, Water Proofing, shall have to submit the Performance Guarantee for 10 years in the Format enclosed as **APPENDIX-XIII** to SCC.

52.0 **DETAILS OF MAINTENANCE STAFF REQUIREMENT DURING MAINTENANCE PERIOD**

As per the minimum need of the maintenance requirement to the landscape developed area on gross basis as per the maintenance schedule, the following number of the person shall be required for desired activities for total 12 Acres(approx.) area under intense landscape & Green Belt 10 Acres (approx.).

Sl. no.	Manpower Description	Nos.
1	Trained Gardener	20
2	Labour	8

All Labours deployed by the contractor during maintenance period shall remain in neat and tidy uniform while working at site.

The contractor shall have to deploy other as specified in the SCC Appendix – VIII.

53.0 **MAINTENANCE PERIOD**

The contractor is to quote rate including 1 year of maintenance period of Horticulture work which will start after completion of work. The work shall include but not be limited



to maintaining & upkeep the entire horticulture works including all plants /trees / shrubs/ hedges etc. in good & healthy conditions and providing necessary consumables like manure, soil, fertilizer, pesticides & replace the dried & diseased plants regularly during Maintenance Period as per Technical Specifications. No other charges will be paid during the Maintenance Period. Recovery towards non-replacement of dried & diseased trees, plants, shrubs etc. shall be made at the rate of double the rate in relevant SOR item and decision of Engineer-in-charge shall be final and binding.

The maintenance for period of 1 year from date of completion of work shall also include watering, manuring, fertilizing, plant protection for pests and diseases, sweeping, weeding, mowing and disposal of garden refuse, cultivation and cutting of edges, pruning and clipping of hedges, Rose bushes etc. and stacking, providing seeds/ seedlings, preparation and planting of seasonal flowers, minor repair works and all other landscape operations necessary for the proper growth and maintaining them in proper standard of maintenance.

#### 54.0 **SECURITY DEPOSIT:**

The tenderer, with whom the contract is decided to be entered into and intimation is so given will have to make a security deposit of one percent (1%) of the total contract value in the form of account payee crossed demand draft drawn in favour of the Owner, within 15 days from the date of intimation of acceptance of their tender, failing which the Owner reserves the right to cancel the Contract and forfeit the EMD.

1% of PO/Contract value as Security deposit will be acceptable in the form of Demand draft upto Rs.50,000/- and in the form of Demand draft / Bank guarantee beyond Rs.50,000/-.

Composite Performance Bank Guarantee (CPBG) for 10% of PO value including cost of comprehensive maintenance services towards Performance Bank Guarantee inclusive of Security Deposit and shall be accepted (in lieu of deduction of retention money); such CPBG shall be valid up to a period of 3 months beyond the expiry of defect liability period.

Demand Draft should be drawn on Scheduled Banks, other than co-operative bank.

Units registered under NSIC for the corresponding item/work are entitled to exemption from payment of security deposit for performance up to monetary limits specified in the NSIC certificate.

#### 55.0 **NURSERY MAINTENANCE & OFFICE SET-UP**

The Contractor may set-up Nursery with good micro-climate to store the supply of the plants on available land inside the premises at his own cost. The land made available for nursery shall be made good and handed over to owner on completion of works. In case of propagation of the plants in the nursery, the same shall be used on site only.

##### **Vermi-Composts**

Contractor shall mandatorily have Vermicomposting System developed at appropriate location where all the pruning wastes, organic wastes shall be dumped with weeds, weed seeds or bulbs, stones etc., mix it well in the soil in the ratio (6:1), level as per grade. (point of unloading 0-50m). The process shall require approval of the Engineer-In-Charge and periodic maintenance of the activity. Approval of Engineer-in-charge prior to dispatch of material for use on site is must.

# **APPENDICES TO SPECIAL CONDITIONS OF CONTRACT**

# **SCOPE OF WORK**

## **[APPENDIX - I TO SPECIAL CONDITIONS OF ONTRACT]**

Scope of work shall be as specified in Technical Section of the bidding document.

## **APPENDIX – II TO SPECIAL CONDITIONS OF CONTRACT**

### **1.0 SCOPE OF SUPPLY**

All materials, equipment, consumables etc. required for successful completion of the works and not specifically mentioned as to be supplied by Owner shall be supplied by the Contractor at their sole cost and expense. Only the materials, which are specified in Technical / Job specification as Free Issued or Supplied by Owner, shall be supplied/ issued by Owner.

बोलीकर्ता से गुणवत्ता प्रबंधन  
प्रणाली अपेक्षाओं हेतु विनिर्देश

**SPECIFICATION FOR QUALITY  
MANAGEMENT SYSTEM  
REQUIREMENTS FROM BIDDERS**

Rev. No	Date	Purpose	Prepared by	Checked by	Approved by
0	04.06.09	Issued as Standard Specification	QMS Standards Committee	QMS Standards Committee	SCT ND
					Standards Committee Convenor
					Standard Bureau Chairman

**Abbreviations:**

MR	-	Material Requisition
PR	-	Purchase Requisition
PO	-	Purchase Order
QA	-	Quality Assurance
QMS	-	Quality Management System
ISO	-	International Organization for Standardization
CV	-	Curriculum Vitae

**QMS Standards Committee**

**Convenor:** Mr. S.C. Tyagi

**Members:** Mr. Chandra Kant (Insp.)  
Mr. R.K. Trivedi (Engg.)  
Mr. R.K. Sabharwal (C&P)  
Mr. M.P. Jain (Projects)  
Mr. Ravindra Kumar (Const.)  
Mr. Mukesh Meena (CQA)

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### Attachment

Format for Concession/Deviation Permit : Format No.5-0000-0180-F1



## 1.0 SCOPE

This specification establishes the Quality Management System requirements to be met by BIDDER for following purpose:

- QMS requirements to be met by suppliers/contractors after award of work/during contract execution.

## 2.0 DEFINITIONS

### 2.1 Bidder

For the purpose of this specification, the word "BIDDER" means the person(s), firm, company or organization who is under the process of being contracted by EIL / Owner for delivery of some products (including service). The word is considered synonymous to supplier, contractor or vendor.

### 2.2 Project Quality Plan

Document tailored from Standard Quality Management System Manual of BIDDER, specifying how the quality requirements of the project will be met.

### 2.3 Owner

Owner means the owner of the project for which services / products are being purchased and includes their representatives, successors and assignees.

## 3.0 REFERENCE DOCUMENTS

6-78-0002	Specification for Documentation Requirements from Contractors
6-78-0003	Specification for Documentation Requirements from Suppliers

## 4.0 QUALITY MANAGEMENT SYSTEM – GENERAL

Unless otherwise agreed with EIL / Owner, the BIDDER proposed quality system shall fully satisfy all relevant requirements of ISO 9001 "Quality Management Systems – Requirements." Evidence of compliance shall be current certificate of quality system registration to ISO 9001 or a recent compliance audit recommending registration from a registrar. The quality system shall provide the planned and systematic control of all quality related activities for execution of contract. Implementation of the system shall be in accordance with BIDDER'S Quality Manual and PROJECT specific Quality Plan.

## 5.0 QUALITY SYSTEM REQUIREMENTS

5.1 BIDDER shall ensure that the responsible authority for execution of the order / contract has communicated the PO / contract requirements including any identified or intended statutory and regulatory requirements to all concerned in their organization and sub-contractor's organization who are contributing to the execution of the PO/ contract.

5.2 BIDDER shall establish a documented Quality Policy and Quality Objectives to achieve the specified and intended requirement of PO / contract.

- 5.3 BIDDER shall identify and communicate the responsibilities and authorities of the personnel contributing to the execution of the PO / contract.
- 5.4 BIDDER shall deploy competent and trained personnel for various activities for fulfillment of PO / contract. BIDDER shall arrange adequate infrastructure and work environment to ensure that the specification and quality of the deliverable are maintained.
- 5.5 BIDDER shall do the quality planning for all activities involved in delivery of order. The quality planning shall cover as minimum the following:
- Resources
  - Product / deliverable characteristics to be controlled.
  - Process characteristics to ensure the identified product characteristics are realized
  - Identification of any measurement requirements, acceptance criteria
  - Records to be generated
  - Need for any documented procedure
- The quality planning shall result into the quality assurance plan, inspection and test plans (ITPs) and job procedures for the project activities in the scope of bidder. These documents shall be submitted to EIL/Owner for review/approval, before commencement of work.
- 5.6 Requirements for sub-contracting / purchasing of services specified in contract / tender shall be adhered to. Wherever requirements are not specified, the sub-contractor shall establish and maintain a system for purchasing / sub-contracting to ensure that purchased product / service conforms to specified requirements. Criteria for selection of sub-contractor, evaluation, re-evaluation, maintenance of purchasing data and verification of purchased product (sub-contractor services), constitute important components of this requirement.
- 5.7 BIDDER shall plan and carry production and service provision under controlled conditions. Controlled conditions shall include, as applicable
- a) the availability of information that describes the characteristics of the product
  - b) the availability of work instructions
  - c) the use of suitable equipment
  - d) the availability and use of monitoring and measuring devices
  - e) the implementation of monitoring and measurement
  - f) the implementation of release, delivery and post delivery activities
- 5.8 BIDDER shall validate any processes for production and service provision where resulting output cannot be verified by subsequent monitoring and measurement. This includes any process where deficiencies become apparent only after the product is in use or service has been delivered.
- 5.9 BIDDER shall establish a system for identification and traceability of product / deliverable throughout product realization. Product status with respect to inspection and testing requirements shall be identified.
- 5.10 BIDDER shall identify, verify, protect and safeguard EIL / Owner property (material / document) provided for use or incorporation into the product. If any Owner / EIL property is lost, damaged or otherwise found to be unsuitable for use, this shall be reported to the EIL / Owner.

- 5.11** BIDDER shall preserve the conformity of product / deliverable during internal processing and delivery to the intended destination. Requirements mentioned in the tender shall be adhered to.
- 5.12** BIDDER shall establish system to ensure that inspection and testing activities are carried out in a manner that is consistent with the inspection and testing requirements. Where necessary, measuring equipments shall be calibrated at specified frequency, against national or international measurement standards; where no such standard exists, the basis used for calibration shall be recorded. The measuring equipments shall be adjusted or re-adjusted as necessary, identified to enable the calibration status to be determined. The measuring equipments shall be protected from damage during handling, maintenance and storage.
- 5.13** BIDDER shall ensure effective monitoring, using suitable methods, of the processes involved in production and other related processes for delivery of the scope of contract.
- 5.14** BIDDER shall monitor and measure the characteristics of the product/deliverable to verify that product requirement has been met. The inspection (stage as well as final) by BIDDER and EIL / Owner personnel shall be carried out strictly as per the ITPs forming part of the contract. Product release or service delivery shall not proceed until the planned arrangements have been satisfactorily completed, unless otherwise approved by relevant authority and where applicable by Owner / EIL.
- 5.15** BIDDER shall establish and maintain a documented procedure to ensure that the product which does not conform to requirements is identified and controlled to prevent its unintended use or delivery
- 5.16** All non-conformities (NCs) / deficiencies found by the BIDDER'S inspection / surveillance staff shall be duly recorded, including their disposal action shall be recorded and resolved suitably. Effective corrective and preventive action shall be implemented by the BIDDER so that similar NCs including deficiencies do not recur.
- 5.17** All deficiencies noticed and reported by EIL / Owner shall be analyzed by the BIDDER and appropriate corrective and preventive actions shall be implemented. BIDDER shall intimate EIL / Owner of all such corrective and preventive action implemented by him.
- 5.18** BIDDER should follow the standards, specifications and approved drawings. Concessions/Deviations shall be allowed only in case of unavoidable circumstances. In such situations Concession/deviation request must be made by the BIDDER in attached Format No. 5-0000-0180-F1.
- 5.19** BIDDER shall have documented procedure for control of documents.
- 5.20** All project records shall be carefully kept, maintained and protected for any damage or loss until the project completion, then handed over to EIL / Owner as per contract requirement (Refer Specification Nos. 6-78-0002 - Specification for Documentation Requirements from Contractors and 6-78-0003 - Specification for Documentation Requirements from Suppliers), or disposed as per relevant project procedure.
- 5.21** BIDDER shall prepare and submit for review and approval, Project Quality Plan / Quality Assurance Plan for contracted scope / job. The BIDDER'S Quality Plan shall address all of the applicable elements of ISO 9001, identify responsible parties within BIDDER'S organization, for the implementation / control of each area, reference the applicable procedures used to control / assure each area, and verify the documents produced for each area. The Project Quality Plan shall necessarily define control or make reference to the relevant procedures, for design and engineering, purchase, documentation, record control, bid evaluation, inspection, production/manufacturing, preservation, packaging and storage,

quality control at construction site, pre-commissioning, commissioning and handing over (as applicable) in line with contract requirement and scope of work.

## 6.0 AUDITS

BIDDER shall plan and carry out the QMS audit for the job. Quality audit programme shall cover design, procurement, construction management and commissioning as applicable including activities carried out by sub-vendors and sub-contractors. This shall be additional to the certification body surveillance audits carried out under BIDDER'S own ISO 9001 certification scheme.

The audit programmes and audit reports shall be submitted to EIL / Owner as per specified documentation requirements. EIL or Owner's representative reserves the right to attend, as a witness, any audit conducted during the execution of the WORKS.

In addition to above EIL, Owner and third party appointed by EIL/Owner may also perform Quality and Technical compliance audits. BIDDER shall provide assistance and access to their systems and sub-contractor / vendor systems as required for this purpose. Any deficiencies noted shall be immediately rectified by BIDDER.

## 7.0 DOCUMENTATION REQUIREMENTS

BIDDER shall submit following QMS documents immediately after award of work (Within one week) for record / review by EIL / Owner.

- Organization chart (for complete organization structure and for the project)
- Project Quality Plan/Quality Assurance Plan
- Job specific Inspection Test Plans
- Job Procedures
- Inspection/Test Formats

In addition to above QMS documents, following documentation shall be maintained by the BIDDER for submission to EIL / Owner on demand at any point of time during execution of the project.

- Quality Manual
- CVs of the personnel in BIDDER'S QA Organogram
- Certificate of approval for compliance to ISO: 9001 standard
- Procedure for Control of Non-conforming Product
- Procedure for Control of Documents
- Sample audit report of the QMS internal and external audits conducted during last one year
- Customer satisfaction reports from at least 2 customers, during the last one year
- Project audit report
- Corrective action report on the project audits
- Technical audit reports for the project

Documents as specified above are minimum requirements. BIDDER shall submit any other document/data required for completion of the job as per EIL/Owner instructions.



**CONCESSION/DEVIATION PERMIT**

(USE ONLY THIS PAGE FOR COMMUNICATION WITH VENDOR/CONTRACTOR)

TO BE FILLED BY ORIGINATOR	Project _____		Originator Ref. _____	
	Job No. _____		Order/Contract No. _____	
	Equipment Title _____		Item No. _____	
	Originator: Vendor/Contractor _____			
	<b>Caution : Originator to note that any delay in processing of concession/deviation permit shall be to originator's account and shall not be used as a reason for extension in delivery</b>			
	Requirement as per specification		Description of Concession/Deviation sought	
	Why the Concession/Deviation is required? Supporting evidence/calculations enclosed/not enclosed			
	Contractual implications if Concession/Deviation is granted:			
	* Time impact		More/Less/No change	
* Cost impact		More/Less/No change		
* Performance Warranty/Guarantee		Affected/Not affected		
Under present constraints requested Concession/deviation is most optimum for the project and does not involve any hazard, and shall meet the stipulated performance requirements.				
Date: _____		Signature Vendor /Contractor (with seal)		

**Decision on Concession/Deviation including decision, on time and cost implications**

(To be filled by the Inspection engineer [at RPO/HO] or RCM, responsible for conveying the decision to the originator, after resolution)

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

Signature \_\_\_\_\_

Location : \_\_\_\_\_

Name \_\_\_\_\_



Opinion from EIL site supervisor/inspection engineer  
(Specify whether post-facto approval required for regularization)

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

Name : \_\_\_\_\_  
RPO/Site Name \_\_\_\_\_

Original forward to : \_\_\_\_\_  
(Target division/department/group)

Copy to : \_\_\_\_\_  
(Project Manager)

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

Name : \_\_\_\_\_

Disposal by target division/department

Whether any vendor/contractor made 'Technically not Acceptable' during bid evaluation, on the aspect of which this concession/deviation is sought-----YES/NO

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

Name : \_\_\_\_\_

Final decision of Project Manager along with overall review  
(Client's decision required/not required)

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

Name : \_\_\_\_\_

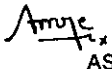
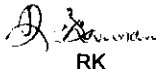


Client's decision, if required

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

Signature : \_\_\_\_\_  
Name : \_\_\_\_\_

निर्माण स्थल पर  
स्वास्थ्य, सुरक्षा एवं पर्यावरण  
प्रबंधन मानक विनिर्देशन

STANDARD SPECIFICATION  
FOR  
HEALTH, SAFETY & ENVIRONMENT  
(HSE) MANAGEMENT  
AT CONSTRUCTION SITES

4	13/02/2008	REVISED & UPDATED				
3	17/07/2007	REVISED & UPDATED	AS	MPJ	VNP	VC
2	11/08/2005	REVISED & UPDATED	MPJ	MPJ	VNP	VJN
1	29/05/2003	REVISED & UPDATED	AS	MPJ	HOD(C)	SKG
0	19/07/2002	ISSUED AS STANDARD SPECIFICATION	AB	MPJ	HOD(C)	GRR
Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convener	Standards Bureau Chairman
						Approved by

**Abbreviations:**

AERB	:	Atomic Energy Regulatory Board
ANSI	:	American National Standards Institute
BARC	:	Bhabha Atomic Research Centre
BS	:	British Standard
EIL	:	Engineers India Limited
ELCB	:	Earth Leakage Circuit Breaker
EPC	:	Engineering, Procurement and Construction
EPCC	:	Engineering, Procurement, Construction and Commissioning
ESI	:	Employee State Insurance
GCC	:	General Conditions of Contract
GM	:	General Manager
GTAW	:	Gas Tungsten Arc Welding
HOD	:	Head of Department
HSE	:	Health, Safety & Environment
HV	:	High Voltage
IS	:	Indian Standard
IE	:	Indian Electricity
LPG	:	Liquefied Petroleum Gas
LSTK	:	Lump Sum Turn Key
MV	:	Medium Voltage
PPE	:	Personal Protective Equipment
RCM	:	Resident Construction Manager or Site-in-Charge, as applicable
ROW	:	Right of Way
SCC	:	Special Conditions of Contract
SLI	:	Safe Load Indicator
TBM	:	Tool Box Meeting

**Construction Standards Committee**

**Convenor :** Sh. S.C. Barman, HOD (Construction)

**Members :** Sh. A.K. Mittal, DGM (Projects)  
Sh. M.P. Jain, AGM (Projects)  
Sh. R. Kannan, AGM (Construction)  
Sh. Rakesh Nanda, AGM (Piping)



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IX.	Permit for Demolishing/ Dismantling	HSE-9 Rev.0	55

## **1.0 SCOPE**

This specification establishes the Health, Safety and Environment (HSE) management requirement to be complied by Contractors including their sub-contractors during construction.

This specification is not intended to replace the necessary professional judgement needed to design & implement an effective HSE system for construction activities and the contractor is expected to exceed requirements given in this specification.

Requirements stipulated in this specification shall supplement the requirements of HSE Management given in relevant Act(s)/legislations, General Conditions of Contract (GCC), Special Conditions of Contract (SCC) and Job (Technical) Specifications. Where different documents stipulate different requirements, the most stringent shall apply.

## **2.0 REFERENCES**

The document should be read in conjunction with following:

- General Conditions of Contract (GCC)
- Special Conditions of Contract (SCC)
- Building and other construction workers (regulation of employment and condition of service) Act, 1996
- Job (Technical) specifications
- Relevant International/ National Codes (refer Appendix-A for standards/codes on HSE)
- Statutory requirements

## **3.0 REQUIREMENTS OF HEALTH, SAFETY & ENVIRONMENT (HSE) MANAGEMENT SYSTEM TO BE COMPLIED BY BIDDERS**

### **3.1 MANAGEMENT RESPONSIBILITY**

#### **3.1.1 HSE Policy & Objectives**

The Contractor should have a documented HSE policy & objectives to demonstrate commitment of their organization to ensure health, safety and environment aspects in their line of operations.

#### **3.1.2 Management System**

The HSE management system of the Contractor shall cover the HSE requirements including but not limited to what is specified under clause 1.0 and 2.0 above.

#### **3.1.3 Indemnification**

Contractor shall indemnify & hold harmless, Owner/EIL & their representatives, free from any and all liabilities arising out of non-fulfillment of HSE requirements.

#### **3.1.4 Deployment & qualifications of safety personnel**

Contractor shall designate/ deploy all the categories of HSE personnel at site as indicated below:

- a) Safety Steward

One for every 500 workers or part thereof. He/She shall possess minimum one year of experience in construction work environment.

b) Safety Supervisor

One for every 1000 workers or part thereof. He/She shall possess minimum two years of work experience in construction work environment.

c) Safety Officer

One for every 1000 workers or part thereof. He/She shall possess a recognized Degree in any branch of engineering or technology or architecture and had a post qualification construction experience of minimum two years or possess a recognized Diploma in any branch of engineering or technology and had a post qualification construction experience of minimum five years.

In addition, he/she shall also possess a recognized degree or diploma in industrial safety and preferably have adequate knowledge of the language spoken by majority of the workers at the construction site.

In case the statutory requirements i.e. Centre or State Acts and/ or Rules as applicable like the Building and Other Construction Workers -Regulation of Employment and Conditions of Service- Act or Rules wherever notified, the Factories Act or Rules wherever notified, etc. are more stringent than above, the same shall be followed.

The Contractor shall ensure physical presence of safety personnel at each work location where Hot work permit is required. No work shall be started at site until above safety personnel are physically present at site. The contractor shall submit a safety organogram clearly indicating the lines of responsibility and reporting system and elaborate the responsibilities of safety personnel in the HSE Manual/Programme. The contractor shall furnish Bio-Data/ Resume/ Curriculum Vitae of the safety personnel as above, at least 1 month before the mobilization, for EIL/Owner's approval.

### 3.1.5 Implementation & Monitoring

Contractor shall be fully responsible for planning, reporting, implementing and monitoring all HSE requirements and compliance of all laws & statutory requirements. The Contractor shall also ensure that the HSE requirements are clearly understood & faithfully implemented at all levels at site.

### 3.1.6 Awareness

The contractor shall brief the visitors about the HSE precautions which are required to be taken before proceeding to site and make necessary arrangements to issue appropriate PPEs like hard hats & safety shoes to his visitors.

The Contractor shall promote and develop consciousness about Health, Safety and Environment among all personnel working for the Contractor. Regular awareness programmes and fabrication shop/work site meetings atleast on monthly basis shall be arranged on HSE activities to cover hazards involved in various operations during construction. During the awareness programme, steps shall be taken by the contractor to motivate & encourage the workmen & supervisory staff by issuing/ awarding them with the tokens/ gifts/ mementos/ monetary incentives.

A verbal warning shall be given to the worker during the first HSE violation. A written warning shall be issued on the second violation and thereafter for the third violation; the services of the worker shall be terminated. For all these violations, penalties shall be imposed separately on the contractor. A record of warnings for each worker shall be maintained by the contractor like by punching their cards.

### 3.1.7 Fire prevention & First-Aid

The contractor shall arrange suitable first aid measures such as First Aid Box (Refer Appendix-B for details), trained personnel to administer First Aid, stand-by ambulance or vehicle and install fire protection measures such as adequate number of steel buckets with sand & water and adequate number of appropriate fire extinguishers (Refer Appendix-C for details) to the satisfaction of EIL/Owner. The contractor's safety personnel shall be trained enough to carry out above activities effectively so as to provide immediate relief in case of an emergency.

In case the number of workers exceeds 500, the Contractor shall position an ambulance/ vehicle on full time basis very close to the worksite.

### 3.1.8 Documentation

The Contractor shall evolve a comprehensive, planned and documented system for implementation and monitoring of the HSE requirements. This shall be submitted to EIL/Owner for approval. The monitoring for implementation shall be done by regular inspections and compliance to the observations thereof. The Contractor shall get similar HSE requirements implemented at his sub-contractor(s) work site/office. However, compliance of HSE requirements shall be the responsibility of the Contractor. Any review/approval by EIL/Owner shall not absolve contractor of his responsibility/liability in relation to all HSE requirements.

### 3.1.9 Audit

Contractor shall carry out internal HSE audits. He shall also cooperate during HSE audits by Owner/ EIL. Non-Conformances on HSE (including his sub-contractors) brought out during review/audit by his internal audit team as well as EIL/Owner's representative shall be resolved forthwith by Contractor. Compliance report shall be submitted to EIL/Owner promptly.

To this effect, the contractor shall submit an Audit Plan to EIL/Owner indicating the type of audits (internal by self including his sub-contractors, external by EIL/Owner & Third Party) and their frequencies. The contractor shall conduct an internal HSE audit atleast on quarterly basis and submit a report to EIL/Owner.

### 3.1.10 Meetings

The Contractor shall ensure participation of his top most executive at site (viz. Resident Engineer/ Site-in-Charge) in Safety Committee/HSE Committee meetings arranged by EIL/Owner usually on monthly basis or as and when called for. The compliance of any observations during the meeting shall be arranged urgently. The contractor shall assist EIL/Owner to achieve the targets set by them on HSE during the project implementation.

In addition, the contractor shall also arrange internal HSE meetings chaired by his top most executive at site on weekly basis and maintain records.

### 3.1.11 Intoxicating drinks & drugs and Smoking

The contractor shall ensure that his staff members & workers (permanent as well casual) shall not be in a state of intoxication during working hours and shall abide by any law relating to consumption & possession of intoxicating drinks or drugs in force. Awareness about local laws on this issue shall form part of the Induction Training.

The contractor shall ensure that all personnel working for him comply with No-smoking requirements of the owner as notified from time to time. Cigarettes, lighters, auto ignition tools or appliances shall not be allowed inside the plant complex. Smoking shall be permitted only inside smoking booths expressly designated & authorized by the Owner/EIL.

### 3.1.12 Penalty

The Contractor shall adhere consistently to all provisions of HSE requirements. In case of non-compliance or repeated failure in implementation of any of the HSE provisions; EIL/Owner may impose stoppage of work without any cost & time implication to the Owner and/or impose a suitable penalty.

The amount of penalty to be levied shall be upto a cumulative limit of

- 1.0% (one percent) of the contract value for Item Rate or Composite contracts with an overall ceiling of Rs. 10,00,000/- (Rupees ten lakhs).
- 0.2% (Zero decimal two percent) of the contract value for LSTK, EPC, EPCC or Package contracts with an overall ceiling of Rs.1,00,00,000/- (Rupees one crore).

This penalty shall be in addition to all other penalties specified elsewhere in the contract. The decision of imposing stop-work-instruction and imposition of penalty shall rest with EIL/Owner. The same shall be binding on the contractor. Imposition of penalty does not make the contractor eligible to continue the work in unsafe manner.

The amount of penalty applicable on different types of HSE violations is specified below:

S. No.	Violation of HSE norms	Penalty Amount
1.	For not using personal protective equipment (Helmet, Shoes, Goggles, Gloves, Full body harness, Face shield, Boiler suit, etc.)	Rs.250/- per day/Item/ Person.
2.	Working without Work Permit/Clearance	Rs.5,000/- per occasion
3.	Unsafe electrical practices (not installing ELCB, using poor joints of cables, using naked wire without top plug into socket, laying wire/cables on the roads, electrical jobs by incompetent person, etc.)	Rs.3,000/- per item per day.
4.	Working at height without full body harness, using non-standard/ rejected scaffolding and not arranging fall protection arrangement as required like Safety Nets.	Rs. 3,000/ per case per day.
5.	Unsafe handling of compressed gas cylinders (No trolley, jubilee clips double gauge regulator, improper storage/handling).	Rs.100/- per item per day.
6.	Use of domestic LPG for cutting purpose.	Rs.1,000 per occasion.
7.	No fencing/barricading of excavated areas.	Rs.1,000 per occasion.

8.	Not providing shoring/strutting/proper slope and not keeping the excavated earth at least 1.5M away from excavated area.	Rs.5,000/- per occasion.
9.	Non display of caution boards, list of hospitals, emergency services available at work locations.	Rs.500/- per occasion.
10.	Traffic rules violations like over speeding of vehicles, rash driving, wrong parking, not using seat belts, vehicles not fitted with reverse warning alarms.	Rs.1,000/- per occasion.
11.	Absence of Contractor's top most executive at site in the safety meetings whenever called by EIL/Owner	Rs. 5,000/- per meeting.
12.	Failure to maintain safety records by Contractor Safety personnel.	Rs.1,000/- per month.
13.	Failure to conduct daily safety site inspection, HSE meeting and HSE audit at predefined frequencies	Rs.1,000/- per occasion.
14.	Failure to submit the monthly HSE report by 5 <sup>th</sup> of subsequent month to Engineer-in-Charge.	Rs.5,000/- per occasion and Rs.100/- per day for further delay.
15.	Poor House Keeping	Rs.1,000/- per occasion
16.	Failure to report & follow up accident (including Near Miss) reporting system.	Rs.10,000/- per occasion
17.	Degradation of environment (not confining toxic spills, spilling oil/lubricants onto ground)	Rs.1,000/- per occasion
18.	Not medically examining the workers before allowing them to work at height, not providing ear muffs while allowing them to work in noise polluted areas, made them to work in air polluted areas without respiratory protective devices, etc.	Rs.1,000/- per occasion
19.	Violation of any other safety condition as per job HSE plan, work permit and HSE conditions of contract (using crowbar on cable trenches, improper welding booth, not keeping fire extinguisher ready at hot work site, unsafe rigging practices, non-availability of First-Aid box, etc.)	Rs.1,000/- per occasion
20.	Any violation not covered above	To be decided by EIL/Owner.

### 3.1.13 Accident/ Incident investigation

All accidents/incidents shall be reported immediately on Format No. HSE-2. Thereafter, a supplementary Accident/Incident investigation report on Format No. HSE-3 shall be submitted. Near Miss incident(s) shall also be reported on Format No. HSE-4. The accidents/incidents shall be investigated by a team of Contractor's senior personnel for establishing root cause and recommending corrective & preventive actions. Findings shall be documented and suitable actions taken to avoid recurrences shall be communicated to EIL/Owner. Owner/EIL shall have the liberty to independently investigate such occurrences and the Contractor shall extend all necessary help and cooperation in this regard. EIL/Owner shall have the right to share the content of this report with the outside world.

### 3.2 HOUSE KEEPING

Contractor shall ensure that a high degree of house keeping is maintained and shall ensure interalia; the followings:

- a. All surplus earth and debris are removed/disposed off from the working areas to designated location(s).
- b. Unused/surplus cables, steel items and steel scrap lying scattered at different places within the working areas are removed to identified location(s).
- c. All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).
- d. Roads shall be kept clear and materials like pipes, steel, sand, boulders, concrete, chips and bricks etc shall not be allowed on the roads to obstruct free movement of men & machineries.
- e. Fabricated steel structural, pipes & piping materials shall be stacked properly for erection.
- f. Water logging on roads shall not be allowed.
- g. No parking of trucks/trolleys, cranes and trailers etc shall be allowed on roads, which may obstruct the traffic movement.
- h. Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas.
- i. Trucks carrying sand, earth and pulverized materials etc. shall be covered while moving within the plant area/ or these materials shall be transported with top surface wet.
- j. The contractor shall ensure that the atmosphere in plant area and on roads is free from particulate matter like dust, sand, etc. by keeping the top surface wet for ease in breathing.
- k. At least two exits for any unit area shall be assured at all times.



### 3.3 HSE MEASURES

#### 3.3.1 Construction Hazards

Contractor shall ensure identification of all Occupational Health, Safety & Environmental hazards in the type of work he is going to undertake and enlist mitigation measures. Contractor shall carry out Job Safety Analysis (JSA) specifically for high risk jobs like working at height & in confined space, deep excavations, radiography jobs, electrical installations, blasting operations, demolishing/ dismantling activities, welding/ gas cutting jobs and submit the findings to EIL/Owner. The necessary HSE measures devised shall be in place prior to start of an activity by the contractor.

A list of typical construction hazards alongwith their effects & preventive measures is given in Appendix-E.

#### 3.3.2 Accessibility

The Contractor shall provide safe means of access to any working place including provisions of suitable and sufficient scaffolding at various stages during all operations of the work for the safety of his workmen and EIL/Owner.

The access to plant complex shall be strictly regulated. Any person or vehicle entering the complex shall undergo identification check, as per the procedures in force.

#### 3.3.3 Personal Protective Equipments (PPEs)

The Contractor shall ensure that all their staff, workers and visitors including their sub-contractor(s) have been issued (records to be kept) & wear appropriate PPEs like nape strap type safety helmets preferably with head & sweat band with ¾" cotton chin strap (made of

industrial HDPE), safety shoes with steel toe cap and antiskid sole, full body harness (CE marked and conforming to EN361), protective goggles, gloves, ear muffs, respiratory protective devices, etc. All these gadgets shall conform to applicable IS Specifications/CE or other applicable international standards.

Owner may issue a comprehensive color scheme for helmets to be used by various agencies. The Contractor shall follow the scheme issued by the owner. All Safety/ Fire personnel shall preferably wear red colour helmet so that workmen can approach them for guidance during emergencies.

For shot blasting, the usage of protective face shield and helmets, gauntlet and protective clothing is mandatory.

For offshore jobs/contracts, contractor shall provide PPEs (new) to EIL & Owner's personnel, at his (contractor's) cost. All personnel shall wear life jacket at all time.

An indicative list of HSE standards/codes is given under Appendix-A.

#### 3.3.4 Working at height

The contractor shall issue height permit for working at height after verifying and certifying the checkpoints as specified in the attached permit (Format No. HSE-6). He shall also undertake to ensure compliance to the conditions of the permit during the currency of the permit including adherence to personal protective equipments.

The permit shall be issued initially for one week or expected duration of an activity and extended further for the balance duration. This permit shall be applicable in areas where specific clearance from Owner's operation Deptt./Safety Deptt. is not required. EIL field Engineers/Safety Officers/Area Coordinators may verify and counter sign this permit (as an evidence of verification) during the execution of the job.

In case work is undertaken without taking sufficient precautions as given in the permit, EIL Engineers may cancel the permit and stop the work till satisfactory compliance is arranged. Contractors are expected to maintain a register for issuance of permit and extensions thereof including preserving the used permits for verification during audits etc.

Contractor shall arrange (at his cost) and ensure use of Fall Arrester Systems by his workers. Fall arresters are to be used while climbing/descending tall structures. These arresters should lock automatically against the anchorage line, restricting free fall of the user. The device is to be provided with a double security opening system to ensure safe attachment or release of the user at any point of rope. In order to avoid shock, the system should be capable of keeping the person in vertical position in case of a fall.

Contractor shall ensure that Full body harnesses conforming EN361 and having authorized CE marking is used by all personnel while working at height. The lanyards and life lines should have enough tensile strength to take the load of the worker in case of a fall. One end of the lanyard shall be firmly tied with the harnesses and the other end with life line. The harness should be capable of keeping the workman vertical in case of a fall, enabling him to rescue himself.

Contractor shall provide Roof Top Walk Ladders for carrying out activities on sloping roofs in order to reduce the chances of slippages and falls.

Contractor shall ensure that a proper Safety Net System is used wherever the hazard of fall from height is present. The safety net, preferably a knotted one with mesh ropes conforming to IS 5175/ ISO 1140 shall have a border rope & tie cord of minimum 12mm dia. The Safety Net shall be located not more than 6.0 meters below the working surface extending on either side upto sufficient margin to arrest fall of persons working at different heights.

Contractor shall ensure positive isolation while working at different levels like in the pipe rack areas. The working platforms with toe boards & hand rails shall have sufficient space to hold the workmen and the tools & the tackles including the equipments required for executing the job.

### 3.3.5 Scaffoldings & Barricading

Suitable scaffoldings shall be provided to workmen for all works that cannot be safely done from the ground or from solid construction except such short period work that can be safely done using ladders. When a ladder is used, an extra workman shall be engaged for holding the ladder.

The contractor shall ensure that the scaffolds used during construction activities shall be strong enough to take the designed load. Owner/EIL reserves the right to ask the contractor to submit certification and or design calculations from his Engineering regarding load carrying capacity of the scaffoldings.

All scaffolds shall be inspected by a Scaffolding Inspector of the contractor. He shall paste a GREEN tag on each scaffold found safe and a RED tag on each scaffold found unsafe. Scaffolds with GREEN tag only shall be permitted to be used and RED ones shall immediately be removed from the site.

The contractor shall ensure positive barricading of the excavated, radiography, heavy lift, high pressure hydrostatic & pneumatic testing and other such areas. Sufficient warning signs shall be displayed along the barricading areas.

### 3.3.6 Electrical installations

All electrical installations/ connections shall be carried out as per the provisions of latest revision of following codes/standards, in addition to the requirements of Statutory Authorities and IE/applicable international rules & regulations:

- OISD STD 173 : Fire prevention & protection system for electrical installations
- SP 30 (BIS) : National Electric Code

All electrical installations shall be approved by the concerned statutory authorities.

#### 3.3.6.1 The contractor shall meet the following requirements:

- i) Ensure that electrical systems and equipment including tools & tackles used during construction phase are properly selected, installed, used and maintained as per provisions of the latest revision of the Indian Electrical/ applicable international regulations.
- ii) Shall deploy qualified & licensed electricians for proper & safe installation and for regular inspection of construction power distribution system/points including their earthing. A copy of the license shall be submitted to EIL / Owner for records. Availability of at least one competent licensed electrician shall be ensured at site round the clock to attend to the normal/emergency jobs.
- iii) All switchboards / welding machines shall be kept in well-ventilated & covered shed. The shed shall be elevated to avoid water logging. No flammable materials shall be used for constructing the shed. Also flammable materials shall not be stored in and around electrical equipment / switchboard. Adequate clearances and operational space shall be provided around the equipment.
- iv) Fire extinguishers and insulating mats shall be provided in all power distribution centers.
- v) Temporary electrical equipment shall not be employed in hazardous area without obtaining safety permit.
- vi) Proper house keeping shall be done around the electrical installations.
- vii) All temporary installations shall be tested before energising, to ensure proper earthing, bonding, suitability of protection system, adequacy of feeders/cables etc.
- viii) All welders shall use hand gloves irrespective of holder voltage.
- ix) Multilingual (Hindi, English and local language) caution boards, shock treatment charts and instruction plate containing location of isolation point for incoming supply, name & telephone No. of contact person in emergency shall be provided in substations and near all distribution boards / local panels.
- x) Operation of earth leakage device shall be checked regularly by temporarily connecting series test lamp (2 bulbs of equal rating connected in series) between phase and earth.
- xi) Regular inspection of all installations (at least once in a month)

3.3.6.2 The following features shall also be ensured for all electrical installations during construction phase by the contractor:

- i) Each installation shall have a main switch with a protective device, installed in an enclosure adjacent to the metering point. The operating height of the main switch shall not exceed 1.5 M. The main switch shall be connected to the point of supply by means of armoured cable.
- ii) The outgoing feeders shall be double or triple pole switches with fuses / MCBs. Loads in a three phase circuit shall be balanced as far as possible and load on neutral should not exceed 20% of load in the phase.
- iii) The installation shall be adequately protected against overload, short circuit and earth leakage by the use of suitable protective devices. Fuses wherever used shall be HRC type. Use of rewirable fuses shall be strictly prohibited. The earth leakage device shall have an operating current not exceeding 30 mA.
- iv) All connections to the hand tools / welding receptacles shall be taken through proper switches, sockets and plugs.
- v) All single phase sockets shall be minimum 3 pin type only. All unused sockets shall be provided with socket caps.
- vi) Only 3 core (P+N+E) overall sheathed flexible cables with minimum conductor size of 1.5 mm<sup>2</sup> copper shall be used for all single phase hand tools.
- vii) Only metallic distribution boxes with double earthing shall be used at site. No wooden boxes shall be used.
- viii) All power cables shall be terminated with compression type cable glands. Tinned copper lugs shall be used for multistrand wires / cables.
- ix) Cables shall be free from any insulation damage.
- x) Minimum depth of cable trench shall be 750 mm for MV & control cables and 900 mm for HV cables. These cables shall be laid over a sand layer and covered with sand, brick & soil for ensuring mechanical protection. Cables shall not be laid in waterlogged area as far as practicable. Cable route markers shall be provided at every 25 M of buried trench route. When laid above ground, cables shall be properly cleated or supported on rigid poles of atleast 2 M high. Minimum head clearance of 6 meters shall be provided at road crossings.
- xi) Under ground road crossings for cables shall be avoided to the extent feasible. In any case no under ground power cable shall be allowed to cross the roads without pipe sleeve.
- xii) All cable joints shall be done with proper jointing kit. No taped/ temporary joints shall be used.
- xiii) An independent earthing facility should preferably be established within the temporary installation premises. All appliances and equipment shall be adequately earthed. In case of armoured cables, the armour shall be bonded to the earthing system.
- xiv) All cables and wire rope used for earth connections shall be terminated through tinned copper lugs.

- xv) In case of local earthing, earth electrodes shall be buried near the supply point and earth continuity wire shall be connected to local earth plate for further distribution to various appliances. All insulated wires for earth connection shall have insulation of green colour.
- xvi) Separate core shall be provided for neutral. Earth / Structures shall not be used as a neutral in any case.
- xvii) ON/OFF position of all switches shall be clearly designated / painted for easy isolation in emergency.

### 3.3.7 Welding/ Gas cutting

Contractor shall ensure that flash back arrestors conforming to BS:6158 or equivalent are installed on all gas cylinders as well as at the torch end of the gas hose, while in use. All cylinders shall be mounted on trolleys and provided with a closing key. The burner and the hose placed downstream of pressure reducer shall be equipped with Flash Back Arrester/Non Return Valve device. The hoses for acetylene and oxygen cylinders must be of different colours. Their connections to cylinders and burners shall be made with a safety collar. At end of work, the cylinders in use shall be closed and hoses depressurized. All welding machines shall have effective earthing. In order to help maintain good housekeeping, and to reduce fire hazard, live electrode bits shall be contained safely and shall not be thrown directly on the ground.

### 3.3.8 Ergonomics and tools & tackles

The Contractor shall assign to his workmen, tasks commensurate with their qualification, experience and state of health. All lifting tools, tackles, equipment, accessories including cranes shall be tested periodically by statutory/competent authority for their condition and load carrying capacity. Valid test & fitness certificates from the applicable authority shall be submitted to Owner/EIL for their review/acceptance before the lifting tools, tackles, equipment, accessories and cranes are used. The contractor shall not be allowed to use defective equipment or tools not adhering to safety norms.

Contractor shall ensure installation of Safe Load Indicator (SLI) on all cranes (while in use) to minimize overloading risk. SLI shall have capability to continuously monitor and display the load on the hook, and automatically compare it with the rated crane capacity at the operating condition of the crane. The system shall also provide visual and audible warnings at set capacity levels to alert the operator in case of violations.

The contractor shall be responsible for safe operations of different equipments mobilized and used by him at the workplace like transport vehicles, engines, cranes, mobile ladders, scaffoldings, work tools, etc.

### 3.3.9 Occupational Health

The contractor shall identify all operations that can adversely affect the health of its workers and issue & implement mitigation measures.

For surface cleaning operations, sand blasting shall not be permitted even if not explicitly stated elsewhere in the contract.

To eliminate radiation hazard, Tungsten electrodes used for Gas Tungsten Arc Welding shall not contain Thorium.

Appropriate respiratory protective devices shall be used to protect workmen from inhalation of air borne contaminants like silica, asbestos, gases, fumes, etc.

Workmen shall be made aware of correct methods for lifting, carrying, pushing & pulling of heavy loads. Wherever possible, manual handling shall be replaced by mechanical lifting equipments.

For jobs like drilling/demolishing/dismantling where noise pollution exceeds the specified limit of 85 decibels, ear muffs shall be provided to the workers.

To avoid upper limb disorders and backaches, Display Screen Equipments' workplace stations shall be carefully designed & used with proper sitting postures. Power driven hand-held tools shall be maintained in good working condition to minimize their vibrating effects and personnel using these tools shall be taught how to operate them safely & how to maintain good circulation in hands.

The contractor shall arrange health check up for all the workers at the time of induction. Health check may have to be repeated if the nature of duty assigned to him is changed necessitating health check or doubt arises about his wellness. EIL/Owner reserve the right to ask the contractor to submit test reports. Regular health check-ups are mandatory for the workers assigned with Welding, Radiography, Blasting, Heavy Lift and Height (>2m) jobs. All the health check-ups shall be conducted by registered Medical practitioner and records are to be maintained.

The contractor shall ensure vaccination of all the workers including their families.

### 3.3.10 Hazardous substances

Hazardous, inflammable and/or toxic materials such as solvent coating, thinners, anti-termite solutions, water proofing materials shall be stored in appropriate containers preferably with lids having spillage catchment trays and shall be stored in a good ventilated area. These containers shall be labeled with the name of the materials highlighting the hazards associated with its use and necessary precautions to be taken.

Where contact or exposure of hazardous materials exceeds the specified limit or otherwise have harmful affects, appropriate personal protective equipments such as gloves, goggles, aprons, chemical resistant clothing, respirator, etc. shall be used.

The work place shall be checked prior to start of activities to identify the location, type and condition of any asbestos materials which could be disturbed during the work. In case asbestos material is detected, usage of appropriate PPEs by all personnel shall be ensured and the matter shall be reported immediately to EIL/ Owner.

### 3.3.11 Slips, trips & falls

The contractor shall establish a regular cleaning and basic housekeeping programme that covers all aspects of the workplace to help minimize the risk of slips, trips & falls. The contractor shall take positive measures like keeping the work area tidy, storing waste in suitable containers & harmful items separately, keeping passages, stairways, entrances & exits especially emergency ones clear, cleaning up spillages immediately and replacing damaged carpet/ floor tiles, mats & rugs at once to avoid slips, trips & falls.

### 3.3.12 Radiation exposure

- a) All personnel exposed to physical agents such as non-ionizing radiation, ultraviolet rays or similar other physical agents shall be provided with adequate shielding or protection commensurate with the type of exposure involved.

- b) For ionizing radiation, requirements of Bhabha Atomic Research Centre (BARC)/ Atomic Energy Regulatory Board (AERB) shall be followed.

### 3.3.13 Explosives/Blasting operations

Blasting operations shall be carried out as per latest Explosive Rules (Indian/ International) with prior permission. The contractor shall obtain license from Controller of explosives for collection, transportation, storage of explosives as well as for carrying out blasting operations.

### 3.3.14 Demolition/ Dismantling

The contractor shall adhere to safe demolishing/ dismantling practices at all stages of work to guard against unsafe working practices. The contractor shall disconnect service lines (power, gas supply, water, etc.)/ make alternate arrangements prior to start of work and restore them, if required as directed by EIL/ Owner at no extra cost. Before carrying out any demolition/ dismantling work, the contractor shall take prior approval of EIL/Owner in Format No.HSE-9. For revamp jobs in operating plants where location of underground utilities is not known with certainty, the contractor shall depute an experienced person for supervision and shall make adequate arrangements for Fire fighting & First-Aid during the execution of these activities.

### 3.3.15 Road Safety

The contractor shall ensure adequately planned road transport safety management system. The vehicles shall be fitted with reverse warning alarms & flashing lights and usage of seat belts shall be ensured. The contractor shall also ensure a separate pedestrian route for safety of the workers and comply with all traffic rules & regulations. The maximum allowable speed shall be adhered to. In case of an alert or emergency, the vehicles must clear all the routes, roads, access.

Dumpers, Tippers, etc. shall not be allowed to carry workers within the plant area and also to & from the labour colony. Hydras shall only be allowed for handling the materials at fabrication/ storage yards and in no case shall be allowed to transport the materials.

For pipeline jobs, the contractor shall submit a comprehensive plan covering transportation of pipes, movement of side booms, movement of vehicles on the ROW, etc.

### 3.3.16 Welfare measures

Contractor shall, at the minimum, ensure the following facilities at work sites.

- A crèche at site where 10 or more female workers are having children below the age of 6 years.
- Reasonable canteen facilities at site and in labour camps at appropriate location depending upon site conditions.
- Adequately lighted & ventilated Rest rooms at site (separate for male workers and female workers)
- Toilets, drinking water, adequate lighting at site and labour camps, commensurate with applicable Laws/ Legislation

### 3.3.17 Environment Protection

Contractor shall ensure proper storage and utilization methodology of materials that are detrimental to the environment. Where required, Contractor shall ensure that only the environment friendly materials are selected and emphasize on recycling of waste materials

such as metals, plastics, glass, paper, oil & solvents. The waste that can not be minimized, reused or recovered shall be stored and disposed of safely. In no way, toxic spills shall be allowed to percolate into the ground. The contractor shall not use the empty areas for dumping the wastes.

The contractor shall strive to conserve energy and water wherever feasible.

The contractor shall ensure dust free environment at workplace by sprinkling water on the ground at frequent intervals. The air quality parameters for dust, poisonous gases, toxic releases, harmful radiations, etc. shall be checked by the contractor on daily basis and whenever need arises.

The contractor shall not be allowed to discharge chemicals, oil, silt, sewage, sullage and other waste materials directly into the controlled waters like surface drains, streams, rivers, ponds. A discharge plan suggesting the methods of treating the waste before discharging shall be submitted to EIL/Owner for approval.

For pipeline jobs, top soil shall be stacked separately while making ROW through fields. This fertile soil shall be placed back on top after backfilling.

For offshore construction barges, arrangements shall be made for safe disposal of human, food & other wastes and applicable laws in this regard shall be followed.

### 3.3.18 Rules & Regulations

All persons deployed at site shall be knowledgeable of and comply with the environmental laws, rules & regulations relating to the hazardous materials, substances and wastes. Contractor shall not dump, release or otherwise discharge or dispose off any such materials without the express authorization of EIL/Owner. An indicative list of Statutory Acts & Rules relating to HSE is given under Appendix-D.

### 3.3.19 Weather Protection

Contractor shall take appropriate measures to protect workers from severe storms, solar radiations, poisonous gases, dust, etc. by ensuring proper usage of PPEs like Sun glasses, Sun screen lotions, respirators, dust masks, etc. and rearranging/ planning the construction activities to suit the weather conditions.

### 3.3.20 Communication

All persons deployed at the work site shall have access to effective means of communication so that any untoward incident can be reported immediately and assistance sought by them.

All health & safety information shall be communicated in a simple & clear language easily understood by the local workforce.

### 3.3.21 Confined Space Entry

The contractor shall obtain a work permit (Format No. HSE -7) before entering a confined space. All necessary precautions mentioned therein shall be adhered to. An attendant shall be positioned outside a confined space for extending help during an emergency. All appropriate PPEs and air quality parameters shall be checked before entering a confined space. It shall be ensured that the piping of the equipment which has to be opened, is pressure- free by checking that blinds are in place, vents are open and volume is drained.



### 3.3.22 Heavy Lifts

The contractor shall submit detailed rigging studies plan for EIL/ Owner approval prior to lifting equipment which cannot be erected with a crane of approx. 100 MT capacity due to constraints of its dimensions, location of foundation height, approach & weight.

Prior to actual lifting activities, contractor shall check the validity of the crane inspection certificate issued by statutory/ competent authority. This requirement shall also apply to all rigging equipments utilized for the job.

The contractor shall, at all times, be responsible for all rigging activities.

Adequate safety measures such as positive barricading, usage of appropriate PPEs, permit to work, etc. shall be taken during all heavy or critical lifts.

### 3.3.23 Key Performance Indicators

The contractor shall measure an activity in both leading & trailing indicators for statistical and performance measurement. The activities pertaining to key performance indicators are covered in Monthly HSE Report (Format No. HSE-5). The contractor shall try to achieve a statistically fair record and strive for its continual improvement.

### 3.3.24 Unsuitable Land Conditions

Contractor shall take appropriate measures and necessary work permits/clearances if work is to be done in or around marshy areas, river crossings, mountains, monuments, etc.

### 3.3.25 Under Water Inspection

Contractor shall ensure that boats and other means used for transportation, surveying & investigation works shall be certified seaworthy by a recognized classification society. It shall be equipped with all life saving devices like life jackets, adequate fire protection arrangements

and shall possess communication facilities like cellular phones, wireless, walkie-talkie. All divers used for seabed surveys, underwater inspections shall have required authorized license, suitable life saving kit. Number of hours of work by divers shall be limited as per regulations. EIL/ Owner shall have the right to inspect the boat and scrutinize documents in this regard.

## 3.4 TOOL BOX MEETING (TBM)

Contractor shall conduct daily TBM with workers prior to start of work and shall maintain proper record of the meeting. A suggested format is given below. The TBM is to be conducted by the immediate supervisor of the workers.

TOOLBOX MEETING RECORDING SHEET		
Date & Time		
Subject		
Presenter		
Hazards involved		
Precautions to be taken		
Worker's Name	Signature	Section
Remarks, in any		

The topics during TBM shall include

- Hazards related to work assigned on that day and precautions to be taken.
- Any forthcoming HSE hazards/events/instruction/orders, etc.

The above record can be kept in local language, which workers can read. These records shall be made available to EIL/ Owner whenever demanded.

### 3.5 TRAINING & INDUCTION PROGRAMME

Contractor shall conduct an induction programme on HSE for his workers and maintain records. The Gate Pass shall be issued only to those workers who successfully qualify the induction programme.

Contractor shall ensure that all his personnel possess appropriate training to carry out the assigned job safely. The training should be imparted in a language understood by them and should specifically be trained about

- Potential hazards to which they may be exposed at their workplace
- Measures available for prevention and elimination of these hazards

The topics during training shall cover, at the minimum ;

- Education about hazards and precautions required
- Emergency and evacuation plan
- HSE requirements
- Fire fighting and First-Aid
- Use of PPEs
- Local laws on intoxicating drinks, drugs, smoking in force

Records of the training shall be kept and submitted to EIL/ Owner whenever demanded.

For offshore and jetty jobs, contractor shall ensure that all personnel deployed have undergone a structured sea survival training including use of lifeboats, basket landing, use of radio communication etc. from an agency acceptable to Owner/EIL.

### 3.6 INSPECTION

The contractor shall carryout daily HSE inspection and record observations at a central location. These inspection records shall be freely accessible to Owner/ EIL representatives. The contractor shall also assist Owner/EIL representatives during the HSE inspections conducted by them.

### 3.7 ADDITIONAL SAFETY REQUIREMENTS FOR WORKING INSIDE A RUNNING PLANT

As a minimum, the contractor shall ensure adherence to following safety requirements while working in or in the close vicinity of an operating plant:

- a) Contractor shall obtain permits for Hot work, Cold work, Excavation and Confined Space from Owner in the prescribed format.
- b) The contractor shall monitor, record and compile list of his workers entering the operational plant/unit each day and ensure & record their return after completing the job.

- c) Contractor's workers and staff members shall use designated entrances and proceed by designated routes to work areas only assigned to them. The workers shall not be allowed to enter units' area, tanks area, pump rooms, etc. without work authorization permit.
- d) Work activities shall be planned in such a way so as to minimize the disruption of other activities being carried out in an operational plant/unit and activities of other contractors.
- e) The contractor shall submit a list of all chemicals/toxic substances that are intended to be used at site and shall take prior approval of the Owner.
- f) Specific training on working in a hydrocarbon plant shall be imparted to the work force and mock drills shall be carried out for Rescue operations/First-Aid measures.
- g) Proper barricading/cordoning of the operational units/plants shall be done before starting the construction activities. No unauthorized person shall be allowed to trespass. The height and overall design of the barricading structure shall be finalized in consultation with the Owner and shall be got approved from the Owner.
- h) Care shall be taken to prevent hitting underground facilities such as electrical cables, hydrocarbon piping during execution of work.
- i) Barricading with water curtain shall be arranged in specific/critical areas where hydrocarbon vapors are likely to be present such as near horton spheres or tanks. Positioning of fire tenders (from owner) shall also be ensured during execution of critical activities.
- j) Emergency evacuation plan shall be worked out and all workmen shall be apprised about evacuation routes. Mock drill operations may also be conducted.
- k) Flammable gas test shall be conducted prior to any hot work using appropriate measuring instruments. Sewers, drains, vents or any other gas escaping points shall be covered with flame retardant tarpaulin.
- l) Respiratory devices shall be kept handy while working in confined zones where there is a danger of inhalation of poisonous gases. Constant monitoring of presence of Gas/ Hydrocarbon shall be done.
- m) Clearance shall be obtained from all parties before starting hot tapping, patchwork on live lines and work on corroded tank roof.
- n) Positive isolation of line/equipment by blinding for welding/cutting/grinding shall be done. Closing of valve will not be considered sufficient for isolation.
- o) Welding spatters shall be contained properly and in no case shall be allowed to fall on the ground containing oil. Similar care shall be taken during cutting operations.
- p) The vehicles, cranes, engines, etc. shall be fitted with spark arresters on the exhaust pipe and got it approved from Safety Department of the Owner.
- q) Plant air should not be used to clean any part of the body or clothing or use to blow off dirt on the floor.
- r) Gas detectors should be installed in gas leakage prone areas as per requirement of Owner's plant operation personnel.

- s) An experienced full time safety personnel shall be exclusively deployed to monitor safety aspects in running plants.

### 3.8 SELF ASSESSMENT AND ENHANCEMENT

The contractor shall develop a method of check & balance through self assessment & enhancement techniques and shall explore the opportunities for continual improvement in the HSE system.

### 3.9 HSE PROMOTION

The contractor shall encourage his workforce to promote HSE efforts at workplace by way of organizing workshops/seminars/training programmes, celebrating HSE awareness weeks & National Safety Day, conducting quizzes & essay competitions, distributing pamphlets, posters & material on HSE, providing incentives for maintaining good HSE practices and granting bonus for completing the job without any lost time accident.

## 4.0 DETAILS OF HSE MANAGEMENT SYSTEM BY CONTRACTOR

### 4.1 ON AWARD OF CONTRACT

The Contractor shall submit a comprehensive Health, Safety and Environment Manual or programme for approval by EIL/Owner prior to start of work. The Contractor shall participate in the pre-start meeting with EIL/Owner to finalize HSE Plans including the following:

- Job procedure to be followed by the Contractor for construction activities including handling of equipments, scaffolding, electric installations, etc. describing the risks involved, actions to be taken and methodology for monitoring each activity.
- EIL/Owner review/audit requirement.
- Organization structure along with responsibility and authority, records/ reports etc. on HSE activities.
- Emergency evacuation plan/ procedures for site and labour camps
- Job Safety Analysis for high risk jobs
- Procedures for reporting & investigation of accidents and near misses.
- HSE Training programmes
- Reference to Rules, Regulations and statutory requirements.
- HSE reporting

### 4.2 DURING JOB EXECUTION

Contractor shall implement approved Health, Safety and Environment management programme including but not limited to as brought out under para 3.0. Contractor shall also ensure:

- to arrange workmen compensation insurance, registration under ESI Act, third party liability insurance etc, as applicable.
- to arrange all HSE permits before start of activities (as applicable), like permits for hot work, working at heights (Refer Format No. HSE-6), confined space (Refer Format No. HSE-7), Radiation Work Permit (Refer Format No. HSE-8), Demolishing/ Dismantling Work Permit (Refer Format No. HSE-9), storage of chemical/ explosive materials & its use and implement all precautions mentioned therein. In this regard, requirements of Oil industry Safety Directorate Standard No. Std -105 "Work Permit Systems" shall be complied with while working in existing Oil or Gas processing plants.

- to submit, timely, the completed checklist on HSE activities in Format No.HSE-1, Monthly HSE report in Format No.HSE-5 (use of web based package is compulsory wherever the facility is available else a hard copy is to be submitted), accident/incident reports, investigation reports etc. as per EIL/Owner requirements. Compliance of instructions on HSE shall be done by Contractor and informed urgently to EIL/Owner.
- that his top most executive at site attends all the Safety Committee/HSE meetings arranged by EIL/Owner. Only in case of his absence from site that a second senior most person shall be nominated by him, in advance, and communicated to EIL/Owner.
- display at site office and at prominent locations HSE Policy, caution boards, list of hospitals, emergency services available, safety signs like Men at work, Speed Limits, Hazardous Area.
- provide posters, banners for safe working to promote safety consciousness.
- assess, analyze & mitigate the construction hazards
- carryout audits/inspection at his works as well as sub contractor works as per approved HSE plan/procedure/programme & submit the reports for EIL/Owner review.
- assistance & cooperate during HSE audits by EIL/Owner, and submit compliance report.
- generate & submit of HSE records/report as per this specification.
- apprise EIL/Owner on HSE activities at site.
- carryout all dismantling activities safely, with prior approval of EIL/Owner representative.

#### 4.3 DURING SHORT LISTING OF THE SUB-CONTRACTORS

The contractor shall review the HSE management system of the sub-contractors in line with the requirements given in this specification. The contractor shall be held responsible for the shortcomings observed in the HSE management system of the sub-contractor(s) during execution of the job.

#### 5.0 RECORDS

At the minimum, the contractor shall maintain/ submit HSE records in the following reporting formats:

1.	Monthly HSE Checklist cum compliance report	HSE-1
2.	Accident/ Incident Report	HSE-2
3.	Supplementary Accident/ Incident Investigation report	HSE-3
4.	Near Miss Incident Report	HSE-4
5.	Monthly HSE Report	HSE-5
6.	Permit for working at height	HSE-6
7.	Permit for working in confined space	HSE-7
8.	Permit for radiation work	HSE-8
9.	Permit for demolishing/ dismantling	HSE-9

**APPENDIX-A**  
**(Sheet 1 of 2)**

**A. I.S. CODES ON HSE**

SP: 53	Safety code for the use, Care and protection of hand operated tools.
IS: 818	Code of practice for safety & health requirements in electric and gas welding and cutting operations
IS: 1179	Eye & Face precautions during welding, equipment etc.
IS: 1860	Safety requirements for use, care and protection of abrasive grinding wheels.
IS: 1989 (Part -II)	Leather safety boots and shoes
IS: 2925	Industrial Safety Helmets
IS: 3016	Code of practice for fire safety precautions in welding & cutting operation.
IS: 3043	Code of practice for earthing
IS: 3764	Code of safety for excavation work
IS: 3786	Methods for computation of frequency and severity rates for industrial injuries and classification of industrial accidents
IS: 3996	Safety Code of scaffolds and ladders
IS: 4082	Recommendations on stacking and storage of construction materials and components at site
IS: 4770	Rubber gloves for electrical purposes
IS: 5121	Safety code for piling and other deep foundations
IS: 5216 (Part-I)	Recommendations on Safety procedures and practices in electrical works
IS: 5557	Industrial and Safety rubber lined boots
IS: 5983	Eye protectors
IS: 6519	Selection, care and repair of Safety footwear
IS: 6994 (Part-I)	Industrial Safety Gloves (Leather & Cotton Gloves)
IS: 7293	Safety Code for working with construction Machinery
IS: 8519	Guide for selection of industrial safety equipment for body protection
IS: 9167	Ear protectors
IS: 11006	Flash back arrestor (Flame arrestor)
IS: 11016	General and safety requirements for machine tools and their operation
IS: 11057	Specification for Industrial safety nets
IS: 11226	Leather safety footwear having direct moulded rubber sole
IS: 11972	Code of practice for safety precaution to be taken when entering a sewerage system
IS: 13367	Code of practice-safe use of cranes
IS: 13416	Recommendations for preventive measures against hazards at working place

**APPENDIX-A**  
**(Sheet 2 of 2)**

**B. INTERNATIONAL STANDARDS ON HSE**

Safety Glasses	:	ANSI Z 87.1, ANSI ZZ 87.1, AS 1337, BS 2092, BS 1542, BS 679, DIN 4646/ 58211
Safety Shoes	:	ANSI Z 41.1, AS 2210, EN 345
Hand Gloves	:	BS 1651
Ear Muffs	:	BS 6344, ANSI S 31.9
Hard Hat	:	ANSI Z 89.1/89.2, AS 1808 , BS 5240, DIN 4840
Goggles	:	ANSI Z 87.1
Face Shield	:	ANSI Z 89.1
Breathing Apparatus	:	BS 4667, NIOSH
Welding & Cutting	:	ANSI Z 49.1
Safe handling of compressed Gases in cylinders	:	P-1 (Compressed Gas Association 1235 Jefferson Davis Highway, Arlington VA 22202 - USA)

APPENDIX-B

DETAILS OF FIRST AID BOX

SL. NO.	DESCRIPTION	QUANTITY
1.	Small size Roller Bandages, 1 Inch Wide (Finger Dressing small)	6 Pcs.
2.	Medium size Roller Bandages, 2 Inches Wide (Hand & Foot Dressing)	6 Pcs.
3.	Large size Roller Bandages, 4 Inches Wide (Body Dressing Large)	6 Pcs.
4.	Large size Burn Dressing (Burn Dressing Large)	4 Pkts.
5.	Cotton Wool (20 gms packing)	4 Pkts.
6.	Antiseptic Solution Dettol (100 ml.) or Savalon	1 Bottle
7.	Mercurichrome Solution (100 ml.) 2% in water	1 Bottle
8.	Ammonia Solution (20 ml.)	1 Bottle
9.	A Pair of Scissors	1 Piece
10.	Adhesive Plaster (1.25 cm X 5 m)	1 Spool
11.	Eye pads in Separate Sealed Pkt.	4 pcs.
12.	Tourniquet	1 No.
13.	Safety Pins	1 Dozen
14.	Tinc. Iodine/ Betadin (100 ml.)	1 Bottle
15.	Polythene Wash cup for washing eyes	1 No.
16.	Potassium Permanganate (20 gms.)	1 Pkt.
17.	Tinc. Benzoine (100 ml.)	1 Bottle
18.	Triangular Bandages	2 Nos.
19.	Band Aid Dressing	5 Pcs.
20.	Iodex/Moov (25 gms.)	1 Bottle
21.	Tongue Depressor	1 No.
22.	Boric Acid Powder (20 gms.)	2 Pkt.
23.	Sodium Bicarbonate (20 gms.)	1 Pkt.
24.	Dressing Powder (Nebasulf) (10 gms.)	1 Bottle
25.	Medicinal Glass	1 No.
26.	Duster	1 No.
27.	Booklet (English & Local Language)	1 No. each
28.	Soap	1 No.
29.	Toothache Solution	1 No.
30.	Vicks (22 gms.)	1 Bottle
31.	Forceps	1 No.
32.	Note Book	1 No.
33.	Splints	4 Nos.
34.	Lock	1 Piece
35.	Life Saving/Emergency/Over-the counter Drugs	As decided at site

Box size : 14" x 12" x 4"

Note : The medicines prescribed above are only indicative. Equivalent medicines can also be used.  
A prescription, in this regard, shall be required from a qualified Physician.



APPENDIX-C

TYPE OF FIRES VIS-À-VIS FIRE EXTINGUISHERS

Fire ↓	Fire → Extinguisher	Water	Foam	CO <sub>2</sub>	Dry Powder	Multi purpose (ABC)
Originated from paper, clothes, wood		✓	✓	can control minor surface fires	can control minor surface fires	✓
Inflammable liquids like alcohol, diesel, petrol, edible oils, bitumen		×	✓	✓	✓	✓
Originated from gases like LPG, CNG, H <sub>2</sub>		×	×	✓	✓	✓
Electrical fires		×	×	✓	✓	✓

LEGEND : ✓ : CAN BE USED

× : NOT TO BE USED

**Note :** Fire extinguishing equipment must be checked atleast once a year and after every use by an authorized person. The equipment must have an inspection label on which the next inspection date is given. Type of extinguisher shall clearly be marked on it.

**APPENDIX-D**

**Indicative List of Statutory Acts & Rules Relating to HSE**

- The Indian Explosives Act and Rules
- The Motor Vehicle Act and Central Motor Vehicle Rules
- The Factories Act and concerned Factory Rules
- The Petroleum Act and Petroleum Rules
- The Workmen Compensation Act
- The Gas Cylinder Rules and the Static & Mobile Pressure Vessels Rules
- The Indian Electricity Act and Rules
- The Indian Boiler Act and Regulations
- The Water (Prevention & Control & Pollution) Act
- The Water (Prevention & Control of Pollution) Cess Act
- The Mines & Minerals (Regulation & Development) Act
- The Air (Prevention & Control of Pollution) Act
- The Atomic Energy Act
- The Radiation Protection Rules
- The Indian Fisheries Act
- The Indian Forest Act
- The Wild Life (Protection) Act
- The Environment (Protection) Act and Rules
- The Hazardous Wastes (Management & Handling) Rules
- The Manufacturing, Storage & import of Hazardous Chemicals Rules
- The Public Liability Act
- The Building and Other Construction Workers (Regulation of Employment and Condition of service) Act
- Other statutory acts Like EPF, ESIS, Minimum Wage Act.

APPENDIX-E  
(Sheet 1 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(A) EXCAVATION  ● Pit Excavation upto 3.0m	➤ Falling into pit	➤ Personal injury	<ul style="list-style-type: none"> <li>➤ Provide guard rails/ barricade with warning signal</li> <li>➤ Provide atleast two entries/ exits.</li> <li>➤ Provide escape ladders.</li> </ul>
	➤ Earth Collapse	<ul style="list-style-type: none"> <li>➤ Suffocation/ Breathlessness</li> <li>➤ Buried</li> </ul>	<ul style="list-style-type: none"> <li>➤ Provide suitable size of shoring and strutting, if required.</li> <li>➤ Keep soil heaps away from the edge equivalent to 1.5m or depth of pit whichever is more.</li> <li>➤ Don't allow vehicles to operate too close to excavated areas. Maintain atleast 2m distance from edge of cut.</li> <li>➤ Maintain sufficient angle of repose. Provide slope not less than 1:1 and suitable bench of 0.5m width at every 1.5m depth of excavation in all soils except hard rock.</li> <li>➤ Battering/benching the sides.</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Contact with buried electric cables</li> <li>➤ Gas/ Oil Pipelines</li> </ul>	<ul style="list-style-type: none"> <li>➤ Electrocutation</li> <li>➤ Explosion</li> </ul>	<ul style="list-style-type: none"> <li>➤ Obtain permission from competent authorities, prior to excavation, if required.</li> <li>➤ Locate the position of buried utilities by referring to plant drawings.</li> <li>➤ Start digging manually to locate the exact position of buried utilities and thereafter use mechanical means.</li> </ul>
● Pit Excavation beyond 3.0m	<ul style="list-style-type: none"> <li>➤ Same as above plus</li> <li>➤ Flooding due to excessive rain/ underground water</li> </ul>	<ul style="list-style-type: none"> <li>➤ Can cause drowning situation</li> </ul>	<ul style="list-style-type: none"> <li>➤ Prevent ingress of water</li> <li>➤ Provide ring buoys</li> <li>➤ Identify and provide suitable size dewatering pump or well point system</li> </ul>
	➤ Digging in the vicinity of existing Building/ Structure	<ul style="list-style-type: none"> <li>➤ Building/Structure may collapse</li> <li>➤ Loss of health &amp; wealth</li> </ul>	<ul style="list-style-type: none"> <li>➤ Obtain prior approval of excavation method from local authorities.</li> <li>➤ Use under-pining method</li> <li>➤ Construct retaining wall side by side.</li> </ul>
	➤ Movement of vehicles/ equipments close to the edge of cut.	<ul style="list-style-type: none"> <li>➤ May cause cave-in or slides.</li> <li>➤ Persons may get buried.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Barricade the excavated area with proper lighting arrangements</li> <li>➤ Maintain atleast 2m distance from edge of cut and use stop blocks to prevent over-run</li> <li>➤ Strengthen shoring and strutting</li> </ul>

APPENDIX-E : (Sheet 2 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
<ul style="list-style-type: none"> <li>Narrow deep excavations for pipelines, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Same as above plus</li> <li>Frequent cave-in or slides</li> </ul>	<ul style="list-style-type: none"> <li>May cause severe injuries or prove fatal</li> </ul>	<ul style="list-style-type: none"> <li>Battering/benching of sides</li> <li>Provide escape ladders</li> </ul>
	<ul style="list-style-type: none"> <li>Flooding due to Hydro-static testing</li> </ul>	<ul style="list-style-type: none"> <li>May arise drowning situation</li> </ul>	<ul style="list-style-type: none"> <li>Same as above plus</li> <li>Bail out accumulated water</li> <li>Maintain adequate ventilation.</li> </ul>
<ul style="list-style-type: none"> <li>Rock excavation by blasting</li> </ul>	<ul style="list-style-type: none"> <li>Improper handling of explosives</li> </ul>	<ul style="list-style-type: none"> <li>May prove fatal</li> </ul>	<ul style="list-style-type: none"> <li>Ensure proper storage, handling &amp; carrying of explosives by trained personnel.</li> <li>Comply with the applicable explosive acts &amp; rules.</li> </ul>
	<ul style="list-style-type: none"> <li>Uncontrolled explosion</li> </ul>	<ul style="list-style-type: none"> <li>May cause severe injuries or prove fatal</li> </ul>	<ul style="list-style-type: none"> <li>Allow only authorized persons to perform blasting operations.</li> <li>Smoking and open flames are to be strictly prohibited</li> </ul>
	<ul style="list-style-type: none"> <li>Scattering of stone pieces in atmosphere</li> </ul>	<ul style="list-style-type: none"> <li>Can hurt people</li> </ul>	<ul style="list-style-type: none"> <li>Use PPE like goggles, face mask, helmets etc.</li> </ul>
<ul style="list-style-type: none"> <li>Rock excavation by blasting (Contd)</li> </ul>	<ul style="list-style-type: none"> <li>Entrapping of persons/ animals.</li> </ul>	<ul style="list-style-type: none"> <li>May cause severe injuries or prove fatal</li> </ul>	<ul style="list-style-type: none"> <li>Barricade the area with red flags and blow siren before blasting.</li> </ul>
	<ul style="list-style-type: none"> <li>Misfire</li> </ul>	<ul style="list-style-type: none"> <li>May explode suddenly</li> </ul>	<ul style="list-style-type: none"> <li>Do not return to site for atleast 20 minutes or unless announced safe by designated person.</li> </ul>
<ul style="list-style-type: none"> <li>Piling Work</li> </ul>	<ul style="list-style-type: none"> <li>Failure of pile-driving equipment</li> </ul>	<ul style="list-style-type: none"> <li>Can hurt people</li> </ul>	<ul style="list-style-type: none"> <li>Inspect Piling rigs and pulley blocks before the beginning of each shift.</li> </ul>
	<ul style="list-style-type: none"> <li>Noise pollution</li> </ul>	<ul style="list-style-type: none"> <li>Can cause deafness and psychological imbalance.</li> </ul>	<ul style="list-style-type: none"> <li>Use personal protective equipments like ear plugs, muffs, etc.</li> </ul>
	<ul style="list-style-type: none"> <li>Extruding rods/casing</li> </ul>	<ul style="list-style-type: none"> <li>Can hurt people</li> </ul>	<ul style="list-style-type: none"> <li>Barricade the area and install sign boards</li> <li>Provide first-aid</li> </ul>
	<ul style="list-style-type: none"> <li>Working in the vicinity of 'Live-Electricity'</li> </ul>	<ul style="list-style-type: none"> <li>Can cause electrocution/ Asphyxiation</li> </ul>	<ul style="list-style-type: none"> <li>Keep sufficient distance from Live-Electricity as per IS code.</li> <li>Shut off the supply, if possible</li> <li>Provide artificial/rescue breathing to the injured</li> </ul>
(B) CONCRETING	<ul style="list-style-type: none"> <li>Air pollution by cement</li> </ul>	<ul style="list-style-type: none"> <li>May affect Respiratory System</li> </ul>	<ul style="list-style-type: none"> <li>Wear respirators or cover mouth and nose with wet cloth.</li> </ul>
	<ul style="list-style-type: none"> <li>Handling of ingredients</li> </ul>	<ul style="list-style-type: none"> <li>Hands may get injured</li> </ul>	<ul style="list-style-type: none"> <li>Use gloves &amp; other PPE.</li> </ul>
	<ul style="list-style-type: none"> <li>Protruding reinforcement rods.</li> </ul>	<ul style="list-style-type: none"> <li>Feet may get injured</li> </ul>	<ul style="list-style-type: none"> <li>Use Safety shoes</li> <li>Provide platform above reinforcement for movement of workers.</li> </ul>

APPENDIX-E : (Sheet 3 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	➤ Earthing of electrical mixers, vibrators, etc. not done.	➤ Can cause electrocution/ asphyxiation	➤ Ensure earthing of equipments and proper functioning of electrical circuit before commencement of work.
	➤ Falling of materials from height	➤ Persons may get injured	➤ Use hard hats ➤ Remove surplus material immediately from work place. ➤ Ensure lighting arrangements during night hours
	➤ Continuous pouring by same gang	➤ Cause tiredness of workers and may lead to accident.	➤ Insist on shift pattern ➤ Provide adequate rest to workers between subsequent pours.
	➤ Revolving of concrete mixer/ vibrators	➤ Parts of body or clothes may get entrapped.	➤ Allow only mixers with hooper ➤ Provide safety cages around moving motors ➤ Ensure proper mechanical locking of vibrator
● Super-structure	➤ Same as above plus ➤ Deflection in props or shuttering material	➤ Shuttering/props may collapse and prove fatal	➤ Avoid excessive stacking on shuttering material ➤ Check the design and strength of shuttering material before commencement of work ➤ Rectify immediately the deflection noted during concreting.
	➤ Passage to work place	➤ Improperly tied and designed props/planks may collapse	➤ Ensure the stability and strength of passage before commencement of work. ➤ Do not overload and stand under the passage.
(C) REINFOR-CEMENT	➤ Curtailment and binding of rods	➤ Persons may get injured	➤ Use PPE like gloves, shoes, helmets, etc. ➤ Avoid usage of shift tools
	➤ Carrying of rods for short distances/at heights	➤ Workers may get injured their hands and shoulders.	➤ Provide suitable pads on shoulders and use safety gloves. ➤ Tie up rods in easily liftable bundles ➤ Ensure proper staging.
	➤ Checking of clear distance/ cover with hands	➤ Rods may cut or injure the fingers	➤ Use measuring devices like tape, measuring rods, etc.
	➤ Hitting projected rods and standing on cantilever rods.	➤ Persons may get injured and fell down	➤ Use safety shoes and avoid standing unnecessarily on cantilever rods ➤ Avoid wearing of loose clothes

**APPENDIX-E : (Sheet 4 of 12)**

**CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)**

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	<ul style="list-style-type: none"> <li>➤ Falling of material from height</li> </ul>	<ul style="list-style-type: none"> <li>➤ May prove fatal</li> </ul>	<ul style="list-style-type: none"> <li>➤ Use helmets</li> <li>➤ Provide safety nets</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Transportation of rods by trucks/trailers</li> </ul>	<ul style="list-style-type: none"> <li>➤ Protruded rods may hit the persons</li> </ul>	<ul style="list-style-type: none"> <li>➤ Use red flags/lights at the ends</li> <li>➤ Do not protrude the rods in front of or by the side of driver's cabin.</li> <li>➤ Do not extend the rods 1/3<sup>rd</sup> of deck length or 1.5m whichever is less</li> </ul>
(D) WELDING AND GAS CUTTING	<ul style="list-style-type: none"> <li>➤ Welding radiates invisible ultraviolet and infra-red rays</li> </ul>	<ul style="list-style-type: none"> <li>➤ Radiation can damage eyes and skin.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Use specified shielding devices and other PPE of correct specifications.</li> <li>➤ Avoid thoriated tungsten electrodes for GTAW</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Improper placement of oxygen and acetylene cylinders</li> </ul>	<ul style="list-style-type: none"> <li>➤ Explosion may occur</li> </ul>	<ul style="list-style-type: none"> <li>➤ Move out any leaking cylinder</li> <li>➤ Keep cylinders in vertical position</li> <li>➤ Use trolley for transportation of cylinders and chain them</li> <li>➤ Use flashback arrestors</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Leakage/cuts in hoses</li> </ul>	<ul style="list-style-type: none"> <li>➤ May cause fire</li> </ul>	<ul style="list-style-type: none"> <li>➤ Purge regulators immediately and then turn off</li> <li>➤ Never use grease or oil on oxygen line connections and copper fittings on acetylene lines</li> <li>➤ Inspect regularly gas carrying hoses</li> <li>➤ Always use red hose for acetylene &amp; other fuel gases and black for oxygen</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Opening-up of cylinder</li> </ul>	<ul style="list-style-type: none"> <li>➤ Cylinder may burst</li> </ul>	<ul style="list-style-type: none"> <li>➤ Always stand back from the regulator while opening the cylinder</li> <li>➤ Turn valve slowly to avoid bursting</li> <li>➤ Cover the lug terminals to prevent short circuiting</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Welding of tanks, container or pipes storing flammable liquids</li> </ul>	<ul style="list-style-type: none"> <li>➤ Explosion may occur</li> </ul>	<ul style="list-style-type: none"> <li>➤ Empty &amp; purge them before welding</li> <li>➤ Never attach the ground cable to tanks, container or pipe storing flammable liquids</li> <li>➤ Never use LPG for gas cutting</li> </ul>

**APPENDIX-E : (Sheet 5 of 12)**  
**CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES ... (Contd.)**

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(E) RADIOGRAPHY	➤ Ionizing radiation	➤ Radiations may react with the skin and can cause cancer, skin irritation, dermatitis, etc.	<ul style="list-style-type: none"> <li>➤ Ensure Safety regulations as per BARC/AERB before commencement of job.</li> <li>➤ Cordon off the area and install Radiation warning symbols</li> <li>➤ Restrict the entry of unauthorized persons</li> <li>➤ Wear appropriate PPE and film badges issued by BARC/AERB</li> </ul>
	➤ Transportation and Storage of Radiography source	➤ Same as above	<ul style="list-style-type: none"> <li>➤ Never touch or handle radiography source with hands</li> <li>➤ Store radiography source inside a pit in an exclusive isolated storage room with lock and key arrangement. The pit should be approved by BARC/AERB.</li> <li>➤ Radiography source should never be carried either in passenger bus or in a passenger compartment of trains.</li> <li>➤ BARC/AERB have to be informed before source movement.</li> <li>➤ Permission from Director General of Civil Aviation is required for booking radio isotopes with airlines.</li> </ul>
	➤ Loss of Radio isotope	➤ Same as above	<ul style="list-style-type: none"> <li>➤ Try to locate with the help of Survey Meter.</li> <li>➤ Inform BARC/AERB (*)</li> </ul>
(F) ELECTRICAL INSTALLATION AND USAGE	➤ Short circuiting	➤ Can cause Electrocutation or Fire	<ul style="list-style-type: none"> <li>➤ Use rubberized hand gloves and other PPE</li> <li>➤ Don't lay wires under carpets, mats or door ways.</li> <li>➤ Allow only licensed electricians to perform on electrical facilities</li> <li>➤ Use one socket for one appliance</li> <li>➤ Ensure usage of only fully insulated wires or cables</li> <li>➤ Don't place bare wire ends in a socket</li> <li>➤ Ensure earthing of machineries and equipments</li> <li>➤ Do not use damaged cords and avoid temporary connections</li> <li>➤ Use spark-proof/flame proof type field distribution boxes.</li> </ul>

(\*) Atomic Energy Regulatory Board (AERB),  
Bhabha Atomic Research Centre (BARC)  
Anushaktinagar, Mumbai – 400 094

**APPENDIX-E : (Sheet 6 of 12)**

**CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)**

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	<ul style="list-style-type: none"> <li>➤ Overloading of Electrical System</li> </ul>	<ul style="list-style-type: none"> <li>➤ Bursting of system can occur which leads to fire</li> </ul>	<ul style="list-style-type: none"> <li>➤ Do not allow open/bare connections</li> <li>➤ Provide all connections through ELCB</li> <li>➤ Protect electrical cables/equipment's from water and naked flames</li> <li>➤ Check all connections before energizing</li> <li>➤ Display voltage and current ratings prominently with 'Danger' signs.</li> <li>➤ Ensure approved cable size, voltage grade and type</li> <li>➤ Switch off the electrical utilities when not in use</li> <li>➤ Do not allow unauthorized connections.</li> <li>➤ Ensure proper grid wise distribution of Power</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Improper laying of overhead and underground transmission lines/cables</li> </ul>	<ul style="list-style-type: none"> <li>➤ Can cause electrocution and prove fatal</li> </ul>	<ul style="list-style-type: none"> <li>➤ Do not lay unarmoured cable directly on ground, wall, roof of trees</li> <li>➤ Maintain atleast 3m distance from HT cables</li> <li>➤ All temporary cables should be laid atleast 750 mm below ground on 100 mm fine sand overlying by brick soling</li> <li>➤ Provide proper sleeves at crossings/ intersections</li> <li>➤ Provide cable route markers indicating the type and depth of cables at intervals not exceeding 30m and at the diversions/termination</li> </ul>
<p><b>(G) FIRE PREVENTION AND PROTECTION</b></p>	<ul style="list-style-type: none"> <li>➤ Small fires can become big ones and may spread to the surrounding areas</li> </ul>	<ul style="list-style-type: none"> <li>➤ Cause burn injuries and may prove fatal</li> </ul>	<ul style="list-style-type: none"> <li>➤ In case a fire breaks out, press fire alarm system and shout "Fire, Fire"</li> <li>➤ Keep buckets full of sand &amp; water/ fire extinguishing equipment near hazardous locations</li> <li>➤ Confine smoking to 'Smoking Zones' only.</li> <li>➤ Train people for using specific type of fire fighting equipments under different classes of fire</li> <li>➤ Keep fire doors/shutters, passages and exit doors unobstructed</li> <li>➤ Maintain good house keeping and first-aid boxes (for details refer Appendix-B)</li> <li>➤ Don't obstruct access to Fire extinguishers.</li> <li>➤ Do not use elevators for evacuation during fire.</li> <li>➤ Maintain lightning arrestors for elevated structures</li> <li>➤ Stop all electrical motors with internal combustion</li> </ul>



**APPENDIX-E : (Sheet 7 of 12)**

**CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)**

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			<ul style="list-style-type: none"> <li>➤ Move the vehicles from dangerous locations</li> <li>➤ Remove the load hanging from the crane booms</li> <li>➤ Remain out of the danger areas.</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Improper selection of Fire extinguisher</li> </ul>	<ul style="list-style-type: none"> <li>➤ It may not extinguish the fire</li> </ul>	<ul style="list-style-type: none"> <li>➤ Ensure usage of correct fire extinguisher meant for the specified fire (for details refer Appendix-C).</li> <li>➤ Do not attempt to extinguish Oil and electric fires with water. Use foam cylinders/CO<sub>2</sub>/sand or earth.</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Improper storage of highly inflammable substances</li> </ul>	<ul style="list-style-type: none"> <li>➤ Same as above</li> </ul>	<ul style="list-style-type: none"> <li>➤ Maintain safe distance of flammable substances from source of ignition</li> <li>➤ Restrict the distribution of flammable materials to only min. necessary amount</li> <li>➤ Construct specifically designed fuel storage facilities</li> <li>➤ Keep chemicals in cool and dry place away from heat. Ensure adequate ventilation</li> <li>➤ Before welding operation, remove or shield the flammable material properly</li> <li>➤ Store flammable materials in stable racks, correctly labeled preferably with catchment trays.</li> <li>➤ Wipe off the spills immediately</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Short circuiting of electrical system</li> </ul>	<ul style="list-style-type: none"> <li>➤ Same as above</li> <li>➤ Can cause Electrocutation</li> </ul>	<ul style="list-style-type: none"> <li>➤ Don't lay wires under carpets, mats or door ways</li> <li>➤ Use one socket for one appliance.</li> <li>➤ Use only fully insulated wires or cables</li> <li>➤ Do not allow open/bare connections</li> <li>➤ Provide all connections through ELCB</li> <li>➤ Ensure earthing of machinaries and equipments</li> </ul>
(H) VEHICULAR MOVEMENT	<ul style="list-style-type: none"> <li>➤ Crossing the Speed Limits (Rash driving)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Personal injury</li> </ul>	<ul style="list-style-type: none"> <li>➤ Obey speed limits and traffic rules strictly</li> <li>➤ Always expect the unexpected and be a defensive driver</li> <li>➤ Use seat belts/helmets</li> <li>➤ Blow horn at intersections and during overtaking operations.</li> <li>➤ Maintain the vehicle in good condition</li> <li>➤ Do not overtake on curves, bridges and slopes</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Adverse weather condition</li> </ul>	<ul style="list-style-type: none"> <li>➤ Same as Above</li> </ul>	<ul style="list-style-type: none"> <li>➤ Read the road ahead and ride to the left</li> <li>➤ Keep the wind screen and lights clean</li> <li>➤ Do not turn at speed.</li> <li>➤ Recognize the hazard, understand the defense and act correctly in time.</li> </ul>

**APPENDIX-E : (Sheet 8 of 12)**

**CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)**

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	<ul style="list-style-type: none"> <li>➤ Consuming alcohol before and during the driving operation</li> </ul>	<ul style="list-style-type: none"> <li>➤ Same as above</li> </ul>	<ul style="list-style-type: none"> <li>➤ Alcohol and driving do not mix well. Either choose alcohol or driving.</li> <li>➤ If you have a choice between hitting a fixed object or an on-coming vehicle, hit the fixed object</li> <li>➤ Quit the steering at once and become a passenger. Otherwise take sufficient rest and then drive.</li> <li>➤ Do not force the driver to drive fast and round the clock.</li> <li>➤ Do not day dream while driving</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Falling objects/ Mechanical failure</li> </ul>	<ul style="list-style-type: none"> <li>➤ May prove fatal</li> </ul>	<ul style="list-style-type: none"> <li>➤ Ensure effective braking system, adequate visibility for the drives, reverse warning alarm..</li> <li>➤ Proper maintenance of the vehicle as per manufacturer instructions</li> </ul>
(I) PROOF TESTING (HYDROSTATIC /PNEUMATIC TESTING)	<ul style="list-style-type: none"> <li>➤ Bursting of piping</li> <li>➤ Collapse of tanks</li> <li>➤ Tanks flying off</li> </ul>	<ul style="list-style-type: none"> <li>➤ May cause injury and prove fatal</li> </ul>	<ul style="list-style-type: none"> <li>➤ Prepare test procedure &amp; obtain EIL/owner's approval</li> <li>➤ Provide separate gauge for pressurizing pump and piping/equipment</li> <li>➤ Check the calibration status of all pressure gauges, dead weight testers and temperature recorders</li> <li>➤ Take dial readings at suitable defined intervals and ensure most of them fall between 40-60% of the gauge scale range</li> <li>➤ Provide safety relief valve (set at pressure slightly higher than test pressure) while testing with air/ nitrogen</li> <li>➤ Ensure necessary precautions, stepwise increase in pressure, tightening of bolts/nuts, grouting, etc. before and during testing</li> <li>➤ Keep the vents open before opening any valve while draining out of water used for hydrotesting of tanks.</li> <li>➤ Pneumatic testing involves the hazard of released energy stored in compressed gas. Specific care must therefore be taken to minimize the chance of brittle failure during a pneumatic leak test. Test temperature is important in this regard and must be considered when the designer chooses the material of construction.</li> </ul>

APPENDIX-E : (Sheet 9 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			<p>A pressure relief device shall be provided, having a set pressure not higher than the test pressure plus the lesser of 345 KPa (50 psi) or 10% of the test pressure.</p> <p>The gas used as test fluid, if not air, shall be nonflammable and nontoxic.</p>
(J) WORKING AT HEIGHTS	➤ Person can fall down	➤ May sustain severe injuries or prove fatal	<ul style="list-style-type: none"> <li>➤ Provide guard rails/barricade at the work place</li> <li>➤ Use PPE like full body harness, life line, helmets, safety shoes, etc.</li> <li>➤ Obtain a permit before starting the work at height above 3 meters</li> <li>➤ Fall arrest and safety nets, etc. must be installed</li> <li>➤ Provide adequate working space (min. 0.6 m)</li> <li>➤ Tie/weld working platform with fixed support</li> <li>➤ Use roof top walk ladder while working on a slopping roofs</li> <li>➤ Avoid movement on beams</li> </ul>
		➤ May hit the scrap/material stacked at the ground or in between	<ul style="list-style-type: none"> <li>➤ Keep the work place neat and clean</li> <li>➤ Remove the scrap immediately</li> </ul>
	➤ Material can fall down	➤ May hit the workers working at lower levels and prove fatal	<ul style="list-style-type: none"> <li>➤ Same as above plus</li> <li>➤ Do not throw or drop materials or equipment from height. I.e. do not <i>bomb</i> materials</li> <li>➤ All tools to be carried in a tool-kit Bag or on working uniform</li> <li>➤ Remove scrap from the planks</li> <li>➤ Ensure wearing of helmet by the workers working at lower levels</li> </ul>
(K) CONFINED SPACES	➤ Suffocation/drowning	➤ Unconsciousness, death	<ul style="list-style-type: none"> <li>➤ Use respiratory devices, if reqd.</li> <li>➤ Avoid over crowding inside a confined space</li> <li>➤ Provide Exhaust fans for ventilation</li> <li>➤ Do not wear loose clothes, neck ties, etc</li> <li>➤ Fulfill conditions of the permit</li> </ul>



APPENDIX-E : (Sheet 10 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			<ul style="list-style-type: none"> <li>➤ Check for presence of hydrocarbons, O<sub>2</sub> level</li> <li>➤ Obtain work permit before entering a confined space</li> <li>➤ Ensure that the connected piping of the equipment which is to be opened is pressure free, fluid has been drained, vents are open and piping is positively isolated by a blind flange</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Presence of foul smell and toxic substances</li> </ul>	<ul style="list-style-type: none"> <li>➤ Inhalation can pose threat to life</li> </ul>	<ul style="list-style-type: none"> <li>➤ Same as above plus</li> <li>➤ Check for hydrocarbon and Aromatic compounds before entering a confined space</li> <li>➤ Depute one person outside the confined space for continuous monitoring and for extending help in case of an emergency</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Ignition/ flame can cause fire</li> </ul>	<ul style="list-style-type: none"> <li>➤ Person may sustain burn injuries or explosion may occur</li> </ul>	<ul style="list-style-type: none"> <li>➤ Keep fire extinguishers at a hand distance</li> <li>➤ Remove surplus material and scrap immediately</li> <li>➤ Do not smoke inside a confined space</li> <li>➤ Do not allow gas cylinders inside a confined space</li> <li>➤ Use low voltage (24V) lamps for lighting</li> <li>➤ Use tools with air motors or electric tools with max. voltage of 24V</li> <li>➤ Remove all equipments at the end of the day</li> </ul>
(L) HANDLING AND LIFTING EQUIPMENTS	<ul style="list-style-type: none"> <li>➤ Failure of load lifting and moving equipments</li> </ul>	<ul style="list-style-type: none"> <li>➤ Can cause accident and prove fatal</li> </ul>	<ul style="list-style-type: none"> <li>➤ Avoid standing under the lifted load and within the operating radius of cranes</li> <li>➤ Check periodically oil, brakes, gears, horns and tyre pressure of all moving machinery</li> <li>➤ Check quality, size and condition of all chain pulley blocks, slings, U-clamps, D-shackles, wire ropes, etc.</li> <li>➤ Allow crane to move only on hard, firm and leveled ground.</li> <li>➤ Allow lifting slings as short as possible and check gunny packings at the friction points</li> <li>➤ Do not allow crane to tilt its boom while moving</li> <li>➤ Install Safe Load Indicator</li> <li>➤ Ensure certification by applicable authority</li> </ul>

**APPENDIX-E : (Sheet 11 of 12)**

**CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)**

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	<ul style="list-style-type: none"> <li>➤ Overloading of lifting equipments</li> </ul>	<ul style="list-style-type: none"> <li>➤ Same as above</li> </ul>	<ul style="list-style-type: none"> <li>➤ Safe lifting capacity of derricks and winches written on them shall be got verified</li> <li>➤ The max. safe working load shall be marked on all lifting equipments</li> <li>➤ Check the weight of columns and other heavy items painted on them and accordingly decide about the crane capacity, boom and angle of erection</li> <li>➤ Allow only trained operators and riggers during crane operation.</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Overhead electrical wires</li> </ul>	<ul style="list-style-type: none"> <li>➤ Can cause electrocution and fire</li> </ul>	<ul style="list-style-type: none"> <li>➤ Do not allow boom or other parts of crane to come within 3m reach of overhead HT cables</li> <li>➤ Hook and load being lifted shall preferably remain in full visibility of crane operators.</li> </ul>
(M) SCAFFOLDING, FORMWORK AND LADDERS	<ul style="list-style-type: none"> <li>➤ Person can fall down</li> </ul>	<ul style="list-style-type: none"> <li>➤ Person May sustain severe injuries and prove fatal</li> </ul>	<ul style="list-style-type: none"> <li>➤ Provide guard rails for working at height</li> <li>➤ Face ladder while climbing and use both hands.</li> <li>➤ Ladders shall extend about 1m above landing for easy access and tying up purpose</li> <li>➤ Do not place ladders against movable objects and maintain base at 1/4 unit of the working length of the ladder.</li> <li>➤ Suspended scaffolds shall not be less than 500 mm wide and tied properly with ropes</li> <li>➤ No loose planks shall be allowed</li> <li>➤ Use PPE, like helmets, safety shoes, Etc</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Failure of scaffolding material</li> </ul>	<ul style="list-style-type: none"> <li>➤ Same as above</li> </ul>	<ul style="list-style-type: none"> <li>➤ Inspect visually all scaffolding materials for stability and anchoring with permanent structures.</li> <li>➤ Design scaffolding for max. load carrying capacity.</li> <li>➤ Scaffolding planks shall not be less than 50X250 mm full thickness lumber or equivalent. These shall be cleated or secured and must extend over the end supports by atleast 150mm and not more than 300mm</li> <li>➤ Don't overload the scaffolds</li> <li>➤ Do not splice short ladders to make a longer one. Vertical ladders shall not exceed 6m.</li> </ul>
	<ul style="list-style-type: none"> <li>➤ Material can fall down</li> </ul>	<ul style="list-style-type: none"> <li>➤ Persons working at lower level gets injured</li> </ul>	<ul style="list-style-type: none"> <li>➤ Remove excess material and scrap immediately</li> <li>➤ Carry the tools in a tool-kit bag only</li> <li>➤ Provide safety nets</li> </ul>

APPENDIX-E : (Sheet 12 of 12)

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES (...Contd.)

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(N) STRUCTURAL WORKS	➤ Personal negligence and danger of fall	➤ Can cause injury or casualty	<ul style="list-style-type: none"> <li>➤ Do not take rest inside rooms built for welding machines or electrical distribution system.</li> <li>➤ Avoid walking on beams at height</li> <li>➤ <i>Wear helmet with chin strap and full body harness while working at height.</i></li> <li>➤ Use hand gloves and goggles during grinding operations</li> <li>➤ Cover or mark the sharp and projected edges</li> <li>➤ Do not stand within the operating radius of cranes</li> </ul>
	➤ Lifting/ slipping of material	➤ Same as above	<ul style="list-style-type: none"> <li>➤ Do not stand under the lifted load</li> <li>➤ Stack properly all the materials. Avoid slippage during handling</li> <li>➤ Control longer pieces lifted up by cranes from both ends</li> <li>➤ Remove loose materials from height</li> <li>➤ Ensure tightening of all nuts &amp; bolts</li> </ul>
(O) PIPELINE WORKS	➤ Erection/ lowering failure	➤ Can cause injury	<ul style="list-style-type: none"> <li>➤ Do not stand under the lifted load</li> <li>➤ Do not allow any person to come within the radii of the side boom handling pipes</li> <li>➤ Check the load carrying capacity of the lifting tools &amp; tackles</li> <li>➤ Use safe Load Indicators</li> <li>➤ Use appropriate PPEs</li> </ul>
	➤ Other	➤ Same as above	<ul style="list-style-type: none"> <li>➤ Wear gum boots in marshy areas</li> <li>➤ Allow only one person to perform signaling operations while lowering of pipes</li> <li>➤ Provide night caps on pipes</li> <li>➤ Provide end covers on pipes for stoppage of pigs while testing/ cleaning operations</li> </ul>



**FORMAT NO. : HSE-1 REV 0**  
**HSE CHECKILIST CUM COMPLIANCE REPORT**

(Sheet 1 of 6)

PROJECT : \_\_\_\_\_ REPORT NO. : \_\_\_\_\_  
 DATE : \_\_\_\_\_ CONTRACTOR : \_\_\_\_\_  
 INSPECTION BY : \_\_\_\_\_ OWNER : \_\_\_\_\_  
 FREQUENCY : FORTNIGHTLY JOB NO. : \_\_\_\_\_

Note : Write 'NA' wherever the item is not applicable

SL. NO.	ITEM	YES	NO	REMARKS	ACTION
<b>1.</b>	<b>HOUSEKEEPING</b>				
a)	Waste containers provided and used				
b)	Sanitary facilities adequate and Clean				
c)	Passageways and Walkways Clear				
d)	General neatness of working areas				
e)	Other				
<b>2.</b>	<b>PERSONNEL PROTECTIVE EQUIPMENT</b>				
a)	Goggles; Shields				
b)	Face protection				
c)	Hearing protection				
d)	Foot protection				
e)	Hand protection				
f)	Respiratory Masks etc.				
g)	Full body harness conforming to CC, EN 361				
h)	Hard hat (HDPE)				
i)	Other				
<b>3.</b>	<b>EXCAVATIONS/OPENINGS</b>				
a)	Openings properly covered or barricaded				
b)	Excavations shored				
c)	Excavations barricaded				
d)	Overnight lighting provided				
	Other				

FORMAT NO.:HSE-1 REV 0  
(Sheet 2 of 6)

	ITEM	YES	NO	REMARKS	ACTION
4.	<b>WELDING &amp; GAS CUTTING</b>				
a)	Gas cylinders chained upright				
b)	Cables and hoses not obstructing				
c)	Screens or shields used				
d)	Flammable materials protected				
e)	Live electrode bits contained properly				
f)	Fire extinguisher (s) accessible				
g)	Other				
5.	<b>SCAFFOLDING &amp; BARRICADING</b>				
a)	Fully decked platforms				
b)	Guard and intermediate rails in place				
c)	Toe boards in place				
d)	Adequate shoring				
e)	Adequate access				
f)	Positive barricading for critical activities				
g)	Installation of warning signs				
h)	Other				
6.	<b>LADDERS</b>				
a)	Extension side rails 1 m above				
b)	Top of landing				
c)	Properly secured				
d)	Angle + 70° from horizontal				
e)	Other				



FORMAT NO.:HSE-1 REV 0  
(Sheet 3 of 6)

	ITEM	YES	NO	REMARKS	ACTION
7.	<b>HOISTS, CRANES AND DERRICKS</b>				
a)	Condition of cables and sheaves OK				
b)	Condition of slings, chains, hooks and eyes O.K.				
c)	Inspection and maintenance logs maintained				
d)	Outriggers used				
e)	Signs/barricades provided				
f)	Signals observed and understood				
g)	Qualified operators				
h)	Other				
8.	<b>MACHINERY, TOOLS AND EQUIPMENT</b>				
a)	Proper instruction				
b)	Safety devices				
c)	Proper cords				
d)	Inspection and maintenance				
e)	Other				
9.	<b>VEHICLE AND TRAFFIC</b>				
a)	Rules and regulations observed				
b)	Inspection and maintenance				
c)	Licensed drivers				
d)	Other				

FORMAT NO.:HSE-1 REV 0  
(Sheet 4 of 6)

	ITEM	YES	NO	REMARKS	ACTION
10.	<b>TEMPORARY FACILITIES</b>				
a)	Emergency instructions posted				
b)	Fire extinguishers provided				
c)	Fire-aid equipment available				
d)	Secured against storm damage				
e)	General neatness				
f)	In accordance with electrical requirements				
g)	Other				
11.	<b>FIRE PREVENTION</b>				
a)	Personnel instructed				
b)	Fire extinguishers checked				
c)	No smoking in Prohibited areas.				
d)	Hydrants Clear				
e)	Other				
12.	<b>ELECTRICAL</b>				
a)	Use of 3-core armored cables				
b)	Usage of 'All insulated' or 'double-insulated' electrical tools				
c)	All electrical connection are routed through ELCB				
d)	Natural Earthing at the source of power (Main DB)				
e)	Continuity and tightness of earth conductor				
f)	Covering of junction boxes, panels and other energized wiring places				
g)	Ground fault circuit interrupters provided				
h)	Prevention of tripping hazards				
f)	Other				

**FORMAT NO.:HSE-1 REV 0  
 (Sheet 5 of 6)**

	ITEM	YES	NO	REMARKS	ACTION
<b>14.</b>	<b>HANDLING AND STORAGE OF MATERIALS</b>				
a)	Properly stored or stacked				
b)	Passageways clear				
c)	Other				
<b>15.</b>	<b>FLAMMABLE GASES AND LIQUIDS</b>				
a)	Containers clearly identified				
b)	Proper storage				
c)	Fire extinguishers nearby				
d)	Other				
<b>16.</b>	<b>WORKING AT HEIGHT</b>				
a)	Erection plan and work permit obtained				
b)	Safety nets				
c)	Full body harness and lanyards; chute lines				
d)	Health Check record available for workers going up?				
e)	Other				
<b>17.</b>	<b>CONFINED SPACE</b>				
a)	Work Permit obtained				
b)	Test for toxic gas and sufficient availability of oxygen conducted				
c)	Atleast one person outside the confined space for monitoring deputed				
d)	Availability of sufficient means of entry, exit and ventilation				
e)	Fire extinguisher and first-aid facility ensured				
f)	Lighting provision made by using 24V Lamp				
g)	Proper usage of PPEs ensured				
<b>18.</b>	<b>RADIOGRAPHY</b>				
a)	Proper storage and handling of source as per BARC/ AERB guidelines				
b)	Work permit obtained				

**FORMAT NO.:HSE-1 REV 0**  
**(Sheet 6 of 6)**

	ITEM	YES	NO	REMARKS	ACTION
c)	Cordoning of the area done				
d)	Use of appropriate PPE's ensured				
e)	Proper training to workers/supervisors imparted				
f)	Minimum occupancy of workplace ensured				
<b>19.</b>	<b>HEALTH CHECKS</b>				
a)	Workers medically examined and found be fit for working i) at heights ii) in confined space				
b)	Availability of First Aid facilities.				
c)	Proper sanitation at site, office and labour camps				
d)	Arrangement of medical facilities.				
e)	Measures for dealing with illness.				
f)	Availability of Potable drinking water for workmen & staff.				
g)	Provision of crèches for children.				
h)	Stand by vehicle available for evacuation of injured				
<b>20.</b>	<b>ENVIRONMENT</b>				
a)	Chemical and Other Effluents properly disposed				
b)	Cleaning liquid of pipes disposed off properly				
c)	Seawater used for hydro-testing disposed off as per agreed procedure				
d)	Lubricant Waste/Engine oils properly disposed				
e)	Waste from Canteen, offices, sanitation etc disposed properly				
f)	Disposal of surplus earth, stripping materials, Oily rags and combustible materials done properly				
g)	Green belt protection				

\_\_\_\_\_  
Signature of Resident  
Engr. With Seal

FORMAT NO. : HSE-2 REV 0  
ACCIDENT/INCIDENT REPORT

(To be submitted by contractor after every Accident/ Incident within 24 hours)

Report No.: \_\_\_\_\_

Name of Site: \_\_\_\_\_

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

Name of work: \_\_\_\_\_

Contractor: \_\_\_\_\_

Type of Accident/ Incident:  Fatal  Other Lost Time  Non Loss Time  First-Aid case

-----  
Name of the injured :

Age :

Father's name :

Sub-contractor M/s :

Date & time of Accident/ Incident :

Location :

-----  
Brief description of Accident/ Incident

-----  
Cause of Accident/ Incident

-----  
Nature of injury/damage

-----  
Medical Aid provided/actions taken

-----  
Intimation to local authorities (if applicable)

Signature of contractor  
with seal

To : Owner  
: RCM/Site-in-charge EIL (3 copies)

└─> Divisional Head (Constn) through RCM  
└─> Project Manager EIL, through RCM

FORMAT NO. : HSE-3 REV 0  
SUPPLEMENTARY ACCIDENT/  
INCIDENT INVESTIGATION REPORT

Supplementary to Report No: \_\_\_\_\_ (Copy enclosed)

Project : \_\_\_\_\_ Site : \_\_\_\_\_

Name of work : \_\_\_\_\_ Dated : \_\_\_\_\_

Contractor : \_\_\_\_\_ Work Order/LOI No. \_\_\_\_\_

Name of the Injured : \_\_\_\_\_ Age : \_\_\_\_\_

Sub-Contractor M/s : \_\_\_\_\_

Date & Time of Accident/ Incident : \_\_\_\_\_ Location : \_\_\_\_\_

Brief Description & Cause of Accident/ Incident

Nature of Injury/Damage

Comments of Medical Practitioner, who attended the victim/injured

Suggested improvement in the working condition, if any

Loss of man days and impact on site works

Any other comment by Safety Officer

Signature of Contractor  
with Seal

To : Owner  
: RCM/Site-in-charge EIL (3 copies)

└─> Divisional Head (Constn) through RCM  
└─> Project Manager EIL, through RCM



FORMAT NO. : HSE-4 REV 0  
NEAR MISS INCIDENT – SUGGESTED PROFORMA

Report No.: \_\_\_\_\_

Name of Site: \_\_\_\_\_

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

Name of work: \_\_\_\_\_

Contractor: \_\_\_\_\_

Incident reported by :

Date & Time of Incident :

Location :

Brief description of incident

Probable cause of incident

Suggested corrective action

Steps taken to avoid recurrence

Yes

No

Signature of Contractor  
with seal

To : Owner  
: RCM/Site-in-charge EIL (3 copies)

↳ Divisional Head (Constn) through RCM  
↳ Project Manager EIL, through RCM

**FORMAT NO. : HSE-5 REV 0**  
**MONTHLY HEALTH, SAFETY & ENVIRONMENT (HSE) REPORT**  
**(To be submitted by each Contractor)**

Actual work start Date : \_\_\_\_\_ For the Month of : \_\_\_\_\_  
Project : \_\_\_\_\_ Report No : \_\_\_\_\_  
Name of the Contractor : \_\_\_\_\_ Status as on : \_\_\_\_\_  
Name of Work : \_\_\_\_\_ Job No : \_\_\_\_\_

(Wherever web based package is available, the contractor shall feed the record in that)

ITEM	UPTO PREVIOUS MONTH	THIS MONTH	CUMULATIVE
1) Average number of Staff & Workmen (average daily headcount, not man days)			
2) Manhours worked			
3) Number of Induction programmes conducted			
4) Number of HSE meetings organized at site			
5) Number of HSE awareness programmes conducted at site			
6) Number of Tool Box Meetings conducted			
7) Number of Lost Time Accidents (LTA)	Fatal		
	Other LTA		
8) Number of Loss Time Injuries (LTI)	Fatalities		
	Other LTI		
9) Number of Non-Loss Time Accidents			
10) Number of First Aid Cases			
11) Number of Near Miss Incidents			
12) No. of unsafe acts/ practices detected			
13) No. of disciplinary actions taken against staff/ workmen			
14) Man-days lost due to accidents			
15) LTA Free Manhours i.e. Number of LTA free manhours from the Last LTA			
16) Frequency Rate (No. of LTA per 2 lacs manhours worked)			
17) Severity Rate (No. of man days lost per 2 lacs manhours worked)			
18) Loss Time Injury Frequency (No. of LTI per 2 lacs manhours worked)			
19) No. of activities for which Job Safety Analysis (JSA) completed			
20) No. of incentives/ awards given			
21) No. of occasions on which penalty imposed by EIL/ Owner			
22) No. of Audits conducted			
23) No. of pending NCs in above Audits			
24) Compensation cases raised with Insurance			
25) Compensation cases resolved and paid to workmen			
26) Whether workmen compensation policy taken		Yes	No
27) Whether workmen compensation policy is valid		Yes	No
28) Whether workmen registered under ESI Act, as applicable		Yes	No
Remarks, if any			

Date :

**Safety Officer/Resident Engineer**  
**(Signature and Name)**

To : - OWNER  
- RCM EIL (2 copies)



FORMAT NO. : HSE-6 REV 0  
PERMIT FOR WORKING AT HEIGHT (ABOVE 2 METER)

(Sheet 1 of 2)

Project site \_\_\_\_\_ Sr.No. \_\_\_\_\_  
Name of the work \_\_\_\_\_ Date \_\_\_\_\_  
Name of Contractor \_\_\_\_\_ Nature of work \_\_\_\_\_  
Total No. of workers \_\_\_\_\_ Exact location of work \_\_\_\_\_  
Duration of work: from \_\_\_\_\_ to \_\_\_\_\_

The following items have been checked and compliance shall be ensured during the currency of the permit:

SL. No.	ITEM	DONE	NOT REQD.
1.	Equipment/Work Area inspected	<input type="checkbox"/>	<input type="checkbox"/>
2.	Considered hazard from other routine/non-routine operations and concerned person alerted	<input type="checkbox"/>	<input type="checkbox"/>
3.	ELCB provided	<input type="checkbox"/>	<input type="checkbox"/>
4.	Proper lighting provided	<input type="checkbox"/>	<input type="checkbox"/>
5.	Area cordoned off.	<input type="checkbox"/>	<input type="checkbox"/>
6.	Precautions against public traffic taken	<input type="checkbox"/>	<input type="checkbox"/>
7.	Sound Scaffolding provided	<input type="checkbox"/>	<input type="checkbox"/>
8.	Adequate protected Platform provided	<input type="checkbox"/>	<input type="checkbox"/>
9.	Access and Exit to the area (Ladder properly fixed)	<input type="checkbox"/>	<input type="checkbox"/>
10.	Floor Openings covered	<input type="checkbox"/>	<input type="checkbox"/>
11.	Safety Net provided	<input type="checkbox"/>	<input type="checkbox"/>
12.	Health check of personnel	<input type="checkbox"/>	<input type="checkbox"/>

- A. Following personal protective equipment/measures are provided (✓ mark) and used as relevant: Hard hat /Gloves/Goggles/Shoes/Face Shield/Life line/Full body safety harness/ Roof top walk ladder/Any other(pl. specify)
- B. This permit shall be available at the work site at all times.
- C. Permit shall be issued for maximum one week only (Monday to Sunday)
- D. This permit shall be applicable in non-operational areas.
- E. After completion of the work, used permits shall be preserved for record purposes
- F. Additional precautions, if any \_\_\_\_\_

Permission is granted to work (See overleaf) = Yes/No

Name of Contractor's supervisor  
(Initiator)

Name of Contractor's Safety Officer  
(Issuing Authority)

**FORMAT NO. : HSE-6 REV 0**  
**(Sheet 2 of 2)**

**GRANT OF PERMIT AND EXTENSIONS**

Sl No.	Validity Period From _____ To _____	Work Time From _____ Hrs. To _____ Hrs	Initiator (Supervisor of Contractor)	Issuing Authority (Safety Officer) of Contractor	Verification by EIL with date

Additional safety instructions, if any:-

FORMAT NO. : HSE-7 REV 0  
**CONFINED SPACE ENTRY PERMIT**

Project site \_\_\_\_\_ Sr.No. \_\_\_\_\_  
 Name of the work \_\_\_\_\_ Date \_\_\_\_\_  
 Name of Contractor \_\_\_\_\_ Nature of work \_\_\_\_\_  
 Exact location of work \_\_\_\_\_

**Safety Requirements POSITIVE ISOLATION OF THE VESSEL IS MANDATORY**

**(A) Has the equipment been ?**

Y	NR		Y	NR		Y	NR	
<input type="checkbox"/>	<input type="checkbox"/>	isolated from power/steam/air	<input type="checkbox"/>	<input type="checkbox"/>	water flushed &/or steamed	<input type="checkbox"/>	<input type="checkbox"/>	radiation sources removed
<input type="checkbox"/>	<input type="checkbox"/>	isolated from liquid or gases	<input type="checkbox"/>	<input type="checkbox"/>	Manways open & ventilated	<input type="checkbox"/>	<input type="checkbox"/>	proper lighting provided
<input type="checkbox"/>	<input type="checkbox"/>	depressurized &/or drained	<input type="checkbox"/>	<input type="checkbox"/>	cont. inert gas flow arranged	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	blanked/ blinded/ disconnected	<input type="checkbox"/>	<input type="checkbox"/>	adequately cooled	<input type="checkbox"/>	<input type="checkbox"/>	

**(B) Expected Residual Hazards**

<input type="checkbox"/>	<input type="checkbox"/>	lack of O <sub>2</sub>	<input type="checkbox"/>	<input type="checkbox"/>	combustible gas/ liquid	<input type="checkbox"/>	<input type="checkbox"/>	H <sub>2</sub> S / toxic gases
<input type="checkbox"/>	<input type="checkbox"/>	corrosive chemicals	<input type="checkbox"/>	<input type="checkbox"/>	pyrophoric iron / scales	<input type="checkbox"/>	<input type="checkbox"/>	electricity / static
<input type="checkbox"/>	<input type="checkbox"/>	heat/ steam / frost	<input type="checkbox"/>	<input type="checkbox"/>	high humidity	<input type="checkbox"/>	<input type="checkbox"/>	ionizing radiation
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	

**(C) Protection Measures**

<input type="checkbox"/>	<input type="checkbox"/>	gloves	<input type="checkbox"/>	<input type="checkbox"/>	ear plug / muff	<input type="checkbox"/>	<input type="checkbox"/>	goggles / face shield
<input type="checkbox"/>	<input type="checkbox"/>	protective clothing	<input type="checkbox"/>	<input type="checkbox"/>	dust / gas / air line mask	<input type="checkbox"/>	<input type="checkbox"/>	personal gas alarm
<input type="checkbox"/>	<input type="checkbox"/>	grounded air educter/blower /AC	<input type="checkbox"/>	<input type="checkbox"/>	attendant with SCBA/air mask	<input type="checkbox"/>	<input type="checkbox"/>	rescue equipment/team
<input type="checkbox"/>	<input type="checkbox"/>	Fire fighting arrangements	<input type="checkbox"/>	<input type="checkbox"/>	safety harness & lifeline	<input type="checkbox"/>	<input type="checkbox"/>	communication equipment
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	

**Authorization / Renewal (It is safe to enter the confined space)**

Date	No. of persons allowed	Name of persons allowed	Signature		Time		Signature
			Contractor's Supervisor	Contractor's Safety Officer	From	To	Workman

**Permit Closure :**

(A) Entry  was closed  stopped  will continue on ...

(B)  Site left in a safe condition  
 Housekeeping done

(C) Multilock  removed  key transferred  
 Ensured all men have come out  Manways barricaded

Remarks, if any:

FORMAT NO. : HSE-8 REV 0  
RADIATION WORK PERMIT

Project : Sr.No. :  
Name of the work : Date :  
Name of contractor : Job No. :

Location of work :

Source strength :

Cordoned distance (m) :

Name of Radiographing agency :

Approved by Owner/EIL

No. of workers engaged :

The following items have been checked & compliance shall be ensured during currency of the permit:

S. No.	Item description	Done
1.	Safety regulations as per BARC/AERB ensured while source in use/in transit & during storage	<input type="checkbox"/>
2.	Area cordoned off	<input type="checkbox"/>
3.	Lighting arrangements for working during nights ensured	<input type="checkbox"/>
4.	Warning signs/ flash lights installed	<input type="checkbox"/>
5.	Cold work permit taken (if applicable)	<input type="checkbox"/>
6.	PPEs like film badges, dosimeters used	<input type="checkbox"/>

Additional precautions, if any \_\_\_\_\_

(Radiography Agency's BARC/AERB authorized Supervisor)

(Contractor's Safety Officer)

**Permission is granted.**

Permit is valid from \_\_\_\_\_ AM/PM \_\_\_\_\_ Date to \_\_\_\_\_ AM/PM \_\_\_\_\_  
Date

(Signature of permit issuing authority)

Name : \_\_\_\_\_ Designation : \_\_\_\_\_ Date : \_\_\_\_\_

**Permit renewal :**

Permit extended upto		Additional precautions required, if any	Sign of issuing authority with date
Date	Time		

Work completed/ stopped/ area cleared at \_\_\_\_\_ Hrs of Date \_\_\_\_\_

(Sign. of permit issuing authority)

Name :

FORMAT NO. : HSE-9 REV 0  
DEMOLISHING/DISMANTLING WORK PERMIT

Project : Sr.No. :  
Name of the work : Date :  
Name of contractor : Job No.:

Name of sub-contractor : No. of workers to be engaged :

Line No./ Equipment No./ Structure to be dismantled :

Location details of dismantling/ demolition with sketch : (clearly indicate the area)

The following items have been checked & compliance shall be ensured during currency of the permit:

S. No.	Item description	Done	Not Applicable
1.	Services like power, gas supply, water, etc. disconnected	<input type="checkbox"/>	<input type="checkbox"/>
2.	Dismantling/ Demolishing method reviewed & approved	<input type="checkbox"/>	<input type="checkbox"/>
3.	Usage of appropriate PPEs ensured	<input type="checkbox"/>	<input type="checkbox"/>
4.	Precautions taken for neighbouring structures	<input type="checkbox"/>	<input type="checkbox"/>
5.	First-Aid arrangements made	<input type="checkbox"/>	<input type="checkbox"/>
6.	Fire fighting arrangements ensured	<input type="checkbox"/>	<input type="checkbox"/>
7.	Precautions taken for blasting	<input type="checkbox"/>	<input type="checkbox"/>

(Contractor's Supervisor)

(Contractor's Safety Officer)

Permission is granted.

(Permit issuing authority)

Name :  
Date :

Completion report :

Dismantling/ Demolishing is completed on \_\_\_\_\_ Date at \_\_\_\_\_ Hrs.

Materials/ debris transported to identified location  Tagging completed (as applicable)

Services like power, gas supply, water, etc. restored

(Permit issuing authority)

**SAFETY PRACTICES DURING CONSTRUCTION**

**OISD-GDN-192**

**Oil Industry Safety Directorate  
Government of India  
Ministry of Petroleum and Natural Gas**

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# SAFETY PRACTICES DURING CONSTRUCTION

## 1.0 INTRODUCTION

Safety in Construction Management deserves utmost attention especially in the hydrocarbon industry, such as Exploration, Refineries, Pipelines and Marketing installations, Gas Processing units etc. Construction is widely recognised as one of the accident prone activities. Most of the accidents are caused by inadequate planning, failure during the construction process and/or because of design deficiencies. Besides property loss, accidents also result in injuries and fatalities to the personnel; same needs to be prevented.

The reasons for accidents during construction activities are related to unique nature of the industry, human behaviour, difficult work-site conditions, extended odd duty hours, lack of training & awareness and inadequate safety management. Unsafe working methods, equipment failure and improper housekeeping also tend to increase the accident rate in construction.

Ensuring good quality of materials, equipment and competent supervision along with compliance of standard engineering practices shall go a long way to in built safety into the system.

The objective of this standard is to provide practical guidance on technical and educational framework for safety and health in construction with a view to:

- (a) prevent accidents and harmful effects on the health of workers arising from employment in construction;
- (b) ensure appropriate safety during implementation of construction;
- (c) provide safety practice guidelines for appropriate measures of planning, control and enforcement.

## 2.0 SCOPE

This document specifies broad guidelines on safe practices to be adhered to during construction activities in oil industry. However, before commencing any job, specific hazards and its effects should be assessed and necessary corrective/preventive actions should be taken by all concerned. The document is intended only to supplement and not to

replace or supersede the prevailing statutory requirements, which shall also be followed as applicable. For Personal Protective Equipment, OISD-STD-155 (Part I&II) shall be referred to. The scope of this document does not include the design aspects and quality checks during construction.

## 3.0 DEFINITIONS

Definitions of various terminology are given below:

- *Adequate, appropriate or suitable* are used to describe qualitatively or quantitatively the means or method used to protect the worker.
- *Brace*: A structural member that holds one point in a fixed position with respect to another point; bracing is a system of structural members designed to prevent distortion of a structure.
- *By hand*: The work is done without the help of a mechanised tool.
- *Competent Authority*: A statutory agency having the power to issue regulations, orders or other instructions having the force of law.
- *Competent person*: A person possessing adequate qualifications, such as suitable training and sufficient knowledge, experience and skill for the safe performance of the specific work. The competent authorities may define appropriate criteria for the designation of such persons and may determine the duties to be assigned to them.
- *Execution agency*:  
Any physical or legal person, having contractual obligation with the owner, and who employs one or more workers on a construction site
- *Owner*:  
Any physical or legal person for whom construction job is carried out.  
It shall also include owner's designated representative/consultant/nominee/agent , authorised from time to time to act for and on its behalf, for supervising/



coordinating the activities of the execution agency.

- *Hazard*: Danger or potential danger.
- *Guard-rail*: An adequately secured rail erected along an exposed edge to prevent persons from falling.
- *Hoist*: A machine, which lifts materials or persons by means of a platform, which runs on guides.
- *Lifting gear*: Any gear or tackle by means of which a load can be attached to a lifting appliance but which does not form an integral part of the appliance or load.
- *Lifting appliance*: Any stationary or mobile appliance used for raising or lowering persons or loads.
- *Means of access or egress*: Passageways, corridors, stairs, platforms, ladders and any other means for entering or leaving the workplace or for escaping in case of danger.
- *Scaffold*: Any fixed, suspended or mobile temporary structure supporting workers and material or to gain access to any such structure and which is not a lifting appliance as defined above.
- *Toe-board*: A barrier placed along the edge of a scaffold platform, runway, etc., and secured there to guard against the slipping of persons or the falling of material.
- *Worker*: Any person engaged in construction activity.
- *Workplace*: All places where workers need to be or to go by reason of their work.

#### 4.0 GENERAL DUTIES

##### 4.1 GENERAL DUTIES OF EXECUTION AGENCIES

###### 4.1.1 Execution agency should:

- i) provide means and organisation to comply with the safety and health measures required at the workplace.
- ii) provide and maintain workplaces, plant, equipment, tools and machinery and organise

construction work so that, there is no risk of accident or injury to health of workers. In particular, construction work should be planned, prepared and undertaken so that:

- (a) dangers, liable to arise at the workplace, are prevented;
  - (b) excessively or unnecessarily strenuous work positions and movements are avoided;
  - (c) organisation of work takes into account the safety and health of workers;
  - (d) materials and products used are suitable from a safety and health point of view;
  - (e) working methods are adopted to safeguard workers against the harmful effects of chemical, physical and biological agents.
- iii) establish committees with representatives of workers and management or make other arrangement for the participation of workers in ensuring safe working conditions.
  - iv) arrange for periodic safety inspections by competent persons of all buildings, plant, equipment, tools, machinery, workplaces and review of systems of work, regulations, standards or codes of practice. The competent person should examine and ascertain the safety of construction machinery and equipment.
  - v) provide such supervision to ensure that workers perform their work with due regard to safety and health of theirs as well as that of others.
  - vi) Employ only those workers who are qualified, trained and suited by their age, physique, state of health and skill.
  - vii) satisfy themselves that all workers are informed and instructed in the hazards connected with their work and environment and trained in the precautions necessary to avoid accidents and injury to health.
  - viii) Ensure that buildings, plant, equipment, tools, machinery or workplaces in which a dangerous defect has been found should not be used until the defect has been rectified.

- ix) Organise for and remain always prepared to take immediate steps to stop the operation and evacuate workers as appropriate, where there is an imminent danger to the safety of workers.
- x) establish a checking system by which it can be ascertained that all the members of a shift, including operators of mobile equipment, have returned to the camp or base at the close of work on dispersed sites and where small groups of workers operate in isolation.
- xi) provide appropriate first aid, training and welfare facilities to workers as per various statutes like the Factories Act, 1948 etc. and, whenever collective measures are not feasible or are insufficient, provide and maintain personal protective equipment and clothing in line with the requirement as per OISD-STD-155 (Vol. I & II) on Personnel Protective Equipment. They should also provide access to workers to occupational health services.
- xii) Educate workers about their right and the duty at any workplace to participate in ensuring safe working conditions to the extent of their control over the equipment and methods of work and to express views on working procedures adopted as may affect safety and health.
- xiii) Ensure that except in an emergency, workers, unless duly authorised, should not interfere with, remove, alter or displace any safety device or other appliance furnished for their protection or the protection of others, or interfere with any method or process adopted with a view to avoiding accidents and injury to health.
- xiv) Ensure that workers do not operate or interfere with plant and equipment that they have not been duly authorised to operate, maintain or use.
- xv) Ensure that workers do not sleep, rest or cook etc in dangerous places such as scaffolds, railway tracks, garages, confined spaces or in the vicinity of fires, dangerous or toxic substances, running machines or vehicles and heavy equipment etc.
- xvii) Obtain the necessary clearance/permits as required and specified by owner
- xviii) As per the Govt. circular as amended from time to time all contractors who employ more than 50 workers or where the contract value exceeds Rs. 50 crores, the following facilities are to be provided by contractor at site :
- Arrangement for drinking water
  - Toilet facilities
  - A creche where 10 or more women workers are having children below the age of 6 years
  - Transport arrangement for attending to emergencies
- xix) should deploy a safety officer at site
- 4.2 GENERAL DUTIES OF OWNERS**
- 4.2.1 Owners should:
- i) co-ordinate or nominate a competent person to co-ordinate all activities relating to safety and health on their construction projects;
  - ii) inform all contractors on the project of special risks to health and safety;
  - iii) Ensure that executing agency is aware of the owner's requirements and the executing agency's responsibilities with respect to safety practices before starting the job.
- 5.0 SAFETY PRACTICES AT WORK PLACES**
- 5.1. GENERAL PROVISIONS**
- 5.1.1 All openings and other areas likely to pose danger to workers should be clearly indicated.
- 5.1.2 Workers & Supervisors should use the safety helmet and other requisite Personal Protective Equipment according to job & site requirement. They should be trained to use personal protective equipment.
- 5.1.3 Never use solvents, alkalis and other oils to clean the skin.
- 5.1.4 Lift the load with back straight and knees bent as far as possible. Seek the help in case of heavy load.

5.1.5 Ensure the usage of correct and tested tools and tackles. Don't allow the make shift tools and tackles.

5.1.6 No loose clothing should be allowed while working near rotating equipment or working at heights.

## **5.2 MEANS OF ACCESS AND EGRESS**

Adequate and safe means of access (atleast two, differently located) to and egress from all workplaces should be provided. Same should be displayed and maintained.

## **5.3 HOUSEKEEPING**

5.3.1 Ensure:

- i) proper storage of materials and equipment;
- ii) removal of scrap, inflammable material, waste and debris at appropriate intervals.

5.3.2 Removal of loose materials, which are not required for use, to be ensured. Accumulation of these at the site can obstruct means of access to and egress from workplaces and passageways.

5.3.3 Workplaces and passageways, that are slippery owing to oil, grease or other causes, should be cleaned up or strewn with sand, sawdust, ash etc.

## **5.4 PRECAUTIONS AGAINST THE FALL OF MATERIALS & PERSONS AND COLLAPSE OF STRUCTURES**

5.4.1 Precautions should be taken such as the provision of fencing, look-out men or barriers to protect any person against injury by the fall of materials, or tools or equipment being raised or lowered.

5.4.2 Where necessary to prevent danger, guys, stays or supports should be used or other effective precautions should be taken to prevent the collapse of structures or parts of structures that are being erected, maintained, repaired, dismantled or demolished.

5.4.3 All openings through which workers are liable to fall should be kept

effectively covered or fenced and displayed prominently.

5.4.4 As far as practicable, guardrails and toe-boards should be provided to protect workers from falling from elevated workplaces.

## **5.5 PREVENTION OF UNAUTHORISED ENTRY**

5.5.1 Construction sites located in built-up areas and alongside vehicular and pedestrian traffic routes should be fenced to prevent the entry of unauthorised persons.

5.5.2 Visitors should not be allowed access to construction sites unless accompanied by or authorised by a competent person and provided with the appropriate protective equipment.

## **5.6 FIRE PREVENTION AND FIRE FIGHTING**

5.6.1 All necessary measures should be taken by the executing agency and owner to:

- i) avoid the risk of fire;
- ii) control quickly and efficiently any outbreak of fire;
- iii) bring out a quick and safe evacuation of persons.
- iv) Inform unit/fire station control room, where construction work is carried out within existing operating area.

5.6.2 Combustible materials such us packing materials, sawdust, greasy/oily waste and scrap wood or plastics should not be allowed to accumulate in workplaces but should be kept in closed metal containers in a safe place.

5.6.3 Places where workers are employed should, if necessary to prevent the danger of fire, be provided with:

- i) suitable and sufficient fire-extinguishing equipment, which should be easily visible and accessible;
- ii) an adequate water supply at sufficient pressure meeting the requirements of various OISD standards.

5.6.4 To guard against danger at places having combustible material,

- workers should be trained in the action to be taken in the event of fire, including the use of means of escape.
- 5.6.5 At sites having combustible material, suitable visual signs should be provided to indicate clearly the direction of escape in case of fire.
- 5.6.6 Means of escape should be kept clear at all times. Escape routes should be frequently inspected particularly in high structures and where access is restricted.
- 5.7 LIGHTING**
- 5.7.1 Where natural lighting is not adequate, working light fittings or portable hand-lamps should be provided at workplace on the construction site where a worker will do a job.
- 5.7.2 Emergency lighting should be provided for personnel safety during night time to facilitate standby lighting source, if normal system fails.
- 5.7.2 Artificial lighting should not produce glare or disturbing shadows.
- 5.7.3 Lamps should be protected by guards against accidental breakage.
- 5.7.4 The cables of portable electrical lighting equipment should be of adequate size & characteristics for the power requirements and of adequate mechanical strength to withstand severe conditions in construction operations.
- 5.8 PLANT, MACHINERY, EQUIPMENT AND HAND TOOLS**
- 5.8.1 General Provisions**
- i) Plant, machinery and equipment including hand tools, both manual and power driven, should:
- a) be of proper design and construction, taking into account health, Safety and ergonomic principles.
- b) be maintained in good working order;
- c) be used only for work for which they have been designed.
- d) be operated only by workers who have been authorised and given appropriate training.
- e) be provided with protective guards, shields or other devices as required.
- ii) Adequate instructions for safe use should be provided.
- iii) Safe operating procedures should be established and used for all plant, machinery and equipment.
- iv) Operators of plant, machinery and equipment should not be distracted while work is in progress.
- v) Plant, machinery and equipment should be switched off when not in use and isolated before any adjustment, clearing or maintenance is done.
- vi) Where trailing cables or hose pipes are used they should be kept as short as practicable and not allowed to create a hazard.
- vii) All moving parts of machinery and equipment should be enclosed or adequately guarded.
- viii) Every power-driven machine and equipment should be provided with adequate means, immediately accessible and readily identifiable to the operator, of stopping it quickly and preventing it from being started again inadvertently.
- ix) Operators of plant, machinery, equipment and tools should be provided with PPEs, including where necessary, suitable ear protection.
- 5.8.2 Hand tools**
- i) Hand tools should be repaired by competent persons.
- ii) Heads of hammers and other shock tools should be dressed or ground to a suitable radius on the edge as soon as they begin to mushroom or crack.
- iii) When not in use and while being carried or transported sharp tools should be kept in sheaths, shields, chests or other suitable containers.
- iv) Only insulated or nonconducting tools should be used on or near live electrical installations.

- v) Only non-sparking tools should be used near or in the presence of flammable or explosive dusts or vapours.

### 5.8.3 Pneumatic Tools

- i) Operating triggers on portable pneumatic tools should be:
  - a) so placed as to minimise the risk of accidental starting of the machine.
  - b) so arranged as to close the air inlet valve automatically when the pressure of the operator's hand is removed.
- ii) Hose and hose connections for compressed air supply to portable pneumatic tools should be:
  - a) designed and tested for the pressure and service for which they are intended;
  - b) fastened securely on the pipe outlet and equipped with the safety chain, as appropriate.
- iii) Pneumatic shock tools should be equipped with safety clips or retainers to prevent dies and tools from being accidentally expelled from the barrel.
- iv) Pneumatic tools should be disconnected from power and the pressure in hose lines released before any adjustment or repair is made.

### 5.8.4 Electrical Tools

- i) Low voltage portable electrical tools should generally be used.
- ii) All electrical tools should be earthed, unless they are "all insulated" or "double insulated" tools which do not require earthing.
- iii) All electrical tools should get inspected and maintained on a regular basis by a competent electrician and complete records kept.

### 5.8.5 Engines

- i) Engines should:
  - a) be installed so that they can be started safely and the maximum safe speed cannot be exceeded.
  - b) have controls for limiting speed.

- c) have devices to stop them from a safe place in an emergency.
- ii) IC engines should not be run in confined spaces unless adequate exhaust ventilation is provided.
- iii) When IC engines are being fuelled:
  - a) the engine should be shut off.
  - b) care should be taken to avoid spilling fuel;
  - c) no person should smoke or have an naked light in the vicinity.
  - d) a fire extinguisher should be kept readily available.
- iv) Secondary fuel reservoir should be placed outside the engine room.

## 6.0 CONSTRUCTION ACTIVITIES

The various common activities in construction are as under:

- Excavation
- Scaffolding, Platforms & Ladders
- Structural Work, Laying of Reinforcement & Concreting
- Road Work (Laying of roads)
- Cutting /Welding
- Working in Confined Space
- Proof/Pressure Testing
- Working at Heights
- Handling & Lifting Equipments
- Vehicle Movement
- Electrical
- Offshore
- Demolition
- Radiography
  - Sand/shot blasting/ spray painting
  - Work above water

The safe practices to be followed during the implementation of above construction activities are given below:

### 6.1 EXCAVATION

- 6.1.1 All excavation work should be planned and the method of excavation and the type of support

- work required should be decided considering the following:
- i) the stability of the ground;
  - ii) the excavation will not affect adjoining buildings, structures or roadways;
  - iii) to prevent hazard, the gas, water, electrical and other public utilities should be shut off or disconnected, if necessary;
  - iv) presence of underground pipes, cable conductors, etc.,
  - v) the position of culvert/bridges, temporary roads and spoil heaps should be determined;
- 6.1.2 Before digging begins on site, all excavation work should be planned and the method of excavation and the type of support work required decided.
- 6.1.3 All excavation work should be supervised.
- 6.1.4 Sites of excavations should be thoroughly inspected:
- i) daily, prior to each shift and after interruption in work of more than one day;
  - ii) after every blasting operation;
  - iii) after an unexpected fall of ground;
  - iv) after substantial damage to supports;
  - v) after a heavy rain, frost or snow;
  - vi) when boulder formations are encountered.
- 6.1.5 Safe angle of repose while excavating trenches exceeding 1.5m depth upto 3.0m should be maintained. Based on site conditions, provide proper slope, usually  $45^{\circ}$ , and suitable bench of 0.5m width at every 1.5m depth of excavation in all soils except hard rock or provide proper shoring and strutting to prevent cave-in or slides.
- 6.1.6 As far as possible, excavated earth should not be placed within one meter of the edge of the trench or depth of trench whichever is greater.
- 6.1.7 Don't allow vehicles to operate too close to excavated area. Maintain atleast 2m distance from edge of excavation. No load, plant or equipment should be placed or moved near the edge of any excavation where it is likely to cause its collapse and thereby endanger any person unless precautions such as the provision of shoring or piling are taken to prevent the sides from collapsing.
- 6.1.8 Adequately anchored stop blocks and barriers should be provided to prevent vehicles being driven into the excavation. Heavy vehicles should not be allowed near the excavation unless the support work has been specially designed to permit it.
- 6.1.9 If an excavation is likely to affect the security of a structure on which persons are working, precautions should be taken to protect the structure from collapse.
- 6.1.10 Barricade at 1m height (with red & white band/self glowing caution board) should be provided for excavations beyond 1.5m depth. Provide two entries/exits for such excavation.
- 6.1.11 Necessary precautions should be taken for underground utility lines like cables, sewers etc. and necessary approvals/clearances from the concerned authorities shall be obtained before commencement of the excavation job.
- 6.1.12 Water shall be pumped/bailed out, if any accumulates in the trench. Necessary precautions should be taken to prevent entry of surface water in trenches.
- 6.1.13 During rains, the soil becomes loose. Take additional precaution against collapse of side wall.
- 6.1.14 In hazardous areas, air should be tested to ascertain its quality. No one should be allowed entry till it is suitable for breathing.
- 6.1.15 In case of mechanised excavation, precaution shall be taken to not to allow anybody to come within one meter of extreme reach of the mechanical shovel. The mechanised excavator shall be operated by a well-trained experienced operator. When not in operation, the machine shall be kept on firm leveled ground with mechanical shovel resting on ground. Wheel or belt shall be suitably jammed to prevent any accidental movement of the

machine. Suitable precautions as per manufacturer guidelines should be taken for dozers, graders and other heavy machines.

6.1.16 In case of blasting, follow strictly IS:4081-1986 & Indian Explosive Act and rules for storage, handling and carrying of explosive materials and execution of blasting operation.

## 6.2 SCAFFOLDING, PLATFORMS & LADDERS

### 6.2.1 Metal as material of construction

- i) A scaffold should be provided and maintained or other equally safe and suitable provision should be made where work cannot safely be done on or from the ground or from part of a building or other permanent structure.
- ii) Scaffolds should be provided with safe means of access, such as stairs, ladders or ramps. Ladders should be secured against inadvertent movement.
- iii) Every scaffold should be constructed, erected and maintained so as to prevent collapse or accidental displacement when in use.
- iv) Every scaffold and part thereof should be constructed :
  - (a) in such a way so as not to cause hazards for workers during erection and dismantling;
  - (b) in such a way so as guard rails and other protective devices, platforms, ladders, stairs or ramps can be easily put together;
  - (c) with sound material and of requisite size and strength for the purpose for which it is to be used and maintained in a proper condition.
- v) Boards and planks used for scaffolds should be protected against splitting.
- vi) Materials used in the construction of scaffolds should be stored under good conditions and apart from any material unsuitable for scaffolds.
- vii) Couplers should not cause deformation in tubes. Couplers should be made of drop forged steel or equivalent material.

- viii) Tubes should be free from cracks, splits and excessive corrosion and be straight to the eye, and tube ends cut cleanly square with the tube axis.
- ix) Scaffolds should be designed for their maximum load as per relevant code.
- x) Scaffolds should be adequately braced.
- xi) Scaffolds which are not designed to be independent should be rigidly connected to the building at designated vertical and horizontal places.
- xii) A scaffold should never extend above the highest anchorage to an extent which might endanger its stability and strength.
- xiii) Loose bricks, drainpipes, chimney-pots or other unsuitable material should not be used for the construction or support of any part of a scaffold.
- xiv) Scaffolds should be inspected and certified:
  - (a) before being taken into use;
  - (b) at periodic intervals thereafter as prescribed for different types of scaffolds;
  - (c) after any alteration, interruption in use, exposure to weather or seismic conditions or any other occurrence likely to have affected their strength or stability.
- xv) Inspection should more particularly ascertain that:
  - (a) the scaffold is of suitable type and adequate for the job;
  - (b) materials used in its construction are sound and of sufficient strength;
  - (c) it is of sound construction and stable;
  - (d) that the required safeguards are in position.
- xvi) A scaffold should not be erected, substantially altered or dismantled except by or under the supervision.
- xvii) Every scaffold should be maintained in good and proper condition, and every part should be kept fixed or secured so that no part can be

displaced in consequence of normal use.

- xviii) If out-rigger scaffolding is to be used, it should be specifically designed and inspected before putting in use.

### 6.2.2 Lifting appliances on scaffolds

- i) When a lifting appliance is to be used on a scaffold:
  - (a) the parts of the scaffold should be carefully inspected to determine the additional strengthening and other safety measures required;
  - (b) any movement of the scaffold members should be prevented;
  - (c) if practicable, the uprights should be rigidly connected to a solid part of the building at the place where the lifting appliance is erected.

### 6.2.3 Prefabricated scaffolds

- i) In the case of prefabricated scaffold systems, the instructions provided by the manufacturers or suppliers should be strictly adhered to. Prefabricated scaffolds should have adequate arrangements for fixing bracing.
- ii) Frames of different types should not be intermingled in a single scaffold.
- iii) Scaffolding shall be erected on firm and level ground.
- iv) All members of metal scaffolding shall be checked periodically to screen out defective / rusted members. All joints should be properly lubricated for easy tightening.
- v) Entry to scaffolding should be restricted.
- vi) Erection, alteration and removal shall be done under supervision of experienced personnel.
- vii) Use of barrels, boxes, loose bricks etc., for supporting platform shall not be permitted.
- viii) Each supporting member of platform shall be securely fastened and braced
- ix) Where planks are butt-joined, two parallel putlogs shall be used, not

more than 100mm apart, to give support to each plank.

- x) Platform plank shall not project beyond its end support to a distance exceeding 4 times the thickness of plank, unless it is effectively secured to prevent tipping. Cantilever planks should be avoided.
- xi) The platform edges shall be provided with 150mm high toe board to eliminate hazards of tools or other objects falling from platform.
- xii) Erect ladders in the "four up-one out position"
- xiii) Lash ladder securely with the structure.
- xiv) Using non-slip devices, such as, rubber shoes or pointed steel ferules at the ladder foot, rubber wheels at ladder top, fixing wooden battens, cleats etc.
- xv) When ladder is used for climbing over a platform, the ladder must be of sufficient length, to extend at least one meter above the platform, when erected against the platform in "four up-one out position."
- xvi) Portable ladders shall be used for heights not more than 4mt. Above 4mt flights, fixed ladders shall be provided with at least 600 mm landings at every 6mt or less.
- xvii) The width of ladder shall not be less than 300mm and rungs shall be spaced not more than 300mm.
- xviii) Every platform and means of access shall be kept free from obstruction.
- xix) If grease, mud, gravel, mortar etc., fall on platform or scaffolds, these shall be removed immediately to avoid slippage.
- xx) Workers shall not be allowed to work on scaffolds during storms or high wind. After heavy rain or storms, scaffolds shall be inspected before reuse.
- xxi) Don't overload the scaffolding. Remove excess material and scrap immediately.
- xxii) Dismantling of scaffolds shall be done in a pre-planned sequential manner.



#### **6.2.4 Suspended scaffolds/boatwain's chair**

- i) In addition to the requirements for scaffolds in general as regards soundness, stability and protection against the risk of falls, suspended scaffolds should meet the following specific requirements.
  - (a) platforms should be designed and built with dimensions that are compatible with the stability of the structure as a whole, especially the length;
  - (b) the number or anchorage should be compatible with the dimensions of the platform;
  - (c) the safety of workers should be safeguarded by an extra rope having a point of attachment independent of the anchorage arrangements of the scaffold;
  - (d) the anchorage and other elements of support of the scaffold should be designed and built in such a way as to ensure sufficient strength;
  - (e) the ropes, winches, pulleys or pulley blocks should be designed, assembled, used and maintained according to the requirements established for lifting gear adapted to the lifting of persons according to national laws and regulations;
  - (f) Before use, the whole structure should be checked by a competent person.

#### **6.2.5 Bamboo Scaffolding**

- i) In general, it should be avoided as far as possible. It should not be used in the unit/off-site areas and where hot work is to be done.
- ii) For construction and maintenance of residential and office buildings, situated outside explosive licensed area, bamboo scaffold, if used, should conform to provisions given in IS-3696 (Part 1)-1987.

### **6.3 STRUCTURAL WORK, LAYING OF REINFORCEMENT & CONCRETING**

#### **6.3.1 General provisions**

- i) The erection or dismantling of buildings, structures, civil

engineering works, formwork, falsework and shoring should be carried out by trained workers only under the supervision of a competent person.

- ii) Precautions should be taken to guard against danger to workers arising from any temporary state of weakness or instability of a structure.
- iii) Formwork, falsework and shoring should be so designed, constructed and maintained that it will safely support all loads that may be imposed on it.
- iv) Formwork should be so designed and erected that working platforms, means of access, bracing and means of handling and stabilising are easily fixed to the formwork structure.

#### **6.3.2. Erection and dismantling of steel and prefabricated structures**

- i) The safety of workers employed on the erection and dismantling of steel and prefabricated structures should be ensured by appropriate means, such as provision and use of:
  - (a) ladders, gangways or fixed platforms;
  - (b) platforms, buckets, boatswain's chairs or other appropriate means suspended from lifting appliances;
  - (c) safety harnesses and lifelines, catch nets or catch platforms;
  - (d) Power-operated mobile working platforms.
- ii) Steel and prefabricated structures should be so designed and made that they can be safely transported and erected.
- iii) In addition to the need for the stability of the part when erected, the design should explicitly take following into account:
  - (a) the conditions and methods of attachment in the operations of transport, storing and temporary support during erection or dismantling as applicable;
  - (b) Methods for the provision of safeguards such as railings and working platforms, and, when necessary, for mounting them

- easily on the structural steel or prefabricated parts.
- iv) The hooks and other devices built in or provided on the structural steel or prefabricated parts that are required for lifting and transporting them should be so shaped, dimensioned and positioned as:
    - (a) to withstand with a sufficient margin the stresses to which they are subjected;
    - (b) Not to set up stresses in the part that could cause failures, or stresses in the structure itself not provided for in the plans, and be designed to permit easy release from the lifting appliance. Lifting points for floor and staircase units should be located (recessed if necessary) so that they do not protrude above the surface;
    - (c) To avoid imbalance or distortion of the lifted load.
  - v) Storeplaces should be so constructed that:
    - (a) there is no risk of structural steel or prefabricated parts falling or overturning;
    - (b) storage conditions generally ensure stability and avoid damage having regard to the method of storage and atmospheric conditions;
    - (c) racks are set on firm ground and designed so that units cannot move accidentally.
  - vi) While they are being stored, transported, raised or set down, structural steel or prefabricated parts should not be subjected to stresses prejudicial to their stability.
  - vii) Every lifting appliance should:
    - (a) be suitable for the operations and not be capable of accidental disconnection;
    - (b) be approved or tested as per statutory requirement.
  - viii) Lifting hooks should be of the self-closing type or of a safety type and should have the maximum permissible load marked on them.
  - ix) Tongs, clamps and other appliances for lifting structural steel and prefabricated parts should:
    - (a) be of such shape and dimensions as to ensure a secure grip without damaging the part;
    - (b) be marked with the maximum permissible load in the most unfavourable lifting conditions.
  - x) Structural steel or prefabricated parts should be lifted by methods or appliances that prevent them from spinning accidentally.
  - xi) When necessary to prevent danger, before they are raised from the ground, structural steel or prefabricated parts should be provided with safety devices such as railings and working platforms to prevent falls of persons.
  - xii) While structural steel or prefabricated parts are being erected, the workers should be provided with appliances for guiding them as they are being lifted and set down, so as to avoid crushing of hands and to facilitate the operations. Use of such appliances should be ensured.
  - xiii) A raised structural steel or prefabricated part should be so secured and wall units so propped that their stability cannot be imperiled, even by external agencies such as wind and passing loads before its release from the lifting appliance.
  - xiv) At work places, instruction should be given to the workers on the methods, arrangements and means required for the storage, transport, lifting and erection of structural steel or prefabricated parts, and, before erection starts, a meeting of all those responsible should be held to discuss and confirm the requirements for safe erection.
  - xv) During transportation within the construction area, attachments such as slings and stirrups mounted on structural steel or prefabricated parts should be securely fastened to the parts.
  - xvi) Structural steel or prefabricated parts should be so transported that the conditions do not affect the stability of the parts or the means of transport result in jolting, vibration or stresses due to blows, or loads of material or persons.

- xvii) When the method of erection does not permit the provision of other means of protection against fall of persons, the workplaces should be protected by guardrails, and if appropriate by toe-boards.
- xviii) When adverse weather conditions such as snow, ice and wind or reduced visibility entail risks of accidents, the work should be carried on with particular care, or, if necessary, interrupted.
- xix) Structures should not be worked on during violent storms or high winds, or when they are covered with ice or snow, or are slippery from other causes.
- xx) If necessary, to prevent danger, structural steel parts should be equipped with attachments for suspended scaffolds, lifelines or safety harnesses and other means of protection.
- xxi) The risks of falling, to which workers moving on high or sloping girders are exposed, should be limited by all means of adequate collective protection or, where this is impossible, by the use of a safety harness that is well secured to a strong support.
- xxii) Structural steel parts that are to be erected at a great height should as far as practicable be assembled on the ground.
- xxiii) When structural steel or prefabricated parts are being erected, a sufficiently extended area underneath the workplace should be barricaded or guarded
- xxiv) Steel trusses that are being erected should be adequately shored, braced or guyed until they are permanently secured in position.
- xxv) Load-bearing structural member should not be dangerously weakened by cutting, holing or other means.
- xxvi) Structural members should not be forced into place by the hoisting machine while any worker is in such a position that he could be injured by the operation.
- xxvii) Open-web steel joists that are hoisted singly should be directly

placed in position and secured against dislodgment.

### 6.3.3 Reinforcement

- i) Ensure that workers use Personnel Protective equipment like safety helmet, safety shoes, gloves etc.
- ii) Don't place the hand below the rods for checking clear distance. Use measuring devices.
- iii) Don't wear loose clothes while checking the rods.
- iv) Don't stand unnecessarily on cantilever rods.
- v) To carry out welding/cutting of rods, safety procedures/precautions as mentioned in Item No. 6.5 to be followed.
- vi) For supplying of rods at heights, proper staging and/or bundling to be provided.
- vii) Ensure barricading and staging for supplying and fixing of rods at height.
- viii) For short distance carrying of materials on shoulders, suitable pads to be provided.
- ix) While transporting material by trucks/trailers, the rods shall not protrude in front of or by the sides of driver's cabin. In case such protrusion cannot be avoided behind the deck, then it should not extend  $1/3^{\text{rd}}$  of deck length or 1.5M whichever is less and tied with red flags/lights.

### 6.3.4 Concreting

- i) Ensure stability of shuttering work before allowing concreting.
- ii) Barricade the concreting area while pouring at height/depths.
- iii) Keep vibrator hoses, pumping concrete accessories in healthy conditions and mechanically locked.
- iv) Pipelines in concrete pumping system shall not be attached to temporary structures such as scaffolds and formwork support as the forces and movements may effect their integrity.

- v) Check safety cages & guards around moving motors/parts etc. provided in concreting mixers.
- vi) Use Personal Protective Equipment like gloves, safety shoes etc. while dealing with concrete and wear respirators for dealing with cement.
- vii) Earthing of electrical mixers, vibrators, etc. should be done and verified.
- viii) Cleaning of rotating drums of concrete mixers shall be done from outside. Lockout devices shall be provided where workers need to enter.
- ix) Where concrete mixers are driven by internal combustion engine, exhaust points shall be located away from the worker's workstation so as to eliminate their exposure to obnoxious fumes.
- x) Don't allow unauthorised person to stand under the concreting area.
- xi) Ensure adequate lighting arrangements for carrying out concrete work during night.
- xii) Don't allow the same workers to pour concrete round the clock. Insist on shift pattern.
- xiii) During pouring, shuttering and its supports should be continuously watched for defects.

#### **6.4 ROAD WORK**

- 6.4.1 Site shall be barricaded and provided with warning signs, including night warning lamps at appropriate locations for traffic diversion.
- 6.4.2 Filled and empty bitumen drums shall be stacked separately at designated places.
- 6.4.3 Mixing aggregate with bitumen shall preferably be done with the help of bitumen batch mixing plant, unless operationally non-feasible.
- 6.4.4 Road rollers, Bitumen sprayers, Pavement finishers shall be driven by experienced drivers with valid driving license.
- 6.4.5 Workers handling hot bitumen sprayers or spreading bitumen aggregate mix or mixing bitumen

with aggregate, shall be provided with PVC hand gloves and rubber shoes with legging up to knee joints.

- 6.4.6 At the end of day's work, surplus hot bitumen in tar boiler shall be properly covered by a metal sheet, to prevent anything falling in it,
- 6.4.7 If bitumen accidentally falls on ground, it shall be immediately covered by sprinkling sand, to prevent anybody stepping on it. Then it shall be removed with the help of spade.
- 6.4.8 For cement concrete roads, besides site barricading and installation of warning signs for traffic diversion, safe practices mentioned in the chapter on "Concreting", shall also be applicable.

#### **6.5 CUTTING/WELDING**

- 6.5.1 Common hazards involved in welding/cutting are sparks, molten metal, flying particles, harmful light rays, electric shocks etc. Following precautions should be taken: -
  - i) A dry chemical type fire extinguisher shall be made available in the work area.
  - ii) Adequate ventilation shall be ensured by opening manholes and fixing a shield or forced circulation of air etc, while doing a job in confined space.
  - iii) Ensure that only approved and well-maintained apparatus, such as torches, manifolds, regulators or pressure reducing valves, and acetylene generators, be used.
  - iv) All covers and panels shall be kept in place, when operating an electric Arc welding machine.
  - v) The work piece should be connected directly to Power supply, and not indirectly through pipelines/structures/equipments etc.
  - vi) The welding receptacles shall be rated for 63 A suitable for 415V, 3-Phase system with a scraping earth. Receptacles shall have necessary mechanical interlocks and earthing facilities.
  - vii) All cables, including welding and ground cables, shall be checked for

- any worn out or cracked insulation before starting the job. Ground cable should be separate without any loose joints.
- viii) Cable coiling shall be maintained at minimum level, if not avoidable.
  - ix) An energised electrode shall not be left unattended.
  - x) The power source shall be turned off at the end of job.
  - xi) All gas cylinders shall be properly secured in upright position.
  - xii) Acetylene cylinder shall be turned and kept in such a way that the valve outlet points away from oxygen cylinder.
  - xiii) Acetylene cylinder key for opening valve shall be kept on valve stem, while cylinder is in use, so that the acetylene cylinder could be quickly turned off in case of emergency. Use flash back arrestors to prevent back-fire in acetylene/oxygen cylinder.
  - xiv) When not in use, valves of all cylinders shall be kept closed.
  - xv) All types of cylinders, whether full or empty, shall be stored at cool, dry place under shed.
  - xvi) Forced opening of any cylinder valve should not be attempted.
  - xvii) Lighted gas torch shall never be left unattended.
  - xviii) Store acetylene and oxygen cylinders separately.
  - xix) Store full and empty cylinders separately.
  - xx) Avoid cylinders coming into contact with heat.
  - xxi) Cylinders that are heavy or difficult to carry by hand may be rolled on their bottom edge but never dragged.
  - xxii) If cylinders have to be moved, be sure that the cylinder valves are shut off.
  - xxiii) Before changing torches, shut off the gas at the pressure reducing regulators and not by crimping the hose.
  - xxiv) Do not use matches to light torches, use a friction lighter.
  - xxv) Move out any leaking cylinder immediately.
  - xxvi) Use trolleys for oxygen & acetylene cylinder and chain them.
  - xxvii) Always use Red hose for acetylene and other fuel gases and Black for oxygen, and ensure that both are in equal length.
  - xxviii) Ensure that hoses are free from burns, cuts and cracks and properly clamped.
  - xxix) Avoid dragging hoses over sharp edges and objects
  - xxx) Do not wrap hoses around cylinders when in use or stored.
  - xxxi) Protect hoses from flying sparks, hot slag, and other hot objects.
  - xxxii) Lubricants shall not be used on Ox-fuel gas equipment.
  - xxxiii) During cutting/welding, use proper type goggles/face shields.
- 6.6 WORKING IN CONFINED SPACES**
- 6.6.1 Following safety practices for working in confined space like towers, columns, tanks and other vessels should be followed in addition to the safety guidelines for specific jobs like scaffolding, cutting/welding etc.
- i) Shut down, isolate, depressurise and purge the vessel as per laid down procedures.
  - ii) Entry inside the vessel and to carry out any job should be done after issuance of valid permit only in line with the requirement of OISD-STD-105.
  - iii) Ensure proper and accessible means of exit before entry inside a confined space.
  - iv) The number of persons allowed inside the vessel should be limited to avoid overcrowding.
  - v) When the work is going on in the confined space, there should always be one man standby at the nearby manway.

- vi) Before entering inside the vessels underground or located at lower elevation, probability of dense vapours accumulating nearby should also be considered in addition to inside the vessel.
- vii) Ensure requisite O<sub>2</sub> level before entry in the confined space and monitor level periodically or other wise use respiratory devices.
- viii) Check for no Hydrocarbon or toxic substances before entry and monitor level periodically or use requisite Personal Protective Equipment.
- ix) Ensure adequate ventilation or use respiratory devices.
- x) Depending upon need, necessary respirator system, gas masks and suit shall be worn by everyone entering confined space. In case of sewer, OWS or in the confined area where there is a possibility of toxic or inert gas, gas masks shall be used by everyone while entering.
- xi) Barricade the confined spaces during hoisting, radiography, blasting, pressure testing etc.
- xii) Use 24V flameproof lamp fittings only for illumination.
- xiii) Use tools with air motors or electric tools with maximum voltage of 24V.
- xiv) House keeping shall be well maintained.
- xv) Safety helmet, safety shoes and safety belt shall be worn by everyone entering the confined space.
- xvi) Don't wear loose clothing while working in a confined space.
- xvii) In case of the vessels which are likely to contain pyrophoric substances (like Iron Sulphide), special care need to be taken before opening the vessel. Attempt should be made to remove the pyrophoric substances. Otherwise, these should be always kept wet by suitable means.
- xviii) The cutting torches should also be kept outside the vessel immediately after the cutting.
- xix) The gas cylinders used for cutting/welding shall be kept outside.
- xx) All cables, hoses, welding equipment etc., shall be removed from confined space at end of each work day, even if the work is to be resumed in the same space the next day.
- xxi) To the extent possible sludge shall be cleared and removed from outside before entering.
- xxii) No naked light or flame or hot work such as welding, cutting and soldering should be permitted inside a confined space or area unless it has been made completely free of the flammable atmosphere, tested and found safe by a competent person. Only non-sparking tools and flameproof hand lamps protected with guard and safety torches should be used inside such confined space or area for initial inspection, cleaning or other work required to be done for making the area safe.
- xxiii) Communication should be always maintained between the worker and the attendant.

## **6.7 PROOF/PRESSURE TESTING**

- 6.7.1 Review test procedure before allowing testing with water or air or any other fluid.
- 6.7.2 Provide relief valves of adequate size while testing with air or other gases.
- 6.7.3 Ensure compliance of necessary precautions, step wise loading, tightening of fasteners, grouting etc. before and during testing.
- 6.7.4 Inform all concerned in advance of the testing.
- 6.7.5 Keep the vents open before opening any valve for filling/draining of liquid used for hydrotesting. The filling/draining should not exceed the designed rate for pressure testing.
- 6.7.6 Provide separate gauges of suitable range for pressurising pump and the equipment to be tested.
- 6.7.7 Provide gauges at designated locations for monitoring of pressures.

6.7.8 Check the calibration of all pressurising equipment and accessories and maintain records.

6.7.9 Take readings at pre-defined intervals.

## **6.8 WORKING AT HEIGHTS**

### **6.8.1 General Provision**

- i) While working at a height of more than 3 meters, ISI approved safety belt shall be used.
- ii) While working at a height of more than 3 meters, permit should be issued by competent person before commencement of the job.
- iii) Worker should be well trained on usage of safety belt including its proper usage at the time of ascending/descending.
- iv) All tools should be carried in tool kits to avoid their falling.
- v) If the job is on fragile/sloping roof, roof walk ladders shall be used.
- vi) Provide lifeline wherever required.
- vii) Additional safety measures like providing Fall Arrestor type Safety belt, safety net should be provided depending upon site conditions, job requirements.
- viii) Keep working area neat and clean. Remove scrap material immediately.
- ix) Don't throw or drop material/equipment from height.
- x) Avoid jumping from one member to another. Use proper passageway.
- xi) Keep both hands free while climbing. Don't try to bypass the steps of the ladder.
- xii) Try to maintain calm at height. Avoid over exertion.
- xiii) Avoid movements on beam.
- xiv) Elevated workplaces including roofs should be provided with safe means of access and egress such as stairs, ramps or ladders.

### **6.8.2 Roof Work**

- i) All roof-work operations should be pre-planned and properly supervised.

ii) Roof work should only be undertaken by workers who are physically and psychologically fit and have the necessary knowledge and experience for such work.

iii) Work on roofs shouldn't be carried on in weather conditions that threaten the safety of workers.

iv) Crawling boards, walkways and roof ladders should be securely fastened to a firm structure.

v) Roofing brackets should fit the slope of the roof and be securely supported.

vi) Where it is necessary for a person to kneel or crouch near the edge of the roof, necessary precautions should be taken.

vii) On a large roof where work have to be carried out at or near the edge, a simple barrier consisting of crossed scaffold tubes supporting a tubing guardrail may be provided.

viii) All covers for openings in roofs should be of substantial construction and be secured in position.

ix) Roofs with a pitch of more than 10 should be treated as sloping.

x) When work is being carried out on sloping roofs, sufficient and suitable crawling boards or roof ladders should be provided and firmly secured in position.

xi) During extensive work on the roof, strong barriers or guardrails and toe-boards should be provided to stop a person from falling off the roof.

xii) Where workers are required to work on or near roofs or other places covered with fragile material, through which they are liable to fall, they should be provided with suitable roof ladders or crawling boards strong enough and when spanning across the supports for the roof covering to support those workers.

xiii) A minimum of two boards should be provided so that it is not necessary for a person to stand on a fragile roof to move a board or a ladder, or for any other reason.

### 6.8.3 Work on tall chimneys

- i) For the erection and repair of tall chimneys, scaffolding should be provided. A safety net should be maintained at a suitable distance below the scaffold.
- ii) The scaffold floor should always be at least 65 cm below the top of the chimney.
- iii) Under the working floor of the scaffolding the next lower floor should be left in position as a catch platform.
- iv) The distance between the inside edge of the scaffold and the wall of the chimney should not exceed 20 cm at any point.
- v) Catch platforms should be erected over:
  - (a) the entrance to the chimney;
  - (b) Passageways and working places where workers could be endangered by falling objects.
- vi) For climbing tall chimneys, access should be provided by:
  - (a) stairs or ladders;
  - (b) a column of iron rungs securely embedded in the chimney wall;
  - (c) Other appropriate means.
- vii) When workers use the outside rungs to climb the chimney, a securely fastened steel core rope looped at the free end and hanging down at least 3 m should be provided at the top to help the workers to climb on to the chimney.
- viii) While work is being done on independent chimneys the area surrounding the chimney should be enclosed by fencing at a safe distance.
- ix) Workers employed on the construction, alteration, maintenance or repair of tall chimneys should not:
  - a) work on the outside without a safety harness attached by a lifeline to a rung, ring or other secure anchorage;
  - b) put tools between the safety harness and the body or in pockets not intended for the purpose;
  - c) haul heavy materials or equipment up and down by hand to or from the workplace on the chimney;
  - d) fasten pulleys or scaffolding to reinforcing rings without first verifying their stability;
  - e) work alone;
  - f) climb a chimney that is not provided with securely anchored ladders or rungs;
  - g) Work on chimneys in use unless the necessary precautions to avoid danger from smoke and gases have been taken.
- x) Work on independent chimneys should not be carried on in high winds, icy conditions, fog or during electrical storms.

## 6.9 HANDLING AND LIFTING EQUIPMENT:

### 6.9.1 General Provisions

Following are the general guidelines to be followed with regard to all types of handling and lifting equipment in addition to the guidelines for specific type of equipments dealt later on.

- i) There should be a well-planned safety programme to ensure that all the lifting appliances and lifting gear are selected, installed, examined, tested, maintained, operated and dismantled with a view to preventing the occurrence of any accident;
- ii) All lifting appliances shall be examined by competent persons at frequencies as specified in "The Factories act".
- iii) Check thoroughly quality, size and condition of all lifting tools like chain pulley blocks, slings, U-clamps, D-shackles etc. before putting them in use.
- iv) Safe lifting capacity of all lifting & handling equipment, tools and shackles should be got verified and certificates obtained from competent authorities before its use. The safe working load shall be marked on them.
- v) Check periodically the oil, brakes, gears, horns and tyre pressure of all moving equipments like cranes,



- forklifts, trailers etc as per manufacturer's recommendations.
- vi) Check the weights to be lifted and accordingly decide about the crane capacity, boom length and angle of erection.
  - vii) Allow lifting slings as short as possible and check packing at the friction points.
  - viii) While lifting/placing of the load, no unauthorised person shall remain within the radius of the boom and underneath the load.
  - ix) While loading, unloading and stacking of pipes, proper wedges shall be placed to prevent rolling down of the pipes.
  - x) Control longer jobs being lifted up from both ends.
  - xi) Only trained operators and riggers should carry out the job. While the crane is moving or lifting the load, the trained rigger should be there for keeping a vigil against hitting any other object.
  - xii) During high wind conditions and nights, lifting of heavy equipments should be avoided. If unavoidable to do erection in night, operator and rigger should be fully trained for night signaling. Also proper illumination should be there.
  - xiii) Allow crane to move on hard, firm and leveled ground.
  - xiv) When crane is in idle condition for long periods or unattended, crane boom should either be lowered or locked as per manufacturer's guidelines.
  - xv) Hook and load being lifted shall remain in full visibility of crane operators, while lifting, to the extent possible.
  - xvi) Don't allow booms or other parts of crane to come within 3 meters reach of overhead electrical cables.
  - xvii) No structural alterations or repairs should be made to any part of a lifting appliance, which may affect the safety of the appliance without the permission and supervision of the competent person.
- 6.9.2 Hoists**
- i) Hoist shafts should be enclosed with rigid panels or other adequate fencing at:
    - (a) ground level on all sides;
    - (b) all other levels at all points at which access is provided;
    - (c) all points at which persons are liable to be struck by any moving part.
  - ii) The enclosure of hoist shafts, except at approaches should extend where practicable at least 2mt above the floor, platform or other place to which access is provided except where a lesser height is sufficient to prevent any person falling down the hoistway and there is no risk of any person coming into contact with any moving part of the hoist, but in no case should the enclosure be less than 1mt in height.
  - iii) The guides of hoist platforms should offer sufficient resistance to bending and, in the case of jamming by a safety catch, to buckling.
  - iv) Where necessary to prevent danger, adequate covering should be provided above the top of hoist shafts to prevent material falling down them.
  - v) Outdoor hoist towers should be erected on firm foundations, and securely braced, guyed and anchored.
  - vi) A ladderway should extend from the bottom to the top of outdoor hoist towers, if no other ladderway exists within easy reach.
  - vii) Hoisting engines should be of ample capacity to control the heaviest load that they will have to move.
  - viii) Hoists should be provided with devices that stop the hoisting engine as soon as the platform reaches its highest stopping place.
  - ix) Winches should be so constructed that the brake is applied when the control handle is not held in the operating position.
  - x) It should not be possible to set in motion from the platform a hoist, which is not designed for the conveyance of persons.

- xi) Winches should not be fitted with pawl and ratchet gears on which the pawl must be disengaged before the platform is lowered.
  - xii) Hoist platforms should be capable of supporting the maximum load that they will have to carry with a safety factor.
  - xiii) Hoist platforms should be equipped with safety gear that will hold the platform with the maximum load if the hoisting rope breaks.
  - xiv) If workers have to enter the cage or go on the platform at landings there should be a locking arrangement preventing the cage or platform from moving while any worker is in or on it.
  - xv) On sides not used for loading and unloading, hoist platforms should be provided with toe-boards and enclosures of wire mesh or other suitable material to prevent the fall of parts of loads.
  - xvi) Where necessary to prevent danger from falling objects, hoist platforms should be provided with adequate covering.
  - xvii) Counterweights consisting of an assemblage of several parts should be made of specially constructed parts rigidly connected together.
  - xviii) Counterweights should run in guides.
  - xix) Platforms should be provided at all landings used by workers.
  - xx) Following notices should be posted up conspicuously and in very legible characters:
    - (a) on all hoists:
      - on the platform: the carrying capacity in kilograms or other appropriate standard unit of weight;
      - on the hoisting engine: the lifting capacity in kilograms or other appropriate standard unit of weight;
    - (b) on hoists authorised or certified for the conveyance of persons:
      - on the platform or cage: the maximum number of persons to be carried at one time;
    - (c) on hoists for goods only:
      - on every approach to the hoist and on the platform: prohibition of use by persons.
  - xxi) Hoists intended for the carriage of persons should be provided with a cage so constructed as to prevent any person from falling out or being trapped between the cage and any fixed part of the structure when the cage gate is shut, or from being struck by the counterbalance weight or by articles or materials falling down the hoistway.
  - xxii) On each side in which access is provided, the cage should have a gate fitted with devices which ensure that the gate cannot be opened except when the cage is at a landing and that the gate must be closed before the cage can move away from the landing.
  - xxiii) Every gate in the enclosure of the hoist shaft which gives access from a landing place to the cage should be fitted with devices to ensure that the gate cannot be opened except when the cage is at that landing place, and that the cage cannot be moved away from that landing place until the gate is closed.
- 6.9.3 Derricks**
- Stiff-leg derricks**
- i) Derricks should be erected on a firm base capable of taking the combined weight of the crane structure and maximum rated load.
  - ii) Devices should be used to prevent masts from lifting out of their seating.
  - iii) Electrically operated derricks should be effectively earthed from the sole plate or framework.
  - iv) Counterweights should be so arranged that they do not subject the backstays, sleepers or pivots to excessive strain.
  - v) When derricks are mounted on wheels:

- a) a rigid member should be used to maintain the correct distance between the wheels;
  - b) they should be equipped with struts to prevent them from dropping if a wheel breaks or the derrick is derailed.
- vi) The length of a derrick jib should not be altered without consulting the manufacturer.
  - vii) The jib of a scotch derrick crane should not be erected within the backstays of the crane.

#### **Guy derricks**

- i) The restraint of the guy ropes should be ensured by fitting stirrups or anchor plates in concrete foundations.
- ii) The mast of guy derricks should be supported by six top guys spaced approximately equally.
- iii) The spread of the guys of a guy derrick crane from the mast should not be more than 45° from the horizontal.
- iv) Guy ropes of derricks should be equipped with a stretching screw or turnbuckle or other device to regulate the tension.
- v) Gudgeon pins, sheave pins and fool bearings should be lubricated frequently.
- vi) When a derrick is not in use, the boom should be anchored to prevent it from swinging.

#### **6.9.4 Gin poles**

- i) Gin poles should:
  - (a) be straight;
  - (b) consist of steel or other suitable metal;
  - (c) be adequately guyed and anchored;
  - (d) be vertical or raked slightly towards the load;
  - (e) be of adequate strength for the loads that they will be required to lift/move.
- ii) Gin poles should not be spliced and if a gin pole is composed of different elements, they should be assembled in conformity with their intrinsic material strength.

- iii) Gin poles should be fastened at their feet to prevent displacement in operation.
- iv) Gin poles, which are moved from place to place and re-erected, should not be taken into use again before the pole, lifting ropes, guys, blocks and other parts have been inspected, and the whole appliance has been tested under load.
- v) When platforms or skips are hoisted by gin poles, precautions should be taken to prevent them from spinning and to provide for proper landing.

#### **6.9.5 Tower cranes**

- i) Where tower cranes have cabs at high level, persons, capable and trained to work at heights, should only be employed as crane operators.
- ii) The characteristics of the various machines available should be considered against the operating requirements and the surroundings in which the crane will operate before a particular type of crane is selected.
- iii) Care should be taken in the assessment of wind loads both during operations and out of service. Account should also be taken of the effects of high structures on wind forces in the vicinity of the crane.
- iv) The ground on which the tower crane stands should have the requisite bearing capacity. Account should be taken of seasonal variations in ground conditions.
- v) Bases for tower cranes and tracks for rail-mounted tower cranes should be firm and level. Tower cranes should only operate on gradients within limits specified by the manufacturer. Tower cranes should only be erected at a safe distance from excavations and ditches.
- vi) Tower cranes should be sited where there is clear space available for erection, operation and dismantling. As far as possible, cranes should be sited so that loads do not have to be handled over occupied premises, over public thoroughfares, other construction works and railways or near power cables.

- vii) Where two or more tower cranes are sited in positions where their jibs could touch any part of the other crane, there should be direct means of communication between them and a distinct warning system operated from the cab so that one driver may alert the other of impending danger.
- viii) The manufacturers' instructions on the methods and sequence of erection and dismantling should be followed. The crane should be tested before being taken into use.
- ix) The climbing operation of climbing tower cranes should be carried out in accordance with manufacturers' instructions. The free-standing height of the tower crane should not extend beyond what is safe and permissible in the manufacturers' instructions.
- x) When the tower crane is left unattended, loads should be removed from the hook, the hook raised, the power switched off and the boom brought to the horizontal. For longer periods or at times when adverse weather conditions are expected, out of service procedures should be followed. The main jib should be slewed to the side of the tower away from the wind, put into free slew and the crane immobilised.
- xi) A windspeed measuring device should be provided at an elevated position on the tower crane with the indicator fitted in the drivers' cab.
- xii) Devices should be provided to prevent loads being moved to a point where the corresponding safe working load of the crane would be exceeded. Name boards or other items liable to catch the wind should not be mounted on a tower crane other than in accordance with the manufacturers' instructions.
- xiii) Tower cranes should not be used for magnet, or demolition ball service, piling operations or other duties, which could impose excessive loading on the crane structure.

#### **6.9.6 Lifting ropes**

- i) Only ropes with a known safe working capacity should be used as lifting ropes.
- ii) Lifting ropes should be installed, maintained and inspected in accordance with manufacturers' instructions.
- iii) Repaired steel ropes should not be used on hoists.
- iv) Where multiple independent ropes are used, for the purpose of stability, to lift a work platform, each rope should be capable of carrying the load independently.

#### **6.10 VEHICLE MOVEMENT**

- 6.10.1 Park vehicles only at designated places. Don't block roads to create hindrance for other vehicles.
- 6.10.2 Don't overload the vehicle.
- 6.10.3 Obey speed limits and traffic rules.
- 6.10.4 Always expect the unexpected and be a defensive driver.
- 6.10.5 Drive carefully during adverse weather and road conditions.
- 6.10.6 Read the road ahead and ride to the left.
- 6.10.7 Be extra cautious at nights. Keep wind screens clean and lights in working condition.
- 6.10.8 All vehicles used for carrying workers and construction materials must undergo predictive/preventive maintenance and daily checks
- 6.10.9 Driver with proper valid driving license shall only be allowed to drive the vehicle
- 6.10.10 Routes shall be leveled, marked and planned in such a way so as to avoid potential hazards such as overhead power lines and sloping ground etc.
- 6.10.11 While reversing the vehicles, help of another worker should be ensured at all times
- 6.10.12 An unattended vehicle should have the engine switched off
- 6.10.13 Wherever possible one-way system shall be followed
- 6.10.14 Barriers/fixed stops should be provided for excavation/openings to prevent fall of vehicle

- 6.10.15 Load should be properly secured
- 6.10.16 The body of the tipper lorry should always be lowered before driving the vehicle off.
- 6.10.17 Signs/signals/caution boards etc. should be provided on routes .

## **6.11 ELECTRICAL**

### **6.11.1 General Provisions**

- i) Only persons having valid licenses should be allowed to work on electrical facilities.
- ii) No person should be allowed to work on live circuit. The same, if unavoidable, special care and authorisation need to be taken.
- iii) Treat all circuits as "LIVE" unless ensured otherwise.
- iv) Electrical "Tag Out" procedure "MUST" be followed for carrying out maintenance jobs.
- v) Display voltage ratings prominently with "Danger" signs.
- vi) Put caution/notice signs before starting the repair works.
- vii) All electrical equipment operating above 250V shall have separate and distinct connections to earth grid.
- viii) Proper grounding to be ensured for all switch boards and equipment including Portable ones prior to taking into service.
- ix) Make sure that electrical switch boards, portable tools, equipments (like grinding machine etc.) don't get wet during their usage. If it happens, stop the main supply, make the tools dry and then only use them. Check proper earthing.  
All temporary switch boards/ KIOSKS put up at work site should be suitably protected from rain and the level of same should be high enough to avoid contact with water due to water logging.
- x) Don't work wet on electrical system.
- xi) Don't overload the electrical system.
- xii) Use only proper rated HRC fuses.
- xiii) Industrial type extension boards and Plug sockets are only to be used.
- xiv) ELCB for all temporary connections must be provided. Use insulated 3-pin plug tops.
- xv) All power supply cables should be laid properly and neatly so that they don't cause hindrance to persons working and no physical damage also takes place to the cables during various construction activities.
- xvi) All Power cables to be properly terminated using glands and lugs of proper size and adequately crimped.
- xvii) Use spark-proof/flame proof type electrical fittings in Fire Hazard zones as per area classification under OISD-STD-113.
- xviii) Check installations of steel plates/pipes to protect underground cables at crossings.
- xix) Don't lay unarmored cable directly on ground, wall, roof or trees. All temporary cables should be laid at least 750 mm below ground and cable markers should be provided. Proper sleeves should be provided at road crossings. In case temporary cables are to be laid on wooden poles/steel poles, the minimum cable heights should be 4.5 M.
- xx) Maintain safe overhead distance of HT cables as per Indian Electricity Rules and relevant acts.
- xxi) Don't connect any earthing wire to the pipelines/structures.
- xxii) Don't make any unsafe temporary connections, naked joints/wiring etc.
- xxiii) Ensure that temporary cables are free from cuts, damaged insulation, kinks or improper insulated joints.
- xxiv) Check at periodic intervals that pins of sockets and joints are not loose.
- xxv) Protect electrical wires/equipments from water and naked flames.
- xxvi) Illuminate suitably all the work areas.
- xxvii) All switchboards should be of MS structure only and incoming source should be marked.
- xxviii) Hand lamps should not be of more than 24V rating.
- xxix) Fire extinguishers (DCP/CO<sub>2</sub>/Sand buckets) should be kept near

temporary switch boards being used for construction purposes. Don't use water for fighting electrical fires.

xxx) Insulating mats shall be provided in the front and back end of switch boards.

xxxi) All parts of electrical installations should be so constructed, installed and maintained as to prevent danger of electric shock, fire and external explosion.

Periodic checking/certification of electrical safety appliances such as gloves, insulating mats, hoods etc. to be done/witnessed along with maintaining a register at site signed by competent authority.

xxxii) A notice displaying following, should be kept exhibited at suitable places:

- a) prohibiting unauthorised persons from entering electrical equipment rooms or from handling or interfering with electrical apparatus;
- b) containing directions as to procedures in case of fire, rescue of persons in contact with live conductors and the restoration of persons suffering from electric shock;
- c) specifying the person to be notified in case of electrical accident or dangerous occurrence, and indicating how to communicate with him.

xxxiii) No other cables/pipes to be laid in trench used for electrical cables.

xxxiv) Utmost care should be taken while excavating Earth from cable trench to avoid damage or any accident.

xxxv) Sub-station floor cut-outs meant for switch board installations to be covered wherever installation is incomplete.

**NOTE:** A Residual Current Operated Circuit Breaker (RCCB) or Earth Leakage Circuit Breaker (ELCB), when installed, protects a human being to the widest extent. RCCB or ELCB should be provided as per Indian Electricity Rules.

#### 6.11.2 Inspection and maintenance

i) All electrical equipment should be inspected before taking into use to

ensure suitability for its proposed use.

ii) At the beginning of every shift, the person using the electrical equipment should make a careful external examination of the equipment and conductors, especially the flexible cables.

iii) Apart from some exceptional cases, work on or near live parts of electrical equipment should be forbidden.

iv) Before any work is begun on conductors or equipment that do not have to remain live:

- a) the current should be switched off by a responsible authorised person;
- b) precautions should be taken to prevent the current from being switched on again;
- c) the conductors or the equipment should be tested to ascertain that they are dead;
- d) the conductors and equipment should be earthed and short-circuited;
- e) neighbouring live parts should be adequately protected against accidental contact.

v) After work has been done on conductors and equipment, the current should only be switched on again on the orders of a competent person after the earthing and short-circuiting have been removed and the workplace reported safe.

vi) Electricians should be provided with approved and tested tools, and personal protective equipment such as rubber gloves, mats etc.

vii) All conductors and equipment should be considered to be live unless there is a proof of the contrary.

viii) When work has to be done in dangerous proximity to live parts the current should be cut off. If for operational reasons this is not possible, the live parts should be fenced off or enclosed by qualified staff from the sub-station concerned.

### 6.11.3. Testing

- i) Electrical installations should be inspected and tested and the results recorded.
- ii) Periodic testing of the efficiency of the earth leakage protective devices should be carried out.
- iii) Particular attention should be paid to the earthing of apparatus, the continuity of protective conductors, polarity and insulation resistance, protection against mechanical damage and condition of connections at points of entry.

## 6.12 OFFSHORE

### 6.12.1 General

The isolated nature of offshore installations are hazardous. They call for greater need for safety and survival at offshore. Safety at offshore is safety of installations and safety of personnel. Safety problems and accidents at offshore have high risks due to limited space, helicopter operation, sea transport etc. Following are the general safety guidelines to be followed in addition to the safety guidelines stipulated for specific jobs dealt later on:

- i) Workers should be well trained to do their job independently with high degree of self-control and self-discipline.
- ii) On arrival at offshore, everyone should be briefed about the safety rules to be followed at offshore, evacuation system etc. All personnel should wear overall (dangri), helmet and shoes for personnel protection.
- iii) In case of emergency, workers should follow instruction of Field Production Superintendent (F.P.S.) In certain cases instructions may be given to abandon the offshore installation and evacuate the persons to safe location.
- iv) To overcome above problems, offshore personnel must receive training for using life saving appliances and other personal survival techniques.
- v) Any person working at offshore should have one person as standby for any eventuality.

### 6.12.2 Drilling Rigs

- i) Location of jack up rigs should not be less than 5 Kms from shipping route. Orientation of the rig, wind direction etc are required for safe landing of helicopter. Information w.r.t. sea currents, wind speed, Hi-lo tide etc are required for mooring of supply vessels.
- ii) Sea bed condition at every location should be ensured for safety of rig.
- iii) Radio and other communication facilities should be such to maintain contact with base all times.
- iv) During toeing of rig, the rig deck should be clear of load, toeing lines should be in good condition and tensions in various toeing lines should be constantly monitored.
- v) Few steps during toeing are:
  - a) crane booms should be secured to their vosta,
  - b) all hatches and water tight doors should be closed,
  - c) number of personnel on board should be restricted,
  - d) evacuate in case of emergency and operation should be completed preferably in day light.

### 6.12.3 Drilling

- i) In view of CO<sub>2</sub> and H<sub>2</sub>S gas cut from well, effective ventilation should be provided where drilling is in progress.
- ii) Safety alarm shall be checked in advance in view of failure of ventilation system.
- iii) Suitable sensors for H<sub>2</sub>S and Methane should be function tested time to time and suitable colour code should be given.
- iv) Working areas of the crane should be illuminated during night to avoid accident.
- v) Clear space should be available for despatch and receipt of load and, in particular, basket transfer of passengers. Persons engaged in loading/unloading of materials should be protected from falling into the sea.

- vi) Signal light should be fitted at the top of the jib.
  - vii) Crane hook should be fitted with safety latches.
  - viii) Experienced person should be engaged in operation of specific equipment like winches, cranes etc.
  - ix) At least three cable turns shall always be there on the winch drum.
  - x) Adequate communication like walkie talkie, round robin phone should be available between the crane operator, supervisor and helper.
  - xi) Crane operation should be completely stopped during helicopter landing/taking off.
  - xii) Except for helicopter landing deck, all decks, platforms, bridges, ladders should have rigid and fixed guard rails atleast one meter high and should have one intermediate rail midway between the handrail and 100 mm toe board.
  - xiii) Wooden ladders shall not be used at offshore.
  - xiv) Flow sensor in the flow line should be ensured for safe working and to avoid blow out.
  - xv) Hydrogen sulphide gas In offshore is of great risk and at 10 ppm (0.001%) concentration in air, a person should not be exposed for more than 8 hours, If concentration is more, then breathing apparatus should be used. Corrosion of equipment is also caused by H<sub>2</sub>S.
  - xvi) Portable H<sub>2</sub>S gas detector should be continuously used.
- iii) Surface safety valve or SDV should be checked for no gas leakage from bleed port / flange etc., in the well head area. It should not be in "mechanical override" or bypassed from panel.
  - iv) High pressure gas lift lines - blowdown system should be O.K.
  - v) Auto actuation of SDVs in the inlet of pressure vessels should be O.K. and in "normal position" from shutdown panels. A record of status of switches normal/bypassed in auto-con\* panels (PSH, PSL, LSL, ILSL) should be maintained.
- \* Shut Down Panels
- vi) Welders rectifier set and electrical connections to it should be checked and approved by electrical-in-charge for proper electrical safety.
  - vii) "SCADA" telemetry system if available should be operational for remote opening and closing of wells at unmanned platforms (through RPMC).
  - viii) Local ESD/FSD (near the work site) should be provided for jobs of very critical nature, so that the persons working can access it immediately in emergency for safety. Safety officer should judge the requirement & inform FPS for the same.
  - ix) Railings and Gratings etc. in and around work area should be O.K. and inspected to avoid slippage of man into sea.
  - x) Emergency shut down (ESD) system is initiated when an abnormal condition is detected. ESD should be checked once in six months.
  - xi) Platform should be manned round the clock.
  - xii) Welding and cutting work should be regulated by hot work permit.
  - xiii) All detectors should be calibrated as per recommendation of the manufacturer.
  - xiv) No system should be by-passed which affects the system of platform.

#### 6.12.4 Production Platforms

- i) In case hydrocarbon is released due to overpressure, leak, overflow, gas blow etc., shut down process to stop flow of hydrocarbon. Prevent ignition of released hydrocarbon and in case of fire shut in the process complex and follow emergency contingency plan.
- ii) Sub surface safety valve (SSSV) below the well head should be actuated during uncontrolled well - flow and they should be regularly checked.



- xv) In H<sub>2</sub>S field platforms, due care shall be taken as per recommendations.
- xvi) Follow the instructions of F.P.S. during stay at platform

#### 6.12.5 Fire Prevention And Control

- i) Provision be made for safe handling and storage of dirty rags, trash, and waste oil. Flammable liquids and chemicals applied on platform should be immediately cleaned.
- ii) Paint containers and hydrocarbon samples, gas cylinders for welding and cutting should be stored properly. Cylinders should be transported in hand-cart.
- iii) Smoking should be restricted and no smoking area should be identified.
- iv) Special attention should be given to crude oil pump seals, diesel and gas engines which are potential source of ignition in the event of failure.
- v) Fire and smoke detectors i.e. ultraviolet heat, thermal and smoke detector should be function tested once in three months.
- vi) Fire is controlled in offshore by water spraying, Halon, CO<sub>2</sub> flooding, DCP and sprinkler system.
- vii) Foaming agent is applied for controlling fire in liquid hydrocarbon. The system is not effective in gas fire.
- viii) Light weight breathing system should be used.
- ix) The fire control plan at offshore should reveal control station, fire alarms and fire detectors, deluge valves and sprinkler, fire extinguishing appliances, fireman outfit and ventilation system.
- x) Fire fighting equipment should be maintained in ready to use condition.

#### 6.12.6 Life Saving Appliances

- i) Life boats with a speed of 6 knots and carrying capacity upto 50 persons are used in offshore.
- ii) No. of life boats on one installation should have a capacity to

accommodate twice the number of persons onboard installation.

- iii) Launching appliances and life boat equipment should be checked every week.
- iv) Boat landing areas should be adequately illuminated.
- v) Life raft has no power and they rely on drift.
- vi) Life jacket lifts the wearer after entering water.
- vii) Life buoys are used to rescue persons if any person accidentally falls in the sea.
- viii) All life saving appliances should be inspected by the MMD surveyor /sr. officials once a year.
- ix) Every life boat shall be inspected once a week.
- x) Every life boat and life raft should be serviced once a year by a competent authority,

#### 6.12.7 Safety Precautions during Helicopter Transportation

- i) Passenger briefing regarding safety rules while travelling in helicopter should be carried out before boarding the helicopter.
- ii) Emergency procedure should be briefed to all the passenger In case helicopter is to ditch into the sea.
- iii) Heli-pad should have a non-skid surface. Nylon rope net should be stretched on the deck.
- iv) Proper drainage should be available on helideck.
- v) There should be no obstruction on the helideck itself and within 3 meters of its parameter. Closest super structure above the helideck should have red obstruction light.
- vi) While landing fire crew of two persons should be standby adjacent to helideck.
- vii) Heli-deck should be properly illuminated for night landing.
- viii) During switching off helicopter, persons should not be allowed to go out/ towards helicopter

## 6.13 DEMOLITION

### 6.13.1. General provisions

- i) When the demolition of any building or structure might present danger to workers or to the public:
  - (a) necessary precautions, methods and procedures should be adopted, including those for the disposal of waste or residues;
  - (b) the work should be planned and undertaken only under the supervision of a competent person.
- ii) Before demolition operations begin:
  - (a) structural details and builders' drawings should be obtained wherever possible;
  - (b) details of the previous use should be obtained to identify any possible contamination and hazards from chemicals, flammables, etc.;
  - (c) an initial survey should be carried out to identify any structural problems and risks associated with flammable substances and substances hazardous to health. The survey should note the type of ground on which the structure is erected, the condition of the roof trusses, the type of framing used in framed structures and the load-bearing walls;
  - (d) a method of demolition should be formulated after the survey and recorded in a method statement having taken all the various considerations into account and identifying the problems and their solutions;
- iii) All electric, gas, water and steam service lines should be shut off and, as necessary, capped or otherwise controlled at or outside the construction site before work commences.
- iv) If it is necessary to maintain any electric power, water or other services during demolition operations, they should be adequately protected against damage.
- v) As far as practicable, the danger zone round the building should be adequately fenced off and sign posted. To protect the public a fence 2m high should be erected enclosing the demolition operations and the access gates should be secured outside working hours.
- vi) The fabric of buildings contaminated with substances hazardous to health should be decontaminated. Protective clothing and respiratory devices should be provided and worn.
- vii) Where plant has contained flammable materials, special precautions should be taken to avoid fire and explosion.
- viii) The plant to be demolished should be isolated from all other plant that may contain flammable materials. Any residual flammable material in the plant should be rendered safe by cleaning, purging or the application of an inert atmosphere as appropriate.
- ix) Care should be taken not to demolish any parts, which would destroy the stability of other parts.
- x) Demolition activities should not be continued under adverse climatic conditions such as high winds, which could cause the collapse of already weakened structures.
- xi) To prevent hazards parts of structures should be adequately shored, braced or otherwise supported.
- xii) Structures should not be left in a condition in which they could be brought down by wind pressure or vibration.
- xiii) Where a deliberate controlled collapse technique is to be used, expert engineering advice should be obtained, and:
  - (a) it should only be used where the whole structure is to come down because it relies on the removal of key structural members to effect a total collapse;
  - (b) it should only be used on sites that are fairly level and where there is enough surrounding space for all operatives and equipment to be withdrawn to a safe distance.
- xiv) When equipment such as power shovels and bulldozers are used for

demolition, due consideration should be given to the nature of the building or structure, its dimensions, as well as to the power of the equipment being used.

- xv) If a swinging weight is used for demolition, a safety zone having a width of at least one-and-a-half times the height of the building or structure should be maintained around the points of impact.

#### **6.13.2. Demolition of structural steelwork**

- i) All precautions should be taken to prevent danger from any sudden twist, spring or collapse of steelwork, ironwork or reinforced concrete when it is cut or released.
- ii) Steel construction should be demolished tier by tier.
- iii) Structural steel parts should be lowered and not dropped from a height.

#### **6.14 RADIOGRAPHY**

- 6.14.1 All radiography jobs shall be carried out as per BARC Safety Regulations
- 6.14.2 During field radiography, nearby area around the radiation source should be cordoned off.
- 6.14.3 If the field radiography is to be done at the same location repeatedly, it is advisable to provide either a wire fencing around or a temporary brick enclosure.
- 6.14.4 Special permission/permit should be taken for radiography from area-in-charge.
- 6.14.5 As far as possible, field radiography should be done only during night time when there is little or no occupancy there.
- 6.14.6 Radiation warning signals should be pasted all along the cordoned off area.
- 6.14.7 Entry into the restricted area by unauthorised persons should be strictly prohibited during exposure.
- 6.14.8 The radiation level alongwith the cordon should be monitored by a suitable and well-calibrated radiation survey meter.

6.14.9 All personnel working with radiography sources should wear appropriate protective equipment and film badges issued by BARC.

6.14.10 Protection facilities such as manipulator rod, remote handling tongs, lead pots, radiation hazard placards and means of cordon off shall be available at each site.

6.14.11 The radiography source shall never be touched or handled directly with hands.

6.14.12 The package containing radiography cameras and sources should never be carried by public transport like bus, train etc.

6.14.13 Radiography sources and cameras, when not in use, should be stored inside a source pit with lock and key arrangement as approved by BARC. The storage room should preferably be located in an isolated area of minimum occupancy and radiation level outside the storage room should not exceed 0.25 mR/hr as per BARC Regulations.

6.14.14 In case of an accident (due to loss or of damage to radiography source), action should be taken in line with BARC Safety Rules/Guidelines.

#### **6.15 SAND/SHOT BLASTING/ SPRAY PAINTING**

6.15.1 Sand blasting should be used only after approval from competent person.

6.15.2 Air Compressor used for sand/shot blasting/painting should have guard and positioned away from the work place.

6.15.3 Exhaust of the prime mover, if IC engine is used, should be directed away from the work place.

6.15.4 In case of motor driven compressor, the body of the motor as well as the compressor to be properly earthed.

6.15.5 The hoses used for compressed air should be of proper quality, and health of the same to be ensured through regular check/ test.

- 6.15.6 The operator of sand/shot blasting/painting should wear suitable PPE's including mask.
- 6.15.7 Adequate measures to be taken to suppress dust/spray particle.
- 6.15.8 Sand used for sand blasting should be suitably covered & protected from rain/moisture.
- 6.15.9 When these activities are done in confined places, adequate measure to be taken for proper ventilation.

## 6.16 WORK ABOVE WATER

### 6.16.1 General Provisions

- i) Where work is done over or in close proximity to water & where possibility of drowning exists, provision should be made for:
  - a) Preventing workers from falling into water;
  - b) The rescue of workers in danger of drowning;
  - c) Safe and sufficient transport.
- ii) Provisions for the safe performance of work over or in close proximity to water should include, where appropriate, the provision and use of suitable and adequate:
  - a) fencing, safety nets and safety harnesses;
  - b) lifebuoys, life jackets and manned boats;
  - c) protection against such hazards as reptiles and other animals.
- iii) Gangways, pontoons, bridges, footbridges and other walkways or work places over water should:
  - a) possess adequate strength and stability;
  - b) be sufficiently wide to allow safe movement of workers;
  - c) have level surfaces free from tripping hazards;
  - d) be adequately lit when natural light is insufficient;
  - e) where practicable and necessary, to prevent danger, be provided with toe-boards, guard rails, hand ropes etc.
  - f) be secured to prevent dislodgment by rising water or high winds;
  - g) if necessary, be equipped with ladders which should be sound, of sufficient strength and length and be securely lashed to prevent slipping.

- iv) All deck openings including those for buckets should be fenced.

### 6.16.2 Rescue & Emergency procedures

- i) Persons who work over water should be provided with some form of buoyancy aid. Life jackets should provide sufficient freedom of movement, have sufficient buoyancy to bring persons to the surface and keep them afloat face upwards, be easily secured to the body, be readily visible by way of self luminous paint/strip.
- ii) Nobody should work alone on or above water.
- iii) Each worker should be trained in the procedure to be followed in the event of an emergency.

## 7.0 ADDITIONAL SAFETY PRECAUTION FOR UNITS WITH HYDROCARBONS

In addition to general safety precautions as outlined above for the activities in Clause 6.0, following additional safety precautions need to be taken for the sites within the operating area or nearby, where presence of Hydrocarbons cannot be ruled out.

- i) No job shall be carried out without a valid permit. Permit should be in line with OISD-STD-105 "Work Permit System".
- ii) Smoking should be prohibited in all places containing readily combustible or flammable materials and "No Smoking" notices be prominently displayed.
- iii) In confined spaces and other places where flammable gases, vapours or dusts can cause danger, following measures should be taken:
  - (a) only approved type electrical installations and equipment, including portable lamps, should be used;
  - (b) there should be no naked flames or source of ignition;
  - (c) oily rags, waste and clothes or other substances liable to spontaneous ignition should be removed without delay to a safe place;
  - (d) ventilation should be provided.

- iv) Regular inspections should be made of places where there are fire risks. These include the vicinity of heating appliances, electrical installations and conductors, stores of flammable and combustible materials, welding and cutting operations.
- v) Welding, flame cutting and other hot work should only be done after issuance of work permit in line with the requirement of OISD-STD-105 after appropriate precautions, as required, are taken to reduce the risk of fire. For carrying out other jobs also, OISD-STD-105 should be followed strictly.
- vi) Fire-extinguishing equipment should be well maintained and inspected at suitable intervals by a competent person. Access to fire-extinguishing equipment such as hydrants, portable extinguishers and connections for hoses should be kept clear at all times.
- vii) All supervisors and a sufficient number of workers should be trained in the use of fire-extinguishing equipment, so that adequate trained personnel are readily available during all working periods.
- viii) Audio means to give warning in case of fire should be provided where this is necessary to prevent danger. Such warning should be clearly audible in all parts of the site where persons are liable to work. There should be an effective evacuation plan so that all persons are evacuated speedily without panic and accounted for and all plant and processes shut down.
- ix) Notices should be posted at conspicuous places indicating:
  - (a) the nearest fire alarm;
  - (b) the telephone number and address of the nearest emergency services.
- x) The work site shall be cleared of all combustible materials, as Sparks and molten metal coming from the welding job can easily ignite combustible materials near or below the welding site. If the combustible materials cannot be removed from the area, the same shall be properly shielded.
- xi) A dry chemical type fire extinguisher shall be made available in the work area. Also fire protection facilities like running hoses etc. as per permit should be complied with.
- xii) Wherever required, welding screens shall be put up to protect other equipment in adjoining areas against flying sparks. Material used should be metal/asbestos/water curtain.
- xiii) Welding or cutting of vessels/equipments used in Hydrocarbon/hazardous chemicals shall be done after proper gas freeing and verifying the same with the explosive-meter.
- xiv) The confined space/equipment shall be gas freed and cleaned.
- xv) Absence of any toxic gas and any flammable gas above explosion limit shall be ensured with the help of gas detection instrument and explosive meter respectively.
- xvi) Used and hot electrode stubs shall be discarded in a metal bucket.
- xvii) Use approved and certified flame arrestors for vehicles.
- xviii) Work permit to be obtained, if construction work is carried out within existing operating area.

## **8.0 FIRST AID**

First aid facilities should be provided in line with various statutory regulations like factory act etc. However following care should be taken:

- i) First aid, including the provision of trained personnel should be ensured at work sites. Arrangement should be made for ensuring the medical attention of the injured workers. First aid box should be as per the Factory rules.
- ii) Suitable rescue equipment, like stretchers should be kept readily available at the construction site.
- iii) First-aid kits or boxes, as appropriate and as per statutory requirements, should be provided at workplaces and be protected against contamination by dust, moisture etc.

- iv) First-aid kit or boxes should not keep anything besides material for first aid in emergencies.
- v) First-aid kits and boxes should contain simple and clear instructions to be followed, be kept under the charge of a responsible person qualified to render the first aid and be regularly inspected and stocked.
- vi) Where the work involves risk of drowning, asphyxiation or electric shock, first-aid personnel should be proficient in the use of resuscitation and other life saving techniques and in rescue procedures.
- vii) Emergency telephone numbers of nearby Hospitals, Police, Fire Station and Administration should be prominently displayed.

## 9.0 DOCUMENTATION

The intention of keeping documentation of all types of accident(s) is to prevent recurrence of similar accident(s). All accidents should be reported as per OISD Guidelines (OISD-GDN-107) and Factories act, 1948.

All accidents (major, minor or near miss) should be investigated, analysed and recommendations should be documented along with implementation status.

All related data should be well-documented and further analysis highlighting the major cause(s) of accidents be done. This will help in identifying thrust areas and training needs for prevention of accidents.

## 10.0 SAFETY AWARENESS & TRAINING

Safety awareness to all section of personnel ranging from site-in-charge to workmen helps not only preventing the risk but also build up the confidence. Time and expenditures also get saved as a result.

Safety awareness basically seeks to persuade/inform people on safety besides supplementing skill also. Awareness programme may include followings:

- i) **Poster:** Posters with safety slogan in humorous, gruesome demonstrating manner may be used to discourage bad habits attributable to accidents by appealing to the workers' pride, self-love, affection curiosity or human aspects. These should be displayed in prominent location(s).
- ii) **Safety Sign Boards:** Different type of message of cautioning, attention, notice etc. should be displayed at the appropriate places for learning/awareness of the workmen while working at site.
- iii) **Films & Slides:** Film(s) narrating the accident including the causes and possible remedial ways of preventing the recurrence of a similar accident should be displayed at regular intervals. Slides consisting main points of the film show may also be shown to workers.
- iv) **Talks, lectures & conferences:** The success of these events would depend much on audience's understandings of the speaker (s). The speakers are to be knowledgeable and good presenter. Speakers should know to hold the attention and to influence the audiences.
- v) **Competitions:** Organise competition(s) between the different deptts/categories of workers. The sense of reward/recognition also will improve safety awareness and result in enhancing safety levels.
- vi) **Exhibitions:** Exhibitions also make the workers acquainted with hazards and means of preventive measures.
- vii) **Safety Publication:** Safety publications including pocket books dealing with ways of investigation and prevention in the field of safety and so on, may be distributed to workers to promote the safety awareness.
- viii) **Safety Drives:** From time to time, an intensive safety drive by organising a safety day or a safety week etc. should be launched.
- ix) **Training:** Training for covering the hazards for different trade should be imparted. Training should also include the specific hazards related

to a job in addition to the general safety training as has been dealt in various chapters and should include all workers. Reference may be drawn from OISD-STD-154.

#### **11.0 REFERENCES**

- i) *Factory Act, 1948*
- ii) *Indian Electricity Rules*

- iii) *Safety & Health in Construction by ILO*
- iv) *The Building & Other Construction Workers (Regulation, Employment and Conditions of Service) Act 1996*

**LIST OF SAFETY CODES FOR CIVIL WORKS PUBLISHED BY BUREAU OF  
INDIAN STANDARDS**

Sr.no	Code No.	Title
01.	IS : 818	Code of Practice for Safety and Health Requirements in Electric and Gas Welding and Cutting Operations – First Revision.
02.	IS : 875	Code of practice for Structural safety of buildings: Masonry walls
03.	IS : 933	Specification for Portable Chemical Fire Extinguisher, Foam Type – Second Revision.
04.	IS : 1179	Specification for Equipment for Eye and Face Protection during Welding – First Revision.
05.	IS : 1904	Code of practice for Structural safety of buildings: Shallow foundations
06.	IS : 1905	Code of practice for Structural safety of buildings: Masonry walls
07.	IS : 2171	Specification for Portable Fire Extinguishers, Dry Powder Type – Second Revision.
08.	IS : 2361	Specification for Building Grips – First Revision.
09.	IS : 2750	Specification for Steel Scaffoldings.
10.	IS : 2925	Specification for Industrial Safety Helmets – First Revision.
11.	IS : 3016	Code of Practice for Fires Precautions in Welding and Cutting Operations – First Revision.
12.	IS : 3521	Industrial safety belts and harnesses
13.	IS : 3696 – Part I	Safety Code for Scaffolds and Ladders : Part I – Scaffolds.
14.	IS : 3696 – Part II	Safety Code for Scaffolds and Ladders : Part II – Ladders.
15.	IS : 3764	Safety Code for Excavation Work.
16.	IS : 4014 -Part I & II	Code of practice for Steel tubular scaffolding
17.	IS : 4081	Safety Code for Blasting and Related Drilling Operations.
18.	IS : 4082	Recommendations on staking and storage of construction materials at site
19.	IS : 4130	Safety Code for Demolition of Buildings – First Revision.
20.	IS : 4138	Safety Code Working in Compressed Air-First Revision
21.	IS : 4756	Safety code for Tunneling works
22.	IS : 4912	Safety requirements for Floor and Wall Openings, Railings and toe Boards –First Revision.
23.	IS : 5121	Safety Code for Piling and other Deep Foundations.
24.	IS : 5916	Safety Code for Construction involving use of Hot Bituminous Materials.
25.	IS : 5983	Specification for Eye Protectors – First Revision.
26.	IS : 6922	Structures subject to underground blasts, criteria for safety and design of
27.	IS : 7155	Code of recommended practices for conveyor safety
28.	IS : 7205	Safety Code for Erection on Structural Steel Works.



Sr.no	Code No.	Title
29.	IS : 7069	Safety Code for Handling and Storage of Building Materials.
30.	IS : 7293	Safety Code for Working with Construction Machinery.
31.	IS : 7323	Guidelines for operation of Reservoirs
32.	IS : 7969	Safety code for handling and storage of building material
33.	IS : 8758	Recommendation for Fire Precautionary Measures in construction of Temporary Structures and Pandals.
34.	IS : 8989	Safety Code for Erection of Concrete Framed Structures.
35.	IS : 9706	Code of Practices for construction of Arial ropeways for transportation of material
36.	IS : 9759	Guidelines for de-watering during construction
37.	IS : 9944	Recommendations on safe working load for natural and man-made fibre roap slings
38.	IS : 10291	Safety code for dress divers in civil engineering works
39.	IS :10386 – Part I	Safety Code for Construction, Operation and Maintenance for River Valley Projects.
40.	IS :10386 – Part II	Safety Code for Construction, Operation and Maintenance of River Valley Projects.
41.	IS : 11057	Code of practice for Industrial safety nets
42.	IS : 13415	Code of Practice on safety for Protective barriers in and around building
43.	IS : 13416	Recommendations for preventive measures against hazards at working places

**OISD – GDN – 207**

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**OCTOBER 2002**

**CONTRACTOR SAFETY**

**OISD – GUIDELINES – 207**

**Oil Industry Safety Directorate  
Government of India  
Ministry of Petroleum & Natural Gas**

# CONTRACTOR SAFETY

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# CONTRACTOR SAFETY

## 1.0 INTRODUCTION

Oil and Gas operations like Drilling, Production, Refining, Transportation and Distribution are inherently hazardous. A large number of contractor workforce is deployed to carry out construction, maintenance and other jobs. The analysis of the incidents in the Petroleum Sector indicates that a large number of incidents involved contractor workforce and have resulted in either casualty or injury besides leading to property damage and operational interruptions and environmental degradation.

In order to improve the safety levels of oil installations, the contractor safety is of utmost importance and there is a need to institute a good contractor safety system.

## 2.0 SCOPE

This standard covers broadly the guidelines on the management system for enhancing the safety levels of the contractor workforce deployed in construction, maintenance and operation activities in the hydrocarbon industry.

The safety precautions to be taken while carrying out different activities during construction / maintenance have separately been covered in OISD-GDN-192 on "Safety Practices during Construction".

## 3.0 DEFINITIONS

### Work station/Work site

A place/unit where the job is carried out by contractor/executing agency in specified manner with safety, during construction phase or in operation phase.

### Owner

Any physical or legal person/entity for whom prescribed job is carried out.

It shall also include owner's designated representative / consultant /nominee / agent, authorised from time to time to act for and

on its behalf, for supervising / co-ordinating the activities of the contractor/execution agency.

### Contractor / Executing Agency

A physical or legal person/entity having contractual obligation with the owner, and who deploys one or more worker on the site.

### Contractor Worker

It covers all workmen who are either self-employed or employed through contractor, the casual workers and includes contractor's supervisor, working at a location / site employed directly by Owner or through their contractor.

### Incident

An incident is an unplanned, uncontrolled, unintended or unforeseen event, caused by unsafe acts and / or unsafe conditions, resulting in or having the potential to result in personal injury and/or property damage.

### Consultant

Consultant is a physical or legal person/entity engaged by owner to provide the consultancy services to owner for management of the contract on their behalf or as specified.

### Designer

Designer is a physical or legal person / entity engaged by owner to provide design services of a work site.

### Owner's Representative / Engineer In Charge

The Owner's representative/Engineer-in-charge is the one, who has been designated by the owner to manage the contract.

### Owner's Safety Officer

A properly trained person designated by owner who ensures safety at work site.

## 4.0 DUTIES/ RESPONSIBILITIES

### 4.1 OWNER

#### 4.1.1 Owner's Management

The commitment to safety has to be emphasised by the owner by practice by its own management and employees at all levels. The duties and responsibilities of owner should include:

- i) To institute a mechanism for identification and compliance of all applicable statutory rules & regulations (Refer Annexure I for a list of few important Bureau of Indian Standards & statutory regulations).
- ii) To provide specific information to contractors and make workers aware on the hazards associated with job assigned.
- iii) To provide information about Risk Mitigation measures available at the place of work.
- iv) To provide the contractor with information on Owners Safety Plan & Regulations, Emergency Management Plan, lockout/ tag out procedure, confined space entry, work permit system, excavation/trench permit system etc.
- v) To specify rules (e.g. for security including access arrangements) and safety rules such as fire protection, first aid arrangements, Work Permit systems etc.
- vi) To provide comprehensive list of statutory regulations / standards and specification, to be complied with during execution of contract, in the tender document itself.
- vii) To ensure training of the contractor workforce, medical examination, and proper usage of safety equipment.

- viii) To specify the requirements of Health, Safety and Environment (HSE) (commensurate with the nature of job) in Pre- Qualification criteria.
- ix) To designate Engineer-in-charge and safety officer.
- x) To arrange for a multi-disciplinary safety audit team to conduct surprise / regular safety audits and monitor the implementation of the recommendations.
- xi) To introduce suitable schemes for motivation of the contractor worker to adhere to safety guidelines.
- xii) To review safety practices & their implementation through periodic surprise visit of the work sites and monthly review meeting.
- xiii) To develop the HSE plans and incorporate the same in the tender document.
- xiv) To liaise with external agencies like press, public etc and with law enforcement, regulatory, statutory agencies etc.
- xv) To report to statutory agencies on safety compliance and accidents, if any.

#### 4.1.2 Owner's Representative/Engineer-in-charge

The duties & responsibilities of engineer-in-charge should include:

- i) To ensure that all Contract requirements including Health, Safety, Environment & Security are complied with.
- ii) To ensure that contractor workforce deployed is adequately qualified, trained and in state of health to commensurate with the requirements of the job.
- iii) To ensure that the Tools / Tackles and Machinery being used are properly

tested and are in sound working conditions and necessary resources proposed for providing safe place of work and necessary PPE are being used.

- iv) To take the required necessary corrective action immediately upon noticing or receipt of a report on noncompliance or any such condition which poses a threat to health, safety or environment. If during the course of execution of the contract, any situation of non-compliance with the contractor's safety and health plan are noticed / reported, the same will be taken up with the contractor for correction. In the event of repeated non compliance, suitable action to be initiated as per the contract.
- v) To ensure that the incidents are reported to all concerned within stipulated timeframe.
- vi) To ensure submission of a plan for safe working (Method Statement) from contractor and approval of the same by competent person / department.
- vii) To ensure that Work Permit System in line with OISD-STD-105 is adhered to.
- viii) To ensure availability of all the documentation needed for the execution of contract.
- ix) To ensure that the quality controls have been maintained during fabrication/erection and all jobs required for safe commissioning have been carried out.
- x) To ensure safe dismantling of all temporary facilities/connections put up by the contractor, after completion of work.
- xi) To compile a report on the safety performance (at the conclusion of each contract or periodically such as annually for renewable and long-term

contracts), which is to be considered in future when selecting contractors.

- xii) To ensure that the Consultant, contractor and sub-contractor employ / designate qualified & trained Safety Engineer / Officer commensurate with requirement of the job.

#### **4.1.3 Owner's Safety Officer**

The duties & responsibilities of the Owner's Safety Officer should include:

- i) To assess the hazards associated with jobs in consultation with all concerned and establish safe working procedure including identification of the escape routes.
- ii) To establish a written record of factors which can cause injuries and illnesses.
- iii) To undertake routine/surprise inspections of all work sites and identify unsafe conditions & practices, if any. Check for compliance of the safety practices being followed with approved HSE Plan.
- iv) To investigate promptly the incidents (including near-miss) in order to advise corrective and/or preventive action.
- v) To maintain statistical information for use in analyzing all phases of incidents and events involving contract personnel.
- vi) To provide the means for complying with the reporting requirements for occupational injuries and illnesses.
- vii) To check whether the proposed working arrangements are safe and satisfactory, particularly at the interface between the contractor's planned work and owner's existing facilities.
- viii) To communicate to the Contractor the imposed restrictions which may affect the work/personnel such as the temporary closure of a corridor or electrical isolation of equipment.

- ix) To review and monitor the contractor's adherence to approved HSE plan and all applicable environmental, health, and safety requirements.
- x) To ensure that Consultant, Contractor's Managers, Supervisors and workmen at all levels (who will plan, monitor, oversee and carry out the work) undergo Health, Safety and Environmental training in their respective responsibilities with respect to conducting work safely and with due regard for the protection of the environment.
- xi) To identify areas of operations where specialized training is required to deal with potential dangers.
- xii) To document and to bring to the attention of the Owner's Supervisor and Contractor any non-compliance/violation of the safety norms against approved safety and health plan or safety and health requirements and also raise these issues in the Safety Committee Meetings.
- xiii) To take part in Tool Box Meetings at random and to ensure maintenance of records.

## 4.2 CONTRACTOR

### 4.2.1 Contractor's Management

Duties & responsibilities of the contractor should include the following:

- i) To implement safe methods and practices, deploy appropriate machinery, tools & tackles, experienced supervisory personnel and skilled work force etc. required for execution.
- ii) To prepare a comprehensive and documented plan for implementation, monitoring and reporting of Health, Safety and Environment (HSE) and implement the same after its approval.

- iii) To nominate qualified & trained Safety Engineers / Officers reporting to the Site in charge, for supervision, co-ordination and, liaison for the implementation of the safety plan.

Similar HSE Plan should be implemented at the sub- contractor's or supplier's site /office. However the compliance with the HSE Plan is to be the sole responsibility of the Contractor.

- iv) To arrange suitable facilities in liaison with the owner for drinking water, toilets, lighting, canteen, crèche etc as applicable as per Laws/ Legislation at site and also arrange for workmen compensation insurance, third party liability insurance, registration under ESI / PF act etc as applicable.
- v) To arrange for fire protection equipment as per the advice of owner.
- vi) To ensure that its employees have completed appropriate health and safety training as required by the statute / regulation and also as per requirements of the Owner / Consultant. The documentation of such training imparted to all its employees should be maintained and produced for verification as required.
- vii) To comply with all the security arrangements of owner.
- viii) To ensure that the plant and equipment used on-site by him / his employees is correctly registered, controlled and maintained in sound working condition.
- ix) To ensure availability of First Aid boxes and First Aid trained attendant.
- x) To ensure that all incidents including near misses are reported to all concerned immediately.

In construction projects where sub-contractors are engaged, the contractor should set out the responsibilities, duties and safety measures that are expected of

the sub-contractor's workforce. These measures should include the provision and use of specific safety equipment, methods of carrying out specific tasks on safety and the inspection and appropriate use of tools.

The responsibilities indicated separately under contractor's Supervisor, Safety Officer and contract worker are contractually that of the Contractor and legally binding on the Contractor only. However the specific detailing as above has been given separately for guidance and operational convenience.

The selection of sub contractors, if employed, should be approved by the owner. Sub-contractor should comply fully with all safety rules and conditions applicable to the main contractor.

#### **4.2.2 Contractor's Supervisor / Safety Officer**

Duties & responsibilities of the Contractor's supervisor/Safety Officer should include the following:

- i) To ensure strict compliance with work permit system by carrying out work only with appropriate work permits and after ensuring that all safety precautions / conditions in the permit are complied with and closing the same after job completion.
- ii) To ensure that required guards and protective equipment are provided, used, and properly maintained.
- iii) To ensure that tools and equipment are properly maintained and tested.
- iv) To plan the workload and assign workers to jobs in commensuration with their qualification, experience and state of health.
- v) To ensure that the workers understand the work to be done, the hazards that may be encountered, and the proper precautions/procedure for carrying out the work safely.
- vi) To take immediate action to correct any violation of safety rules observed or reported.
- vii) To ensure that the workers likely to be exposed to hazardous chemicals/materials have access to appropriate Material Safety Data Sheets (MSDS), wherever applicable, and provide necessary mitigation measures.
- viii) To ensure inspection and certification of all tools (hand operated as well as mechanically operated) being used. Defective tools shall be immediately removed.
- ix) To ensure that appropriate warning signboards or tags are displayed.
- x) To ensure that workers have proper training for their job assignments, including use of appropriate PPE and first aid fire fighting equipment.
- xi) To comply with all applicable safety and health standards, rules, regulations and orders issued by competent authority pertaining to the assigned activities.
- xii) To ensure that sick and/or injured workers receive appropriate first aid and/or medical attention.
- xiii) To report each incident and/or injury in accordance with established procedures and assist in investigation.
- xiv) To take necessary action for correction of any unsafe act / condition at the workplace. However, in case the same is outside the limits of authority, it should be reported to Owner's Engineer-in-charge immediately.
- xv) To conduct daily inspections to ensure compliance with safety standards, codes, regulations, rules and orders applicable to the work concerned.



- xvi) To ensure that workers under their supervision are aware of their responsibilities.
- xvii) To arrange daily tool box meeting and regular site safety meetings and maintain records in the required formats. (Refer Clause 5.9.1)
- xviii) To arrange stand-by supervisor/worker where situations so demand.
- xix) To develop methods and display banners/posters to inculcate safety consciousness.
- xx) To attend training and ensure participation of his workers for training as per schedule arranged by the Owner / Consultant and keeps himself updated.
- xxi) To keep records of number of persons working at the site.
- xxii) To keep a constant liaison with Engg-in-charge / owners' representative on safety issues.
- xxiii) To maintain accident & nearmiss record in a register.
- xxiv) To ensure that only PPE of the approved type by owner is used at site.

A separate Safety Officer should be assigned, where more than 100 workers are employed at site. For smaller jobs, the supervisor should assume the role of the safety officer also.

#### 4.2.3 Contract workers

The duties & responsibilities of the contractor worker should include the following:

- i) To perform work safely as per the job requirement and instructions.
- ii) To inform all concerned regarding unsafe conditions/acts.

- iii) To wear PPE as stipulated and necessary for the job.
- iv) To inform promptly to their supervisor regarding all work related incidents resulting in personal injury, illness and/or property damage.
- v) To take all necessary and appropriate safety precautions to protect themselves, other personnel and the environment.

### 4.3 CONSULTANT

The activities and responsibilities covered under the scope of the Owner may be delegated to the consultant in those cases as applicable, based on the respective contract conditions. The primary responsibility of Consultant is to ensure compliance with agreed HSE plan for the contract by the Contractor. However those responsibilities conferred on Owner as Principal employer cannot be delegated to consultant.

Where the consultant's scope involves Engineering and Design, those factors under **Designer** should also be applicable.

In all cases, the Consultant's scope should include submission of latest HSE plans for work under his and Contractor's purview and implementing the same till job completion. It should conform to owner's overall HSE plan. This should include Guidelines and Implementation and Reporting Methodology to be followed with required report formats.

Adequate number of Safety Officers shall be provided by the Consultant with necessary skills required for the work to be performed.

The Consultant shall review the documents submitted by the contractor and advise owner on acceptance as well as advise suitability and number of Contractor's safety officers / supervisors.

### 4.4 DESIGNER

The Process Designer should identify all hazards and risks likely to be encountered during fabrication, erection including

dismantling, Pre-commissioning, commissioning and Performance run to meet the Guarantees and advise the risk mitigation measures.

All the hazards and safety measures to be adopted while handling Dangerous chemicals and Catalysts should be detailed by the Process Licensor and the same should be again included in the scope of the suppliers. Specific write ups/MSDS should be obtained from Patented single source suppliers also.

Designs should recognize, include and apply safe practice during preparation, construction and subsequent operational use and maintenance after completion of the Project.

All documents including drawings and calculations are to be originated, checked and approved in accordance with latest international codes, standards, specifications and design basis philosophy.

**Preferred use of low risk materials, policy on hazardous substances, preferred use of low noise and dust-suppressed equipment etc. should be encouraged.**

## **5.0 SAFETY MANAGEMENT**

### **5.1 JOB SAFETY ANALYSIS (JSA)**

Job safety analysis (JSA) provides a mechanism by which the contractor, safety officer or supervisor take a detailed look at how an individual task is performed and its inherent hazards and preventive measures. This procedure helps in integrating accepted safety and health principles and practices into a particular operation. In a JSA, each step of the job is examined to identify potential hazards and to determine the safest way to do the job.

A job safety analysis includes five steps as below:

- Select a job
- Break the job down into a sequence of steps
- Identify the hazards against each of these steps (based on knowledge of

accident, causes of injuries and personal experience) and determine the preventive measures to overcome these hazards

- Apply the controls to the hazards
- Evaluate the controls

### **5.2 CRITERIA OF SELECTION OF A CONTRACTOR**

“Contractor Safety” can be ensured to a large extent if competent agency for execution of assignment or job, based on HSE system agreed upon by owner, is selected. It is necessary to assess his capabilities and competencies to perform work safely.

A databank should be developed for all the contractors for their past performance on HSE aspects. An attempt should also be made to get similar data from other similar industries.

The data required will depend upon complexity involved in the job and type / size of resources required. Format needs to be suitably developed depending upon size, nature of the job & hazard associated therein. The format designed should also take care of the skill required to carry out the job.

Performance review is essential for all type of contractors. It helps in recording actual performance/experience with contractors while the contract is in progress. It is essential that resources agreed as per the contract are reviewed at mobilization stage for ensuring compliance from the day one and thorough effective supervision / monitoring system are at place.

This activity also helps in taking timely action in case of unsatisfactory performance to correct the situation and ensure safe work during execution period and deciding about suitability of the contractor for future jobs.

The periodicity of such performance review will depend upon size/type/complexity of contract. However, the performance should be reviewed at least at mobilisation stage and at the end of the contract.

### 5.3 SITE PLANNING AND LAYOUT

Before starting the construction/maintenance job at existing workplace in operation or green field locations, following should be ensured: -

- i) Details regarding location of workshop/ fabrication yard, site office, stores, laboratory, electrical installations, placement of construction machinery, medical and welfare facilities, lighting underground and above ground piping route, cable route etc. should be decided prior to commencement of the work in consultation with owner / Consultants and implementation should be ensured. Layout should be displayed at strategic locations.
- ii) The resources required to meet any emergency situations like fire fighting, first aid etc. should be planned and mobilized as per the job requirement.
- iii) The sequence or order in which work to be done and any hazardous operations or processes should be identified.
- iv) Free access to site shall be provided with clear roads, passage, gangways, staircases etc. Access to construction site should be leveled, open and free from any obstructions like construction material or scrap/waste, exposure to hazards such as falling materials, material handling equipment and vehicles. Any pit or ditch shall be covered or barricaded.
- v) Arrangements should be made to maintain good housekeeping at site. Scrap and debris generated out of construction work should be removed/disposed off at a regular interval as directed. Emergency exit should be provided in case of blockade of primary exit.
- vi) Suitable warning notices and also the routes to and from welfare facilities should be displayed prominently.

vii) Pedestrian pathways and routes for vehicular traffic (light/heavy vehicles including material handling equipment) should be earmarked.

viii) Artificial lighting to be provided at places where work continues or workers pass by after sunset or in case natural light is insufficient like confined spaces.

ix) Keep all equipment /machines under cover to prevent them from dust, rain/flood water, heat etc. and follow storage instructions as applicable for each of them.

### 5.4 GATE ENTRY PROCEDURE

Gate entry at any site / workplace / unit is to be restricted to ensure entry of only authorised persons / vehicles.

5.4.1 Entry procedure for all contractor worker should be as follows:

#### A. Issuance of Pass

i) The passes are to be issued after the owner's representative/engineer-in-charge forwards the application of the contractor providing complete details of the workers being engaged. The contractor may be asked to submit Character & Antecedents (C&A) verification of individual worker from concerned authorities.

ii) With regard to issuance of passes for all vehicles including material handling equipment, owner's representative / engineer-in-charge should forward the application only after ensuring that all documents pertaining to the fitness of the vehicle/equipment and valid driving license of the driver etc. are available.

iii) The passes should be serially numbered with address, contractor name, identification mark, signature of the worker etc.

iv) Special colour code for passes should be used for persons entering different

areas like Administrative Block, Unit area, Project Area (wherever applicable).

- v) Contractor workers engaged on routine basis for long periods should be provided with monthly photo pass.
- vi) Special permit is required separately for working beyond normal working hours and holidays.

## **B. Gate Entry**

- i) Entry of the contractor's employees should be permitted with valid gate passes only.
- ii) Entry of contractor's workers should be allowed in presence of authorized representative of contractor.
- iii) Records of persons at the time of entry/exit should be maintained.
- iv) At the entry gate of the location, a physical checking for non-carrying of lighter, matchboxes, explosives etc. should be carried out.
- v) Gate passes/Identity Cards should be displayed on persons at all the times.
- vi) For Mega-projects at existing / operating installations, it is preferable to have a separate gate for entry of contractor workers and also the project areas should be segregated fencing from operational area by fencing / other physical means.
- vii) No vehicle should be allowed to enter in an operational area without proper flame arrestor.
- viii) Awareness on Safety through training / posters etc. highlighting Do's and Don'ts should be spread within entire contractor workforce. Video/Audio tapes on Safety Topics should be played preferably.
- ix) For occasionally engaged labourers such as for material handling etc., spot photograph may be preferably

taken with two copies (one for preparing the pass and other for attachment with gate register). Specific advice and recommendation of User Department may be given due cognizance. Relevant details are to be written. The pass should be collected back at the gate after day's work.

### **5.4.2 Tank Truck Loading (TTL) Operation :**

At the loading / unloading location, a large no. of Tank Trucks of petroleum products enter the installation. Crew members are generally not regular entrants. The procedure should be as follows:

- i) The gate pass should be issued to the individual crew members on written request of the transporter mentioning TT registration nos., License and certificate of training as per MV rule 9.
- ii) Character & Antecedent (C & A) verification of the TTL crew through local police is to be done preferably and record maintained.
- iii) For loading/unloading purpose, register entry at security gate is made before allowing entry into the premises with recording of names of crew members, time of entry, pass Sr. No., TT no. etc.
- iv) For loading/unloading, crew is allowed entry alongwith TT only, after checking of TT from explosive/security point of view.
- v) Out time, invoice no., Destination etc., are recorded while TTs go out of the security gate.

### **5.5 TRAINING**

Training is to educate contractor workforce on various hazards associated with the job/workplace and on the respective preventive / mitigation measures to avoid untoward incidents.

- i) Workers should be adequately and suitably:
    - (a) informed of potential safety and health hazards to which they may be exposed to at their workplace;
    - (b) instructed and trained in the measures available for the prevention, control and protection against those hazards.
  - ii) No person should be employed in any work at a workplace unless that person has received the necessary information, instruction and training so as to be able to do the work competently and safely. The competent authority should, in collaboration with employers, promote training programs to enable all the workers to read and understand the information / instructions related to safety and health matters.
  - iii) The information, instruction and training should be given in a language understood by the worker and written, Oral, visual and participative approaches should be used to ensure that the worker has assimilated the information.
  - iv) Every worker should receive instruction and training regarding the general safety and health measures common to the workplace. This should include:
    - (a) general rights and duties of workers at the workplace;
    - (b) means of access and egress both during normal working and in an emergency;
    - (c) measures for good housekeeping;
    - (d) location and proper use of welfare amenities and first aid facilities provided;
    - (e) proper use and care of the items of personnel protective equipment and protective clothing provided to the worker;
- (f) general measures for personal hygiene and health protection;
  - (g) fire precautions to be taken;
  - (h) action to be taken in case of an emergency;
  - (i) requirements of relevant safety and health rules and regulations.

Copies of the relevant safety and health rules, regulations and procedures should be available to workers upon the commencement of and upon any change of employment.

### 5.5.1 Training Techniques

#### a) Lectures

This technique should be applied when it is required to transfer information in local language to a large contractor workforce with controlled content and time.

#### b) Case Study

This is an effective technique based on the presentation of case of real events by Trainer to highlight probable causes like Human Error, ignorance about the job etc.

#### c) Videos

Videos, an effective technique of communication, should be used to display the right techniques of performing a task in a safe manner and hazards associated with a job.

#### d) Demonstration at site

Right way to do a job should invariably be demonstrated to workers at the site itself. The right way is also a safe way. Hazards due to wrong procedures, short cuts and their adverse effects etc. should also be highlighted.

## 5.5.2 Training/Awareness Module and Frequency

**A.** General Safety Training to all categories of contractor employees should be imparted before induction and annually thereafter. No person should be allowed to enter the installation without undergoing this training. This training program may cover:

- i) Mandatory uses of PPE like Cotton clothes, Helmet, Safety Shoes, Safety Belts etc.
- ii) Probable Hazards
- iii) Important Telephone No / Escape route
- iv) First Aid
- v) Use of Fire extinguisher

The contractor workers, if engaged in operation of the plants/facilities, should be trained in line with Clause No. 4.6 of OISD-GDN-206 on "Safety Management System". For other categories of contractor workers, training modules for different category employees are as follows:

### **B. Contractor Supervisor**

Contractor Supervisor should be trained in accordance with the provision of clause no. 5.1.1.2, 5.2.7, 5.3.10, 5.6.12 and 5.7.8 of OISD-STD-154 on 'Safety Aspects in Functional Training'

### **C. Contractor Worker**

Yearly training programme should be carried out for contractor worker and the records should be maintained. The training programme should cover at least the following:

- i) Worker responsibility for safety of himself and work area.
- ii) Associated hazards with the job and job area including electrical shock hazards.

iii) Importance of First Aid fire fighting equipment, their use & operations

iv) Communication system at the installation

v) Fire / Accident Reporting procedure

vi) General Safety rules

vii) Safety Measures during execution of job such as:

- Welding / Cutting / Grinding
- Working at height
- Confined space entry
- X ray / radiation
- Erection / Dismantling of scaffolding
- Tank construction and repairs
- Handling of chemicals etc.

viii) Importance & use of PPE

ix) Emergency Routes

x) Assembly Points

xi) Job Specific Training

### **D. Consultant / Contractor**

Awareness program should be carried out for Consultant / Contractor at the time of induction. This program should cover at least the following:

- i) Responsibility of contractor for safety of their personnel and work area
- ii) Hazardous property of Petroleum products and chemical used
- iii) Communication system
- iv) Fire / Accident Reporting procedure
- v) Medical facility available
- vi) Statutory requirements

- vii) Importance of First Aid equipment and required at the site
- viii) Work Permit system
- ix) Direct/ Indirect losses due to accident
- x) Safety Measures while executing the jobs such as:
  - Welding / Cutting / Grinding
  - Working at height
  - Confined space entry
  - X ray / radiation
  - Erection / Dismantling of scaffolding
  - Tank construction and repairs
  - Handling of chemicals etc.
  - electrical jobs
- xi) Safety training needs of their supervisors and workers
- xii) Importance & Use of PPE at the site
- xiii) General Safety rules at the installation

## **E Security Personnel**

Training program should be carried out for Security personnel at the time of induction and annually thereafter and the records should be maintained. The training program should cover at least the following:

- i) Layout of Plant and Facilities
- ii) Vulnerable locations
- iii) Safety regulations (Statutory and in company)
- iv) Fire Protection Facilities and Locations
- v) Role in case of Fire / Disaster
- vi) Emergency Procedure and Drills
- vii) Industrial First Aid
- viii) Use of Personnel Protective Equipment
- ix) Disaster Management Plan

## **5.6 INSPECTION / AUDIT**

Inspection / Audit is a tool to evaluate compliance of all safety requirements. Most of the information could be gathered

through site inspection using ready-made check lists to ensure that contractors / agencies abide by the safety rules and norms while working at operating / construction sites.

A checklist, while carrying out different type of jobs, should be developed based on hazards associated with the job being performed and requirements as per OISD-GDN-192 on "Safety Practices during Construction". Typical format is enclosed at Annexure II, which should be modified to suit the requirement of the site / job to be done.

Before starting the work and at regular intervals thereafter, Contractor's Supervisor/safety Officer and Owner's representative / Engineer-in charge/safety Officer should inspect as per the checklist so prepared to ensure that contractor has prepared to start the work with all safety precaution required for safe execution of job.

## **5.7 PENALTIES FOR NON-COMPLIANCE**

Financial or other type of penalties like seizure of gate passes, stoppage of work for a limited period etc. may be levied on the contractors or their workers for non-compliance of safety rules. A provision of suitable accident severity based penalty clause for contractor may be incorporated to ensure adherence of systems and procedures. A few of the usual non-compliance are as follows:

- Non-usage of PPEs like Safety helmet / Safety shoes / Safety goggles / Respiratory protection etc. by the contractor personnel
- Non-usage of the safety belt and life line by the workers while working at height
- Non-provision of basic safety requirement such as 24 V lamp for working in confined space, uncertified / non standard lifting tools, earth leakage protection & earthing connections for electrical appliances as per Indian Electricity Rules, emergency isolation switches etc.

- Violation of Safety Permit conditions like Fire fighting equipment
- Non-barricading of area while rigging, digging etc.
- Working without valid work permit
- Unauthorised road closure/blockage

**5.8 INCIDENT REPORTING AND INVESTIGATION SYSTEM**

All the incidents including near-miss should be reported immediately by contractor's Supervisor to Contractor and owner's Supervisor/Engineer-in-charge, who should inform to Owner's Safety Officer and owner's Management. Owner's Safety Department will be required for onward reporting as per OISD, Statutory requirements.

All accidents regardless of the extent of injury or damage should be investigated in order to find probable causes, lessons learnt thereof and remedial measures required to prevent its recurrence.

The incident investigation should be done as per provision of clause no. 4.12 of OISD-GDN-206 on 'Safety Management System'. All the recommendations of investigation / Enquiry Report need to be monitored closely for its implementation. A proper record needs to be maintained to ensure implementation of all the recommendations and same should be reviewed from time to time.

**5.9 SAFETY COMMITTEE MEETINGS**

Following three type of safety committee meetings should be held aiming at raising the level of safety consciousness at the site:

**5.9.1 Toolbox meeting**

To maintain awareness, update training and convey important safety and health information, contractor supervisors should conduct tool box meetings at least weekly and also prior to start of any work. All the contractor workers should attend this meeting. The owner's supervisor/Engineer-in-charge and safety officers should also

attend these meetings on random basis. Tool box meeting should be conducted more frequently depending upon circumstances. Record of the same can be maintained in the following typical format.

**TOOLBOX MEETING FORM**

SUBJECT :  
 PRESENTER :  
 DATE :  
 TIME : From..... To.....  
 CONTENT IN BRIEF :

Participant's Name	Signature
-----	-----
-----	-----
-----	-----

**5.9.2 Site Safety Committee Meeting**

Primary purpose of this safety committee is to enable owner, contractor and workers to work together to monitor the site safety and health plan so as to prevent accidents and improve working condition on site. Its size and membership will depend on the size and nature of job.

The safety committee should include representatives of owner, consultant, contractor identified as safety officer/supervisor. It should be headed by Engineer-in-charge.

The safety committee should have regular and frequent meetings, atleast fortnightly, to discuss the safety and health program on site and to make suggestions for improvement. The meetings should be documented with a time bound action plan. The functions carried out by safety committee should include:

- i) Review compliance of pending items of last Safety meetings.
- ii) Consideration of the reports of safety personnel.
- iii) Discussion of accident/near-miss and illness reports in order to make appropriate recommendation for prevention.



- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>iv) Examination/evaluation of suggestions made by workers.</li> <li>v) Dissemination of acquired knowledge through training programs and information sharing sessions.</li> <li>vi) Discussion &amp; review of Fire Prevention &amp; Disaster Management Plan.</li> <li>vii) To send recommendation to Apex Body for consideration/approvals.</li> </ul> | <ul style="list-style-type: none"> <li>2) OISD-GDN-192 on “Safety During Construction”</li> <li>3) OISD-STD-155 Part(I&amp;II) on “Personnel Protective Equipment”</li> <li>4) Building &amp; Other Construction workers (Regulation of Employment &amp; Condition of Service) Act 1996</li> </ul> |
|---|--|

**5.9.3 Safety Review Meeting by Location Head**

This meeting should be headed by the Location head and attended by Owner’s Supervisor/Engineer-in-charge, owner’s safety Officer and all concerned department heads. Prime purpose of this review is to ensure that all the recommendations of various committees are being complied with and to take decisions on critical points raised. This meeting should take place at least once in every quarter. All the investigation reports/ audit findings with status of implementation of recommendations should be discussed.

**5.10 SAFETY EQUIPMENT / PERSONNEL PROTECTIVE EQUIPMENT**

The type of safety equipment to be used is decided based on the job requirement. Selection should be made based on OISD-GDN-192, OISD-STD-155 (Part I & II) and the job requirement. Safety equipment / Personnel Protective Equipment (PPE) shall be of approved make. Contractor shall provide necessary training to each employee regarding proper usage and upkeep of PPE including its limitation.

A register showing stock and issue of PPE should be maintained by the contractor at site and must be available for inspection.

**6.0 REFERENCES**

- 1) OISD-GDN-206 on “Safety Management System”

**ANNEXURE I****LIST OF SAFETY CODES FOR CIVIL WORKS PUBLISHED BY BUREAU OF  
INDIAN STANDARDS**

<b>Sl.no.</b>	<b>Code No.</b>	<b>Title</b>
1	IS: 818	Code of Practice for Safety and Health Requirements in Electric and Gas Welding and Cutting Operations – First Revision.
2	IS: 875	Code of practice for Structural safety of buildings: Masonry walls
3	IS: 933	Specification for Portable Chemical Fire Extinguisher, Foam Type – Second Revision.
4	IS: 1179	Specification for Equipment for Eye and Face Protection during Welding – First Revision
5	IS: 1904	Code of practice for Structural safety of buildings: Shallow foundations
6	IS: 1905	Code of practice for Structural safety of buildings: Masonry walls
7	IS: 1989 – Part II	Leather Safety Boots and shoes for heavy metal industry
8	IS: 2171	Specification for Portable Fire Extinguishers, Dry Powder Type – Second Revision
9	IS: 2361	Specification of Building Grips – First Revision
10	IS: 2750	Specification for Steel Scaffoldings
11	IS: 2925	Specification for Industrial Safety Helmets – First Revision
12	IS: 3016	Code of Practice for Fires Precautions in Welding and Cutting Operations – First Revision
13	IS: 3521	Industrial Safety Belts and harnesses
14	IS: 3696 – Part I	Safety Code for Scaffolds and Ladders: Part I – Scaffolds
15	IS: 3696 – Part II	Safety Code for Scaffolds and Ladders: Part II – Ladders
16	IS: 3764	Safety Code for Excavation Work
17	IS: 4014 – Part I & II	Code of Practice for Steel Tubular Scaffolding
18	IS: 4081	Safety Code for Blasting and Related Drilling Operations
19	IS: 4082	Recommendations on stacking and storage of construction materials at site
20	IS: 4130	Safety Code for Demolition of Buildings – First Revision
21	IS: 4138	Safety Code for working in compressed air – First Revision

22	IS: 4756	Safety Code for Tunneling works
23	IS: 4912	Safety requirements for Floor and Wall openings, Railings and toe boards – First Revision
24	IS: 5216 – Part I & II	Recommendations on safety procedures and practices in electrical work
25	IS: 5121	Safety code for piling and other deep foundations
26	IS: 5916	Safety Code for Construction involving use of Hot Bituminous materials
27	IS: 6994 – Part I	Specifications for safety gloves: Part I – Leather and Cotton gloves
28	IS: 5983	Specification for Eye Protectors – First Revision
29	IS: 6922	Criteria for safety and design of structures subject to underground blasts
30	IS: 7155	Code of recommended practices for conveyor safety
31	IS: 7205	Safety Code for Erection on Structural Steel Works
32	IS: 7069	Safety Code for Handling and Storage of Building Materials
33	IS: 7293	Safety Code for Working with Construction Machinery
34	IS: 7323	Guidelines for operation of Reservoirs
35	IS: 7969	Safety Code for handling and storage of building materials
36	IS: 8758	Recommendation for Fire Precautionary Measures in construction of Temporary Structures and Pandals
37	IS: 8989	Safety Code for Erection of Concrete Framed Structures
38	IS: 9706	Code of Practices for construction of Aerial ropeways for transportation of material
39	IS: 9759	Guidelines for de-watering during construction
40	IS: 9944	Recommendations on safe working load for natural and manmade fibre rope slings
41	IS: 10667	Guide for selection of industrial safety equipment for protection foot and leg
42	IS: 10291	Safety Code for dress divers in civil engineering works
43	IS: 10386 – Part I	Safety Code for Construction, Operation and Maintenance for River Valley Projects
44	IS: 10386 – Part II	Safety Code for Construction, Operation and Maintenance for

## River Valley Projects

45	IS: 11057	Code of Practice for Industrial Safety Nets
46	IS: 13415	Code of Practice on safety for Protective barriers in and around building
47	IS: 13416	Recommendations for preventive measures against hazards at working places

## Statutory Regulations

Latest Statutory Acts and Rules, as given below, may be referred:-

1. The Petroleum Acts 1934 and Petroleum Rules 2002
2. The Factory Act, 1948 (As amended by Factory Amendment Act 1987) and concerned Factory Rules
3. The Water (Prevention and Control of Pollution) Act 1974 & Rules 1975
4. The Environment (Protection) Act 1986
5. The Manufacturing, Storage and Import of Hazardous Rules 1989
6. The Hazardous Wastes Management (Management & Handling) Rules 1989
7. The Indian Electricity Act 1901 and Rules 1956
8. The Indian Explosive Acts, 1884 & The Indian Explosive Rules 1983
9. The Gas Cylinder Rules 1981 and the static & Mobile Pressure Vessels (Unfired) Rules 1981
10. The Indian Boiler Act 1923 and Regulations 1950
11. The Public Liability Act 1991 as amended in 1992
12. The Motor Vehicle act 1988 and Central Motor Vehicle rules 1989
13. Building & Other Construction workers (Regulation of Employment & Condition of Service) Act 1996

In addition to above, various other statutory acts like EPF, ESIS, Minimum wage act and other local statutory requirements shall also be complied with.

**CHECK LIST FOR SAFETY INSPECTION / AUDIT**

Job \_\_\_\_\_ Location \_\_\_\_\_ Date of Audit \_\_\_\_\_ Frequency \_\_\_\_\_

Inspected by \_\_\_\_\_ Contractor (s) \_\_\_\_\_

Sl.no.	ITEM	YES	NO	NA	REMARKS / ACTION
<b>1.0</b>	<b>PERSONNEL PROTECTIVE EQUIPMENT (PPE):</b> Are following PPEs being used as per the job requirements?				
1.1	Safety Helmets				
1.2	Safety Shoes				
1.3	Gum Boots				
1.4	Safety Belts with life line				
1.5	Gloves				
1.6	Ear Plug				
1.7	Goggles				
1.8	Shield Glass				
1.9	Face Protection				
1.10	Breathing Apparatus				
1.11	Canister Mask				
1.12	Hand wash / Eye wash/ Respirating filter / cloth				
1.13	Boiler Suit				
1.14	Others				
<b>2.0</b>	<b>HOUSE KEEPING</b>				
2.1	Whether Waste Bins are provided / used				
2.2	Are Passageways / Walkways clear?				
2.3	Is General neatness O.K.?				
2.4	Is the Ground free from oil, grease etc. and is not found to be slippery?				
2.5	Others				

<b>3.0</b>	<b>EXCAVATION</b>				
3.1	Whether soil stability is checked?				
3.2	Whether proper shoring for the excavation is provided to prevent cave-in for side of slope >45 Degree?				
3.3	Whether proper precautions have been taken if the excavation is adjoining to heavy structure like building, street and roadways?				
3.4	While excavating whether proper slope usually 45° & suitable benches of 0.5 m width at each 1.5 m depth are provided?				
3.5	Whether barricading of 1m height with glowing caution board is provided for excavation beyond 1.5m depth?				
3.6	Whether excavating earth is placed beyond 1m of the edge of the trench?				
3.7	Whether heavy vehicle movement is restricted to come too close to the excavating area?				
3.8	Whether necessary precaution is taken for underground pipes, sewers, cables by contractors?				
3.9	Whether excavation hot work permit is taken?				
3.10	Whether extra precaution is taken for bailing out water properly while excavating?				
3.11	During rains whether the excavation is done with extra precaution to prevent caving in?				
3.12	Whether two separate entry/ exit points with necessary ladders / steps, as per requirement, have been provided?				
3.13	Whether one person is available at all the time to communicate any hazards noticed with workers working in deep trenches or excavation?				
3.14	Whether necessary precautions like				

	regular gas testing are being taken in areas having hydrocarbons and LPG so that no gas accumulation takes place in the trenches.				
3.15	Whether IS: 4081-1986 & Indian Explosive act & rules for storage, handling & carrying of explosive material and execution of blasting operation is followed?				
3.16	Whether in case of mechanised excavation, caution board is provided for do's and don'ts like 'Nobody to enter' within one meter of the extreme reach?				
3.17	Whether the following are inspected during excavation work :- a) Boulder formation encountered b) Collapsing / development of cracks of sides c) Marked damage to support d) Unexpected fall of ground e) Inspection of site after each blast.				
3.18	Others				
<b>4.0</b>	<b>PERMITS</b>				
4.1	Whether valid work permit is issued to start any work?				
4.2	Whether all conditions of the permit are fulfilled before starting the job?				
4.3	As noted in the permit, whether compliance of all the recommendations are ensured?				
4.4	Whether permits are available at work site all the times?				
4.5	Whether hot work permit registered in fire station?				
4.6	Whether permits are being closed after the completion of job?				
4.7	Others				
<b>5.0</b>	<b>SAFETY IN CUTTING / WELDING/GRINDING</b>				
5.1	Whether LPG / Oxygen / Acetylene/ Gas				

	cylinders are kept outside only while working in confined space?				
5.2	Are Acetylene /LPG cylinders kept in upright position and secured at designated places under shed – wet gunny bags wrapped around it if the same is under sun at designated place?				
5.3	Check cylinder and cylinder valves for any kind of damage?				
5.4	Whether protective valves are kept on cylinder while not in use?				
5.5	Whether proper means and method for transportation of cylinders to avoid dropping and rolling are being adopted / followed?				
5.6	Whether gas cylinders, regulators are kept away/free from oil and grease?				
5.7	Whether all hoses were found to be free of any damage or crack?				
5.8	Whether oxygen and acetylene cylinders are stored separately?				
5.9	Whether color coding is being used for easy identification of different type of cylinders and hoses?				
5.10	Whether cylinder keys are available near the cylinder?				
5.11	Whether gas torches with NRV with flash back arrestor of approved make are only being used?				
5.12	Whether pressure gauges are in working condition and checked from time to time?				
5.13	Whether welding shields are used while welding?				
5.14	Whether proper earthing for welding machines are provided?				
5.15	Whether power is taken from approved sources (welding receptacles)?				
5.16	Whether welding receptacles are properly grounded?				



5.17	Whether welding cables are maintained in good condition and without any joints/cuts?				
5.18	Whether to avoid short circuit, welding machines are protected against rain?				
5.19	Whether earth connectors are securely connected to the job and not to the adjoining pipeline or structure?				
5.20	Whether flame arrestor of DG set is of approved make and quality?				
5.21	Others				
<b>6.0</b>	<b>SAND / SHOT BLASTING</b>				
6.1	Whether sand blasting is used only after getting approval from competent authority?				
6.2	Whether air compressor used for sand / shot blasting are positioned away from work place?				
6.3	Whether exhaust of the prime mover is directed away from the work place?				
6.4	Whether in case of motor driven compressor, the body of the motor as well as the compressor is properly earthed?				
6.5	Whether line operator of sand/shot blasting wear suitable PPEs including mask?				
6.6	Whether adequate measures are adopted to confine dust/spray particles?				
6.7	Whether adequate measures are taken for proper ventilation while the work is done in confined space?				
6.8	Others				
<b>7.0</b>	<b>SAFETY WHILE WORKING AT HEIGHTS / SCAFFOLDING / LADDERS</b>				
7.1	Whether work permit is obtained to take up work at height above 3 mts?				
7.2	Whether steel pipes scaffoldings are used in unit/off site areas?				

7.3	Whether provision for suitable platform with all scaffoldings are made? Whether its construction is as per specification with toe board and railing?				
7.4	Whether the area below working at height is cordoned?				
7.5	Whether suitable platform is provided?				
7.6	Whether ISI approved quality and good condition safety belts are used while working at heights?				
7.7	Whether life line of safety belt is Anchored to an independent secured support capable of withstanding load of a falling person?				
7.8	Whether the area around the scaffold is cordoned off to prohibit the entry of unauthorized person?				
7.9	Whether ropes used are of good condition and adequate strength free of defects?				
7.10	Whether ladder is placed at secured and leveled surface?				
7.11	Whether it is extended 1.5 Mts. Above the landing point?				
7.12	Whether ladder used are of adequate length and tying short ladder is avoided?				
7.13	Whether metallic ladders are placed away from electrical system?				
7.14	Whether tools or materials are removed after completion of the day's job at heights?				
7.15	Whether a valid permit is obtained before taking up work on asbestos or fragile roof?				
7.16	Whether sufficient precaution is taken while working on fragile roof?				
7.17	Whether provision is made to arrange duck ladder, crawling board for working at fragile roof?				
7.18	Whether scaffolding has been erected on rigid / firm / levelled surfaces only?				

7.19	Whether scaffold has been inspected by competent person prior to being put in use?				
7.20	Whether the scaffolding has been designed for the load to be borne?				
7.21	Whether the erection and dismantling of the scaffolding is being done only by trained persons and under supervision?				
7.22	Whether safety net with proper working arrangement and life line has been provided?				
7.23	Others				
<b>8.0</b>	<b>SAFETY IN CONFINED SPACE</b>				
8.1	Whether a permit is obtained to enter a confined space?				
8.2	Whether gas test for hydrocarbon, toxic gas, oxygen level is obtained before entering any confined space?				
8.3	Whether adequate oxygen level is ensured in confined space before entering? If not, whether all precaution like using of Breathing Apparatus set is ensured?				
8.4	Whether, in case of chance of ingress of hydrocarbon gases / toxic gases, Personnel Monitoring System (PMS) is used or not?				
8.5	Whether only in presence of a supervisor, worker enters in confined space?				
8.6	Whether provision of sufficient means of entry and exit is available?				
8.7	Whether provision of ventilation to remove welding fumes, dust, exhaust gases are made?				
8.8	Whether provision of 24V (Hand lamps with cage as per OISD-STD-155) light for working inside space is made?				

8.9	Is it strictly ensured that a stand-by trained person is standing outside before a person enters a confined space and communication is being maintained all the time with workers working inside?				
8.10	Whether life belt with one end under control of stand-by person outside is kept while working in confined space?				
8.11	Whether Personnel protective Equipment are in good condition as specified in the permit?				
8.12	Whether absence of Hydrogen Sulfide, CO or other toxic gas is ensured before entering into a confined space? If yes, whether proper required PPE like BA, Gas Mask are used.				
8.13	Whether boxing up is being done only as per the approved procedures and by competent persons?				
8.14	Whether all the safety precautions listed in OISD-GDN-192 are taken while working in sewers, OWS etc.?				
8.15	Whether proper house keeping is being maintained inside the confined space?				
8.16	Whether training has been provided to workers working in the confined space and the workers only of sound health are being asked to work in the confined space?				
8.17	Others				
<b>9.0</b>	<b>SAFETY IN MATERIAL HANDLING</b>				
9.1	Whether all lifting tools, tackles, machines, chains, ropes etc. are of sound construction, made of sound material and maintained in good condition?				
9.2	Whether safe working load, date of testing visibly marked/painted on the equipment?				
9.3	Whether lifting tools, tackles are of adequate strength for the load to be handled?				
9.4	Whether all parts including the working gears fixed or movable of every lifting machine, chain, rope, tackles specify the				

	<p>following condition:</p> <p>a) Thoroughly examined by competent person at least once a year or such interval as required by statutory authority.</p> <p>b) Document of such examination are maintained and produced to owner supervisor before use of particular equipment?</p>				
9.5	Whether chain blocks and cables are inspected before each use to assure their sound condition?				
9.6	<p>Whether hoist and lift if used are:</p> <p>a) Properly maintained and thoroughly examined by competent authority at least once in every year.</p> <p>b) A register to be maintained to record particulars of such examination in prescribed forms and shall be produced to the owner supervisor before use.</p>				
9.7	Whether area below the movement of boom of crane is cleared to avoid injury from falling objects?				
9.8	Whether it is ensured that crew of truck leave the truck in crane handling area before starting loading / unloading, if not involved in rigging operation?				
9.9	Whether transporting material from one place to another is done by suitable means?				
9.10	Whether carrier with sufficient capacity without projecting parts is used for transporting materials?				
9.11	Whether riggers engaged are well trained and conversant with signaling procedures including night signalling if required?				
9.12	Whether permission of authorized person is obtained before working on or near an overhead crane?				
9.13	Whether trained riggers are available all the time along with crane?				

9.14	Whether barricading has been done to ensure no unauthorised person enters in the working area of the crane?				
9.15	Whether lifting plan has been prepared and approved before start of the work?				
9.16	Whether route of crane movement has been planned before the crane moves out of the garage?				
9.17	Whether it has been ensured that no electrical cable come within 3 metres or safe distance from the boom of the crane?				
9.18	Whether boom is being kept in the horizontal position or locked while idling?				
9.19	Whether material is being stacked / destacked in trucks with the help of wedges to ensure no slippage while loading / unloading takes place?				
9.20	Whether the forklift / crane is being operated only by trained person?				
9.21	Others				
<b>10.0</b>	<b>ELECTRICAL SAFETY</b>				
10.1	Has the Electrical Line Clearance procedure been followed involving electrical and other concerned Dept. and filling of formats?				
10.2	Have Danger Signs with Voltage rating/ Men at work signboards been displayed at both Sub Station as well as the work site?				
10.3	Has the contractor worker understood the electrical circuit on which he is going to work with probable electrical hazards and mitigation measures to be adopted?				
10.4	Whether contractor has engaged electrician (s) having valid electrical licence in line with provisions in Indian Electricity Rules?				

10.5	Have all checks prior to switching operation been carried out and authorisation of owner/ user section obtained subsequently?				
10.6	Have all earthing links on electrical conductors removed before charging the line/ apparatus?				
10.7	Have PPE as prescribed under Indian Electricity Rules been in place, kept healthy and used?				
10.8	Are earthing and bonding arrangement of non-current carrying metallic parts in line with provisions of Indian Electricity Rules – 1956 amended time to time as IS: 3043?				
10.9	Have electrical part of OISD-GDN-192 and Clause No. 9.0 for Temporary installations in OISD-173 been understood and followed wherever applicable?				
10.10	Are flexible wires having voltage of 240 volts above earth potential taken through PVC conduits?				
10.11	Whether portable hand lamps with a voltage rating of not more than 24 volts used with flameproof enclosures in confined spaces within columns, vessels etc?				
10.12	Have the Switches, MCBs, fuses etc. been inspected for proper ratings?				
10.13	Has Earth Leakage Circuit Breaker (ELCB) been used on the incoming side to protect against leakage of current? Is the device tested every time the work is started?				
10.14	Whether all portable appliances are provided with insulated Three pin Plugs and socket arrangement?				
10.15	Whether industrial type extension boards and plug sockets are used?				
10.16	Has the electrical equipment brought to site by contractor been inspected by owner's supervisor/ safety officer for damage/cuts/abrasion etc? Is record of				

	Insulation Resistance, wherever required , being kept?				
10.17	Have standard practices for termination of conductors/ cables been followed (e.g. use of proper lugs, crimping tool, cable glands etc)? Is cable armour in continuity from feeding point to load?				
10.18	Are the Contractor supervisor and workmen well acquainted with first aid for electrical shock?				
10.19	Are the wires/ cables identifiable along their route towards the load by using colour coding and/or markers?				
10.20	Others				
<b>11.0</b>	<b>ROAD WORK</b>				
11.1	Whether site is barricaded and provided with warning signs including night warning lamps/ self glowing markers at appropriate location for diversion of traffic?				
11.2	Whether mixing aggregates with bitumen is done with the help of batch mixing plants? If no, whether adequate precautions have been taken?				
11.3	Whether road rollers, bitumen sprayers, pavement finishers are driven by experienced drivers with valid driving licenses?				
11.4	Whether the worker handling hot bitumen sprayers or spreading bitumen aggregate mix or mixing bitumen with aggregate are provided with PVC hand gloves rubber shoes with pegging upto knee joints?				
11.5	Others				
<b>12.0</b>	<b>FORM WORK, REINFORCEMENT</b>				
12.1	Whether form work, shuttering, shoring etc. are adequately designed and provided to erect the structure and to support the expected load?				



12.2	Whether staging (support) for shuttering is designed for loads like worker movement, impact load and other incidental loads during construction?				
12.3	Whether workers use PPEs at work site?				
12.4	Whether all safety procedures are adopted while cutting rod?				
12.5	Whether proper staging and bundling is provided for supplying rods at height?				
12.6	Whether sufficient cross bracings are provided for high staging works at vulnerable points?				
12.7	Others				
<b>13.0</b>	<b>CONCRETING</b>				
13.1	Whether the concreting area is barricaded?				
13.2	Whether vibrator hoses, pumping concrete accessories are in healthy condition and mechanically strong?				
13.3	Whether it is ensured that no pipe line in concrete pumping system is attached to any temporary strut such as scaffolds etc.?				
13.4	Whether it is checked that safety guards around moving parts are provided in concrete mixer/ machines?				
13.5	Whether earthing of electrical mixers, vibrator etc. are checked?				
13.6	Whether entry of unauthorised person in the concreting area is restricted?				
13.7	Whether adequate lighting arrangement is made in the concreting area if working during night?				
13.8	Whether PPEs like gum boots, gloves and dust masks etc. are being used?				
13.9	For overhead or underground work, whether form work and shuttering have been checked so that the same do not collapse during concreting?				

13.10	Others				
<b>14.0</b>	<b>DEMOLISHING (DEMOLISHING BY BLAST NOT CONSIDERED)</b>				
14.1	Has the stability of structure been examined by competent person and found OK?				
14.2	Are non-sparking tools being used, if required?				
14.3	Is intermittent clearing operation being done to keep the area reasonably tidy and clean?				
14.4	Whether effective barricading has been provided?				
14.5	Whether Electrical and other facilities like water, oil, gas pipelines have been isolated/protected?				
14.6	Whether the plan of demolition (including sequence of activities) has been prepared and approved prior to start of the work?				
14.7	Others				
<b>15.0</b>	<b>RADIOGRAPHY</b>				
15.1	Are safety precautions for handling of source as per guidelines of BARC being followed?				
15.2	Is the potency of the source being used within acceptable limits as per the BARC regulations?				
15.3	Is the area being cordoned with proper signs during radiography?				
15.4	Does proper place exist as per BARC regulations for storage of source / Personnel safety equipment?				
15.5	Does the radiographer has valid certificate of radiography from competent authority (BARC)?				
15.6	Is radiographer using Exposure Meter / Dosi Meter?				
15.7	Whether minimum occupancy of the				

	premises / workplace is being ensured while radiography is in progress?				
15.8	Is permit system being followed?				
15.9	Others				
<b>16.0</b>	<b>ADDITIONAL SAFETY PRECAUTION FOR UNITS WITH HYDROCARBONS</b>				
16.1	Are jobs being carried out with a valid work permit only as per OISD-STD-105 "Work Permit System".				
16.2	Is smoking prohibited in all places containing combustible or flammable materials and "No Smoking" notices prominently displayed.				
16.3	Are only approved type electrical installations and equipment, including portable lamps, being used?				
16.4	Are oily rags, waste, wooden materials and clothes or other substances liable to spontaneous ignition being removed?				
16.5	Are the combustible materials properly shielded in case same cannot be removed from the area?				
16.6	Has welding screens (like metal/asbestos/ water curtain) been put up to protect other equipment / facilities/ OWS/ drains in adjoining areas against flying sparks, as may be required?				
16.7	Is Gas-testing being done with the means of a calibrated Gas detection Meter prior to start of Hot work and being done subsequently at regular intervals as per the requirement?				
16.8	Are regular inspections being done of places where there are fire risks like in the vicinity of heating appliances, electrical installations and conductors, stores of flammable and combustible materials, welding and cutting operations?				
16.9	Are fire-extinguishing equipment being placed at strategic locations and are kept well maintained and inspected at suitable intervals by a competent person.				
16.10	Are access to fire-extinguishing equipment such as hydrants, portable				

	extinguishers and connections for hoses kept clear at all times?				
16.11	Are all supervisors and a sufficient number of workers trained in the use of fire-extinguishing equipment?				
16.12	Are audio means, to give warning in case of fire provided, audible in all parts of the site where persons are liable to work?				
16.13	Is there an effective evacuation plan in place so that all persons are evacuated speedily without panic?				
16.14	Others				
<b>17.0</b>	<b>EMERGENCY PROCEDURES</b>				
17.1	Is signaling / siren system effective?				
17.2	Is arrangement for rescuing affected person adequate?				
17.3	Are signs showing emergency exit route installed?				
17.4	Is emergency exit route clear of obstacles?				
17.5	Is communication system adequate?				
17.6	Whether emergency vehicle with driver has been provided to meet any emergency situation?				
17.7	Does any tie-up with hospitals or local doctors exist?				
17.8	Has the assembly point for workers in case of emergency been identified and earmarked?				
17.9	Has training been provided to a few workers for First Aid?				
17.10	Others				
<b>18.0</b>	<b>WELFARE FACILITIES</b>				
18.1	Is hygienic conditions prevailing at labour camps?				
18.2	Are First Aid facilities available?				

18.3	Does proper sanitation exist at site office and labour camps?				
18.4	Does any arrangement of medical facilities like tie ups with nearby hospital exist?				
18.5	Is proper drinking water facility available for workmen & staff?				
18.6	Are crèches provided for children (if applicable)?				
18.7	Is any proper place/canteen/restroom provided for eating food and taking rest?				
18.8	Is any place earmarked for storing / keeping clothing?				
18.9	Is Adequate washing facility available?				
18.10	Does proper ventilation at working place exist?				
18.11	Others				
<b>19.0</b>	<b>GENERAL</b>				
19.1	Are illumination levels at workplace and passages adequate?				
19.2	Is communication system adequate?				
19.3	Are display and caution boards provided at strategic locations?				
19.4	Are road barriers being used for blocking any roads/passage?				
19.5	Has the structure been adequately secured against storm/high winds during construction/ erection?				
19.6	Are the equipment properly earthed?				
19.7	Are vehicles being checked like brakes, oil, lights etc. on regular basis?				
19.8	Is compressed air being used only for its intended purpose and not for any other purpose?				
19.9	Are only proper clothes and not loose clothes being used while working around				

	machinery?				
19.10	Are nails or other sharp objects being removed or bent?				
19.11	Are machine guards over moving parts of machinery such as coupling, pulley, wheel etc. installed?				
19.12	Whether after maintenance of machinery the guards are securely fitted before putting into operation?				
19.13	Are working platforms / gangways provided with hand rails & toe guards?				
19.14	Are swing platforms provided with chains & secured adequately when not in use?				
19.15	Are the approaches to work sites being maintained & kept clear of obstacles?				
19.16	Whether engines of equipment entering into the operating area have exhaust and muffler system with approved spark arrestor?				
19.17	Whether vehicles/engine driven equipment, electrical equipment and tools used are certified?				
19.18	Whether contractors inform his workers about hazards and safe procedures?				
19.19	Whether sufficient care is taken so that spark do not go outside working enclosure & falls below?				
19.20	Whether contractor's qualified / trained supervisor is present?				
19.21	Whether all exhausts of engines are provided with approved type of flame arrestors and exhaust is not facing toward the place where the workers are working?				
19.22	Others				

**Signature of the Auditor**

ELECTRICAL POWER IS THE MAINSTAY OF ANY CONSTRUCTION ACTIVITY. AT THE SAME TIME IT REQUIRES UTMOST CARE IN IT'S UTILISATION TO AVOID ACCIDENTS DUE TO ELECTRICAL SHOCK, FIRE INCIDENTS OR ELECTRIC SHORT CIRCUITS. EXPOSURE OF ELECTRICAL INSTALLATION TO ADVERSE ENVIRONMENTAL CONDITIONS INCREASE THE RISK OF SUCH ACCIDENTS. HENCE IT IS NECESSARY TO TAKE EXTRA PRECAUTIONS FOR SUCH INSTALLATIONS TO ENSURE SAFETY OF PERSONNEL AND EQUIPMENT. THIS STANDARD ADDRESSES THE SAFETY MEASURES REQUIRED TO BE ADOPTED FOR THE ELECTRICAL INSTALLATIONS BY ALL CONTRACTORS DURING CONSTRUCTION PHASE.

1. ALL ELECTRICAL CONNECTIONS/WORK FOR ELECTRICAL INSTALLATIONS SHALL BE CARRIED OUT AS PER PROVISIONS OF THE LATEST REVISION OF THE FOLLOWING CODES AND STANDARDS IN ADDITION TO THE REQUIREMENTS OF STATUTORY AUTHORITIES AND IE RULES:  
OISD-STD-173 : FIRE PREVENTION AND PROTECTION SYSTEM FOR ELECTRICAL INSTALLATIONS.  
SP-30 (BIS) : NATIONAL ELECTRIC CODE.  
THE INSTALLATION SHALL HAVE APPROVAL FROM CONCERNED STATUTORY AUTHORITIES.
2. ALL ELECTRICAL CONNECTIONS SHALL BE DONE BY AN ELECTRICIAN WITH VALID LICENCE AND TO THE SATISFACTION OF ENGINEER-IN-CHARGE.
3. ONE COMPETENT LICENCED ELECTRICIAN SHALL BE MADE AVAILABLE BY CONTRACTOR AT SITE ROUND THE CLOCK TO ATTEND TO THE NORMAL/EMERGENCY JOBS.
4. ALL SWITCH BOARDS/WELDING MACHINES SHALL BE KEPT IN WELL VENTILATED & COVERED SHED. THE SHED SHALL BE ELEVATED TO AVOID WATER LOGGING. NO FLAMMABLE MATERIALS SHALL BE USED FOR CONSTRUCTING THE SHED. ALSO FLAMMABLE MATERIALS SHALL NOT BE STORED IN AND AROUND ELECTRICAL EQUIPMENT/SWITCHBOARD. ADEQUATE CLEARANCES AND OPERATIONAL SPACE SHALL BE PROVIDED AROUND THE EQUIPMENT.
5. FIRE EXTINGUISHERS AND INSULATING MATS SHALL BE PROVIDED IN ALL POWER DISTRIBUTION CENTERS.
6. TEMPORARY ELECTRICAL EQUIPMENT SHALL NOT BE EMPLOYED IN HAZARDOUS AREAS WITHOUT OBTAINING SAFETY PERMIT.
7. PROPER HOUSE KEEPING SHALL BE DONE AROUND THE ELECTRICAL INSTALLATIONS.
8. ALL TEMPORARY INSTALLATIONS SHALL BE TESTED BEFORE ENERGISING, TO ENSURE PROPER EARTHING, BONDING, SUITABILITY OF PROTECTION SYSTEM, ADEQUACY OF FEEDERS/CABLES ETC.
9. ALL WELDERS SHALL USE HAND GLOVES IRRESPECTIVE OF HOLDER VOLTAGE.
10. MULTILINGUAL (ENGLISH, HINDI AND LOCAL LANGUAGE) CAUTION BOARDS, SHOCK TREATMENT CHARTS AND INSTRUCTION PLATE CONTAINING LOCATION OF ISOLATION POINT FOR INCOMING SUPPLY, NAME & TELEPHONE NO. OF CONTACT PERSON IN EMERGENCY SHALL BE PROVIDED IN SUBSTATIONS AND NEAR ALL DISTRIBUTION BOARDS/LOCAL PANELS.
11. OPERATION OF EARTH LEAKAGE DEVICE SHALL BE CHECKED REGULARLY BY TEMPORARILY CONNECTING SERIES TEST LAMP (2 BULBS OF EQUAL RATING CONNECTED IN SERIES) BETWEEN PHASE AND EARTH.
12. THE FOLLOWING DESIGN FEATURES SHALL BE ENSURED FOR ALL ELECTRICAL INSTALLATIONS DURING CONSTRUCTION PHASE.
  - 12.1 EACH INSTALLATION SHALL HAVE A MAIN SWITCH WITH A PROTECTIVE DEVICE, INSTALLED IN AN ENCLOSURE ADJACENT TO THE METERING POINT. THE OPERATING HEIGHT OF THE MAIN SWITCH SHALL NOT EXCEED 1.5 M. THE MAIN SWITCH SHALL BE CONNECTED TO THE POINT OF SUPPLY BY MEANS OF ARMoured CABLE.
  - 12.2 THE OUTGOING FEEDERS SHALL BE DOUBLE OR TRIPLE POLE SWITCHES WITH FUSES/MCBs. LOADS IN A THREE PHASE CIRCUIT SHALL BE BALANCED AS FAR AS POSSIBLE AND LOAD ON NEUTRAL SHOULD NOT EXCEED 20% OF LOAD IN THE PHASE.

1	26.09.06	REVISED & ISSUED AS STANDARAD	<i>B. Prakash</i> BP	<i>R.K.S. Patil</i> RKS/UAP	<i>JMS</i> JMS	<i>A</i> VC
0	04.12.01	ISSUED AS STANDARD	UAP	AA	VPS	GRR
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
						Approved by

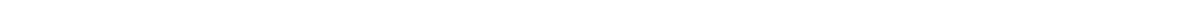
- 12.3 THE INSTALLATION SHALL BE ADEQUATELY PROTECTED AGAINST OVERLOAD, SHORT CIRCUIT AND EARTH LEAKAGE BY THE USE OF SUITABLE PROTECTIVE DEVICES. FUSES WHEREVER USED SHALL BE HRC TYPE. USE OF REWIRABLE FUSES SHALL BE STRICTLY PROHIBITED. THE EARTH LEAKAGE DEVICE SHALL HAVE AN OPERATING CURRENT NOT EXCEEDING 30 mA.
- 12.4 ALL CONNECTIONS TO THE HANDTOOLS/WELDING RECEPTACLES SHALL BE TAKEN THROUGH PROPER SWITCHES, SOCKETS AND PLUGS.
- 12.5 ALL SINGLE PHASE SOCKETS SHALL BE MINIMUM 3 PIN TYPE ONLY. ALL UNUSED SOCKETS SHALL BE PROVIDED WITH SOCKET CAPS.
- 12.6 ONLY 3 CORE (P+N+E) OVERALL SHEATHED FLEXIBLE CABLES WITH MINIMUM CONDUCTOR SIZE OF 1.5 MM<sup>2</sup> COPPER SHALL BE USED FOR ALL HAND TOOLS.
- 12.7 ONLY METALLIC DISTRIBUTION BOXES WITH DOUBLE EARTHING SHALL BE USED AT SITE. NO WOODEN BOXES SHALL BE USED.
- 12.8 ALL POWER CABLES SHALL BE TERMINATED WITH COMPRESSION TYPE CABLE GLANDS. LUGS SHALL BE USED FOR MULTISTRAND WIRES/CABLES.
- 12.9 CABLES SHALL BE FREE FROM ANY INSULATION DAMAGE.
- 12.10 CABLES SHALL BE LAID IN UNDERGROUND AT A MINIMUM DEPTH OF 750 MM, FOR LV & CONTROLS AND 900MM FOR HV CABLES COVERED WITH SAND, BRICK AND SOIL FOR ENSURING MECHANICAL PROTECTION. CABLES SHALL NOT BE LAID IN WATER LOGGED AREA AS FAR AS PRACTICABLE. CABLE ROUTE MARKERS SHALL BE PROVIDED AT EVERY 25 M OF BURIED TRENCH ROUTE. WHEN LAID ABOVE GROUND, CABLES SHALL BE PROPERLY CLEATED OR SUPPORTED ON RIGID POLES OF ATLEAST 2 M HIGH. MINIMUM HEAD CLEARANCE OF 6 METERS SHALL BE PROVIDED AT ROAD CROSSING.
- 12.11 UNDER GROUND CABLES SHALL NOT BE ALLOWED TO CROSS THE ROADS WITHOUT PIPE SLEEVE.
- 12.12 ALL CABLE JOINTS SHALL BE DONE WITH PROPER JOINTING KIT. NO TAPED/TEMPORARY JOINTS SHALL BE USED.
- 12.13 AN INDEPENDENT EARTHING FACILITY SHOULD PREFERABLY BE ESTABLISHED WITHIN THE TEMPORARY INSTALLATION PREMISES. ALL APPLIANCES AND EQUIPMENT SHALL BE ADEQUATELY EARTHED. IN CASE ARMoured CABLES ARE USED, THE ARMOUR SHALL BE BONDED TO THE EARTHING SYSTEM.
- 12.14 ALL CABLES AND WIRE ROPE USED FOR EARTH CONNECTIONS SHALL BE TERMINATED THROUGH TINNED COPPER LUGS.
- 12.15 IN CASE OF LOCAL EARTHING, EARTH ELECTRODES SHALL BE BURIED NEAR THE SUPPLY POINT AND EARTH CONTINUITY WIRE SHALL BE CONNECTED TO LOCAL EARTH PLATE FOR FURTHER DISTRIBUTION TO VARIOUS APPLIANCES. ALL INSULATED WIRES FOR EARTH CONNECTION SHALL HAVE INSULATION OF GREEN COLOUR.
- 12.16 SEPARATE CORE SHALL BE PROVIDED FOR NEUTRAL. EARTH/STRUCTURES SHALL NOT BE USED AS A NEUTRAL IN ANY CASE.
- 12.17 ON/OFF POSITION OF ALL SWITCHES SHALL BE CLEARLY DESIGNATED/PAINTED FOR EASY ISOLATION IN EMERGENCY.
13. ALL INSULATIONS SHALL BE INSPECTED BY ENGINEER-IN-CHARGE ATLEAST ONCE IN A MONTH.

1	26.09.06	REVISED & ISSUED AS STANDARD	<i>B. Prakash</i> BP	<i>RKS/UA</i> RKS/UAP	<i>JMS</i> JMS	<i>VC</i> VC
0	04.12.01	ISSUED AS STANDARD	UAP	AA	VPS	GRR
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	



# **MEASUREMENT OF WORK**

## **[APPENDIX – V TO SCC]**



## **MEASUREMENT OF WORK**

### **1.0 GENERAL**

- 1.1 The mode of measurement shall be as mentioned in relevant standard specification incorporated in the Bidding Document. Any other mode of measurements not covered in above specifications shall be followed in accordance with relevant BIS codes /Schedule of Rates/ Specifications etc. and/or as decided by Engineer-in-Charge.
- 1.2 Payment will be made on the basis of joint measurements taken by Contractor and certified by Engineer-in-Charge. Measurement shall be based on "Approved for Construction" drawings, to the extent that the work conforms to the drawings and details are adequate.
- 1.3 Wherever work is executed based on instructions of Engineer-in-Charge or details are not adequate in the drawings, physical measurements shall be taken by Contractor in the presence of Engineer-in-Charge.
- 1.4 Measurements of weights shall be in metric tonnes corrected to the nearest Kilogram. Linear measurements shall be in meters corrected to the nearest centimeters.
- 1.5 The weights mentioned in the drawing or shipping list shall be the basis for payment. If mountings for panels etc. are packed separately, their erection weights shall include all mountings.
- 1.6 No other payment either for temporary works connected with this Contract or for any other item such as weld, shims, packing plates etc. shall be made. Such items shall be deemed to have been included for in the rates quoted.
- 1.7 Measurements will be made for various items under schedule of rates on the following basis as indicated in the unit column
- |             |           |
|-------------|-----------|
| i) Weights  | MT or Kg  |
| ii) Length  | M (Metre) |
| iii) Number | No.       |
| iv) Volume  | Cu.M      |
| v) Area     | Sq.M      |
- 1.8 Wherever the unit of items has been indicated as lumpsum, the payment shall be made on lumpsum basis on completion & no mode of measurement shall be applicable.

#### **NOTE:**

All other mode of measurements not covered in above clauses shall be measured in accordance with relevant BIS codes/ Schedule of Rates/ Specifications etc. and/ or as decided by Engineer-in-Charge. The above measurement of works shall not be applicable for lumpsum items of SOR.

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## APPENDIX - VI TO SPECIAL CONDITIONS OF CONTRACT.

### TERMS OF PAYMENT

Progress Payments shall be released to CONTRACTOR against monthly running account bills duly certified by Engineer-in-charge after affecting the necessary deductions/recovery as per the Contract. The basis for payment against various items shall be as shown below:

Following shall be the terms of payments for the subject work:-

S.NO.	NATURE OF WORK	PAYMENT TERMS
1.	<b>ITEMS INVOLVING SUPPLY, INSTALLATION &amp; TESTING (other than civil &amp; Horticulture work)</b>	<ul style="list-style-type: none"> <li>- 50 % on receipt of material at site on pro-rata basis, inspection &amp; acceptance by Engineer-in-Charge.</li> <li>- 30 % after erection and alignment.</li> <li>- 15% after testing &amp; acceptance</li> <li>- 5 % after completion of all works in all respects including commissioning</li> </ul>
2.	<b>FOR WORKS NOT MENTIONED ABOVE</b>	<ul style="list-style-type: none"> <li>- 95 % on completion of work on pro-rata basis as certified in monthly R. A. bills.</li> <li>- 5 % on completion of all work in all respects and acceptance thereof by Engineer- in-Charge including submission of completion documents.</li> </ul>

### NOTES:

**1.0** All progressive/ final Payments shall be made after necessary deductions on account of income tax, mobilization advance and other deductions, as applicable, as per the provisions of the Contract and as required under the law. In case CPBG is not submitted, 10% of each bill shall be retained.

**2.0 Running account Bill**

The Contractor shall submit the R.A. Bill(s) in approved pro-forma to the Engineer-in-charge of the work giving abstract and detailed measurement for the various items executed during a month, before the expiry of first week of the succeeding months. Running bills shall have reconciliation statements for all the items supplied/received and consumed which shall be updated in each running bill. The payment shall be released only on submission of said document. The payment shall be released within 15 (Fifteen) working days of the receipt of R. A. Bill. Depending on the urgency an ad-hoc payment of 75% of the recommended payments may be released within 7 days which shall be reconciled/regularized while processing the bill.

**3.0 Final Bill**

The final bill shall be submitted by the Contractor within the time frame specified in the General Conditions of the Contract. No further claims shall be made by the Contractor

after submission of the final bill. The Contractor shall submit the final bill complete in all respect with no claim and no dues by Contractor, no objection certificate from labour officer and other completion documents including material consumption/Reconciliation statement.

- 4.0** Last 5% payment under other work shall be released after issue of completion certificate by Engineer-In-charge.

**QUALIFICATION & EXPERIENCE REQUIREMENT AND  
PENALTY FOR NON MOBILISATION**

CATEGORY	QUALIFICATION & EXPERIENCE REQUIRED			
Construction Resident Manager/ Resident Engineer/Site-In-Charge	Degree or Diploma in Engineering with minimum following relevant experience in construction:			
	Contract value (Rs) →	< 5 Cr. works	5-20 Cr. works	> 20 Cr. works
	Degree holders	5 yrs	10 yrs	15 yrs
	Diploma holders	8 yrs	13 yrs	20 yrs
Lead Discipline Engineer (Mechanical, Civil, Electrical, Instrumentation)	Degree or Diploma in relevant Engineering discipline with following minimum experience in Construction:			
	Contract value (Rs) →	≤ 20 Cr. works	> 20 Cr. works	
	Degree holders	5 yrs	10 yrs	
	Diploma holders	8 yrs	13 yrs	
Lead Welding/ NDT Engineer	Degree or Diploma in Mechanical Engineering/ Metallurgy with the following experience in Welding & NDT (Non Destructive Testing) plus Level-II in RT (Radiographic Testing) (refer Note 1 also):			
	Contract value (Rs) →	≤ 20 Cr. Works	> 20 Cr. Works	
	Degree holders	5 yrs	10 yrs	
	Diploma holders	8 yrs	13 yrs	
Lead QA/QC Engineer	Degree in Engineering with following experience (refer Note 2 also):			
	Contract value (Rs) →	≤ 20 Cr. Works	> 20 Cr. Works	
	Experience	5 yrs of construction experience of which 2 years should be as QA Manager	10 yrs of construction experience of which 3 years should be as QA Manager	
Lead Planning Engineer	Degree in Engineering with following experience in Planning & Scheduling:			
	Contract value (Rs) →	≤ 20 Cr. works	> 20 Cr. works	
	Experience	5 yrs.	10 yrs.	
Safety Officer	As per clause 3.1.4 of EIL standard specification for HSE Management at construction sites (No. xxxx-/6-82-0001) enclosed elsewhere in the bid			
Warehouse- In- Charge/ Materials Manager	Diploma in Engineering or Diploma in Materials Management or Graduate in any stream with min. following experience in Warehousing/ Stores Management:			
	Contract value (Rs) →	≤ 20 Cr. works	> 20 Cr. works	
	Experience	5 yrs.	10 yrs.	
Quantity Surveyor	Degree or Diploma in Engineering with minimum following experience in quantity estimation, field measurement, rate analysis, bill preparation etc. in Construction field:			
	Contract value (Rs) →	≤ 20 Cr. works	> 20 Cr. works	
	Degree holders	2 yrs.	5 yrs.	
	Diploma holders	5 yrs.	10 yrs.	

Discipline Engineer	Degree in relevant Engineering Discipline with minimum 2 years of experience in construction or Diploma in relevant Engineering Discipline with minimum 4 years of experience in Construction.
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**Notes: (for Table on previous page)**

1. For Mechanical, Composite, EPC or EPCC Contracts of value more than Rupees 20 crores, the Lead Welding/NDT Engineers shall also possess Certified Welding Inspector qualification from American Welding Society or CSWIP3.1 Welding Inspector qualification from The Welding Institute, UK.
2. For Mechanical, Composite, EPC or EPCC Contracts of value more than Rupees 20 crores, the Lead QA/QC Engineer shall also be a qualified internal auditor for ISO 9001.
3. CVs of key construction personnel proposed to be deployed shall be submitted to Owner/Engineer-in-Charge prior to their mobilization at site. The mobilization of key personnel shall be done at site subject to prior approval of their CVs by Owner/Engineer-in-Charge.

**PENALTY FOR NON - MOBILIZATION OF KEY CONSTRUCTION PERSONNEL**

**I) Penalty for non-mobilization per day per person after the contractual mobilization period unless agreed otherwise by the Engineer-in-Charge:**

- Rs. 5000/- for Resident Construction Manager/ Resident Engineer/ Site-in-Charge;
- Rs. 3000/- for Lead QA/QC Engineer, Lead Planning Engineer, Lead Safety Officer and Warehouse In-charge

**II) Penalty for non-mobilization per day per person after completion of the mobilization period agreed during the Kick off Meeting:**

- Rs. 3000/- for Lead Discipline Engineer, Lead Welding/ NDT Engineer and the Quantity Surveyor

**Notes: (for Penalty clauses)**

- a) All intervening off days (Sundays etc.) and holidays will be counted for levy of penalty
- b) Mobilized personnel shall not be demobilized till contractual completion or based on consent of Engineer-in-Charge else penalties as above shall be applied.
- c) Total of above penalties shall not exceed 3% of the contract value.
- d) The above penalties are over & above all other contractual provisions for late mobilization of resources.

# **SUPERVISORY PERSONNEL TO BE DEPLOYED**

**(APPENDIX - VIII TO SPECIAL CONDITIONS OF CONTRACT]**



**QUALIFICATION & KEY CONSTRUCTION PERSONNEL TO BE DEPLOYED –  
HARDSCAPE, HORTICULTURE & ALLIED WORKS FOR HPCL GREEN R&D  
CENTRE AT BENGALURU**

**MINIMUM QUALIFICATION & EXPERIENCE OF KEY SUPERVISOR PERSONNEL DURING  
CONSTRUCTION PERIOD**

<b>SL. NO.</b>	<b>CATEGORY</b>	<b>QUALIFICATION &amp; EXPERIENCE</b>	<b>No's</b>
1	RESIDENT ENGINEER	DEGREE IN HORTICULTURE SCIENCE WITH MINIMUM 8 YEARS' RELEVANT EXPERIENCE IN HORTICULTURE WORKS.	01
2	QUALIFIED SUPERVISOR	WITH MINIMUM 2 YEARS' RELEVANT EXPERIENCE IN HORTICULTURE WORKS.	02
3	TRAINED GARDNER	WITH MINIMUM 2 YEARS' RELEVANT EXPERIENCE IN HORTICULTURE WORKS.	04

**DETAILS OF MAINTENANCE STAFF REQUIREMENT DURING MAINTENANCE PERIOD**

<b>SL. NO.</b>	<b>CATEGORY</b>	<b>QUALIFICATION &amp; EXPERIENCE</b>	<b>No's</b>
1	HORTICULTURIST	DEGREE IN HORTICULTURE SCIENCE WITH MINIMUM 8 YEARS' RELEVANT EXPERIENCE IN HORTICULTURE WORKS.	ONE VISIT IN A WEEK/ AS AND WHEN REQUIRED AS PER DIRECTION OF ENGINEER-IN-CHARGE
2	QUALIFIED SUPERVISOR	WITH MINIMUM 2 YEARS' RELEVANT EXPERIENCE IN HORTICULTURE WORKS.	01

**(STAMP & SIGNATURE OF BIDDER)**

**MINIMUM EQUIPMENTS & MACHINERY  
TO BE DEPLOYED – HARDSCAPE, HORTICULTURE AND ALLIED WORKS FOR  
GREEN R & D CENTRE COMPLEX OF HPCL AT BENGALURU.  
[APPENDIX – IX TO SPECIAL CONDITIONS OF CONTRACT]**

SL. NO.	DESCRIPTION OF EQUIPMENT	REQUIREMENT
1	JCB / Poclain	1
2	Tempo/Van	1
3	Tractor with trailer	1
4	Concrete Mixer Machine	1
5	Compactor — Earth Compacting Machine	1
6	Concrete Needle Vibrators	2
7	Equipment such as <b>Shovels, Scrapers &amp; Hammers</b> etc ,	as required
8	Lawn mower (Manual)	1
9	Lawn mower (Electrical)	1
10	Pesticide sprayers	2
11	Hose Pipe	500 M
12	Secature	5
13	Pickaxes ("Guddali")	10
14	Pruning tools	10
15	Rakes, Brooms	10
16	Garden shears	5
17	Grass cutter	5
18	Spade ("Mumti")	5
19	Basket / Bucket ("Gamala")	20
20	Wheel Barrows	5
21	Sickles	5
22	Plastic Pot ("Bindige")	10

**NOTES:**

1. The details of indicative equipments in good working condition, required to be mobilized by the Contractor, to complete the work within the schedule are shown above. Contractor shall augment the above list with additional numbers/categories of equipments, tools & tackles, as

**MINIMUM EQUIPMENTS & MACHINERY  
TO BE DEPLOYED – HARDSCAPE, HORTICULTURE AND ALLIED WORKS FOR  
GREEN R & D CENTRE COMPLEX OF HPCL AT BENGALURU.  
[APPENDIX – IX TO SPECIAL CONDITIONS OF CONTRACT]**

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required and as directed by Engineer-In charge to complete the work within the completion time schedule and quoted price. The actual deployment schedule of Construction Equipments shall be submitted by the Contractor and approved by Engineer-in-charge.

2. Contractor to confirm that the above minimum equipments are available with him in good working condition and shall be timely mobilized on this project site. Contractor has the option to hire some of these equipments from equipment-hiring agencies also.

3. EIL reserves the right to physically check & verify the availability of these equipments prior to award of work.

4. Contractor shall replace any defective/damaged equipment promptly as directed by the Engineer-in-charge and mobilize equipments in good working condition to complete the work without any additional time & cost implication.

**(STAMP & SIGNATURE OF BIDDER)**

# APPENDIX - X TO SPECIAL CONDITIONS OF CONTRACT

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## TIME SCHEDULE

**NAME OF PROJECT: CONSTRUCTION OF HPCL GREEN R&D CENTRE AT BENGALURU**

NAME OF WORK	TIME OF COMPLETION
HARDSCAPE, HORTICULTURE AND ALLIED WORKS	Eight (08) Months

Note:

1. The time of completion shall be reckoned from date of award of Contract, which shall be the date of issue of Fax/ Letter of Acceptance/Notification of Award/Purchase Order, whichever is earlier.
2. Time Schedule for completion of works shall be Eight (08) Months from the date of issue of Letter/ Fax of Intent/PO, whichever is earlier.
3. Maintenance Period of Horticulture Works 1(One) year after completion of work and acceptance thereof by Engineer-in-Charge.
4. The time of completion indicated is for completing all the Works in all respects.

**(SIGNATURE OF BIDDER)**

## APPENDIX-XI TO SCC

### Annexure - I

#### List of Approved Manufacturer of Cement:

SI No	Name of Company	Product
1.	ACC,	All types of cements having validity of BIS approval on the date of ordering.
2.	Ultra tech cement	All types of cements having validity of BIS approval on the date of ordering.
3.	Vikram Cement	All types of cements having validity of BIS approval on the date of ordering.
4.	Shri Cement	All types of cements having validity of BIS approval on the date of ordering.
5.	Gujarat Ambuja,	All types of cements -having validity of BIS approval on the date of ordering.
6.	Jaypee Cement	All types of cements having validity of BIS approval on the date of ordering.
7.	Century Cement	All types of cements having validity of BIS approval on the date of ordering.
8.	JK (Laxmi) cement	All types of cements having validity of BIS approval on the date of ordering.

#### **1.2 CONTRACT CLAUSE FOR PROCURING CEMENT FROM NON LISTED MANUFACTURERS**

In case of non availability of cement from the listed Manufacturers as above and forming part of the contract, Engineer In Charge may accord Project specific approval to the Contractor to use Cement procured from other reputed manufacturer of Cement subjected to fulfilling Technical requirements as per clause 1.3.

#### **1.3 TECHNICAL REQUIREMENTS APPLICABLE TO CEMENT**

- Availability of valid BIS license.
- Availability of valid ISO Certification from recognized body.
- Test certificates of the products from the reputed laboratories accredited by NABL.
- Infrastructure & testing facilities with methodology of Quality control of products.

- List of products being manufactured in the plant.
- The contractor shall furnish documentary evidence towards non availability of cement from the listed suppliers.
- The cement manufacturing plant must have the Capacity of production not less than 1MMTPA.
- Cement procured shall meet the provisions of relevant IS codes for respective grade /type of cement and shall have IS mark on them.
- The contractor shall furnish manufacturer's test certificates to the Engineer-in-Charge in respect of all supplies of cement brought by him to site for incorporation in permanent work
- In addition to verification of delivery orders and delivery challans of the cement manufacturer, samples shall be taken and got tested by the Engineer-in-Charge in an approved test house as per the provisions laid down in EIL Specifications/BIS codes.  
The sample size shall be as under in case of Cement.

<b>Type of cement</b>	<b>For Consignment below 100 MT</b>	<b>For Consignment above 100 MT</b>
All types	One sample for each 25 MT or part thereof	One sample for each 40 MT or part thereof

- The cost for all the tests shall be borne by the contractor. In case the test results indicate that the cement arranged by the contractor does not conform to the specifications, the same shall stand rejected as per discretion of EIC, and shall be removed immediately from the site of work by the contractor at his own expense and without any claim for compensation due to such rejection

## Annexure - II

### List of Approved Manufacturer of TMT bars :

SI No	Name of Company	Product
1.	SAIL	All types of bars having validity of BIS approval on the date of ordering.
2.	RINL	All types of bars having validity of BIS approval on the date of ordering.
3.	TATA STEEL LTD (TSL)	All types of bars having validity of BIS approval on the date of ordering.
4.	JINDAL STEEL & POWER LIMITED	All types of bars having validity of BIS approval on the date of ordering.
5.	JSW STEEL LIMITED	All types of bars having validity of BIS approval on the date of ordering.

### 1.2 CONTRACT CLAUSE FOR OBTAINING REBATE ON TMT REINFORCEMENT BARS

In case of non availability of steel from the listed Producers as above and forming part of the contract, Engineer In Charge may accord Project specific approval to the Contractor to use TMT reinforcement bars procured from other reputed producers of TMT bars subjected to fulfilling Technical requirements. However, such approvals shall be considered subject to the contractor offering rebate as per following:

Difference in Base price of TMT reinforcement bars procured from "Primary Manufacturer" (Listed) & "Secondary Manufacturer" (Non Listed) shall be as per Memorandum issued by CPWD (Sample Memorandum attached for reference and available on CPWD website) & shall be considered for obtaining the rebate rate per MT. The Memorandum of CPWD as applicable on the date of receipt of material at site shall be considered for working out the rebate rate. Base price of TMT bars issued by CPWD shall be applicable for all types/grade of reinforcement bars. The sample memorandum of CPWD mentioned above shall be applicable irrespective of the geographical locations.

### 1.3 TECHNICAL REQUIREMENTS APPLICABLE TO TMT BARS

- Availability of valid BIS license shall be verified from BIS website.
- Availability of valid ISO Certification from recognized body.
- Inspection reports of the products from the reputed third party inspection like DNV, LRS, CEIL, TU, BV, etc.
- Infrastructure! and testing facilities with methodology of quality control of products.
- List of products being manufactured in the plant.
- The contractor shall furnish documentary evidence towards non availability of TMT bars from the listed suppliers
- Materials supplied by producers having Integrated steel plants shall have capacity of production of crude steel of 0.5 million tons per annum

The producers must have valid license from BIS to produce High Strength Deformed (HSD) rebars / TMT bars conforming to IS: 1786. In addition to BIS license for HSD rebars, the producers must have valid license from any of the firms Tempcore, Thermex, Evcon Turbo & Turbo Quench to produce Thermo-Mechanically Treated (TMT) rebars and shall conform to the specifications laid by these firms for particular grade of TMT rebars.

Steel material procured shall meet the provisions of IS: 1786 for respective grade of TMT rebars like Fe500, Fe500D, etc. and shall preferably have IS mark on them.

The contractor shall furnish manufacturer's test certificates to the Engineer-in-Charge in respect of all supplies of rebars brought by him to site for incorporation in permanent work.

In addition to verification of delivery orders and delivery challans of the steel manufacturer, samples shall be taken and got tested by the Engineer-in-Charge in an approved test house duly witnessed by Reputed third party agency like DNV, LRS, CEIL, TU, BV, etc. as per the provisions laid down in EIL Specifications/BIS codes. The sample size shall be as under in case of TMT bars.

Size of Bar	For Consignment below 100 MT	For Consignment above 100 MT
Under 10 mm dia bars	One sample for each 25 MT or part thereof	One sample for each 40 MT or part thereof
10mm to 16 mm dia bars	One sample for each 35 MT or part thereof	One sample for each 45 MT or part thereof
Over 16 mm dia bars	One sample for each 45 MT or part thereof	One sample for each 50 MT or part thereof

The cost for all the tests and the test certificates shall be borne by the contractor. In case the test results indicate that the rebars arranged by the contractor does not conform to the specifications, the same shall stand rejected as per discretion of EIC, and shall be removed immediately from the site of work by the contractor at his own expense and without any claim for compensation due to such rejection



**ITEMS QUALIFYING FOR SECURED ADVANCE**  
**[APPENDIX- XI TO SPECIAL CONDITIONS OF CONTRACT]**

## ITEMS QUALIFYING FOR SECURED ADVANCE

### 1. CATEGORY : 'A' -- ITEMS AGAINST WHICH SECURED ADVANCE CAN BE GRANTED

#### **A-1 CIVIL**

- i) Bricks
- ii) Stone and Brick aggregates
- iii) Stones
- iv) Finished products of brass, Iron or Steel such as doors and window frames, wiremesh, gate, G.I. Sheets.
- v) Precast RCC products such as pipes & fittings, jail, water storage tanks.
- vi) Doors and windows fitting.
- vii) Pipes and sanitary fittings of GI, CI, SCI and HCI.
- viii) Metallic doors/windows
- ix) M.S. Gratings.
- x) Reinforcement bars
- xi) Hydraulic door closures.
- xii) Structural steel.
- xiii) C.I. Flushing Cisterns
- xiv) C.I. Valves, Sluice gates etc.
- xv) Fencing, material, Chain-Link/Barbed wire etc.
- xvi) Anchor bolts and Nuts.

#### **A-2 ELECTRICAL**

- i) Steel Conduit
- ii) G.I. Pipes
- iii) C.I. Boxes
- iv) I.C. Boards
- v) Switchgears (Air circuit breakers and Air breaker switches)
- vi) A.C.S.R. Conductors.
- vii) A.C. Plant and Machinery
- viii) Pumps
- ix) Generating sets (without oil)
- x) G.I. Strips
- xi) Street light poles (Steel)
- xii) Cable Trays

**2. CATEGORY : 'B'--- ITEMS AGAINST WHICH SECURED ADVANCE CAN BE GRANTED AFTER OBTAINING INSURANCE COVER FROM THE CONTRACTOR**

**B-1 CIVIL**

- i) Kitchen sink china vitreous, flush back for wash basin vitreous china, water closet and pedestal type water closet vitreous china, urinals.
- ii) Glazed tiles, terrazo tiles and similar articles.
- iii) Marble/Kota Stone/Granite slabs
- iv) Asbestos cement products
- v) Finished timber products such as doors, windows, flush doors, particle boards (subject to the mandatory tests being satisfactory).
- vi) Bitumen in sealed drums.
- vii) Bitumen felt
- viii) Polythene pipes and fittings.
- ix) Sanitary fittings and pipes of S.W. Porcelain and chinaware materials.
- x) Laminated/safety one way vision and Bullet proof glasses.
- xi) Chemicals required for antitermite treatment (in sealed drums).
- xii) Paints, Varnishes, Distempers, pigment.
- xiii) Ceiling and false flooring frames and tiles etc.
- xiv) Acid proof tiles
- xv) Bitumen products required for mastic flooring etc.
- xvi) Waterproofing, compounds such as CICO etc.
- xvii) Materials for Grouting, Epoxy finishing etc.
- xviii) PVC Water storage Tanks, PVC tiles, PVC waterbar etc.
- xix) Cement

**B-2 ELECTRICAL**

- i) Transformers
- ii) Switchgears (Oil filled)
- iii) L.T. &.H.T. Cables
- iv) Fans
- v) Storage & Dry Batteries
- vi) Insulation tapes
- vii) Epoxy cable compounds
- viii) Electric light fittings
- ix) Wood battens, casing & capping and wooden boards
- x) Flexible wires
- xi) PVC materials

- xii) Rubber materials
- xiii) Glass wools, thermocol and other insulating materials.
- xiv) Porcelain H.T. and L.T. insulators
- xv) Electric heat tracing tapes
- xvi) Oil and Lubricants.

**NOTE:** The Category "B" shall cover all the above items and any other item not covered in category "A" and "C" and imperishable in nature.

**3. CATEGORY : 'C' -- ITEMS AGAINST WHICH NO SECURED ADVANCE SHOULD BE GRANTED**

**C-1 CIVIL**

- i) Glass products other than those indicated in Category 'B'.
- ii) Sand and Mooram.
- iii) Chemical compounds other than those under Category 'B'.

**C-2 ELECTRICAL**

- i) Glass Globes and Shades.
- ii) Bulbs and Tubes.
- iii) Petrol and Diesel.
- iv) Freon and other Refrigeration gases.

## **FORMAT OF GUARANTEE BOND**

**[APPENDIX - XIII TO SPECIAL CONDITIONS OF CONTRACT]**

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**GUARANTEE TO BE EXECUTED BY CONTRACTOR FOR REMOVAL OF DEFECTS  
AFTER COMPLETION OF WORK IN RESPECT OF WATER PROOFING WORKS**

This agreement made on \_\_\_\_\_ day of \_\_\_\_\_ two thousand twelve between \_\_\_\_\_ son of \_\_\_\_\_ (Hereinafter called the Guarantor of the one part) and Hindustan Petroleum Corporation Limited (Hereinafter called HPCL on the other part).

WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract) dated \_\_\_\_\_ and made between the GUARANTOR ON THE ONE PART AND HPCL on the other part, whereby the contractor inter alia, undertook to render the building and structures in the said contract recited completely water and leak proof.

NOW THE GUARANTOR hereby guarantees that water proofing treatment given by him will render the structures completely leak proof and the minimum life of such water proofing treatment shall be ten years to be reckoned from the date of completion/ handing over.

Provided that the guarantor will not be responsible for leakage caused by earthquake or structural defects or misuse or alteration and for such purpose:

- a) Misuse of roof shall mean any operation, which will damage proofing treatment, like chopping of firewood and things of the same nature, which might cause damage to the roof.
- b) Alteration shall mean construction of an additional storey or a part of the roof or construction adjoining to existing roof whereby proofing treatment is removed in parts.
- c) The decision of the Engineer-in-Charge with regard to nature and cause of defect shall be final.

During this period of guarantees, the guarantor shall make good all defects and in case of any defect being found render the building water proof to the satisfaction of the Engineer-in-Charge at his cost and shall commence the work for such rectification within seven days from the date of issue of the notice from Engineer-in-Charge calling upon him to rectify the defects failing which the work shall be got done by HPCL by some other contractor at the GUARANTOR'S risk & cost. The decision of the Engineer-in-Charge as to the cost payable by the Guarantor shall be final and binding.

That if guarantor fails to execute the water proofing or commits breach there under; then the guarantor will indemnify the Principal and his successors against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/ or damage and/ or cost incurred by HPCL, the decision of the Engineer-in-Charge will be final and binding on the parties.

IN WITNESS WHEREOF these presents have been executed by the obligator \_\_\_\_\_ and by \_\_\_\_\_ for an on behalf of HPCL on the day, month and year first above written.  
SIGNED, sealed and delivered by OBLIGATOR in the presence of

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

SIGNED FOR AND ON BEHALF OF 'HPCL' BY \_\_\_\_\_ In the presence of

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

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**GUARANTEE TO BE EXECUTED BY CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION OF WORK IN RESPECT OF ANTI TERMITE TREATMENT WORKS**

The agreement made this \_\_\_\_\_ day of \_\_\_\_\_ two thousand twelve between \_\_\_\_\_ son of \_\_\_\_\_ (Hereinafter called the Guarantor of the one part) and Hindustan Petroleum Corporation Limited (Hereinafter called HPCL on the other part).

WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract) dated \_\_\_\_\_ and made between the GUARANTOR ON THE ONE PART AND HPCL on the other part, whereby the contractor inter alia, undertook to render the building and structures in the said contract recited completely termite proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said structure will remain termite proof for TEN YEARS to be reckoned from the date of completion/ handing over.

During this period of guarantee, the guarantor shall make good all defects and for that matter, shall replace at his risk and cost such wooden members as may be damaged by termites and in case of any other defect being found he shall render the building termite proof at his cost to the satisfaction of the Engineer-in-Charge and shall commence the work for such rectification within seven days from the date of issue of the notice from HPCL calling upon him to rectify the defects failing which the work shall be got done by HPCL from some other contractor at the GUARANTOR'S cost and risk and in the later case the decision of HPCL as to the cost recoverable from the Guarantor shall be final and binding.

That if guarantor fails to execute the anti termite or commits breach here under; then the guarantor will indemnify the Principal and his successors against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/ or damage and/ or cost incurred by HPCL, the decision of HPCL will be final and binding on the parties.

IN WITNESS WHEREOF these presents have been executed by the obligator \_\_\_\_\_ and by \_\_\_\_\_ for an on behalf of HPCL on the day, month and year first above written.

SIGNED, sealed and delivered by OBLIGATOR in the presence of

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

SIGNED FOR AND ON BEHALF OF 'HPCL' BY \_\_\_\_\_ In the presence of

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

## **PREAMBLE TO SCHEDULE OF PRICE**

- 1 The Schedule of Price shall be read with all other sections of this Bidding Document.
- 2 The CONTRACTOR is deemed to have studied the drawings, specifications and details of works to be done within the Time Schedule and should have acquainted himself of the conditions prevailing at site.
- 3 The quantity shown against the various items are only approximate and may vary to any extent individually subject to conditions given in General Conditions of Contract/Special Conditions of Contract provided in Bidding Document. No claim shall be entertained during currency of this Contract towards any items due to the above.
- 4 OWNER/ EIL reserves the right to interpolate or extrapolate the rates for any new item of work not covered in Schedule of Rates from the similar items already available in schedule of rates. All the works shall be measured upon completion and paid for at the rate quoted and accepted in the "Schedule of Rates". In case any activity though specifically not covered in schedule of rates descriptions but the same is covered under scope of work/ scope of supply/ specification/ drawings etc. no extra claim on this account shall be entertained, since Schedule of Price is to be read in conjunction with all other documents forming part of the Contract.
- 5 All items of work mentioned in the Schedule of Rates shall be carried out as per the specifications, drawings and instructions of OWNER/ EIL and the rates are deemed to be inclusive of material, consumable, labour, supervision, tools & tackles and detailing of construction/fabrication drawings, isometric wherever required as called for in the detail specification and conditions of the Contract.
- 6 OWNER/ EIL reserves the right to cancel/ delete/ curtail any item or group of work if necessary. Such a step shall not be construed as reason for changing the rates.
- 7 Bidder shall indicate only the increase/decrease on total estimated value in terms of percentage upto 2 decimal places in the " Summary of Prices" sheet. Bidder shall not change rate/amount indicated in 'Schedule of Rates'.



**FORM- SP-1****SUMMARY OF PRICE**

**NAME OF WORK** : **HARDSCAPE, HORTICULTURE AND ALLIED WORKS FOR CONSTRUCTION OF HPCL GREEN R&D CENTRE AT BENGALURU**

**BIDDING DOCUMENT NO.** : **KNM/ A298-000-CQ-TN-7030/1007**

**NAME OF BIDDER** :

Sr.No.	DESCRIPTION		AMOUNT
<b>A</b>	<b>TOTAL ESTIMATED PRICE (AS PER SCHEDULE OF RATES (SP- 0))</b>	:	<b>Rs. 7,14,73,787.00</b>
<b>B</b>	Percentage increase/ decrease on Total estimated price for total work (i.e. on 'A' above), applicable on all items of SOR	:	In figure_____ % In words _____percent <b>(Refer Note-1)</b>
<b>C</b>	Amount on the basis of percentage increase/decrease on total estimated price as mentioned at "B" above		Rs.....
<b>D</b>	Total amount after considering percentage Increase/ Decrease as above.	:	(In fig.) Rs._____ (In Words) Rupees_____

Note:

- Bidder shall indicate the Percentage Increase/Decrease under Sr.no.B and amount as per Sr.no. C & D in **Price bid only (and not in techno-commercial bid)**.
- Bidder shall indicate (+) for increase and (-) for decrease. For no increase/decrease, 'NIL' shall be indicated.
- The percentage should be quoted upto 2 decimal place.
- In case of any discrepancy in the % and the amount quoted by the bidder, the amount shall be calculated after applying the % increase/decrease on the total estimated price as shown above.

**(STAMP & SIGNATURE OF BIDDER)**

NAME OF PROJECT: CONSTRUCTION OF HPCL GREEN R&D CENTRE AT BENGALURU					
NAME OF WORK: HARDSCAPE, HORTICULTURE AND ALLIED WORKS					
BIDDING DOCUMENT NO: KNM/ A298-000-CQ-TN-7030/1007					
NAME OF BIDDER:					
SCHEDULE OF RATES				FORM-SP 0	
ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
<b>1</b>	<b>HARD LANDSCAPE WORKS</b>				
<b>1.1</b>	<b>EARTH WORK</b>				
<b>1.1.1</b>	Earth work in <b>EXCAVATION</b> below ground level for all kinds of works including roads in ALL TYPES OF SOILS EXCLUDING SOFT ROCK AND HARD ROCK as classified in specification for a depth <b>upto 1.5m</b> including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, leveling, grading and ramming of bottoms, dewatering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material within a lead of 100 m, as directed including providing temporary supports to existing service lines like water pipes, sewage pipes, electric overhead and underground cables etc. all complete, <b>excluding</b> shoring and strutting ,all complete as per specification and direction of Engineer-In-Charge.	Cu.m.	<b>1 769</b>	<b>178</b>	<b>3 14 882</b>
<b>1.1.1.1</b>	Extra Over Item no.1.1.1 for a depth beyond 1.5m				
<b>1.1.1.2</b>	<b>1.5m to 3.0m</b>	Cu.m.	<b>100</b>	<b>19</b>	<b>1 900</b>
<b>1.1.2</b>	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, for all leads & lifts, all complete as per specification and direction of Engineer-In-Charge.	Sq.m.	<b>7 892</b>	<b>102</b>	<b>8 04 984</b>
<b>1.1.3</b>	<b>Preparation of mounds</b> of various size and shape by available excavated / supplied earth in layers not exceeding 20 cm in depth, breaking clods, watering of each layer, dressing etc., lead upto 50 meter and lift upto 1.5 m complete as per direction of Engineer-in-charge.	Sq.m.	<b>13 419</b>	<b>215</b>	<b>28 85 085</b>
<b>1.2</b>	<b>Concrete works</b>				
<b>1.2.1</b>	Providing and laying in position <b>cement concrete</b> of specified grade including the cost of centering and shuttering for all work up to plinth level all complete as per specification and direction of Engineer-In-Charge.				
<b>1.2.1.2</b>	1:4:8 (1 Cement : 4 coarse sand : 8 graded stone aggregate 20mm nominal size)	Cu.m.	<b>299</b>	<b>4 542</b>	<b>13 58 058</b>
<b>1.2.1.1</b>	1:3:6 (1 Cement : 3 coarse sand : 6 graded stone aggregate 20mm nominal size)	Cu.m.	<b>118</b>	<b>4 989</b>	<b>5 88 702</b>

1.2.2	Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, for All works upto Plinth Level using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work, including pumping of R.M.C. from transit mixer to site of laying, <b>including</b> the cost of centering, shuttering, finishing and admixtures, in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability, excluding the cost of reinforcement, as per specification and direction of the Engineer - in - charge. Note :- Minimum Cement content to be considered in this item is @ 330 kg/cum.	Cu.m.	78	7 782	6 06 996
1.2.3	Supply and fixing of steel reinforcement (Fe 500, TMT bars) for R.C.C. work including supply, straightening, cutting, bending, placing in position and binding with 16 gauge wire, all complete as per specification and direction of Engineer-In-Charge.	MT	6	76 202	4 57 212
1.2.4	Providing and laying <b>damp-proof course 40 mm thick</b> with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 12.5mm nominal size) all complete as per specification and direction of Engineer-In-Charge.	Sq.m.	10	254	2 540
1.3	<b>STONE MASONRY</b>				
1.3.1	Providing and Laying Random rubble masonry with hard stone in foundation and plinth including leveling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) upto plinth level with Cement mortar 1:6 (1 cement : 6 coarse sand) all complete as per specification and direction of Engineer-In-Charge.	Cu.m.	121	3 745	4 53 145
1.4	<b>BRICK WORK</b>				
1.4.1	Providing and laying <b>Brick work</b> with non modular fly ash lime bricks (FALG Bricks) conforming to IS:12894, class designation 10 average compressive strength in superstructure above plinth level up to floor V level in Cement mortar 1 : 6 (1 cement : 6 coarse sand) all complete as per specification and direction of Engineer-In-Charge.	Cu.m.	329	4 870	16 02 230
1.5	<b>PLASTERING</b>				
1.5.1	Providing & applying <b>plaster</b> to wall with 15mm thick cement mortar 1:4 (1 cement: 4 coarse sand) on external surfaces with finished smooth, including scaffolding, curing, etc. upto 10 m height from Ground level, all complete as per specifications and direction of Engineer in Charge.	Sq.m.	823	188	1 54 724
1.5.2	Extra for providing and mixing <b>water proofing</b> material in cement plaster work in proportion recommended by the manufactures and all complete as per specifications and direction of Engineer in Charge.	per bag of 50 kg cement	76	46	3 496
1.6	<b>FLOOR FINISHES</b>				
1.6.1	Providing and laying <b>Kota</b> stone slab 25 mm thick in flooring over 20 mm (average) thick base laid over and jointed with grey cement slurry mixed with pigment to match the shade of the slab, including rubbing and polishing complete with base of cement mortar 1 : 4 (1 cement : 4 coarse sand), all complete as per specification and direction of Engineer-In-Charge.	Sq.m.	117	1 157	1 35 369

1.6.2	Extra for covering top of LDPE sheet membrane with <b>Geotextile</b> , 120 gsm non woven, 100% polyester of thickness 1 to 1.25 mm bonded to the membrane with intermittent touch by heating the membrane by Butane Torch as per manufactures recommendation all complete as per specification and direction of Engineer-In-Charge.	Sq.m.	2 333	65	1 51 645
1.6.3	Providing and laying 500x500x40 mm thick <b>Turf paver</b> (Turfpave XD) on 150 mm thick sub grade of compacted bed of 20 mm thick nominal size stone aggregate and base course and filling with 150 mm thick river sand, including spreading, well ramming, consolidating and finishing smooth etc. all complete as per direction of Engineer-in-charge.	Sq.m.	2 333	1 986	46 33 338
1.6.4	Providing and laying <b>65mm</b> thick factory made cement concrete of minimum grade M35 interlocking <b>flexi paver</b> block of approved make, of approved size, design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with fine sand etc. all complete as per the direction of Engineer-in-charge. Basic cost of Flexi paver is Rs 1800 per sqm	Sq.m.	625	2 500	15 62 500
1.6.5	Supply and fixing of 20mm thick Flamed <b>sadarahalli granite</b> stone for seater coping <b>laid in 20mm thick</b> cement mortar 1:6 (1 cement : 6 coarse sand) with coping outer edge '5mm Bull-nosed' including cut to shape as per detail etc., all complete as per direction of Engineer-in-charge. Basic cost of granite is Rs 1000 per sqm	Sq.m.	268	2 279	6 10 772
1.6.6	Supply and fixing of 20mm thick Flamed <b>sadarahalli granite</b> stone cladding for seater, fixed with MYK Laticrete/ BOSTIC or approved equivalent make adhesive, with straight machine cut edges, including acid wash & cleaning, wastages, lead and lift etc., all complete as per direction of Engineer-in-charge. Basic cost of granite is Rs 1000 per sqm	Sq.m.	109	2 590	2 82 310
1.6.7	Supply and laying of <b>Black Granite cobble stone pavers</b> 150x150mm in size & 150mm thk laid in 50mm thk cement mortar 1:6 (1 cement : 6 coarse sand) to approved pattern,with 15mm wide joints with recessed pointing etc, all complete as per direction of Engineer-in-charge. Basic cost of cobble stone is Rs 550.00 per sqm	Sq.m.	840	3 470	29 14 800
1.6.8	Supply and laying of <b>Grey Granite cobble stone pavers</b> 150x150mm in size & 150mm thk laid in 50mm thk cement mortar 1:6 (1 cement : 6 coarse sand) to approved pattern,with 15mm wide joints with recessed pointing etc, all complete as per direction of Engineer-in-charge. Basic cost of cobble stone is Rs 500.00 per sqm	Sq.m.	63	3 108	1 95 804
1.6.9	Supply and fixing of 40 mm thk <b>RED AGRA stone as steps tread</b> , laid in 25mm thk cement mortar 1:4 (1 cement : 4 coarse sand), including machine cut edges, wastages, lead and lift etc., all complete as per direction of Engineer-in-charge. Basic cost of red agra stone is Rs -1800 per sqm	Sq.m.	762	2 486	18 94 332
1.6.10	Providing and laying Ceramic glazed tiles of size 200x200 mm or above, (thickness to be specified by the manufacturer) of 1st quality conforming to IS : 15622 of approved make and colour, laid on 20 mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand), including spacers, pointing the joints with white cement and matching pigment etc., complete.e as per direction of Engineer-in-charge. Basic cost of the tile is Rs. 700 per sqm	Sq.m.	202	1 253	2 53 106

1.6.11	Supply and fixing of <b>20mm thick polished steel grey granite</b> stone for flooring laid in 20 mm thick Cement mortar 1:6 (1 cement : 6 coarse sand)including cut to shape as per detail including lead and lift etc., all complete as per direction of Engineer-in-charge. Basic cost of granite is Rs 1200 per sqm	Sq.m.	195	3 211	6 26 145
1.6.12	Supply and fixing of <b>20mm thick antique finish steel grey granite</b> stone for flooring laid in 20 mm thick Cement mortar 1:6 (1 cement : 6 coarse sand) including cut to shape as per detail including lead and lift etc., all complete as per direction of Engineer-in-charge. Basic cost of granite is Rs 1200 per sqm	Sq.m.	53	3 729	1 97 637
1.6.13	Supply and fixing of <b>20mm thick black granite stone</b> for flooring laid in 20 mm thick Cement mortar 1:6 (1 cement : 6 coarse sand) including cut to shape as per detail including lead and lift etc., all complete as per direction of Engineer-in-charge. Basic cost of granite is Rs 1800 per sqm	Sq.m.	43	3 522	1 51 446
1.6.14	Supply and fixing of 60mm thk <b>CEMENT GRASS CRETE PAVERS</b> 300x300mm in size in GREY COLOUR, laid on 150mm Sweet earth cushion, in a pattern as per design etc., all complete as per direction of Engineer-in-charge.	Sq.m.	100	1 916	1 91 600
1.7	<b>PAINTING WORKS</b>				
1.7.1	Providing and Finishing walls of New work with textured exterior paint of required shade with Two or more coats applied @ 3.28 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20kg/10 sqm all complete as per specifications and direction of Engineer in Charge.	Sq.m.	190	142	26 980
1.8	<b>MISCELLANEOUS</b>				
1.8.1	Supplying & fixing steel work with <b>Hot finished welded type tubes</b> in built-up tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete as per the direction of Engineer-In-Charge.	kgs	15 000	102	15 30 000
	Providing and applying two coats of <b>Painting with synthetic enamel</b> paint, having VOC (Volatile Organic Compound) content less than 150 grams/ litre, of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour all complete as per specifications and direction of Engineer in Charge. (Cleaning & touch up of damage of primer paint applied earlier is also included in the scope)	Sq.m.	345	65	22 425
1.8.3	Providing and laying at or near ground level factory made <b>kerb stone</b> of M-25 grade cement concrete in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement: 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not be more than 5mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-charge (length of finished kerb edging shall be measured for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-charge).	Cum	170	6 071	10 32 070
1.8.4	Providing and laying 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20mm nominal size) <b>cement concrete</b> in kerbs, steps and the like at or near ground level excluding the cost of centering, shuttering and finishing.	Cu.m.	51	4 841	2 46 891

1.8.5	Providing and fixing of Hammer dressed <b>Sadarhalli granite stone Kerb</b> 100mm thk, 450mm deep, 0.60-0.90m running lengths, in Cement mortar 1:6 (1 cement : 6 coarse sand), as per Drawing detail all complete as per direction of Engineer-in-charge.	Rmt	3 629	1 554	56 39 466
1.8.6	Supply and fixing of 100 mm thk <b>2-line dressed sadarahalli granite stone</b> , laid on 50mm thk cement mortar 1:6 (1 cement : 6 coarse sand), including machine cut edges, wastages, lead and lift etc., all complete as per drawing, specification and directions of Engineer-in-charge.	Sq.m.	653	3 625	23 67 125
1.8.7	Supply and spreading of Hoskote <b>murrum gravel of 20mm down size</b> , in 100mm thk. Layer, including all wastages, lead and lift etc., all complete as per drawing, specification and directions of Engineer-in-charge.	Sq.m.	2 295	104	2 38 680
1.8.8	Supply and placement of <b>natural Boulders</b> , having shape of an elliptical configuration and well rounded corners, including lead and lift etc.,all complete as per drawing, specification and directions of Engineer-in-charge.				
1.8.8.1	300x450mm in size & 300mm high	nos	150	777	1 16 550
1.8.8.2	450x600mm in size & 450mm high	nos	100	1 036	1 03 600
1.8.8.3	600x900mm in size & 900mm high	Nos	10	2 072	20 720
1.8.8.4	900x1200mm in size & 1200mm high	Nos	10	3 108	31 080
1.8.9	Placement of <b>existing natural Boulders inside the site</b> , having shape of an elliptical configuration and well rounded corners, including lead and lift etc., all complete as per drawing, specification and directions of Engineer-in-charge.				
1.8.9.1	300x450mm in size & 300mm high	nos	20	259	5 180
1.8.9.2	450x600mm in size & 450mm high	nos	20	345	6 900
1.8.9.3	600x900mm in size & 900mm high	Nos	20	691	13 820
1.8.9.4	900x1200mm in size & 1200mm high	Nos	20	1 036	20 720
1.8.10	Providing <b>Rubble packing</b> below floor with approved quality 100 to 150 mm size well packed and correct to level, interstices filled with 40 mm down graded aggregates or stone spalls. The surface shall be consolidated manually or any other approved methods of consolidation after spreading good quality river sand upto 33 1/3 % by volume of soling metal and through watering. The consolidated thickness of soling shall be 150mm, all complete as per the Technical Specifications and Directions of Engineer- In- Charge.	Sq.m.	139	363	50 457
1.8.11	Supply and laying of 500 microns <b>LDPE sheet</b> with a minimum overlap of 9" between sheets for open joints, including lead and lift etc , all complete as per drawing, specification and directions of Engineer-in-charge.	Sq.m.	5 171	93	4 80 903
1.8.12	<b>Edge Fixing of LDPE sheet</b> - including placement of the liner edge, boulder packing and back filling, securing of the edges into a trench of size 300mm wide and 450mm deep and packed with boulders etc., all complete as per drawing, specification and directions of Engineer-in-charge.	Rmt	270	155	41 850
1.8.13	Supply and spreading of <b>Lake soil</b> to a minimum depth of 250mm across the entire base and sloped sides of the lake, all complete as per drawing, specification and directions of Engineer-in-charge.	Cu.m.	773	777	6 00 621
1.8.14	Supply and spreading of 70 mm down size <b>black granite stone aggregate</b> laid loose in 100mm thk. Layer, including all wastages, lead and lift etc., all complete as per drawing, specification and directions of Engineer-in-charge.	Sq.m.	850	518	4 40 300

1.8.15	Supply and spreading of <b>20mm down size granite stone aggregate</b> (blue metal) laid loose in 50mm thk. Layer, including all wastages, lead and lift etc., complete as per drawing, specification and directions of Engineer-in-charge.	Sq.m.	2 519	93	2 34 267
1.8.16	Supply and spreading of <b>10mm down size black granite stone aggregate</b> laid loose in 100mm thk. layer, including all wastages, lead and lift etc., complete as per drawing, specification and directions of Engineer-in-charge.	Sq.m.	2 519	207	5 21 433
1.8.17	Supply and fixing of 100 mm thk <b>single -line dressed sadarahalli granite stone</b> , for Open Air Theatre vertical walls fixed in compacted soil, including machine cut edges, wastages, lead and lift etc., all complete as per drawing, specification and directions of Engineer-in-charge.	Sq.m.	564	2 590	14 60 760
1.8.18	Providing and fixing G.I. chain link fabric fencing of required width in mesh size 50x50 mm made of G.I. wire of dia 4 mm including strengthening with 2 mm dia wire or nuts, bolts and washers as required complete as per the direction of Engineer-in-charge.	Sq.m.	600	585	3 51 000
1.8.19	Providing and laying GUNITED SPRAYED CONCRETE WATERPROOFING (40mm thk.) in Waterbody areas consisting of mix 1:2:4 (1 cement: 2 coarse sand: 4 coarse aggregate of 10mm nominal size) over G.I. Wire mesh of approved weight per sq.m. using appropriate equipment & the following operations: a) Cleaning the surfaces where gunited concrete is to be applied, b) Fixing of G.I. wire mesh with approved fasteners on surface, c) Applying sprayed concrete d) Finishing the surface with trowel to achieve smooth finish etc. all complete as per drawing, specification and directions of Engineer-in-charge.	Sq.m.	300	625	1 87 500
<b>2.0</b>	<b>SOFT LANDSCAPE AND HORTICULTURE WORKS</b>				
<b>2.1</b>	<b>BASE PREPARATION</b>				
2.1.1	Surface scrapping by removal of clods, building debris, dirt etc., and carting of debris out of the site, to provide a clean surface to dump soil for grading works etc., all complete, <b>for intensive landscaped areas</b> , as per drawing, specification and directions of Engineer-in-charge.	Sq.m.	36 244	41	14 86 004
2.1.2	Surface scrapping by removal of clods, building debris, dirt etc., and carting of debris out of the site, to provide a clean surface to dump soil for grading works etc., complete, for tree planted areas without any further landscape development, all complete as per drawing, specification and directions of Engineer-in-charge.	Sq.m.	52 899	31	16 39 869
<b>2.2</b>	<b>SUPPLY OF SOIL</b>				
2.2.1	Supply and filling of <b>available earth</b> to the required depth <b>from within the site</b> to reach formation levels and planting areas, including lead and lift etc., all complete as per drawing, specification and directions of Engineer-in-charge.	cu. m.	3 624	363	13 15 512
2.2.2	Supply and Filling of good earth <b>from outside</b> to the required depth to reach formation levels and planting areas, including lead and lift etc., all complete as per drawing, specification and directions of Engineer-in-charge.	cu. m.	3 624	570	20 65 680

2.2.3	Supply and filling of <b>sweet earth (fertile soil suitable for gardening) brought from outside</b> , to reach formation levels and planting areas, including lead and lift etc., all complete as per drawing, specification and directions of Engineer-in-charge.	cu. m.	<b>7 630</b>	<b>673</b>	<b>51 34 990</b>
<b>2.3</b>	<b>SUPPLY AND PLANTING OF LAWN (including planting media)</b>				
<b>2.3.1</b>	Supply and planting of Lawn on garden soil which is to be spread on garden surface upto a depth of 75mm and mixed with manure to attain a total depth of 100mm to form the final garden surface. Surface preparation is to be done by raking and mixing to attain a smooth finished surface and planted with rooted slips of the specified grass species. Quoted rate for the item to include supply of grass species, labour charges for mixing soil media in the desired proportion, planting of rooted grass slips, maintenance, mortality replacement as per the clause of SCC. Rate shall also include supply of sand, neem cakes and organic manure and all other additives as mentioned in the specifications, all complete as per drawing, specification and directions of Engineer-in-charge. (Supply earth as required shall be paid separately)				
2.3.1.1	Bermuda carpet grass	Sq.m.	<b>2 775</b>	<b>158</b>	<b>4 38 450</b>
2.3.1.2	Bermuda grass dibbled	Sq.m.	<b>14 416</b>	<b>66</b>	<b>9 51 456</b>
2.3.1.3	Mexican carpet grass	Sq.m.	<b>182</b>	<b>264</b>	<b>48 048</b>
2.3.1.4	Phasphallum grass dibbled	Sq.m.	<b>20</b>	<b>66</b>	<b>1 320</b>
<b>2.4</b>	<b>SUPPLY AND PLANTING OF TREES of the specified height and crown</b>				
<b>2.4.1</b>	<b>SUPPLY AND PLANTING OF TREES</b> in pits of size 1200x1200x1000mm filled with 50% of excavated mother earth and balance 50% filled with a mixture of good earth, sand and manure in the ratio of 3:1:1. Quoted rate to include supply of healthy plants as per the specs., labour charges for pitting, mixing soil media, filling the pits with soil media, planting the specimen tree, supply of sand and manure, maintainance, mortality replacement as per maintenance clause of SCC all complete as per drawing, specification and directions of Engineer-in-charge. (Supply earth as required shall be paid separately)				
2.4.1.1	Acrus sapota (min. ht. of 4'-0", with a trunk girth of 2" dia. @ base)	NOS	<b>56</b>	<b>880</b>	<b>49 280</b>
2.4.1.2	Alstonia scholaris (Devil's tree) (min. ht. of 10'-0"-12'-0" and a canopy spread of 5'-0" with a trunk girth of 4" dia @ base)	NOS	<b>200</b>	<b>1 629</b>	<b>3 25 800</b>
2.4.1.3	Artocarpus integra (Jack fruit) (min. ht. of 4'-0" and a canopy spread of 3'-0" with a trunk girth of 2" dia @ base)	NOS	<b>6</b>	<b>572</b>	<b>3 432</b>
2.4.1.4	Artocarpus incisa (bread fruit) (min. ht. of 5'-0" and a canopy spread of 3'-0" with a trunk girth of 3" dia @ base)	NOS	<b>10</b>	<b>616</b>	<b>6 160</b>
2.4.1.5	Anthocephalus kadamba (Kadamb) (min. ht. of 12'-0" - 15'-0" and a canopy spread of 6'-0" with a trunk girth of 5" dia @ base)	NOS	<b>140</b>	<b>1 585</b>	<b>2 21 900</b>
2.4.1.6	Azadirachta indica (Neem) (min. ht of 8'-0" with a canopy spread of 4'-0" dia and a trunk girth of 4" dia @ base)	NOS	<b>35</b>	<b>836</b>	<b>29 260</b>
2.4.1.7	Bauhinia blakiana (min. ht of 10'-0" with a canopy spread of 5'-0" dia and a trunk girth of 3" dia @ base)	NOS	<b>86</b>	<b>1 585</b>	<b>1 36 310</b>
2.4.1.8	Bauhinia purpurea (min. ht of 10'-0" with a canopy spread of 3'-0" dia and a trunk girth of 2" dia @ base)	NOS	<b>2</b>	<b>1 322</b>	<b>2 644</b>



2.4.1.9	Bauhinia variegata (Camel's foot tree) (min. ht of 10'-0" with a canopy spread of 3'-0" dia and a trunk girth of 2" dia @ base)	NOS	2	1 761	3 522
2.4.1.10	Brassia actinophylla (min. ht of 10'-0" - 12'-0" with a canopy spread of 5'-0" and a trunk girth of 4" dia @ base)	NOS	2	924	1 848
2.4.1.11	Butea monosperma (min. ht. of 10'-0" with a canopy spread of 5'-0" dia and trunk girth of 4" dia @ base)	NOS	15	924	13 860
2.4.1.12	Callistemon lanceolata (min. ht. of 8'-0" and a canopy of 5'-0" with a trunk girth of 3" @ base)	NOS	40	1 761	70 440
2.4.1.13	Canaga odorata (min. ht of 6'-0" with a canopy spread of 4'-0" dia and a trunk girth of 3" dia @ base)	NOS	5	660	3 300
2.4.1.14	Caryota urens (min. ht of 10'-0" with a canopy spread of 5'-0" dia and a trunk girth of 6" to 8" dia @ base)	NOS	5	2 201	11 005
2.4.1.15	Cassia fistula (min. ht of 8'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	15	792	11 880
2.4.1.16	Cassia marginata (min. ht of 8'-0" with a canopy spread of 4'-0" dia and a trunk girth of 5" dia @ base)	NOS	40	1 057	42 280
2.4.1.17	Cassia nodosa (min. ht of 8'-0" with a canopy spread of 4'-0" dia and a trunk girth of 5" dia @ base)	NOS	39	880	34 320
2.4.1.18	Cassia siamea (min. ht of 8'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	5	660	3 300
2.4.1.19	Cassia spectabilis (min. ht of 8'-0" with a canopy spread of 4'-0" dia & a trunk girth of 3" dia @ base)	NOS	30	836	25 080
2.4.1.20	Ceiba pentandra (min. ht. of 12'-0" and a canopy of 4'-0" with a trunk girth of 4" @ base)	NOS	11	1 497	16 467
2.4.1.21	Chorisia speciosa (min. ht of 10'-0" with a canopy spread of 5'-0" dia and a trunk girth of 6" dia @ base)	NOS	5	4 226	21 130
2.4.1.22	Couropita guianensis (Cannon ball tree , Shivalinga)(min. ht of 8'-0" with a canopy spread of 4'-0" dia and a trunk girth of 3" dia @ base)	NOS	65	1 189	77 285
2.4.1.23	Colvillea racemosa (min. ht of 12'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	67	3 698	2 47 766
2.4.1.24	Delonix regia (min. ht of 12'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	16	1 321	21 136
2.4.1.25	Diospyros montana (min. ht of 8'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	5	836	4 180
2.4.1.26	Erythrina indica picta (min. ht of 8'-0" with a canopy spread of 5'-0" dia and a trunk girth of 3" dia @ base)	NOS	53	1 101	58 353
2.4.1.27	Filicium decipens (min. ht of 8'-0" with a canopy spread of 5'-0" dia and a trunk girth of 3" dia @ base)	NOS	10	1 717	17 170
2.4.1.28	Ficus infectoria (min. ht of 5'-0" with a canopy spread of 3'-0" dia and a trunk girth of 4" dia @ base)	NOS	2	1 541	3 082
2.4.1.29	Golden melaleuca (min. ht. of 8'-0" and a canopy spread of 4'-0" with a trunk girth of 4" dia @ base)	NOS	25	1 189	29 725
2.4.1.30	Gravelia robusta (min. ht. of 10'-0" with a canopy spread of 5'-0" and a trunk girth of 6" dia @ base)	NOS	2	1 673	3 346
2.4.1.31	Jacaranda mimosifolia(min. ht. of 12'-0" and a canopy spread of 4'-0" with a trunk girth of 4" dia @ base)	NOS	70	1 057	73 990

2.4.1.32	Lagerstroea flosreginae (min. ht of 8'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	4	1 321	5 284
2.4.1.33	Lagerstroea thorelli (min. ht of 8'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	10	1 145	11 450
2.4.1.34	Madhuca indica (min. ht of 8'-0" with a canopy spread of 5'-0" dia and a trunk girth of 3" dia @ base)	NOS	27	880	23 760
2.4.1.35	Melia dubia (min. ht of 8'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	5	836	4 180
2.4.1.36	Millingtonia hortensis (min. ht. of 10'-0" with a canopy spread of 4'-0" and a trunk girth of 4" dia @ base)	NOS	35	924	32 340
2.4.1.37	Mimusops elengi (min. ht of 8'-0" with a canopy spread of 5'-0" dia and a trunk girth of 3" dia @ base)	NOS	71	1 717	1 21 907
2.4.1.38	Michelia champaka (min. ht of 10'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	43	660	28 380
2.4.1.39	Muntingia calabura (min. ht of 8'-0" with a canopy spread of 5'-0" dia and a trunk girth of 3" dia @ base)	NOS	61	836	50 996
2.4.1.40	Nyctanthes arborristis (min. ht of 5'-0" with a canopy spread of 3'-0" dia and a trunk girth of 2" dia @ base)	NOS	10	660	6 600
2.4.1.41	Parkia biglandulosa (min. ht of 10'-0" with a canopy spread of 5'-0" dia and a trunk girth of 3" dia @ base)	NOS	82	1 057	86 674
2.4.1.42	Peltophoeum ferrugineum (min. ht of 12'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	33	1 101	36 333
2.4.1.43	Plumeria acutifolia 'alba' (TREE SIZE with a min. ht. of 12'-0",with a canopy spread of 6'-0" and a trunk girth of 6"dia. @ base)	NOS	165	3 962	6 53 730
2.4.1.44	Plumeria acutifolia 'carnea red' ( with a min. ht. of 8'-0" to 10'-0",with a canopy spread of 4'-0" and a trunk girth of 4"dia. @ base)	NOS	4	5 283	21 132
2.4.1.45	Plumeria obtusa 'alba' (TREE SIZE with a min. ht. of 10'-0",with a canopy spread of 6'-0" and a trunk girth of 5"dia. @ base)	NOS	10	5 283	52 830
2.4.1.46	Plumeria 'alba' dwarf ( with a min. ht. of 4'-0",with a canopy spread of 4'-0" and a trunk girth of 4"dia. @ base)	NOS	4	2 201	8 804
2.4.1.47	Plumeria pudica ( with a min. ht. of 4'-0" and a trunk girth of 2"dia. @ base)	Nos.	10	528	5 280
2.4.1.48	Phoenix sylvestris (with a min. ht. of 10'-0" with a canopy of atleast 6'-0" dia.and trunk girth of 6" dia @ base)	NOS	35	8 805	3 08 175
2.4.1.49	Pongamia pinnata (min. ht of 8'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	82	1 057	86 674
2.4.1.50	Psidium guajava (Guava) (min. ht of 5'-0" with a trunk girth of 2" dia @ base)	NOS	35	836	29 260
2.4.1.51	Punica granatum ganesh (min. ht. of 5'-0", with a trunk girth of 2"dia. @ base)	NOS	4	792	3 168
2.4.1.52	Putranjiva roxbhurgii (min. ht of 5'-0" with a canopy spread of 3'-0" dia and a trunk girth of 2" dia @ base)	NOS	55	1 013	55 715
2.4.1.53	Phyllanthus acidus (min. ht. of 5'-0" & a canopy spread of 3'-0" with a trunk girth of 2" dia @ base)	NOS	4	836	3 344
2.4.1.54	Royastonea regia (TREE SIZE with a min. ht. of 12'-0",with a canopy spread of 6'-0" and a trunk girth of 8"dia. @ base)	NOS	144	3 962	5 70 528
2.4.1.55	Salix babylonia (min. ht. of 10'-0" and a canopy spread of 4'-0" with a trunk girth of 4" @ base)	NOS	8	2 818	22 544

2.4.1.56	Samania saman (min. ht. of 10'-0" and a canopy spread of 4'-0" with a trunk girth of 4" @ base)	NOS	5	1 321	6 605
2.4.1.57	Saraca indica (min. ht of 6'-0" with a canopy spread of 5'-0" dia & a trunk girth of 3" dia @ base)	NOS	25	792	19 800
2.4.1.58	Spathodea companulata (min. ht of 12'-0" - 15'-0" with a canopy spread of 6'-0" dia and a trunk girth of 5" dia @ base)	NOS	144	1 761	2 53 584
2.4.1.59	Sterculia brassikitana (min. ht. of 12'-0" and a canopy spread of 4'-0" with a trunk girth of 4" @ base)	NOS	63	1 585	99 855
2.4.1.60	Swietenia mahogany (min. ht. of 12'-0" and a canopy spread of 5'-0" with a trunk girth of 4" dia @ base)	NOS	170	1 233	2 09 610
2.4.1.61	Syzygium cumini (min. ht of 8'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	3	836	2 508
2.4.1.62	Tabebuia argentea (min. ht of 10'-0" with a canopy spread of 5'-0" dia and a trunk girth of 3" dia @ base)	NOS	5	836	4 180
2.4.1.63	Tabebuia avellandae (min. ht. of 10'-0" and a canopy spread of 5'-0" with a trunk girth of 3" dia @ base)	NOS	34	836	28 424
2.4.1.64	Tabebuia pallida 'rosea' (min. ht. of 8'-0" and a canopy spread of 5'-0" with a trunk girth of 3" @ base)	NOS	5	836	4 180
2.4.1.65	Tabebuia rosea (min. ht. of 12'-0" - 15'-0" and a canopy spread of 5'-0" with a trunk girth of 4" @ base)	NOS	175	1 497	2 61 975
2.4.1.66	Tecoma dolichandrone (min. ht. of 10'-0" and a canopy spread of 4'-0" with a trunk girth of 3" @ base)	NOS	50	1 101	55 050
2.4.1.67	Terminalia arjun (min. ht of 6'-0" with a canopy spread of 5'-0" dia and a trunk girth of 3" dia @ base)	NOS	50	924	46 200
2.4.1.68	Terminalia catappa (min. ht of 10'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	70	1 761	1 23 270
2.4.1.69	Terminalia mentalica (min. ht of 10'-0" with a canopy spread of 5'-0" dia & a trunk girth of 4" dia @ base)	NOS	7	2 465	17 255
2.4.1.70	Anacardium officinale (Cashew nut tree) min ht of 4'-0" with a trunk girth of 2" @ base)	NOS	43	1 761	75 723
2.4.1.71	Annona squamosa (Custard apple) min ht of 4'-0" with a trunk girth of 2" at base)	NOS	24	1 145	27 480
2.4.1.72	Areca nut (betel nut) min ht of 6'-0" with a trunk girth of 2" at base)	NOS	12	1 145	13 740
2.4.1.73	Carica papaya (Papaya) min ht of 4'-0" with a trunk girth of 2" at base)	NOS	22	880	19 360
2.4.1.74	Citrus aurantium (Lemon tree) (min ht of 4'-0" with a trunk girth of 2" at base)	NOS	38	1 321	50 198
2.4.1.75	Citrus sinensis (Mausambi tree) (min ht of 4'-0" with a trunk girth of 2" at base)	NOS	77	1 321	1 01 717
2.4.1.76	Cocos nucifera (coconut Singapore dwarf) (min ht of 4'-0" with a trunk girth of 2" at base)	NOS	111	1 321	1 46 631
2.4.1.77	Cocos nucifera malay (coconut tree) (min ht of 4'-0" with a trunk girth of 2" at base)	NOS	100	1 761	1 76 100
2.4.1.78	Cocos nucifera east (coconut tall tree) (min ht of 4'-0" with a trunk girth of 2" at base)	NOS	111	1 761	1 95 471
2.4.1.79	Eugenia jambolana (jamun) min ht. of 8'-0" with a trunk girth of 4" @ base)	NOS	96	1 761	1 69 056
2.4.1.80	Embllica officinalis (Indian gooseberry) min ht of 4'-0" with a trunk girth of 2" at base)	NOS	50	1 321	66 050

2.4.1.81	Kigelia pinnata (min. ht of 8'-0" with a canopy spread of 5'-0" dia and a trunk girth of 3" dia @ base)	NOS	66	1 321	87 186
2.4.1.82	Litchie chinensis (Litchie) min ht. of 5'-0" with a trunk girth of 2" @ base)	NOS	8	1 145	9 160
2.4.1.83	Mangifera indica (Mango rajapuri) min ht of 4'-0" with a trunk girth of 1" at base	NOS	22	880	19 360
2.4.1.84	Mangifera indica (Mango alphonso) min ht of 4'-0" with a trunk girth of 1" at base	NOS	22	969	21 318
2.4.1.85	Mangifera indica (Mango baramsai) min ht of 4'-0" with a trunk girth of 1" at base	NOS	22	969	21 318
2.4.1.86	Punica granatum ganesh (min. ht. of 5'-0", with a trunk girth of 2" dia. @ base)	NOS	36	1 145	41 220
2.4.1.87	Tectona grandis (min. ht of 10'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	25	1 761	44 025
2.4.1.88	Santalum album (min. ht of 10'-0" with a canopy spread of 5'-0" dia and a trunk girth of 4" dia @ base)	NOS	20	2 641	52 820
<b>2.5</b>	<b>Supply and planting of specimen plants of specified ht.</b>				
2.5.1	Supply and planting of specimen plants in pits of size 900x900x900mm filled with 50% of excavated mother earth and balance 50% filled with a mixture of good earth sand and manure in the ratio of 3:1:1. Rate to include supply of healthy plants as per the specs., supply of sand and manure, labour charges for pitting, mixing soil media, filling the pits with soil media, planting the specimen shrub, maintenance, mortality replacement as per maintenance Clause of SCC, all complete as per drawing, specification and directions of Engineer-in-charge. (Supply earth as required shall be paid separately)				
2.5.1.1	Bismarkia nobilis (min. ht of 7'-0" with a spread of 4'-0")	NOS	2	3 962	7 924
2.5.1.2	Buddha's belly bamboo (min. ht of 7'-0" with a spread of 3'-0")	NOS	5	1 541	7 705
2.5.1.3	Chrysalidocarpus lutescens (min. ht. of 6'-0" with a stem girth of 3" dia. @ base)	NOS	4	1 145	4 580
2.5.1.4	Codiaeum variegatum (min ht. of 2'-0")	NOS	47	484	22 748
2.5.1.5	Cycas revoluta (min ht. of 2'-0" with a spread of 2'-6" and atleast 3 whorls)	NOS	4	3 082	12 328
2.5.1.6	Dyopsis leutescens (multi stem with a min ht. of 6'-0" and trunk girth of 6" @ base)	NOS	4	1 761	7 044
2.5.1.7	Ficus benjamina (min. 6'-0" ht.)	NOS	75	1 321	99 075
2.5.1.8	Ficus benjamina prestige (min. 6'-0" ht.)	NOS	4	1 761	7 044
2.5.1.9	Ficus nerifolia (min. 6'-0" ht.)	NOS	15	2 641	39 615
2.5.1.10	Howea fosteriana (Kentia palm) (with a min. ht. of 10'-0" with a canopy of atleast 6'-0" dia. and trunk girth of 6" dia @ base)	NOS	8	3 170	25 360
2.5.1.11	Licula grandis (min ht. of 2'6" with at least 5 whorls)	NOS	4	924	3 696
2.5.1.12	Livinstonia chinensis (min ht. of 2'6" with at least 5 whorls)	NOS	5	836	4 180
2.5.1.13	Phyllosyachys aurea (Golden bamboo - min. 8'-0" ht. with a stem girth of at least 3" @ base)	NOS	100	969	96 900
2.5.1.14	Phoenix roebellinii (min. 2'-0" high with a spread of 2'-0" and a stem girth of 3" dia. @ base)	NOS	11	969	10 659
2.5.1.15	Ptychosperma macaranturii (min. ht. of 7'-0" with a stem girth of 3" @ base)	NOS	2	1 321	2 642
2.5.1.16	Raphis excelsa (small - min. ht. of 1'-6" with a spread of 1'-0")	NOS	228	660	1 50 480

2.5.1.17	Ravenala madagascarensis( min. 8'-0" ht. with a stem girth of at least 3" @ base)	NOS	2	1 101	2 202
2.5.1.18	Sterlizia reginae (bird of paradise- min ht. of 1'6")	NOS	80	528	42 240
2.5.1.19	Vetchia myereli (min. ht of 5'-0" with a stem girth of 3" dia. @ base)	NOS	26	1 761	45 786
2.5.1.20	Vetchia myereli gold (min. ht of 5'-0" with a stem girth of 3" dia. @ base)	NOS	40	1 761	70 440
2.5.1.21	wodyetia bifurcata(min. ht of 5'-0" with a stem girth of 3" dia. @ base)	NOS	10	1 321	13 210
2.5.1.22	Washingtonia filifera (min ht of 2'-0" with a spread of 2'-0")	NOS	24	660	15 840
2.5.1.23	Washingtonia robusta(min ht of 2'-0" with a spread of 2'-0")	NOS	10	660	6 600
<b>2.6</b>	<b>Supply and planting of Tall shrubs</b>				
2.6.1	Supply and planting of Tall shrubs in pits of size 450x450x450mm & filled with 50% of excavated mother earth and balance 50% filled with a mixture of garden soil, sand and manure in the ratio of 3:1:1. Quoted rate to include supply of healthy shrub species, supply of sand, manure and all other additives as per the specs, labour charges for pitting, mixing soil media,filling the pits with soil media, planting the sapling, maintenance, mortality replacement as per maintenance Clause of SCC. Plants shall be 0.9 m high all complete as per drawing, specification and directions of Engineer-in-charge. (Supply earth as required shall be paid separately)				
2.6.1.1	Alpinia purpurea	NOS	25	53	1 325
2.6.1.2	Alpinia speciosa var.	NOS	50	88	4 400
2.6.1.3	Caesalpinia pulcherima	NOS	23	53	1 219
2.6.1.4	Euphorbia leucocephala	NOS	30	53	1 590
2.6.1.5	Heliconia psittacorum	NOS	150	66	9 900
2.6.1.6	Hibiscus hawaii	NOS	15	57	855
2.6.1.7	Hibiscus indica	NOS	15	57	855
2.6.1.8	Hibiscus mutabilis	NOS	42	66	2 772
2.6.1.9	Hibiscus rosasinensis	NOS	547	48	26 256
2.6.1.10	Hibiscus snow flakes	NOS	762	57	43 434
2.6.1.11	Ixora chinensis red	NOS	235	66	15 510
2.6.1.12	Ixora singaporensis	NOS	15	66	990
2.6.1.13	Jatropha variegated	NOS	30	75	2 250
2.6.1.14	Jatropha pandulifolia	NOS	231	66	15 246
2.6.1.15	Leea coccinae green	NOS	277	53	14 681
2.6.1.16	Manihot ultimissima var.	NOS	20	66	1 320
2.6.1.17	Melastroma decemfidum	NOS	15	62	930
2.6.1.18	Murayya paniculata	NOS	4 055	40	1 62 200
2.6.1.19	Meyenia erecta blue	NOS	187	53	9 911
2.6.1.20	Murayya exotica	NOS	10	35	350
2.6.1.21	Nerium oleander tall	NOS	384	53	20 352
2.6.1.22	Tabernemontana coronaria	NOS	1 150	40	46 000
2.6.1.23	Tecoma gaudichaudi	NOS	45	40	1 800
2.6.1.24	Tecoma stans	NOS	36	44	1 584
<b>2.7</b>	<b>Supply and planting of Medium and small shrubs</b>				

<b>2.7.1</b>	Supply and planting of Medium and small shrubs in pits of size 375x375x375mm & filled with 50% of excavated mother earth and balance 50% filled with a mixture of garden soil and manure in the ratio of 3:1:1. Rate to include supply of healthy shrub species, supply of sand, manure and all other additives as per the specs, labour charges for pitting, mixing soil media, filling the pits with soil media, planting the sapling, maintenance, mortality replacement as per maintenance clause of SCC. <b>Plants shall be of 0.6 m high</b> all complete as per drawing, specification and directions of Engineer-in-charge. (Supply earth as required shall be paid separately)				
2.7.1.1	Acalypha green dwarf var.	NOS	355	31	11 005
2.7.1.2	Acalypha hispida	NOS	1 152	31	35 712
2.7.1.3	Acalypha macfeena pink	NOS	15	35	525
2.7.1.4	Acalypha rosea	NOS	384	28	10 752
2.7.1.5	Acalypha wilkesiana moorea	NOS	1 962	28	54 936
2.7.1.6	Agave angustifolia	NOS	15	106	1 590
2.7.1.7	Aglonema silver queen	NOS	15	110	1 650
2.7.1.8	Allamanda nerifolia nana yellow	NOS	152	44	6 688
2.7.1.9	Allamanda cathartica yellow	NOS	22	48	1 056
2.7.1.10	Allamanda violacea	NOS	10	70	700
2.7.1.11	Alocacia macrorhiza	NOS	40	79	3 160
2.7.1.12	Amaryllis lily	NOS	15	40	600
2.7.1.13	Angelonia grandiflora	NOS	15	35	525
2.7.1.14	Aster amellus lilac	NOS	1 490	70	1 04 300
2.7.1.15	Beloperone guttata	NOS	532	44	23 408
2.7.1.16	Calathea zebrina	NOS	5	62	310
2.7.1.17	Canna blakeana	NOS	177	62	10 974
2.7.1.18	Canna dwarf red	NOS	846	35	29 610
2.7.1.19	Canna generalis red	NOS	250	40	10 000
2.7.1.20	Canna malawiensis var.	NOS	15	62	930
2.7.1.21	Canna generalis yellow	NOS	1 689	35	59 115
2.7.1.22	Clerodendron inerme	NOS	15	31	465
2.7.1.23	Cymbopogon fleosus (Lemon grass)	NOS	15	44	660
2.7.1.24	Cyperus alternifolia	NOS	1 050	31	32 550
2.7.1.25	Dracaena mahatma	NOS	60	35	2 100
2.7.1.26	Dracaena marginata var.	NOS	157	66	10 362
2.7.1.27	Duranta goldeana	NOS	13 198	19	2 50 762
2.7.1.28	Duranta speciosa	NOS	9 410	23	2 16 430
2.7.1.29	Duranta plumerie var.	NOS	15	28	420
2.7.1.30	Euphorbia mili hybrid	NOS	785	123	96 555
2.7.1.31	Ficus panda	NOS	66	35	2 310
2.7.1.32	Furcraea	NOS	5	88	440
2.7.1.33	Galphimia glauca	NOS	104	40	4 160
2.7.1.34	Hamelia patens	NOS	195	53	10 335
2.7.1.35	Heliconia caribbean hybrid	NOS	15	92	1 380
2.7.1.36	Heliconia humilis	NOS	15	88	1 320
2.7.1.37	Heliconia rostrata	NOS	15	62	930
2.7.1.38	Hymenocallis speciosa (spider lily)	NOS	3 194	44	1 40 536

2.7.1.39	Hymenocallis (variegated)	NOS	290	75	21 750
2.7.1.40	Ixora dwarf red	NOS	2 885	88	2 53 880
2.7.1.41	Lemonia spectabilities	NOS	15	26	390
2.7.1.42	Lemonia red variegated	NOS	25	75	1 875
2.7.1.43	Malpighia coccigera	NOS	2 233	75	1 67 475
2.7.1.44	Malviscus arboricola	NOS	870	79	68 730
2.7.1.45	Malviscus arboricola rosea	NOS	200	79	15 800
2.7.1.46	Nerium oleander dwarf	NOS	3 768	35	1 31 880
2.7.1.47	Ocimum sanctum	NOS	50	26	1 300
2.7.1.48	Pachystachys lutea	NOS	120	44	5 280
2.7.1.49	Pampass grass	NOS	600	26	15 600
2.7.1.50	Pandanus sanderie	NOS	300	114	34 200
2.7.1.51	Pelargonium hortorum (geranium)	NOS	946	31	29 326
2.7.1.52	Pennisetum roepellini (Red fountain grass)	NOS	213	35	7 455
2.7.1.53	Pennisetum setaceum (Green fountain grass)	NOS	943	35	33 005
2.7.1.54	Pentas lanceolata red & white	NOS	640	44	28 160
2.7.1.55	Phyllanthus snow bush	NOS	15	44	660
2.7.1.56	Pleomele reflexa (Song of India)	NOS	15	44	660
2.7.1.57	Plumbago capensis alba	NOS	655	26	17 030
2.7.1.58	Plumbago capensis blue	NOS	725	26	18 850
2.7.1.59	Poinsettia flaming sphere	NOS	10	44	440
2.7.1.60	Polyscias balfouriana	NOS	15	66	990
2.7.1.61	Psuederanthemum reticulatum	NOS	20	26	520
2.7.1.62	Sansevieria trifasciata	NOS	15	110	1 650
2.7.1.63	Schefflera hicolour	NOS	50	106	5 300
2.7.1.64	Schefflera arbicolour	NOS	2 024	48	97 152
2.7.1.65	Spathyphyllum	NOS	15	40	600
2.7.1.66	Spathyphyllum variegated	NOS	15	97	1 455
2.7.1.67	Tabernemontana coronaria var.	NOS	15	35	525
2.7.1.68	Tecoma capensis	NOS	628	35	21 980
2.7.1.69	Thunbergia erecta	NOS	15	48	720
2.7.1.70	Vetiveria zizanioides	NOS	18	44	792
2.7.1.71	Adenium obesum	NOS	52	176	9 152
2.7.1.72	Cymbopogon nardus (Citronella)	NOS	26	70	1 820
2.7.1.73	Euphorbia leucocephala	NOS	20	132	2 640
2.7.1.74	Gardenia jasminoides	NOS	200	114	22 800
2.7.1.75	Philodendron xanadu	NOS	45	409	18 405
2.7.1.76	Philodendron ceylon	NOS	120	176	21 120
2.7.1.77	Philodendron selloum	NOS	60	220	13 200
<b>2.8</b>	<b>SUPPLY AND PLANTING OF Ground covers</b>				

	SUPPLY AND PLANTING OF Ground covers on garden soil which is to be spread on garden surface upto a depth of 75mm and mixed with manure to attain a total depth of 100mm to form the final garden surface. Surface preparation is by raking and mixing to attain a smooth finished surface and planted with rooted slips of the specified species. All plants supplied shall be of a minimum height of 230mm or above. Rate to include supply of plant species, supply of sand, neem cakes and organic manure and all other additives as mentioned in the specifications, labour charges for mixing soil media in the desired proportion, planting, maintenance, mortality replacement as per maintenance clause of SCC all complete as per drawing, specification and directions of Engineer-in-charge.(Supply earth as required shall be paid separately)				
2.8.1	<b>General Ground covers</b>				
2.8.1.1	Alternanthera green	Sq.m.	237	220	52 140
2.8.1.2	Alternanthera versicolour	Sq.m.	100	220	22 000
2.8.1.3	Alternanthera beltzikiana red.	Sq.m.	100	242	24 200
2.8.1.4	Artemesia dusty miller	Sq.m.	5	308	1 540
2.8.1.5	Aptenia white	Sq.m.	1 200	308	3 69 600
2.8.1.6	Asparagus sprengeri	Sq.m.	12	308	3 696
2.8.1.7	Asystacia gangetica var.	Sq.m.	5	264	1 320
2.8.1.8	Bamboo grass	Sq.m.	5	308	1 540
2.8.1.9	<b>Cuphea hyssopifolia pink</b>	Sq.m.	19	264	5 016
2.8.1.10	<b>Cuphea hyssopifolia white</b>	Sq.m.	20	264	5 280
2.8.1.11	Dianella var.	Sq.m.	5	396	1 980
2.8.1.12	Gazania	Sq.m.	4	308	1 232
2.8.1.13	Hemigraphis colorata	Sq.m.	80	308	24 640
2.8.1.14	Lavender angustifolia	Sq.m.	4	308	1 232
2.8.1.15	Mondo grass	Sq.m.	20	396	7 920
2.8.1.16	Opheopogon green	Sq.m.	242	396	95 832
2.8.1.17	Opheopogon var.	Sq.m.	174	396	68 904
2.8.1.18	Oxalis hedysaroides	Sq.m.	183	308	56 364
2.8.1.19	Pilea rotundifolia	Sq.m.	5	308	1 540
2.8.1.20	Portulaca olracea (yellow)	Sq.m.	313	308	96 404
2.8.1.21	Rhoeo spathacea	Sq.m.	20	308	6 160
2.8.1.22	Russelia juncea	Sq.m.	50	308	15 400
2.8.1.23	Schizocentron elegans (Mexican showel)	Sq.m.	442	396	1 75 032
2.8.1.24	Syngonium butterfly var.	Sq.m.	5	484	2 420
2.8.1.25	Setcreasea purpurea	Sq.m.	6	308	1 848
2.8.1.26	Tabernemontana coronaria dwarf	Sq.m.	36	396	14 256
2.8.1.27	Verbeenas	Sq.m.	5	308	1 540
2.8.1.28	Zephyranthes candida (white)	Sq.m.	70	286	20 020
2.8.1.29	Zephyranthes grandiflora (pink)	Sq.m.	20	286	5 720
2.8.2	<b>Wild Ground covers - cuttings</b>				
2.8.2.1	Lantana camara yellow (depressa)	Sq.m.	162	286	46 332
2.8.2.2	Lantana orange	Sq.m.	135	286	38 610
2.8.2.3	Lantana sellowiana (pink +white)	Sq.m.	656	286	1 87 616
2.8.2.4	Wadelia bifurcata	Sq.m.	830	220	1 82 600



<b>2.8.3</b>	<b>Ground covers- exclusive</b>				
2.8.3.1	Asparagus myeri	Sq.m.	5	396	1 980
2.8.3.2	Nephrolepis bostonensis	Sq.m.	45	484	21 780
2.8.3.3	Nephrolepis compacta	Sq.m.	89	594	52 866
2.8.3.4	Nephrolepis companulata	Sq.m.	69	572	39 468
<b>2.8.4</b>	<b>Climbers</b>				
2.8.4.1	Ipomea indica	NOS	104	84	8 736
2.8.4.2	Jacquemontia violacea (Climber variety)	NOS	3	57	171
2.8.4.3	Ficus pumila	NOS	3	53	159
2.8.4.4	Thunbergia mysorensis	NOS	3	66	198
2.8.4.5	Pyrastogia venusta	NOS	3	62	186
2.8.4.6	Ficus pumila	NOS	17	48	816
2.8.4.7	Thunbergia mysorensis	NOS	24	66	1 584
2.8.4.8	Pyrastogia venusta	NOS	9	70	630
<b>2.8.5</b>	<b>AQUATIC PLANTS</b>				
2.8.5.1	Lily yellow	NOS	100	660	66 000
2.8.5.2	Lily white	NOS	25	440	11 000
2.8.5.3	Lily red	NOS	25	484	12 100
2.8.5.4	Pistia stratiotes (Water Lettuce)	Sq.m.	50	3 962	1 98 100
2.8.5.5	Papyrus alternifolia	NOS	155	352	54 560
2.8.5.6	Salvinia auriculata	Sq.m.	40	440	17 600
<b>2.8.6</b>	<b>HERBS</b>				
2.8.6.1	Cymbopogon khasans (Jamrosa)	Sq.m.	25	572	14 300
2.8.6.2	Allium schoenoprasum (Chives)	Sq.m.	45	616	27 720
2.8.6.3	Monarda citriodora (Horse mint)	Sq.m.	34	616	20 944
2.8.6.4	Mentha piperita (pepper mint)	Sq.m.	69	440	30 360
<b>3.0</b>	<b>AUTOMATIC IRRIGATION WORKS</b>				
<b>3.1</b>	<b>PVC AND LLDPE PIPING AND ACCESSORIES</b>				
3.1.1	Providing, laying & jointing in position <b>PVC pipe</b> conforming to IS:4985:2000 and suitable for the respective working pressures including all fittings and accessories e.g. couplings, tees, bends, reducers, screwed adapters, flanged tail pieces etc. jointing as per manufacturers' instruction, all complete as per drawing, specification and directions of Engineer-in-charge.				
3.1.1.1	PVC pipe 90mm-10 kg/cm2	Rm	3 300	506	16 69 800
3.1.1.2	PVC pipe 75mm-6 kg/cm2	Rm	744	255	1 89 720
3.1.1.3	PVC pipe 63mm-6 kg/cm2	Rm	1 200	176	2 11 200
3.1.1.4	PVC pipe 50mm-6 kg/cm2	Rm	200	157	31 400
3.1.1.5	PVC pipe 40mm-6 kg/cm2	Rm	200	74	14 800
3.1.1.6	PVC pipe 20mm-10 kg/cm2	Rm	1 800	31	55 800
3.1.2	Providing, laying & jointing in position 16 mm <b>LLDPE pipe</b> with necessary fittings and suitable for 2 to 3 bar working pressures including all fittings and accessories e.g. couplings, tees, bends, reducers, screwed adapters, flanged tail pieces etc. jointing as per manufacturers' instruction, all complete as per drawing, specification and directions of Engineer-in-charge.	Rm	5 000	30	1 50 000
<b>3.2</b>	<b>SPRINKLERS &amp; ACCESSORIES</b>				

3.2.1	Providing & fixing of Pop up spray head having colour coded Rotary nozzle with <b>multiple stream MPR water spray</b> capable of covering 17 to 24 feet with a discharge rate of 0.08 to 0.15 lps.The Spray Head body, stem, nozzle, ratchet and screen shall be constructed of heavy-duty, ultraviolet resistant plastic and stainless steel with multifunctional wiper seal with small exposed coverall complete as per drawing, specification and directions of Engineer-in-charge.	No.	90	601	54 090
3.2.2	Providing & fixing of Pop up spray head having colour coded Rotary nozzle with <b>multiple stream MPR water spray</b> capable of covering 6.0 Mtrs with a discharge rate of 0.03 to 0.15lps.The Spray Head body, stem, nozzle ,ratchet and screen shall be constructed of heavy-duty, ultraviolet resistant plastic and stainless steel with multifunctional wiper seal with small exposed coverall complete as per drawing, specification and directions of Engineer-in-charge.	No	260	404	1 05 040
3.2.3	Providing & fixing of Pop up spray head having colour coded Rotary nozzle with <b>multiple stream MPR water spray</b> capable of covering 4.0 Mtrs with a discharge rate of 0.03 to 0.15lps.The Spray Head body, stem, nozzle ,ratchet and screen shall be constructed of heavy-duty, ultraviolet resistant plastic and stainless steel with multifunctional wiper seal with small exposed coverall complete as per drawing, specification and directions of Engineer-in-charge.	No	550	604	3 32 200
3.2.4	Supply and fixing of 8 lph dripper with fittings	Nos	4 500	14	63 000
<b>3.3</b>	<b>VALVES &amp; ACCESSORIES</b>	No.			
3.3.1	Providing and fixing <b>Brass Ball Valve</b> , security pivot to maintain lever in space,double water tight joint,direct injection stem non mechanical ,with a base which permits maximum penetration into the valve all complete as per drawing, specification and directions of Engineer-in-charge.				
3.3.1.1	Valve 90 mm	No.	5	2 539	12 695
3.3.1.2	Valve 63 mm	No.	15	1 088	16 320
3.3.2	Providing & fixing of a double acting Air release valve 3/4". The Air release valve shall be capable of both releasing and admitting air from and into the line. The working pressure shall be 5 bar, all complete as per drawing, specification and directions of Engineer-in-charge.	No.	5	1 382	6 910
3.3.2.1	12" Rectangular Valve Box	No.	20	2 384	47 680
3.3.2.2	10" round valve box	No	25	1 244	31 100
3.3.3	Providing and fixing of Quick coupling valve of 1" dia made up of solid brass with locking cover corrosion resistant all complete as per drawing, specification and directions of Engineer-in-charge.	No	25	1 612	40 300
3.3.4	Providing and fixing of 50mm dia ABS flush valve all complete as per drawing, specification and directions of Engineer-in-charge.	No	20	518	10 360
<b>3.4</b>	<b>FILTRATION UNIT</b>				
3.4.1	Providing & Fixing of Disc Filter with capacity of 30m3 /hr having an inlet connections of 2", to create a helical effect in the incoming water ,spinning particulate in suspension away from the filtering element and so minimizing cleanings frequency ,3/4" outlet for flushing at bottom of filter & maximum working pressure of 12 Bars all complete as per drawing, specification and directions of Engineer-in-charge.	No.	1	9 788	9 788

<b>3.5</b>	<b>PUMPING UNIT</b>				
3.5.1	Providing & Fixing of Monobloc pumpset of 10 hp having discharge of 7 -8 lps at 47 m head ( 1 set = 1 working + 1stand by) with panel board all complete as per drawing, specification and directions of Engineer-in-charge.	Set	1	46 060	46 060
3.5.2	Providing and fixing of control panel suitable for pumpset having panel box made of CRCA sheet of 2 mm thickness and fixed alongwith following accessories DOL starter (L&T make or approved equivalent),start / stop push buttons (L&T make or approved equivalent), Ammeter (AE make or approved equivalent), Single phase preventor (Minilec make or approved equivalent), Voltmeter (AE make or approved equivalent) , Indicating lamps (L & T make or approved equivalent), MCB (L & T make or approved equivalent), Dry level guard sensor (Minilec make or approved equivalent) with control cable, etc. all complete as per drawing, specification and directions of Engineer-in-charge.	No	1	22 454	22 454
3.5.3	Providing & Fixing of Suction ( 6 "), Delivery & Header Pipe (2 1/2") GI to the pump including foot valve, suction and delivery manifolds, isolation valves and check valves, including leak testing, complete as per drawing, specification and directions of Engineer-in-charge.	Lot	1	8 291	8 291
3.5.4	Providing & fixing of Non Return Valve 3" all complete as per drawing, specification and directions of Engineer-in-charge.	No.	1	5 527	5 527
<b>3.6</b>	<b>Automation Equipment</b>				
3.6.1	Supply and installation of Dual core 48 station Controller with necessary module all complete as per drawing, specification and directions of Engineer-in-charge.	no	1	60 108	60 108
3.6.2	Supply, installation, testing and commissioning of 14 Awg x 2 Maxi cable for two way communication between controller and decoders all complete as per drawing, specification and directions of Engineer-in-charge.	Mtr	2 000	187	3 74 000
3.6.3	Supply, installation, testing and commissioning of Field Decoder as per specifications and with different station capacities as given below, all complete as per drawing, specification and directions of Engineer-in-charge.				
	Field Decoder 1 station 1 solenoids	Nos	15	3 731	55 965
3.6.4	Supply, installation, testing and commissioning of 2" Solenoid globe Valves with fabric reinforced diaphragm with PRS-Dial and slow closing with manual internal bleed all complete as per drawing, specification and directions of Engineer-in-charge.	Nos	15	7 047	1 05 705
<b>4</b>	<b>SWIMMING POOL &amp; STILL POOL (WATER BODY)</b>				

4.1	Design, Supply, Installation, Testing & Commissioning of <b>Electro-Mechanical Equipment for swimming pool</b> of capacity 180 m3, with balancing tank of design capacity turnover period of 6 hours, approved sand filter of 900mm (Turn over - 33 m³/Hr), centrifugal monoblock pump with pre-filter basket - 3.0 HP of approved make, dosing unit with pump, chemical tank and agitators - 2 Nos, with pool basin equipment, 10 kg/cm2 PVC pipes & fittings, suitable valves, NRV's, maintenance kit including spares etc., 8 nos. 300W underwater lights, Transformer (400 VA 12-15v IP65 - blue), conduit of 1.0 mts length, 6 sqmm X 2 core Electrical power cable, Starter Panel board with Ammeter, Voltmeter & Dryrun Protection (3 nos of DOL Starter for 3.0 HP pumps), Individual MCB controls for respective pumps, complete as per the specifications, detailed drawings and as per the instructions of the Engineer In Charge. (Civil works as required shall be paid separately)	Nos	1	10 36 350	10 36 350
4.2	Supply and fixing of SS 314 grade Pool Ladders of size 700mm wide and 1900mm high in 50 dia. SS pipe section all complete as per drawing, specification and directions of Engineer-in-charge.	Nos	2	46 060	92 120
4.3	Design, Supply, Installation testing and commissioning of <b>Electromechanical equipment for Still pool</b> comprising of approved foam jet nozzle - 8 nos of make oase -germany or approved equivalent, with suitable pump 5 HP, 10 kg/cm2 PVC pipes, fittings and valves, 16 nos. under water lights of 3W warm white of approved make, with under water cables with water proof joints, sand filtration system with suitable pump with prefilter, of approved make with pipes valves, fittings etc and maintenance kit, suitable panel board with ammeter, voltmeter, dry run protection for fountain and filter pump & provision for lightings unit transformer complete as per the specifications, detailed drawings and as per the instructions of the Engineer In Charge. (Civil works as required shall be paid separately)	Nos	1	6 85 143	6 85 143
SUB TOTAL					<b>69139127</b>
<b>5</b>	<b>COMPREHENSIVE MAINTENANCE SERVICES FOR HORTICULTURE WORKS</b>				
5.1	Providing comprehensive maintenance services for horticultural works for a period of 1 year after handing over, all complete as per SCC, specification and directions of Engineer-in-charge.	Month	12	1 94 555	23 34 660
TOTAL					<b>71473787</b>



**HINDUSTAN PETROLEUM CORPORATION LIMITED**

**CONSTRUCTION OF HPCL GREEN R&D CENTRE AT  
BENGALURU**

**(BIDDING DOCUMENT NO. KNM/ A298-000-CQ-TN-7030/1007)**

**BIDDING DOCUMENT FOR  
HARDSCAPE, HORTICULTURE AND ALLIED WORKS  
VOLUME II OF II  
(TECHNICAL)**

**Prepared & Issued by:**

**इंजीनियर्स  
इंडिया लिमिटेड**  **ENGINEERS  
INDIA LIMITED**  
(भारत सरकार का उपक्रम) (A Govt. of India Undertaking)

Regd. Office : Engineers India Bhawan, 1, Bhikaiji Cama Place, New Delhi - 110066

Cost of tender document: Rs.10,000/- (Non-transferable)

## MASTER INDEX

**NAME OF WORK** : **HARDSCAPE, HORTICULTURE AND ALLIED WORKS**

**NAME OF PROJECT** : **CONSTRUCTION OF HPCL GREEN R&D CENTRE AT BENGALURU**

**BIDDING DOCUMENT NO.** : **KNM/ A298-000-CQ-TN-7030/1007**

### (TECHNICAL SECTION)

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HARDSCAPE, HORTICULTURE  
& ALLIED WORKS FOR HPCL  
GREEN R&D CENTRE AT  
BENGALURU

Scope of Work

# SCOPE OF WORK

## 1 GENERAL

- 1.1 Rates for all the items of Schedule of Rates include all cost involved for the performance of the completed item considering all parts of the Bidding Document. In case any activity though specifically not covered in description of item under 'Schedule of Rates' but is required to complete the work which could be reasonably implied/ inferred from the contents of the Bidding Document, the cost for carrying out such activity of work shall be deemed to be included in the item rate.
- 1.2.1 Scope of work as mentioned under shall be read in conjunction with item description of Schedule of Rates and Contractor's scope shall include all activities of work as specified in the item description of Schedule of Rates.

## 2 SCOPE OF WORK

All the Hardscape, Softscape, irrigation works, pertaining to the Landscape works, will have to be done at **Hindustan petroleum corporation ltd. (HPCL)** Green R& D center (1 st phase -45 acres) at Devangonhi, Hoskote, Bangalore rural. While utmost care has been taken on landscape proposal for the area but plantation works require dedicated effort for ensuring survivability of the planting materials requires appropriate level of expertise and experiences in handling of the work .The landscape shall be in stages, primarily as per the availability of the site after completion of the Civil Works on the desired stretch. The broad scope of work is mentioned as below while the detailed performance of the contractor shall be gauged based on the schedules as provided in the "Special Contract Condition & Technical Specifications". The landscape contractor shall from the date of commencement of contract, Furnish all materials, labour, and related items necessary to complete the work indicated and specified herein.

- 3 The scope of work for the above mentioned work shall include following and shall be carried out as per BOQ, Specification & Landscaping Layout drawings:
- a) **Wood land plantation**
  - b) **Avenue Road Plantation**
  - c) **Lawns**
  - d) **Median Plantation**
  - e) **Road Side Plantation**
  - f) **Indoor Plantation Works for Admin Building along with decorative pebbles.**
  - g) **Providing planter P.C.C. Planter beds, R.C.C. Urns.**
  - h) **Static Water body with all necessary civil works**
  - i) **Pathways with paving material.**
  - j) **Irrigation system (drip irrigation for planting, Sprinkler system for lawns).**



**k) Design, Supply, Installation, Testing & Commissioning of all Electro-Mechanical Equipments for Swimming Pool**

- 4 The landscape contractor will be generally responsible for the entire site but in particular to works listed below. Along with site management, the responsibilities will include landscaping works and arboriculture works and maintaining the same. Total landscaped and arboriculture plantation works area is about 25 acres out of total Project Site area 45 acres. The Landscape contractor should have or shall set up their office in Bangalore for effective dealing with client and the consultant. After planting, all planted areas that have exposed soil will have to be mulched with straw or hay. Mulching will be evenly spread to cover any exposed soil. In addition, the contractor will also be responsible for filling gaps, thinning and transplanting, or replanting where plants may need to be replaced. Along with other planting, the contractor will also be responsible for improving soil conditions for planting. This may include import /export of sand/soil to/from site. The contractor will also clear vacant area from existing grasses, keep the site clean and maintain the already planted areas free of weeds, pests or insects that cause diseases. All weeds, unwanted grasses and plant material will be cleared up to 1000mm from the edge of planting of newly created and already existing horticultural works (such as boundary trees). The contractor will also be responsible for protection of the plants from salt spray that may occur during the monsoons.
- 5 **SPEEDY WORK:** Follow-up with the Civil Contractors for handing over of the site in desired state for speedy landscape works. Owner shall not be responsible for any delay on account of the said reasons whatsoever.
- 6 **SITE CLEARANCE:** The landscape Contractor shall ensure the area of concern to be cleared of all the unwanted materials like cement mix, aggregates, debris, and wastes of any type or left over of the civil contractors before starting his work. The same should be cleared off by the civil contractor and to be followed-up by the landscape contractor. In-event of the same not being removed off the site by the civil contractors, Landscape Contractor shall be required to get the undesirable waste including wild vegetations cleared off the off the site as per instruction of the Site-In-Charge. The site clearance and preparation shall be at no additional cost but form the part and parcel of the landscape works. The site shall be signed off for landscape works only after signoff by the Site-In-Charge on joint inspection with the Landscape Contractor.
- 7 **SOIL PREPARATION:** Rough grading and earthworks as per section 2 of the specification. This work shall include the supply, placement, shaping of earth berms, and or excavation and removal of unwanted soils to tip, as may be required and as indicated in the grading drawings, details and tender documents. This section includes the setting and formation of rough grading to plus or minus 15cm with suitable materials to achieve the level, berms and earth contouring as indicated in the drawings and documents. This section includes the fine grading to finish levels to plus or minus 25mm. The contractor shall be responsible for plantation works in the right soil medium (pH-value not exceeding 7.5) besides other chemical composition suitable for planting materials. The contractor shall be required to get the proposed

good soil tested as recommended & accepted by the owner for entire Landscape site at definite intervals as per instruction of the Site-In-Charge. Also the soil test shall be done for the final mixture ready for plantation and should be good for plantation works. In case contractor fails to conduct the required tests, the test will be conducted on behalf of the contractor by the owner and shall be liable for deduction of amount of testing from their R/A bill as raised by the contractor on plantation works. Also the contractor shall be required to create landforms (mounds & berms) as per drawing and instruction of the site-in-charge for facilitation of the drainage and aesthetic value in the landscape area. This section includes the fine grading to finish levels to plus or minus 25mm. The payment shall be on the basis of the total volume of the earthworks payable in cu.mt.

**8 PLANTATION WORKS:** The landscape contractor shall be required to complete the plantation works as per the planting schedule provided in Technical Specifications.

**9 MAINTENANCE WORKS:** The contractor shall be responsible for maintenance of the plantations works as per the schedule in "Special Contract Condition & Technical Specifications". Including general cleanliness of the landscape area for entire period of the contract.

9.1 The detailed Scope with regard to individual discipline is mentioned under Technical Specification provided in Technical Part of the Bidding Document.

9.2 The general character and the scope of work to be carried out under this contract are illustrated in Drawings, Specification and Schedule of Quantities. The Tenderer shall carry out and complete the said work under this contract in every respect in conformity with the contract documents and with the direction of and to the satisfaction of Engineer-In-charge. The scope of work includes supply of all labour, materials and equipments (except those to be supplied by the client) as listed under Schedule of quantities and specified otherwise, transportation and carryout the complete horticulture work as described in the Specifications and as shown on the drawings. This also includes any material, equipment, appliances and incidental work not specifically mentioned herein or noted on the Drawings / Documents as being furnished or installed, but which are necessary and customary to be performed under this contract.

**CONSTRUCTION OF GREEN R&D CENTRE COMPLEX  
FOR HPCL AT BENGALURU**

**TECHNICAL SPECIFICATIONS**

**FOR**

**HARDSCAPE, HORTICULTURE & ALLIED WORKS**

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**1. CARRIAGE OF MATERIALS**

The carriage and stacking of materials shall be done as per Sub-head No-1 of CPWD Specifications Volume-1. However, where CPWD specifications are not available, the work shall be carried out with prior approval of Engineer-in-charge.

**2. EARTH WORK****2.1 General**

The work shall be carried out as per CPWD specifications, Vol. -1, Sub-head No -2. However, where CPWD specifications are not available, the work shall be carried out with prior approval of Engineer in charge.

The following shall not be measured and allowance for the same shall be made by the contractor in the quoted rates:

- i. Setting out of work and site clearance.
- ii. Excavation for insertion of planking and strutting.
- iii. Removal of slips or falls in excavation due to any reason whatsoever.
- iv. Forming steps in the sides of excavation and their removal.
- v. Forming ramps for vehicular movement during excavation and their removal.
- vi. Bailing out or pumping of rain water from excavations.
- vii. Disposal of earth within the site plot boundaries.
- viii. Additional lift in backfilling work
- ix. Use of Chemicals for splitting of rocks.
- x. Keeping the excavated area clean from any deposition of water due to rain, sandstorm, flood, landslip etc.

**2.2 Measurements**

**2.2.1** Measurements shall be done as per the relevant CPWD specification/ IS codes. However for HARD ROCK and SOFT ROCK/DISINTEGRATED ROCK following mode shall be followed for measurement.

**2.2.2** Excavated materials from HARD ROCK and SOFT ROCK/DISINTEGRATED ROCK shall be stacked separately, measurement reduced by 50% to allow for voids to arrive at the quantity payable under 'hard rock' and 'soft rock' respectively.

**2.2.3** The difference between the entire excavation (worked out from the levels) and such of the quantities payable under 'hard rock' and 'soft rock/disintegrated rock' shall be paid for as excavation in all kinds of soil.

**2.2.4** Wherever rock excavation is encountered, contractor will be paid only up to required level. Nothing extra shall be paid if extra excavation is carried out beyond the level mentioned in the drawings due to any reason.

**2.3 Excavation in all types of Soils**

**2.3.1** Excavation and/or removal of any other material on the site shall be carried out accurately to the lines, levels and dimensions shown in the drawings or as ordered by the Engineer-in-charge, so as to allow proper and efficient concrete work and other work in clean and dry condition. The method of excavation shall be at the discretion of the Engineer-in-charge.

**2.4 Material for Earthwork in Filling**

**2.4.1** Only soil considered suitable by the Engineer-in-charge shall be deployed for the construction and that considered unsuitable shall be disposed off, as directed by Engineer-in-charge, at his own cost and no claim for compensation will be entertained.

**2.4.2** The Contractor shall give the samples of soil he proposes to use for filling, along with the following characteristics of the samples, to Engineer-in-charge for approval, prior to collection

and use. The tests for these characteristics shall be done in a laboratory / test house as approved by Engineer-in-charge.

- a. Mechanical analysis or grain size analysis as per IS: 2720 Part IV.
- b. Liquid limit as per IS: 2720 Part V.
- c. Plastic limit as per IS: 2720 Part V.
- d. Moisture density relationship as per IS: 2720 Part VII.

- 2.4.3** The soil used for filling shall be free from boulders, lumps, tree roots, rubbish or any organic deleterious matter.
- 2.4.4** Soil having plasticity index less than 20 shall be used for filling purpose.
- 2.4.5** Soil having laboratory maximum dry density of less than 1.5 gms/cc shall not be used.
- 2.4.6** Care shall be taken to see that unsuitable waste material is disposed off in such a manner that there is no likelihood of its getting mixed with the material, proposed to be used, for filling.
- 2.4.7** Hard rock obtained from excavation shall be measured as per CPWD specifications Vol.1 and the hard rock so obtained shall be the Owner's property. However, if the owner desires the contractor to take the possession of the excavated hard rock, recovery shall be made at unit prices mentioned in Schedule of Rates. The utilization/ disposal of hard rock once possessed and removed from site by the contractor, shall be as per contractor's discretion. The contractor shall indemnify owner/ EIL from all liabilities thereof towards any statutory, legal implications.

### **3. MORTARS**

The work shall be carried out as per CPWD specifications, Vol. -1, Sub-head No -3. However, where CPWD specifications are not available, the work shall be carried out with prior approval of Engineer in charge. The cement used shall be Portland Pozzolana cement (fly ash based) conforming to IS 1489 (Part 1) and Sand conforming to Zone-II/III as per IS 383.

### **4. CONCRETE WORK & REINFORCED CEMENT CONCRETE WORK**

#### **4.1 General**

All concrete included in the work shall comply with the General requirements of this section of the specification except where those requirements are modified by the provisions of later Clauses relating to specialized uses for concrete in which case the requirements of those Clauses shall take precedence. Apart from this specification, construction of Plain and Reinforced Cement Concrete works shall be in accordance with Vol. 1, Sub-head No -4 & Sub-head No -5 of CPWD Specifications, the Indian Standard Code of Practice for Plain and Reinforced Cement Concrete IS 456 and other relevant codes mentioned therein.

#### **4.2 Materials**

- 4.2.1** Portland Pozzolana Cement (PPC) conforming to IS 1489 Part 1, shall be used for all concrete works.
- 4.2.2** The responsibility of storing and stacking of all materials lies with the contractor. All relevant clauses of CPWD specifications and IS standards shall be followed.
- 4.2.3** Quarry/ Source of material shall be inspected and approved by Engineer in charge. Change of source, if proposed by the contractor, shall immediately be informed to and got approved by Engineer in charge.

#### **4.3 Water**

- 4.3.1** Contractor shall get the water tested from any approved laboratory before commencement of works at his own cost. In case, there is change in the source of water, the same shall be tested again to meet the requirements at any stage of construction.

#### **4.4 Laying of Concrete**

- 4.4.1** To ensure proper cover, preferably factory made round type cover blocks/PVC cover blocks will be used to avoid displacement of bars in any direction.

- 4.4.2 The construction joints if unavoidable shall be provided in predetermined locations only as decided and directed by Engineer-in-charge. Nothing extra shall be paid for providing shuttering as required or for applying a coat of neat cement slurry on the joints before re-commencing concreting work.
- 4.4.3 The contractor shall necessarily use the surface vibrator for compaction of concrete in floor slab etc. For placement of concrete at various levels tower crane of appropriate size, capacity and boom length or concrete pump shall necessarily be deployed by the contractor. However, mechanical hoist can be used by the contractor for lifting other construction materials.

**4.5 Design Mix:**

Design mix concrete shall be used for all RCC works. Fully automatic computerized batching plant of required capacity at the site shall be installed or alternatively RMC as per approved design mix from approved RMC plant shall be used. The concrete mix design with and without admixture will be carried out by the contractor through approved laboratory/test house/institute and reviewed and approved by Engineer-in-Charge. Ready Mix concrete shall confirm to accepted/approved mix. The Contractor shall submit the mix design report for approval of Engineer-in-Charge within 30 days from the date of issue of letter of commencement of the tender. No concreting shall be done until the mix design is approved by Engineer-in-Charge. The cost of packaging, sealing, transportation, loading, unloading, cost of samples and the testing charges for mix design in all cases shall be borne by the contractor.

The various ingredients of design mix for laboratory test shall be sent to the laboratory/test house through the Engineer-in-Charge and sample of such ingredients sent for testing shall be preserved at site till completion of RCC work. The contractor shall make cubes of size 15 Cm x 15Cm x 15 Cm of trial mixes as per approved design mix at site laboratory for all grades of concrete in presence of the Engineer-in-Charge using same ingredients as adopted for design mix, prior to commencement of concreting and get them tested for strength in presence of Engineer-in-charge for 7 days and 28 days. For each design mix, a set of six cubes shall be prepared from each of the three consecutive batches three cubes from each set shall be tested at the age of 7 days and three cubes at the age of 28 days. The cubes shall be made, cured, transported and tested strictly in accordance with CPWD specifications. The average strength of cubes at the age of 28 days shall exceed the specified target strength for which design mix has been approved.

For each change of source of quality/ characteristic properties of the ingredients from that approved & used in the concrete mix during the work, a fresh design mix shall be got done by the contractor. Revised trial mix test shall be conducted at laboratory established at site and shall be submitted by the contractor as per the direction of the Engineer-in-Charge.

The item of design mix cement concrete shall be inclusive of all the ingredients including admixtures if required, labour, machinery including shuttering, T&P etc. (except reinforcement which will be measured & paid separately) required for design mix concrete of required strength and workability and for transporting, placing, compacting and curing etc. The rate quoted by the agency shall be net & nothing extra shall be payable on account of change in quantities of concrete ingredients like cement and aggregates and admixtures etc. as per the approved mix design.

**4.6 Use of admixture:**

Approved admixture conforming to IS: 9103 shall be permitted to be used for obtaining required workability and for retarding/ accelerating setting time of concrete. The Chloride content in the admixture shall satisfy the requirement of BS 5075. The total amount of chloride content in the admixture mixed concrete shall satisfy the requirement of IS: 456-2000.

#### 4.7 Batching Plant

The contractor shall arrange and install fully automatic computerized batching plant of adequate capacity (with printer to generate pre-printed details of each load). The batching plant should have all the facilities as per IS 4925 including water measuring device for controlled concrete mix. Volumetric mix shall not be allowed for controlled concrete. All other operations in concreting work like mixing, transportation, laying/placing of concrete, compaction, curing etc. are not mentioned in this particular specification for design mix of concrete shall be as per IS 456-2000 and CPWD specification. Transportation of Concrete from batching plant: Concrete shall be transported from batching plant to work site through transit mixers or any other suitable arrangement approved by Engineer-in-charge.

#### 4.8 RMC Plant

Alternatively the contractor may be allowed by Engineer-in-Charge to arrange Ready Mix Concrete (RMC) from producing plants supplying concrete in Bengaluru. The RMC plant proposed to be engaged by the contractor shall fulfill the following requirements:

It shall be fully automatic and computerized.

It should have supplied RMC for Govt. projects.

It should have facility for providing printed advice showing ingredients of concrete carried by each mixer.

For procurement of ready mix concrete from RMC plants, the contractor shall, within 15 days of award of the work, submit list of at least three RMC plant companies of repute along with details of such plants including details of transit mixer and pumps etc. to be deployed indicating name of owner/ company, its location, capacity, technical establishment, past experience and text of MOU/ Agreement proposed to be entered between purchaser (the contractor) and supplier (RMC Plant) to the Engineer-in-Charge. The Engineer-in-Charge shall give approval in writing (subject to drawl of MOU). The contractor shall draw the MOU with approved RMC plant owner/company and submit to Engineer-in-Charge within a week of such approval. The contractor will not be allowed to purchase ready mixed-concrete without completion of above stated formalities for use in this project. Availability of concrete round the clock throughout the project duration shall also be included in MOU. Notwithstanding the approval granted by Engineer-in-Charge in aforesaid manner, the contractor shall be fully responsible for quality of concrete including input control, transportation and placement etc.

The Engineer-in-Charge will reserve the right to inspect at any such stage and reject the concrete if he is not satisfied about quality of product. The contractor should therefore draw MOU/ agreement with RMC owner/ company very carefully keeping all terms and conditions/ specifications forming a part of this tender document.

It shall be the responsibility of the contractor to ensure that all necessary equipment manpower & facilities are made available to Engineer-in-Charge and/ or his authorized representative at RMC plant. Ingredients, admixtures & water declared unfit for use in production of mix shall not be used. A batch mix found unfit for use shall not be loaded into the transit mixer for transportation. The RMC produced concrete shall be accepted by Engineer-in-Charge at site after receipt of the same after fulfilling all the requirements of mix mentioned in the tender documents.

#### 4.9 Quality Control of Ready-Mix Concrete

It shall be the responsibility of the contractor to ensure that the RMC producer provides all necessary testing equipments and take all necessary measures to ensure Quality control of ready mixed concrete. In general the required measures shall be:

##### 4.9.1 Control of Purchased Material Quality



RMC producer shall ensure that all the materials purchased and used in the production of concrete conform to the stipulation of the relevant agreed standards with the materials supplier and the requirements of the products design mix and quality control procedures. The materials shall be accomplished by visual checks, sampling and testing, certification and information/ data from material supplier. Necessary equipment for the testing of all material shall be provided and maintained in calibrated condition at the plant by the RMC producer.

#### **4.9.2 Control of Material Storage**

Adequate and effective storage arrangement shall be provided by RMC producer at RMC plant for prevention of contamination, reliable transfer and feed systems, drainage of aggregates, prevention of freezing or excessive solar heating of aggregate etc.

Each truckload/ transit mixer dispatched to site shall carry computer printout of the ingredients of the concrete it is carrying. The printout shall be handed over to Engineer-in-Charge or his representative at site before RMC is used in work.

#### **4.9.3 Transfer and Weighing Equipment**

RMC producer shall ensure that a documented calibration is in place. Proper calibration records shall be made available indicating date of next calibration due, corrective action taken etc. RMC producer shall ensure additional calibration checks whenever required by Engineer-in-Charge in writing to contractor. RMC producer shall also maintain a daily production record including details of cubes. Record shall also be maintained of the materials used for that day's production including water and admixtures. The accuracy of measuring equipment shall be as per manufacturer's recommendation/ relevant IS specifications.

#### **4.9.4 Production of Concrete**

The following precautions shall be taken during the production of RMC at the plant;

Weighing (correct reading of batch data and accurate weighing) - For each load written, printed or graphical records shall be made of the weights of the materials batched, the estimated slump, the total amount of water added to the load, the delivery ticket number for that load and the time of loading the concrete into the truck.

Visual observation of concrete during production and delivery during sampling and testing of fresh concrete assessment of uniformity, cohesion, workability, adjustment to water content - The workability of concrete shall be controlled on a continuous basis during production. The batch mix found unfit shall not be loaded into the truck for transportation. Necessary corrective action shall be taken in the production of mix as required for further batches. Use of adequate equipment at the plant to measure surface moisture content of aggregates, particularly fine aggregate or the workability of the concrete, cube tests etc. shall also be ensured.

Making corresponding adjustment at the plant automatically or manually to batched quantities to allow for observed, measured or reported changes in materials or concrete qualities, sampling of concrete, testing, monitoring of results, diagnosis and correction of faults identified from observations/complaints shall be done. The RMC plant produced concrete shall be accepted by Engineer-in-Charge at site after receipt of the same after fulfilling all the requirements of mix mentioned in the tender documents.

Ready mix concrete shall be arranged in quantity as required at site of work. The ready mix concrete shall be supplied as per the pre agreed schedule approved by Engineer-in-Charge. If so required by the Engineer-in-Charge, the RMC producer shall provide separate storage space/ go down for storage of materials approved by Engineer-in-Charge for the design mix concrete. Use of Fly ash/ mineral based admixtures in RMC shall not be permitted without prior approval of Engineer in Charge. No addition of water or other ingredients shall be permitted in the RMC at site or during transit.

Concrete shall be placed by pump of suitable capacity or tower crane or boom placer and the contractor shall arrange sufficient length of pipe at site to place the concrete in the minimum required time. Nothing extra shall be paid for placing of concrete through concrete pump/ tower crane/boom placer.

Printed delivery tickets shall be produced with each truck load of RMC. The representative of RMC supplier shall attend the site meeting as and when decided by the Engineer-in-Charge.

The contractor shall assess the quantity of RMC requirement at site well in advance and order accordingly to the RMC supplier. In case excess RMC is received at site, the Engineer-In-Charge shall not be under any obligation to get the extra quantity utilized and no payment for such RMC shall be made. The contractor shall have to employ labour in shifts to ensure continuous casting of raft and other RCC members as directed by Engineer-In-Charge. No extra payment on this account shall be made.

#### **4.10 RMC/ Site Batch Concrete**

The Engineer-in-charge reserves the right to exercise control over the:

Ingredients, water and admixtures purchased, stored and to be used in the concrete including conducting of tests for checking quality of materials, recordings of test results and declaring the materials fit or unfit for use in production of mix, calibration checks of the site batching plant / RMC plant, weight and quality check on the ingredients, water and admixtures added for batch mixing.

Time of mixing of concrete - Testing of fresh concrete, recordings of results and declaring the mix fit or unfit for use. This will include continuous control on the workability during production and taking corrective action.

All required relevant records of RMC/ batching plant shall be made available to the Engineer-in-Charge or his authorized representative. Engineer-in-Charge shall, as required, specify guidelines & additional procedures for quality control & other parameters in respect of materials and production & transportation of concrete mix, which shall be binding on the contractor & the RMC plant.

PPC (conforming to IS-1489 Part 1) of brand/ make/ source as approved by Engineer-in-charge shall only be used for production of concrete.

Ready mix / batching plant concrete shall be arranged in quantity as required at site of work. The ready mix concrete shall be supplied as per the pre-agreed schedule approved by Engineer-in-Charge.

#### **4.11 Form Work and scaffolding / Staging**

For the execution of centering and shuttering, the contractor shall use chemical mould release agent of FOSROC or approved equivalent shuttering oil as recommended by the manufacturer and nothing extra shall be paid on this account. The shuttering system shall have sufficient strength to withstand the pressure resulting from placement and vibration of concrete and shall have sufficient rigidity to maintain specified tolerances.

Scheme of arrangement /Shop drawings/shuttering design for the shuttering system shall be submitted for approval of the Engineer-In-Charge sufficiently prior to commencement of work.

The design and engineering of the shuttering system shall be the responsibility of the contractor and Contractor shall use the latest technology available for staging and shuttering.

The selection of material shall be consistent with safety and quality required in the finished work.

The shuttering system shall be sufficiently tight to prevent loss of cement slurry from the concrete and shall be securely braced against lateral deflection.

#### **4.12 Removal of Formwork (Stripping Time)**

Unless specified in the drawing, or directed by the Engineer-in-charge, the minimum intervals of time, which should be allowed between the placing of the concrete and the striking of the formwork shall be as per relevant CPWD Specifications and other IS Standards.

#### **4.13 Curing**

Curing of concrete shall be done using water based curing compound of approved make.

**Exposed concrete slabs:** Curing compound should be spray applied on to the newly placed concrete slab as soon as possible after it is free from visible surface water.

**Shuttered and precast concrete:** Curing compound should be spray applied to all surfaces as soon as formwork has been removed or the element demoulded.

In all cases the nozzle of the spray should be held approximately 450mm from the concrete surface and should be passed back and forth to ensure complete and even coverage. The pump pressure should be maintained at a level to produce a fine spray ensuring complete coverage of the surface.

Rate of application shall be as per the instructions of Engineer-In-Charge and manufacturer's specifications but is typically within the range of 200 to 285 ml/m<sup>2</sup>.

Alternatively by taking the prior approval of Engineer-in-charge water may be used for curing. Water for curing shall be of the same quality as used for concreting and masonry works.

#### 4.14 Reinforcement steel works

Rate quoted for uncoated reinforcement steel shall include cost of supplying, de-coiling, straightening, cleaning, cutting, bending, placing, binding, welding if required and providing necessary cover blocks of concrete. No payment for cement wash shall be made separately and is deemed to be included in the quote rate for RCC works.

### 5. BRICK WORK

The work shall be carried out as per CPWD specifications, Vol. -1, Sub-head No -6. However, where CPWD specifications are not available, the work shall be carried out with prior approval of Engineer in charge.

### 6. STONE WORK

The work shall be carried out as per CPWD specifications, Vol. -1, Sub-head No - 7 and other relevant IS codes. However, where CPWD specifications are not available, the work shall be carried out with prior approval of Engineer in charge.

### 7. STEEL WORK

The work shall be carried out as per CPWD specifications, Vol. -1, Sub-head-10. However, where CPWD specifications and relevant IS standards are not available; the work shall be carried out with prior approval of Engineer in charge. The rate quoted by the contractor shall be inclusive of the following clauses as well.

#### 7.1 Fabrication Drawings

The contractor shall prepare all fabrication and erection drawings on the basis of design drawings supplied to him and submit the same in triplicate to the Engineer-in-charge for review. Engineer-in-charge shall review and comment, if any, on the same. Such review, if any, by the Engineer-in-charge, does not relieve the contractor of any of his required guarantees & responsibilities. The contractor shall however be responsible to fabricate the structural members strictly conforming to specifications and reviewed drawings.

Review by Engineer-in-charge shall not absolve the contractor of his responsibility for the correctness of dimensions, adequacy of details and connections. One copy will be returned with or without comments to the contractor for necessary action.

The contractor shall supply three prints each of the final reviewed drawings to the Engineer-in-charge within a week since final review, at no extra cost for reference and records.

Fabrication and erection drawings shall be thoroughly checked and stamped "Approved for Construction" and signed by the responsible engineer of the Contractor and shall be released for construction by the contractor directly to his work site.

If any modification is made in the design drawing during the course of execution of the job, revised design drawings will be issued to the contractor. Further changes arising out of these shall be incorporated by the contractor in the fabrication drawings already prepared at no extra cost & extra time and the revised fabrication drawings shall be duly got reviewed as per the above Clauses.

## **7.2 Painting Structural Steel Work**

The work shall be carried out as per CPWD specifications, Vol. -2, chapter-13. However, where CPWD specifications are not available, the work shall be carried out with prior approval of Engineer in charge.

## **8. FLOORING**

The work shall be carried out as per CPWD specifications, Vol. -1, Sub head -8 & Sub-head-11. However, where CPWD specifications are not available, the work shall be carried out with prior approval of Engineer in charge.

### **8.1 Rubble Soling Location**

Soling shall be constructed under floors and other areas where shown in the drawings as per the directions of Engineer in charge.

#### **8.1.1 Soling Materials**

The size of aggregates used for soling shall not be more than 150 mm, nor less than 50 mm when measured in any direction, and their height shall be equal to the proposed soling course depth  $\pm 25$  mm.

#### **8.1.2 Preparation of the Sub-grade before laying soling**

The top level of the well compacted sub-grade shall be lower than the level of the underside of the floor or other structure, to be built over it, by a thickness equal to the combined depth of soling and metalling (due allowance being made for consolidation). The depth of the soling shall be 150 mm but to achieve this finished depth, an initial loose layer of approximately 200 mm will be necessary.

#### **8.1.3 Laying and packing the soling stones**

A layer of sand or small size gravel 50 mm thick shall be spread and consolidated on the sub- grade surface prepared to the satisfaction of Engineer-in-charge.

The aggregates for soling shall be of a height equal to the required thickness of soling. Their length or breadth shall not be greater than twice the soling thickness. This means that the aggregates would pass through a ring 180 mm in diameter but not a ring 100 mm in diameter.

Soling aggregates shall be hand packed as close as possible with their broadest side downward and greatest length across the road. Gauge pegs shall be driven at close intervals to indicate the required thickness of the soling. The joints between stones shall be placed at the edges of the area to be covered. All interstices between stones shall be wedged in with smaller stones, well driven into achieve tight packing and complete filling of the interstices.

#### **8.1.4 Consolidation of the soling**

The soling shall be thoroughly consolidated with mechanical rollers of 8 to 10 tone weight starting at the edges and working towards the center. If the soling is to have a cross fall the rolling shall commence at the lowest edge and work over and up to the upper edge. Rollers shall pass over the same surface at least 8 times to ensure that the soling is well consolidated. The top surface shall be checked frequently to make sure that it conforms to the design grade and level.

Vibratory compactors may be used, if approved by the Engineer-In-Charge instead of mechanical rollers. For areas where access is difficult or restricted, heavy hand rammers and hand rollers may be used subject to approval from Engineer-in-charge.

#### 8.1.5 Measurements

Measurement shall be made in square meters only after the soling has been consolidated to the satisfaction of Engineer in charge.

#### 8.1.6 Rate

The rate shall include the cost of material and labour involved in all the operations described above.

### 8.2 POLISHED/FLAMED GRANITE IN FLOORING, SKIRTING, RISERS & TREADS OF STEPS

#### 8.2.1 Material

The granite slabs shall be of approved colour & shall be from a lot of size sufficient to cover the particular area to avoid variation in grain/ shade. They shall be hard, sound, durable and free from weathering and decay and defects like cavities, cracks, holes, injurious veins, patches of soft materials and such other defects adversely affecting strength and appearance.

The polished / Flamed Granite as per sample approved by the Engineer-In-Charge shall be brought by the Contractor in adequate quantity and from one single batch / source so as to ensure that the grains and shade of entire flooring laid is homogeneous and consistent. The granite slabs shall be cut to sizes and shapes as per the Drawings/ instructions of Engineer-In-Charge, edges being true and square. The exposed edges of the slab are to be polished in factory or at site. Granite slabs shall be cut with machines as approved by the Engineer-In-Charge.

The thickness of the slabs shall be 18, 30 or 40 mm as specified in the description of the item. Tolerance of + 3% shall be allowed for the thickness. In respect of length and breadth of slabs a tolerance of + 2% shall be allowed.

#### 8.2.2 Laying in flooring and treads of steps

Base concrete or the RCC slab on which the slabs are to be laid shall be cleaned, wetted and mopped. The bedding for the slabs shall be with cement mortar 1:4 (1 cement: 4 coarse sand) or as given in the description of the item. The average thickness of the bedding mortar under the slab shall be 20 mm and the thickness at any place under the slab shall be not less than 12 mm.

##### **The slabs shall be laid in the following manner:**

Mortar of the specified mix shall be spread under the area of each slab, roughly to the average thickness specified in the item. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped with wooden mallet and brought to level with the adjoining slabs. To provide joints of specified width, spacers of approved quality shall be used wherever required. It shall be lifted and laid aside. The top surface of the mortar shall then be corrected by adding fresh mortar at hollows. The mortar is allowed to harden a bit and cement slurry of honey like consistency shall be spread over the same at the rate of 2.75kg of cement per sqm. The edges of the slab already paved shall be buttered and joints are grouted with epoxy grout of approved color and make to match the shade of the granite slabs as given in the description of the item.

The slab to be paved shall then be lowered gently back in position and tapped with wooden mallet till it is properly bedded in level with and close to the adjoining slabs with as fine a joint as possible. Subsequent slabs shall be laid in the same manner. After each slab has been laid, surplus cement on the surface of the slabs shall be cleaned off. The flooring shall be cured for a minimum period of seven days. The surface of the flooring as laid shall be true to levels, and, slopes as instructed by the Engineer-in-Charge.

Due care shall be taken to match the grains of slabs which shall be selected judiciously having uniform pattern of Veins/streaks or as directed by the Engineer-in-Charge.

The slabs shall be matched as shown in drawings or as instructed by the Engineer-in-Charge.

Slabs which are fixed in the floor adjoining the wall shall enter not less than 12 mm under the plaster skirting or dado. The junction between wall plaster and floor shall be finished neatly and without waviness.

The treads and landings shall be projected out to a minimum 20mm from the face of the riser or as detailed.

The slabs for treads of staircase shall be a single piece without joints. The exposed edges shall be finished as shown in the drawings and machine polished either at site or at factory.

Providing 3 nos of 3mm grooves at spacing of 30mm in granite stone laid in treads all complete as per drawing and direction of Engineer-In-Charge.

### 8.2.3 Laying in Risers of steps, Skirting

The risers of steps, skirting and dado shall be grouted with epoxy grout of shade matching to the shade of the granite, as specified in the description of the item, with the line of the slab at such a distance from the wall that the average width of the gap shall be 12 mm and at no place the width shall be less than 10 mm, if necessary, the slabs shall be held in position by temporary M.S. hooks fixed into the wall at suitable intervals. The skirting or riser face shall be checked for plane and plumb and corrected. The joints shall thus be left to harden then the rear of the skirting or riser slab shall be packed with cement mortar 1:4 (1 cement: 4 coarse sand) or other mix as specified in the description of the item. The fixing hooks shall be removed after the mortar filling the gap has acquired sufficient strength. The joints shall be as fine as possible but not more than 1 mm. The top line of skirting and risers shall be truly horizontal and joints truly vertical, except where otherwise indicated. The risers and skirting slab shall be matched as shown in drawings or as instructed by the Engineer -In-Charge.

The polished granite shall conform to the specification for Granite for flooring. It shall be of approved thickness.

The height of the skirting shall be 75mm or as specified. The top edge of skirting shall be treated as shown in the detailed drawing.

On masonry walls, it shall be fixed over a backing coat of cement mortar 1:4 (1 cement: 4 coarse sand) 10mm thick with the back of the granite strip coated with a thin layer of cement paste of butter like consistency. Curing is to be carried out for a minimum period of 7days.

The granite tiles shall be fixed with proper adhesive (with VOC limit 50g/Ltr) of approved make) on plywood or similar backing material as detailed in the drawing.

The joints between granite strips in skirting shall be straight flush joints and to minimum nos. Any adhesive oozing out shall be wiped off with a cloth and washed away with water so as to give a clean appearance.

The junction between the skirting and wall/partition shall be provided with 'C' channel of size 6mm x 6mm x 1.2mm for groove in wall /partition.

A protective layer of polythene sheet of 300 micron thick overlaid with a coat of Plaster of Paris 8-10mm thick shall be laid on the flooring, till handing over and cleaning the same with dilute acid to the satisfaction of Engineer-In-charge before handing over.

### 8.2.4 Measurements

Granite stone flooring shall be measured in square meter correct to two places of decimal. Length and breadth shall be measured correct to a cm before laying skirting, dado or wall plaster. Risers and treads of stairs paved with Granite stone slabs shall also be measured under the item of Granite Stone flooring. Nothing extra shall be paid for nosing of treads, polythene sheet and POP layer.

Grooves made in the treads of the steps shall be measured separately in meter correct to two places of decimal.

The skirting shall be measured separately in meter correct to two places of decimal.

**8.2.5 Rate**

The rate shall include the cost of all materials and labour involved in all the operations described above including making special type of pattern/design as per drawings or as directed by Engineer-In-Charge, providing protective layer of polythene sheet overlaid with a coat of Plaster of Paris and polished edges and grooves if required.

Payment for the grooves made in the treads shall be paid separately under the respective item.

Payment for the Skirting shall be paid separately under the respective item.

**8.3 GRANITE IN DADO**

**8.3.1 Material**

The polished granite shall conform to the specification for Granite for flooring and shall have a machine cut edges to form a very fine joints and 4mm 'V' grooves. It shall be of thickness specified in the item.

**8.3.2 Laying:**

The dado shall be grouted with epoxy grout of shade matching to the shade of the granite, as specified in the description of the item, with the line of the slab at such a distance from the wall that the average width of the gap shall be 20 mm, if necessary, the slabs shall be held in position by temporary M.S. hooks fixed into the wall at suitable intervals. Dado face shall be checked for plane and plumb and corrected. The joints shall thus be left to harden then the rear of the skirting or riser slab shall be packed with cement mortar 1:4 (1 cement: 4 coarse sand) or other mix as specified in the description of the item. The fixing hooks shall be removed after the mortar filling the gap has acquired sufficient strength. The joints shall be as fine as possible but not more than 1 mm, groove of 4mm. The top line of dado shall be truly horizontal and joints truly vertical, except where otherwise indicated. The Dado shall be matched as shown in drawings or as instructed by the Engineer -In-Charge.

**8.3.3 Measurements**

Length shall be measured along the finished face of dado, correct to a cm. Height shall be measured from the finished level of floor, to the top correct to 0.5 cm. The areas shall be calculated in square metre correct to two places of decimal.

**8.3.4 Rate**

The rate shall include the cost of all materials and labour involved in all the operations described above.

**9. FINISHING**

The work shall be carried out as per CPWD specifications, Vol. -2, sub-head-13. However, where CPWD specifications are not available, the work shall be carried out with prior approval of Engineer-in -charge.

Contractor shall ensure use of paints with VOC less than 50 grams/litre in all the painting and finishing works. Nothing shall be paid extra on this account and it is deemed to be included in the quoted rates of respective items.

**10. LEED/ GRIHA REQUIREMENTS**

The project is being designed to attain **GRIHA 5 star and LEED Platinum rating**. The contractor has to adhere to and implement all the applicable clauses under GRIHA 5 star and LEED Platinum requirement for the contract and also maintain the necessary documentation of the various works including the following. Nothing extra shall be paid on account of these requirements.

Following are the contractor's responsibilities but not limited to:

The contractor to submit the Project Management Plan showing the material storing yard, Batching Plant , facilities for labour ( Accommodation, toilets etc), approach roads, site office of owner, PMC and

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Contractor, location for preservation of top soil, staging and spill prevention measures, erosion and sedimentation control measures etc. The plan should be such that area of disturbance shall be minimum and get the same approved by Engineer-In-charge prior to start of work at site.

## **10.1 PRESERVE AND PROTECT LANDSCAPE DURING CONSTRUCTION**

### **10.1.1 Collection, storage and reapplication of topsoil**

Contractor to ensure that the soil onsite is protected from erosion in accordance with NBC 2005 – Part 10 – Landscaping, Signs and Outdoor Display Structures, Section 1 – Landscape planning and design, Subsection 4 – Protection of landscape during construction.

This should be done from areas likely to be disturbed by construction activities (especially in cases where the site area is larger than 10,000 m<sup>2</sup>), topsoil should be stripped to a depth of 20 cm from the areas proposed for buildings, roads, paved areas, and external services.

It should be stockpiled to a height of 40 cm in designated areas and reapplied during plantation of the proposed vegetation. The topsoil should be separated from the subsoil debris and stones larger than 50 mm in diameter. The adjoining areas shall be barricaded to prevent construction activities damaging the surrounding areas.

### **10.1.2 Sedimentation basin**

Sedimentation basin, a temporary dam or basin at the lowest convenient point of the site should be constructed for collecting, trapping, and storing sediment produced by the construction activities.

A flow-detention facility must also be constructed for reducing peak run-off rates. This would allow most of the sediments to settle before the run-off is directed towards the outfall.

### **10.1.3 Contour trenching**

Contour trenching is an earth embankment or ridge-and-channel arrangement constructed parallel to the contours, along the face of the slope, at regular intervals on the lengths and slopes greater than 10% (1:10).

They are used for reducing run-off velocity, increasing the distance of overland run-off flow. They are also used to hold moisture and minimize sediment loading of surface run-off.

### **10.1.4 Mulching**

Mulch is a protective layer of material that is spread on the top of the soil, which can either be organic (such as grass clippings, straw, bark chips, and similar materials) or inorganic, (such as stones and brick chips).

Mulching should be used with seedings and plantings on steep slopes (slopes > 33%). Steep slopes are prone to heavy erosion and, therefore, netting or anchoring should be used to hold it in place.

### **10.1.5 Topsoil improvement**

Topsoil needs to be tested before preservation to ensure that it is worth preserving, and will help conserve resources and money in the long run.

The soil should be tested at a laboratory accredited by the Indian Council of Agricultural Research (ICAR) for primary plant nutrient and pH. In case the soil test conducted yields a result that is not up to the requisite standard, then adequate measures need to be adopted to ensure that the fertility of the soil is restored to a usable level as per the direction of Engineer-In-Charge.

### **10.1.6 Preservation of existing Trees and preventing damage to the same During Construction**

During construction, protection of existing vegetation (including trees, shrubs, grasses and other plants) where possible, by preventing disturbance or damage to specified areas is recommended. This practice minimizes the amount of bare soil exposed to erosive forces.



Trees retained on the project site shall be protected during the construction period as per National Building Code – Part 10: Landscaping, signs, and outdoor display structures.

**Documentation**

Site plan showing staging and spill prevention measures, erosion and sedimentation control measures. Document to be submitted after completion of the construction of the project, a brief description along with photographic records to show that other areas have not been disrupted during construction. The document should also include brief explanation and photographic records to show erosion and sedimentation control measures adopted. (Document CAD drawing showing site plan details of existing vegetation, existing buildings, existing slopes and site drainage pattern, staging and spill prevention measures, erosion and sedimentation control measures and measures adopted for top soil preservation during construction).

Site plan (one CAD drawing) along with a narrative to demarcate areas on site from which topsoil has to be gathered, designate area where it will be stored, measures adopted for topsoil preservation.

Obtaining Certificate from Engineer-in-charge confirming proper protection and preservation of existing trees during construction process.

Landscape plan, clearly highlighting the areas where trees were removed (indicating the number of trees), if applicable, with the number of replanted trees in the proportion of 1:3 in the proposed landscape design. List details about species, which existed, and the species that have been replanted on-site. Narrative explanation about the methods of soil stabilization used, wherever required, accompanied by photographs with brief description.

Certificate by the landscape architect on topsoil laying, soil stabilization, and adequate primary soil nutrient and pH [(supported by test results performed at Indian Council of Agricultural Research (ICAR)–accredited laboratory.

**10.2 PROVIDE MINIMUM LEVEL OF SANITATION/SAFETY FACILITIES FOR CONSTRUCTION WORKERS**

Contractor shall provide minimum level of sanitation facilities and ensure safety of construction workers as per guidelines given in The National Building Code of India (Latest version).

**Documentation**

Contractor shall take regular photographs showing the safety measure followed during construction and maintain the record of the same.

Contractor shall submit the detailed narrative on provision for safe drinking water and sanitation facility for construction workers and site personnel accompanied by the photographs taken at regular intervals during construction.

**10.3 EFFICIENT WATER USE DURING CONSTRUCTION**

Contractor shall use curing compound for curing the concrete as per the specifications mentioned elsewhere in the tender document.

**Documentation**

Contractor to submit the narrative explaining the efficient water use during construction accompanied by regular photographs of curing showing the use of concrete compound as per the direction of Engineer-In-Charge.

**10.4 REDUCTION IN WASTE DURING CONSTRUCTION**

**Documentation**

Contractor to submit the narrative indicating the quantum of waste generated during construction and storage facility for segregated inert and hazardous waste before recycling and disposal accompanied by necessary documents and photographs.

Contractor to submit the layout (showing the location & capacity) and photo of the storage facility for segregated inert and hazardous waste.

## 10.5 USE OF LOW-VOC PAINTS/ADHESIVES/SEALANTS

Contractor to ensure that all the Adhesives, Sealants, Paints and Coatings used in the project have a VOC level within the following limits. Maintain Proper documentation in the form of manufacturer cut sheets, technical data sheets, and lab test reports as conformation for compliance.

### 10.5.1 Architectural Applications VOC Limit (g/L less water)

Ceramic Tile Adhesives - 65

### 10.5.2 Paints VOC Limit (g/L less water)

Non-flat - 150

Flat (Mat) - 50

Anti corrosive/ anti rust - 250

### 10.5.3 Coatings VOC Limit (g/L less water) Clear wood finishes

Floor coatings - 100

Stains - 250

### 10.5.4 Sealers

Waterproofing sealer - 250

Sanding sealer - 275

Other sealers – 200

## 10.6 STORM WATER MANAGEMENT DURING CONSTRUCTION:

Contractor needs to take measures to ensure that the storm water runoff during construction does not exceed the runoff before construction. To this effect there is need to provide rain water recharge pits right around the periphery of the site & have rain water harvesting wells to capture rain water and then filter all suspended solids and other materials before recharge into the earth.

## 10.7 CONSTRUCTION WASTE MANAGEMENT

Contractor to ensure that a plan is in place to ensure that more than 75% of the waste generated by weight or volume, on-site due to construction activities is either reused, recycled or sold as scrap and is diverted from going into landfills.

Contractor to submit the proper records/documents in the form of logs, photographs, gate passes, hauler certificates, etc. for compliance of the same.

## 10.8 RECYCLED CONTENT IN MATERIALS

Contractor to submit the letters confirming the recycled content (post-consumer and pre-consumer) in the materials from the manufacturers. Recycled content in the various materials is given below:

a. Steel – Minimum recycled content of 25%

b. Fly ash in AAC Blocks, Cement Plaster, RMC- Minimum recycled content of 25-50%

Contractor to maintain documentation records in the form of Manufacturer cut-sheets, Technical data sheets and/or test reports to confirm compliance of the same.

Post consumer material is defined as waste material generated by households or by commercial, industrial and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose. Pre consumer material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.

## 10.9 REGIONAL MATERIALS

Contractor to procure materials which are extracted, harvested or recovered and manufactured/ processed within a 250mile (400km) radius of the project site as far as possible and ensure that 20% of the materials by cost are extracted, harvested or recovered and manufactured / processed regionally within a 250mile (400km) radius.

Contractor to maintain and submit documentation records in the form of Manufacturer letters indicating the place of manufacture/process and place of raw material extraction/harvesting and the distance of both from the project site to ensure compliance with the above.

#### 10.10 RAPIDLY RENEWABLE MATERIALS

Contractor to ensure that more than 5% of the total materials by cost are from rapidly renewable sources.

Contractor to submit and maintain documentation records in the form of Manufacturer letters indicating the rapidly renewable content percentage and the type of rapidly renewable material used such as strawboard, corkboard, Eucalyptus based ply board and MDF, agri-waste based board and MDF, cotton, wool, etc.

### 11 SPECIFICATIONS FOR PAVERS

#### 11.1 GRASS PAVER

The grass pavers shall meet the structural loading requirement for Fire Engine Access ways of 80 N/cm<sup>2</sup> (80 t/m<sup>2</sup>) unconfined. The grass pavers shall be of structural modules manufactured with high impact thermoplastic with the following features:

- The individual cells of the grass pavers shall be evenly spaced across each module to ensure even distribution of loads.
- The individual cells of the grass pavers shall have an open base design for minimal hindrance to root growth and drainage.
- The individual cells of the grass pavers shall have side openings to allow for runner and root growth between cells.
- The modules shall be securely interconnected with adjacent modules to prevent movement of individual modules subject to differential settlement or loading. Interconnection shall be by snap-on clipping, welding, wire ties or other mechanical means.
- The modules shall be capable of being anchored to the ground by pegging where required.

Typical properties of the grass pavers are:

PROPERTY	VALUE
Material	Recycled polypropylene
Dimensions	500 L x 500 W mm
Height	40 mm
Individual cell size (diagonal)	70 mm
Weight	≥4.3 kg/m <sup>2</sup>
Compressive strength (unconfined cells)	>200 tonne/m <sup>2</sup>
Compressive strength (confined cells)	>2000 tonne/m <sup>2</sup>

#### EXECUTION

- The grass pavers shall be provided / installed in accordance to the project requirement as approved by the Engineer-In Charge.
- All installed grass pavers shall be joined with no gaps between them.
- Prior to installation, the Contractor shall submit Method Statements and/or Shop Drawings endorsed by the supplier's qualified engineer for the installation of the grass pavers.

##### Sub-grade preparation

Excavation shall be taken and levelling done in the area where the grass pavers are to be installed according to the recommendations under the section *Base Course* (below).

The levelled area shall be compacted using a mechanical plate compactor or light compactor roller according to the Engineer-In Charge specifications.

Sub-surface drainage and irrigation systems and utility lines shall be installed in the sub-grade. Disturbed areas should be lightly compacted after installation.

**Base course preparation**

The sandy gravel or granite aggregate base shall be laid down and compacted that meets road base construction specifications or according to Engineer In Charge specifications.

**Grass pavers installation**

The connected grass pavers shall be placed on the sandy gravel mix ensuring that the open cells are facing upwards.

The cells shall be Filled to cover the cells with an 80% sand and 20% organic sandy soil mix. Clay or heavy loam soil mixes that can adversely affect turf establishment shall not be used.

The surface shall be levelled off and lightly compacted using water spray evenly across the surface.

The top of the grass pavers must be covered with 10 mm of the sandy soil mix if the area is to be turfed, and by 20 mm if the area is to be hydro-seeded.

Ensure that vehicles are not driven over newly installed grass pavers.

**Turf establishment**

Sprigs or washed rolled turf shall be laid onto the sandy soil layer. Turfed areas should be protected from traffic except for emergency vehicles until the root system becomes established. Only grass species that are hardy and suitable for local growing conditions should be used.

**Hydro-seeding**

Grass seed and mulch shall be applied over the soil filled cells. Poorly germinated areas should be re-seeded immediately.

**Protection and maintenance**

Seeded areas must be protected from traffic, other than for emergency vehicles, for a period of 6 to 8 weeks, or until the grass can withstand traffic. Implement regular water regimes and apply recommended fertilizer applications and topsoil dressing, as needed.

**11.2 FLEXIPAVERS**

**Concrete block paving for driveway / pathway**

**General:**

**a) Paver blocks**

SI No	Property	Requirement
1	Length and width	As specified by the manufacturer
2	Tolerance on length and width	+/- 2mm
3	Thickness	65mm
4	Tolerance on thickness	+/- 3mm
5	Wearing surface area	Minimum 75% of plan area
6	No of layers	Single layer
7	Finish	Anti skid and anti glare type surface
8	Colour	Cement grey/color as approved by Engineer In Charge
9	Appearance	Dense, uniform shape with no hollows, cracks or other visual defects which will interfere with the proper paving of the unit or impair the strength or performance of the pavement constructed with the paver blocks.
10	Compressive strength at 28 days	as per table 3 of IS 15658
11	Tensile splitting strength	Minimum 2.5N/mm <sup>2</sup>
12	Abrasion Resistance	Maximum 1.5
13	Water Absorption	Maximum 6%

Conform to IS - 15658 "Precast concrete blocks for paving – specification". They shall be of grade designation M – 35 and of minimum thickness 65 mm.

The pavers and edge blocks shall be procured from one of the approved manufacturers/suppliers.

The contractor shall submit sample/ samples of paver blocks proposed to be used in the work together with the following information:

- Name of the manufacturer/ brand name of the pavers.
- Grade designation of the paver blocks, dimensions of the paver blocks
- A certificate from the manufacturer that the paver blocks conform to the requirements of IS 15658 in all respects.
- Test reports for the paver blocks of the manufacturer from independent approved labs.
- Manufacturer's test report of the lot of pavers proposed to be used by the contractor.

The paver blocks shall conform to the following requirements

#### b) Edging units and kerbs

The edging units and kerbs shall conform to IS: 5758 - "Specification for precast concrete kerbs, channels, edgings, quadrants and gutter aprons".

The Concrete shall be minimum of M 20 grade. Edgings and straight kerbs shall be manufactured in lengths of one metre and to the sections shown in IS: 5758, unless otherwise specified

Sample/ samples of edging units/kerbs proposed to be used and the following information shall be submitted for approval of Engineer-In-Charge:

- Name of the manufacturer/ brand name of the edging units.
- Grade/ designation of the edging units, dimensions of the edging units.
- c) A certificate from the manufacturer that the edging units/ kerbs conform to the requirements of IS: 5758 in all respects.
- Test reports for the edging units/kerbs of the manufacturer from independent approved labs.
- Manufacturer's test report for the lot of edging units/kerbs proposed to be used by the contractor.

The edging units/kerbs shall conform to the following requirements:

SI No	Property	Requirement
1	length and height	As specified by the manufacturer
2	Tolerance on length and height	± 3mm
3	Thickness	As per IS - 5758
4	Tolerance on thickness	+ 1.5 mm, -3 mm
5	Colour	Cement grey/color as approved by Engineer In Charge
6	Appearance	All angles of the precast units except the angles at the splays or chamfered faces shall be true right angles. The arrises shall be clean and sharp except for rounded arrises. The wearing surfaces shall be true and out of winding. On being fractured, the interior of the products shall present a clean homogeneous appearance. The units shall not have hollows, cracks or other visual defects which will interfere with the proper functioning of the unit.
7	Transverse strength at 28 days	As per table 1 of IS - 5758
8	Water Absorption	Maximum 8% after 24 hours

The whole quantity of paver blocks and edging units (edge restraints) required for the work shall be procured from one manufacturer and preferably from the same lot.

#### Methodology

Contractor shall submit his method statement and detailed methodology to the Engineer In Charge along with details of paver blocks and edgings/kerbs, Concrete mix design, tools, plant and personnel to be employed by him for the work at least one month prior to the date of commencement of work. The laying of paver blocks shall be undertaken only after approval of the methodology

#### **Laying of paver blocks**

##### **General:**

The base surface like WMM / concrete base or earth over which the paver blocks are to be laid shall be inspected for the longitudinal and transverse slope of the pavement as shown on the drawings or as specified and for any potholes or deep depressions which shall be filled up before laying the paver blocks.

If the base surface is earth, it shall be compacted with two passes of light roller after making up the longitudinal and transverse slope of the pavement in the base and filling up any depressions with suitable earth. The surface shall be lightly sprinkled with water just before rolling. Where rolling is not possible, the surface shall be compacted by ramming.

All the manholes shall be raised to the footpath level. The concrete around manhole covers is to be cast in square or rectangular shape. This concrete surround should be minimum 100 mm wide and extend to the underside of the laying course or manhole frame flange. The mix of the concrete shall be to grade M-20. No extra payments will be made for this purpose. The area of raised manholes shall be included in the measurement of overall area of paver blocks for the purpose of payment.

**Bedding Sand Course:**

The bedding sand shall consist of clean, well graded sand passing through 4.75 mm sieve. The bedding sand may be from either a single source or blended to achieve the following grading. The sand shall be free of any deleterious soluble salts, organic matter or other contaminants likely to cause efflorescence.

SIEVE SIZE	% PASSING
9.52mm	100
4.75mm	95-100
2.36mm	80-100
1.18mm	50-100
600 microns	25-60
300 microns	10-30
150 microns	5-15

Single sized, gap graded sands or sands containing an excessive amount of fines or plastic fines shall not be used. The sand particles should preferably be sharp, not rounded, as sharp sands possess higher strength and resist the migration of sand from under the block to less frequented areas.

The sand shall be of uniform moisture content within 4% - 8% by weight when spread and shall be protected against rain when stockpiled prior to spreading. Saturated sand shall not be used.

The bedding sand shall be spread loose in a uniform layer as per drawing/ as directed. The compacted uniform thickness shall be 25mm and within + 5mm. Thickness variation shall not be used to correct irregularities in the base course surface.

The spread sand shall be carefully maintained in a loose dry condition and protected against pre-compaction both prior to and following screeding. Any pre compacted sand or screeded sand left overnight shall be loosened before further laying of paving units take place.

Sand shall be spread loosely in a uniform layer and screeded only slightly ahead of the laying of the paving unit to the thickness required to give the target laying course thickness of 25mm after the paving blocks have been laid and vibrated into place.

Where screed rails have been used to assist in the line and level of the laying course screeding, they should be carefully removed to avoid disturbing the screeded surface. Any depressions in the screeded sand shall be loosened, raked and rescreeded before laying of paving units. If the prepared laying course is disturbed or damaged prior to laying of blocks, it shall be corrected before block laying commences.

**Laying of Paving Units:**

Laying of Paving units shall normally start at a fixed edge restraint. Paving units shall be laid in the approved pattern through out the pavement. Once the laying pattern has been established, it shall continue without interruption over the entire pavement surface. Cutting of blocks, the use of infill concrete or discontinuity in laying pattern is not permitted in other than approved locations.

Paving units shall be placed on the uncompacted screeded sand bed to the approved laying pattern, care being taken to maintain the specified bond through out the job. The first row shall be located next to an edge restraint. Specially manufactured or cut edge paving units shall be permitted. Edge paving units may be cut using a power saw, a mechanical or hydraulic guillotine, or other approved cutting machine.

Paving units shall be placed to achieve gaps nominally 2 to 3mm wide between adjacent paving blocks. No joint shall be less than 1.5 mm nor more than 4mm wide. Frequent use of string lines shall be made to check alignment. In this regard, the "laying face" shall be checked at least every two metres as the

work proceeds to ensure that the block bond remains in alignment. Should the face become out of alignment, it must be corrected prior to initial compaction and before further laying is proceeded with.

In each row, all full units shall be laid first. Specially manufactured or cut closure units shall be fitted subsequently. Such closure units shall consist of not less than 25% of a full unit.

With curved edge restraints, a single stretcher course or a header/soldier course can be introduced against the edge restraint. Cut faces of blocks can then be positioned against this course to reduce the visual impact of the cut, providing a neat finish and also making the marking of the cut block much easier.

To infill spaces between 25mm and 50mm wide, concrete with screened sand, coarse aggregate mix and strength of min. 20 N/Sq mm shall be used. Within such mix the nominal aggregate size shall not exceed one third the smallest dimension of the infill spaces. For smaller spaces, dry packed mortar shall be used.

**Initial Compaction:**

After laying the paving units, they shall be compacted to achieve consolidation of the sand bedding and brought to design levels and profiles by not less than two (2) passes of suitable plate compactor.

The compactor shall be a high frequency, low amplitude mechanical flat plate vibrator having plate area sufficient to cover a minimum of twelve paving units.

Prior to compaction all debris shall be removed from the surface.

Compaction shall proceed as closely as possible following laying. Compaction shall not, however, be attempted within one metre of the laying face. Compaction shall continue until lipping has been eliminated between adjoining units. All work further than one metre from the laying face shall be left fully compacted at the completion of each day's laying.

Any units that are structurally damaged prior to or during compaction shall be immediately removed and replaced.

Sufficient numbers of plate compactors shall be maintained at the paving site for both bedding compaction and joint filling.

**Joint Filling and Final Compaction:**

As soon as practical after compaction and in any case prior to the termination of work on that day and prior to the acceptance of construction traffic, sand for joint filling shall be spread over the pavement.

Prior to commencing the joint filling process, ensure all the debris has been swept off the pavement surface and the following checked for compliance:

- a) flatness of the pavement: 10 mm under 3m straight edge
- b) difference in levels between blocks 2mm
- c) joint width 2mm to 4mm and consistent
- d) joints are correctly aligned
- e) there are no damaged or cracked blocks

Joint sand shall pass a 2.36 mm sieve and shall be free of soluble salts, organic matter or contaminants likely to cause efflorescence. The sand shall comply with the following grading limits.

SIEVE SIZE	% PASSING
2.36mm	100
1.18mm	90-100
600 microns	60-90
300 microns	30-60
150 microns	15-30
75 microns	10-20



The use of cement in the joint filling sand is not recommended as the cemented sand is likely to crack into segments which are easily dislodged. The contractor shall supply a sample of the jointing sand to be used in the contract prior to delivering any such material to site for incorporation into the works.

The jointing sand shall be broomed to fill the joints. Excess sand shall then be removed from the pavement surface and the jointing sand shall be compacted with not less than one pass of the plate vibrator and joints refilled with sand to full depth. This procedure shall be repeated until all joints are completely filled with sand. No traffic shall be permitted to use the pavement until all joints have been completely filled with sand and compacted.

Both the sand and paving units shall be dry when sand is spread and broomed into the joints to prevent premature setting of the sand.

The difference in level (lipping) between adjacent units shall not exceed 3 mm with not more than 1% in any 3m x 3m area exceeding 2mm. Pavement which is deformed beyond above limits after final compaction, shall be taken out and reconstructed to the satisfaction of the Engineer-In-Charge.

#### **Edge restraint**

The function of the edge restraints (or edging units) is to retain the sand bedding and to ensure that paving blocks at the edge of the pavement do not creep outward or rotate under load with consequent opening of joints and loss of interlock. They need to be sufficiently robust to withstand override by the anticipated traffic, to withstand thermal expansion etc. Edge restraints are to be adequately secured.

Edge restraints may be provided by:

- a) Walls of buildings abutting the paved area
- b) Edging units adequately secured to act as edge restraints
- c) Concrete kerbs/edging

#### Walls of buildings abutting the paved area:

In case of walls of buildings abutting the paved area, the walls shall be minimum 200mm thick if constructed in brick or solid block masonry, minimum 300mm thick if in random rubble masonry and minimum 100mm thick if in RCC. It shall be ensured that there are no holes or openings in the wall through which the sand bedding may leak out. The first course abutting or adjoining the wall shall be a full header/ stretcher course except at bends where the length/ width of the blocks may have to be adjusted.

Concrete of grade M 15 with 20mm graded aggregate shall be laid on the base, with one edge abutting the wall, to the full width of the first course and a minimum thickness of 50 mm such that the top of concrete is at the same level as the top of bedding sand layer. Lay the first course of pavers on the concrete bedding with joints nominally 2 to 3mm wide between adjacent paving blocks, when the concrete is sufficiently stiff to bear the load of the paver blocks. The concrete shall be cured in the normal manner and the joints filled with sand as for other blocks. The paver blocks adjoining the first course shall be laid after concrete is cured.

#### Edging units adequately secured to act as edge restraints:

The edge course (first edging unit) is set in concrete bed and haunch. Concrete shall be of grade min M 20 with 20mm grad20ed aggregate. The concrete bed shall extend to the full width of the edge course and it shall rest on a firm base; thickness of concrete bed shall be minimum 75mm; if the base is WMM/ concrete, it may have to be cut to achieve the required depth of concrete bed. The concrete haunching (stem) is to be integral with the bed and shall be minimum 75mm wide and upto the top of edge course. To allow for expansion/contraction, contraction joints 2mm wide and cut vertically through the concrete at right-angles to the length shall be provided at 3m intervals and expansion joints, 15mm wide, shall be provided at 15m intervals and at tangent points of curves of less than 25m radius. Expansion joints shall be sealed with 15mm wide joint sealer cut to the full profile of the edging section.

#### Concrete kerbs/edging:

Concrete edging may be of precast sections or cast in situ. Precast edging shall be with concrete to grade M- 20. It shall be minimum 50 mm thick, the height of edging blocks shall be equal to at least the

thickness of paver blocks plus bedding sand layer so that the sand bedding is retained in place. Length may be any convenient length

The precast edging blocks/kerbs shall be set in concrete bed of grade M- 15 with a minimum depth of 75mm below the unit. The units should be haunched monolithic with concrete, the haunch shall be minimum 150mm wide at bottom reducing uniformly to 40mm at top and 100mm high. The joints between the edging/Kerb units shall be 2mm wide and left unfilled. The concrete bed for the edging unit must be supported, either on the underlying sub-layers or directly on an adequate subgrade, the WMM/ concrete base may have to be cut to the required depth if necessary.

Edging blocks/kerb units are set-out to line and level using a string line between pegs or steel pins. The line and level of the laid units should then be checked and any necessary adjustments made. Allowances should be made on curves and final alignments are to be checked to ensure that the units follow a smooth curve both horizontally and vertically.

Units should be laid to within 10 mm of their design alignment and the difference between adjacent units shall not exceed 3 mm. The joints between the units shall be 2mm wide and left unfilled.

For cast in situ edging units, the concrete bed and the haunching (stem) shall be cast as a single unit. The concrete shall be to grade M-20 and proper steel formwork shall be used.

Contraction joints, 2mm wide and cut vertically through the concrete at right-angles to the length shall be provided at 3m intervals with minor adjustments to avoid short closing lengths.

Expansion joints, 15mm wide, shall be provided at 15m intervals and at tangent points of curves of less than 25m radius. Expansion joints shall be sealed with 15mm wide joint sealer cut to the full profile of the edging section.

## 12 HORTICULTURE WORKS

### Design & Details

Contractor has to work as per the designs and lineout details provided by Engineer-in-charge. Difficulty on site in execution as per the plan/ design has to be brought to the notice of engineer-in-charge immediately. Any discrepancies in the design subject to execution hurdles and alteration required should be reported to engineer-in-charge and the same should be improvised or as per instruction of the engineer-in-charge and contractor shall have to work only after due approval of the modification.

### Landscape Site Preparation

The landscape site should be free of any Construction Debris or wild vegetation. It shall be responsibility of the contractor to ensure that the site is in working condition as per instruction of the engineer-in-charge. The contractor shall also ensure proper grading of the landscape site in terms of aesthetics as well as drainage providing mounds and slopes with a gentle slope towards natural drainage direction, removal of all rubble and debris if any and dispose it of in the suitable location possibly in low lying areas as identified by the contractor and approved by Engineer-in-charge.

### Soil Testing

The Soil to be used as Top Soil (Good Soil/earth) for all plantation works shall be primarily imported fertile soil from agriculture fields off the site. The contractor should get the soil test report and accordingly with experts and consultants would meet the requirement for additives and soil conditioner to possibly maintain pH value of the soil between 7.0 - 7.5 before plantation works. Also after every 6 months or as required on poor performance of the plantation shall accordingly get the soil tested and measures taken for maintaining the pH value within acceptable range. Also Contractor shall undertake treatment as per advice of the experts to soil conditioning during the entire maintenance period as per SCC.

The contractor shall be required to get the test done as per instruction and supervision of Engineer-in-charge for ensuring the soil correction before the plantation works. The soil test shall be done minimum 20 nos. of locations selected randomly by Engineer-in-charge.

#### **Acceptance Value of Parameters**

pH Value 7.5  
Nitrogen Between 25-60 ppm  
Total Soluble Solids 0.01%  
Chloride 20 mg/kg  
Carbonates Between 1 & 60%  
Organic Matter Between 1 & 60%  
Phosphorous Between 4 & 5 ppm  
Calcium Between 150 & 250 ppm  
Magnesium Between 11 & 20% Between 7 and 10 ppm  
Salinity Between 420 & 12 Months 0 ppm  
Sodium Less than 5%  
Potassium Between 90 & 125 ppm  
Sodium Adsorption Ratio ( SAR) Between 12% to 15 %  
Sulphure as Sulphate Between 7 & 12 ppm  
Iron Between 5 & 20 ppm  
Boron Between 0.5 & 1.0ppm  
Zinc Between 1.2 & 3.5 ppm

#### **Disposal of Waste- General Cleanliness of Landscape Site**

The arrangement of transport for disposal of waste, shifting of plants, etc. has to be made by the contractor. The generated waste has to be disposed off within 48 hrs of generation or as instructed by the owner, failing which disposal of the same shall be arranged by the owner at risk and cost of the landscape contractor. It is the contractor's responsibility to keep the garden in green, healthy and in proper condition all the time. Owner will provide the place for disposal of garden waste within premises for Vermi composting to be compulsorily adopted by the Contractor

#### **Water requirement**

Adequate water shall be provided for trees, shrubs, lawn etc. For development of horticulture works indicative measures of water will be for Trees-@ 20 ltrs/every alternate day of watering, for Shrubs-@15 ltrs/sq.mt/every alternate day of watering, for Lawns-@ 25 ltrs/sq.mt/weekly requirement of watering.

Water will be procured by contractor during construction period as per SCC. Wherever irrigation tap connection is not available, watering should be done with water tankers or appropriate methodology. The maintenance of tankers or any appropriate system shall be integral responsibility of the Contractor to meet the watering requirements of the Trees, shrubs and lawns under any circumstances.

#### **Electricity**

As per SCC.

#### **PLANTING SCHEDULE -Tree Plantations Procedures**

##### **Supply of Trees-Physical Condition**

All plant materials shall be healthy, sound, vigorous with good foliage, Plants supplied shall be conforming to the names listed on the plant list. No plant materials will be accepted if branches are damaged or broken. All plant materials must be protected from the sun and weather until planted.

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### **Health of Trees**

All plant materials shall be free from plant diseases, insect pests, or their eggs, and shall have healthy well-developed root systems. Plant material shall be well formed and shaped true to type and free from disease, insect and defect such as knots, windburn, sun-cold, injuries, abrasion or disfigurement.

### **Specification of Trees**

In no case, deviation from the specification of the material in terms of height, Girth & Foliage as mentioned in the SOR shall be acceptable for plantation works. In case of non-availability of the particular species or the planting material as per specification in SOR the alternate species shall have to be approved by Engineer-in-charge in special case after due confirmation from the landscape consultant.

### **Planting of Trees**

Pit Size - Minimum Pit Size for all trees should be of the size 1.2mtX1.2mtX1.0mt. In case of larger trees pit size should be of 1.2mtX1.2mtX1.5mt. The soil shall be essentially good Earth mixed with 1/3rd of decomposed farmyard manure along with additives like Gypsum, sulphur, Zinc Sulphide (ZnS) etc to maintain ph-value of the soil between 7 - 7.5. Planting of trees and stacking / propping to protect the trees from wind and irrigate on need basis.

Maintain the tree basins - free of weeds by regular hoeing. Plant the tree with root ball in the pit (tin grown / poly bag grown) after removing carefully and without disturbing the root. Pressing the soil firmly around the tree planted. Preparing the basin around the tree and watering after staking and tying. The plant should be well maintained, disease free, well trimmed at the time of handing over. In case of death of the plant the contractor need to replace the same with equally well grown healthy plant.

### **Staking / Propping**

To ensure protection from Winds the trees shall have staking/ propping with bamboo tripod using jute string. In all condition, tree should be standing in erect position. The staking should have anti-termite treatment. Fertilizers /organic solid manures and liquid manures, spray bio-insecticides, parasites, predators:

All the planting materials shall be periodically examined for termite attacks or plant disease and appropriate measure (application of liquid manures/ growth regulators/ pesticides as per need, weeding regularly so as to keep the plant healthy all the time) shall be undertaken for entire period of the contract. Watering Arrangement Making basin around Trees (1mtr dia clear space) and maintaining tools and tackles/Hose-pipes, tractor mounted Water Tankers or as required in sense all arrangement for water distribution and watering equipments/manpower to be managed by the Contractor for watering the trees;

### **Handing Over of Trees**

Name Plate for Trees - All Trees planting should have Name Tag with name of the relevant species and well placed on trees with good visual characteristics. In case of row plantation of similar species, the same can be repeated at definite intervals may be on every 5th tree from the start. The name plate can either be of printed flex board or Painted GI. The Quoted rate shall be deemed to be inclusive of the same.

### **Maintenance of Trees**

Maintenance of Trees - Apart from the essential watering of the plants as per the maintenance schedule, nurture the trees with organic solid manures and liquid manures, spray bio-insecticides, parasites, predators to protect the trees from pest and disease. Amend the soil on regular basis with proper soil amendments to keep the pH level between 7 - 7.5. During the maintenance period as per SCC the plants should be maintained by regular watering, weeding, replacing dead plants, applying pesticides, use of plant physical protection measures etc. so as to grow them vigorously. Newly Planted

should be maintained by 1) Watering every alternate days @ 20 ltrs/watering cycle 2) Applying FYM @ 10kg/ tree/ annum 3) Trimming, pruning as & when required under guidance of the engineer-in-charge etc. 4) The Trees should have proper stacking so as the tree should stand erect till the tree settles with no possibility of bending due to Wind or Rain.

### **DETAILS OF PERIODIC MAINTENANCE ACTIVITIES- Operation Frequency**

1. Irrigation As per Demand or as specified under-
  - (a) In Summer 15 times in a Month / Every Alternate Day
  - (b) In rainy Season 5 to 7 times monthly or as per climatic condition
  - (c) In winter 10 times in a month
2. Weeding- 2 times in a Month
3. Forking of the Plants & Shrubs- 2 times in a Month
4. Edging- Once in a Month
5. Grass Cutting- 2 times in a Month
6. Trimming of Shrubs/Ground Covers: Once Monthly or as per instruction of the engineer-in-charge
7. Pruning of Big Trees- 2 times Year
8. Mulching i.e., 50mm thick layer fine powdered FYM or Cockpit /vermin compost  
Once in a month
9. Fertilizing-Lawn (NPK value 10-15-15)-250 Grams/sq.mt at interval of after planting with enough watering Once Quarterly/Half Yearly as instructed by Engineer-in-charge. Shrubs & Ground Covers etc @ 50 grm per sq.mt with enough watering once Quarterly/Half Yearly as instructed by Engineer-in-charge (c) Trees @ 50 grams per Tree Once Quarterly/Half Yearly as instructed by Engineer-in-charge.
10. Gypsum+ Sulphur for maintaining pH Value at 7 to 7.5 @ 200 grm/sq.mt or as Instructed by Engineer-in-charge in consultation with Horticulturist or Landscape Consultant Once Yearly
11. Site Cleaning & maintenance of General Appeal of the Site - Daily As & When required but site should be maintained clean.

### **SHRUBS PLANTATIONS-Supply of Shrubs, Creepers, Ground Covers**

Health of Shrubs/Ground Cover/Creepers etc - Plant material shall be well formed and shaped true to type and free from disease, insect and defect such as knots, windburn, sun-cold, injuries, abrasion or disfigurement.

Physical Condition - All plant materials shall be healthy, sound, vigorous with good foliage, and free from plant diseases, insect pests, or their eggs, and shall have healthy well-developed root systems. Plants supplied shall be conforming to the names listed on the plant list. No plant materials will be accepted if branches are damaged or broken. All plant material must be protected from the sun and weather until planted.

Specification of Shrubs - The species should be in appropriate specification in terms of height & Foliage as provided in SOR.

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### **Planting of Shrubs, Creepers, Ground Covers**

Bed Sizes - As per the specification and depth should be minimum 300 mm deep exclusive of the top 50mm where top edge is defined for watering and flooding. The plantation bed shall be the basis of all billing purpose including maintenance charges to be paid to the contractor.

Soil Preparation - Dig and remove all weeds, debris, rubbles, and stones from 18" depth of the surface soil level to be maintained in due course. The soil shall be essentially good Earth mixed with 1/3rd of decomposed farmyard manure along with additives like Gypsum, sulphur etc to maintain ph-value of the soil between 7 - 7.5.

Preparation of soil for grass, ground cover, edges, shrubs and flower beds. – Then prepare the same soil with 2-3" thick layer of well decomposed, weed free farm yard manure or vermin-compost. Treat the soil with chlorophyriphos / Lindane / Neemcake depends upon the infestation of soil borne pests. Treat the soil with proper herbicide to control the weeds only on need basis. Finally level the soil as per the drawing or planting details.

Preparation of pits for shrubs, creepers and hedges - The bed shall be prepared with good earth mixed with 1/3rd quantity of decomposed far yard manure along with planting a sampling of shrubs, ground covers, lilies, suckering plants etc. as per design plant spacing – 30-60 cm. maintaining (application of liquid manures/growth regulators/ pesticides as per need, weeding regularly so as to keep the plant healthy all the time) till the completion of maintenance period as per SCC.

Planting shrub/ground cover (Planting of shrub in the bed prepared earlier by filling garden soil and manure (67:33 ratio)) - Planting the shrub with root ball in the pit (tin grown / poly bag grown) after removing carefully and without disturbing the root. Pressing the soil firmly around the tree / shrub planted. Preparing the bed around the shrub and watering after staking and tying. Maintenance of shrub/ground cover up to complete maintenance period as per SCC by regular watering and attending the inter-cultivation practices such as weeding, racking, watering gap filling ,free of weeds by regular hoeing. etc. The plant should be well maintained, disease free, well trimmed at the time of handing over. In case of death of the plant the contractor need to replace the same with equally well grown healthy plant. Nurture the shrubs/ground cover with organic solid manures and liquid manures, spray bio-insecticides, parasites, predators to protect the trees from pest and disease. Amend the soil on regular basis with proper soil amendments to keep the pH level between 7 - 7.5

Planting hedges / edges - Planting of hedge / edge in the ground prepared earlier by filling garden soil and manure. Preparing a pit of require size (for accommodating the root ball of plant) Planting the plants in 2/3 rows (as per instructions) at specified distance with root ball removed carefully and without disturbing the root ball from poly bag. Pressing the soil firmly around the plant preparing the basin for watering. Maintain hedge / edge up to two months by regular watering and attending the inter-cultivation practices such as weeding, raking, gap filling, trimming and pruning etc. The hedge / edge should be well maintained, disease free, well trimmed at the time of handing over. In case of death of the plant the contractor need to replace the same with equally well grown healthy plant.

Planting Ground cover - Planting of ground cover plants in the ground prepared earlier by filling garden soil and manure. Preparing a pit of require size in the ground. Planting the ground cover plant root ball at nine inches apart in the pit after removing carefully and without disturbing the root ball. Pressing the soil firmly around the plant preparing the basin around the plant watering. Maintenance of ground cover up to two month by regular watering and attending the inter-cultivation practices such as weeding, raking, gap filling, trimming and pruning etc. The ground cover should be well maintained, disease free, well trimmed at the time of handing over. In case of death of the plant the contractor need to replace the same with equally well grown healthy plant. Fertilizers/organic solid manures and liquid manures, spray bio-insecticides, parasites, predators Required at the time of Plantation and entire period of maintenance as per Maintenance Schedule Watering Requirements Tools and Tackles/Hose-pipes, tractor mounted Water Tankers or as required to be managed by the Contractor for watering the trees;

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### Handing Over of Shrubs

Name Plate for Shrubs - The Shrubs planting shall be provided with Name Plate to specify the type of shrubs planted as per the bed and in case of longer beds at appropriate intervals so that the same can be identified at distant observations. The name plate can either be of printed flex board or Painted GI. The Quoted rate shall be deemed to be inclusive of the same.

### Maintenance of Shrubs

During maintenance period the plants should be maintained by regular watering, weeding, replacing dead plants, applying pesticides etc. so as to grow them vigorously. Trees & plants: should show regular healthy growth through regular maintenance by manuring, fertilizing. Use of plant protection measures, adequate watering etc.

1. Maintenance of all developed features ground cover, hedges and shrubs etc. of the complex. Maintenance work includes timely pruning, weeding and cutting of ground cover plants, hedges, edges, plants planted in the areas mentioned above. Application of fertilizers, manure, etc to the lawn, plant and spraying pesticide etc. as and when required.
2. Removal of wild grass normally found growing in rainy season by cutting and/or uprooting so as to keep the areas free of grass.

### LAWNS- Supply

Plant material shall be well formed and shaped true to type and free from disease, insect and defect such as knots, windburn, sun-cold, injuries, abrasion or disfigurement.

Supply and planting of lawn - Planting of lawn grass ( Paspalum/ cynadon sp./ zoasia sp./ stenotaphrum etc) as per drawing without disturbing the desired gradient and level, maintaining (forking, mowing, weeding, fertilizer application) it for the complete maintenance period as per SCC (Irrigation system, water supply & distribution channel as per SCC).

Specification of Lawns Supply and Laying of carpet lawn (zoasia sp.) will be as per the drawing without disturbing the desired gradient and level, maintaining (forking, mowing, weeding, fertilizer application) it for the complete maintenance period as per SCC (Irrigation system, water supply & distribution channel as per SCC).

### Planting of Lawns - Soil Preparation

Top 200 mm depth - The soil shall be essentially good Earth mixed with 1/3rd of decomposed farmyard manure along with additives like Gypsum, sculpture etc to maintain ph-value of the soil between 7 - 7.5.

Planting Dribbling of grass - Fine level the soil, apply thin layer of sand, vermicompost and Neemcake mixture of 1" thickness and dibble the grass at 3" distance. Roll the lawn after planting. Irrigate the lawn regularly. Remove weeds on periodical basis. Nurture the lawn with organic, bio-insecticides, parasites, predators to protect the lawn from pest and disease. Mow the lawn regularly and maintain the grass at 50 mm (2") height. Trim all the edges after mowing, keep the edges with trees, shrubbery and flower beds clean. The Carpet Grass primarily Japonica would be brought in Rolled carpet form in healthy condition and shall be placed on the already prepared surface and Light roller should be used for setting of the edges for smooth carpet lawns. The watering of the lawn should be sufficient for thriving of the lawn to grow then vigorously. Fertilizers /organic solid manures and liquid manures, spray bio insecticides, parasites, predators required at the time of plantation or as per maintenance schedule mentioned in SCC to be managed by the Contractor. Watering requirements, tools and tackles/Hose-pipes, tractor mounted Water Tankers or as required to be managed by the Contractor for watering the trees.

### Handing Over of Lawns

The lawn areas should be considered fit for handing over once the lawns have settled and the surface starts showing the lawn effect.

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### **Maintenance of Lawns**

The Lawns should be maintained by regular watering, weeding, replacing dead Spots, applying pesticides etc. so as to grow them vigorously for the maintenance period as per SCC. The Lawn should be regularly mowed and maintained as good green carpet till the final completion of the maintenance period as per the SCC.

### **MAINTENANCE SCHEDULE**

#### **GENERAL OBLIGATIONS**

- a. The contractor shall maintain the works for the maintenance period as per SCC. The Employer reserves the right to terminate the maintenance period at any time, whereby no additional charges are to be made by the contractor to the Employer.
- b. The extend of the landscape to be maintained by the contractor shall be deemed to cover and include all softscape areas within the overall project boundaries as shown on the drawings including any existing soft landscape not affected by the other works and retained intact or nearly so through the end of the contract period as well as all the landscape works covered in the contract scope of works. No additional charges will be allowed unless specifically agreed by the Engineer-in-charge.
- c. The contractor's horticulturist shall inspect the site weekly and shall submit report to the owner on their actions and closure of the pending works .Also on weekly basis, the Contractor's Horticulturist shall prepare a brief schedule of operations planned for the week with target dates.
- d. The daily report and the weekly schedule shall be running record of proposed operations which would be checked at the maintenance inspections every month. If in the opinion of the owner/Engineer-In- Charge, the maintenance works have not been satisfactorily carried out according to site conditions and the specifications, the payment will be withheld until the works have been satisfactorily carried out besides the penalty as in the penalty clause.
- e. The contractor shall take all necessary measures to ensure that all pot plants, trees and shrubs and other plants shall thrive and become established within this period. All landscape areas will be inspected and list of remedial works issued after each inspection. All items on the remedial lists are to be carried out by the time of the next inspection.
- f. The contractor shall keep the landscape areas clean and tidy at all times and dispose of all waste materials arising from the cleaning.
- g. If the contractor's works are found to be unsatisfactory, payment shall be withheld and the maintenance period extended for the time period for which the maintenance has not been satisfactory. All cost associated with the extension of time shall be borne by the contractor.

### **MAINTENANCE OF PLANTED AREAS: TREES, SHRUBS, CLIMBERS, HERBACEOUS PLANTS AND GROUNDCOVERS**

- a. The contractor shall water all trees, palms, shrubs, groundcover, herbaceous plants and other planting areas as often as necessary to keep the ground moist all around and to the full depth of the roots.
- b. Water shall be provided as per SCC but watering shall be all time responsibility of the Contractor till the time, irrigation system is commissioned. The Landscape Contractor shall supply his own hoses and sprinklers to distribute the water.
- c. Water shall be applied using an approved rose or sprinkler so as not to cause compaction or wash-outs of the soil or loosening of plants. The contractor shall immediately make good any such damage.



- d. All planting beds are to be kept in a weed free condition with a weeding operation as per maintenance schedule or more regularly as required. All weeds, stones and rubbish collected from this operation shall be removed from the site by the contractor.
- e. Firming up and adjusting of stakes/ties shall be carried out monthly to ensure that the trees and shrubs are firmly held in ground. If required, guy ropes or tree ties shall be adjusted, tightened or loosened. If tree ties or ropes are rubbing the bark of the trees, the ties are to be taken off and retied. Any damaged branches are to be carefully pruned and the wounds sealed.
- f. All protective fencing is to be maintained and kept in good condition as long as required on site.
- g. All shrubs and groundcovers are to be reviewed monthly and pruned as per maintenance schedule or as and when required during the maintenance period as per SCC to promote bushy growth and good flowering characteristics. The shrubs shall be checked and all dead wood, broken, damaged or crossed branches shall be cut back, depending on species.
- h. Pruning for all plants shall be carried out as follows:
- Pruning is to be done with the cut just above and sloping away from an outward facing healthy bud.
  - Removal of branches is to be done by cutting flush with the adjoining stem and in such a way that no part of the stem is damaged or torn.
  - Ragged edges of bark are to be trimmed with a sharp knife.
  - Any cuts or wounds over 25mm diameter are to be painted with an approved sealant such as Arbrex after trimming.
  - All pruning are to be cleared up and removed from operation site after pruning for Vermi-Composting.
- i. All hedges, mat forming herbaceous plants and groundcover plants shall be clipped with shears as often as necessary (at least monthly) to maintain a tidy appearance. Tall hedges are to be cut to forms shown on the drawings.
- j. Selective pruning of flowering plants shall be done where special flowering characteristics are required such as for Ixoras, Hibiscus, Bougainvillea etc
- k. The Landscape Contractor shall on continual basis supervise and attend to fertilizer needs/disease control/termite or fungus control as maintenance operations during the entire period of contract. An approved fertilizer/insecticides/pesticides shall be applied to each plant at the frequency provided in the maintenance schedule or as suggested by the Owner/EIC. Contractor shall apply the fertilizer evenly over the entire area and lightly forked into the soils. All areas shall be well watered immediately after application of fertilizer.
- l. The horticultural requirements of different plants or areas may involve variations to those techniques (such as the use of organic liquid fertilizers for sensitive plants) and variations in method will be authorized as required.
- m. Mulching - An additional 25mm deep mulching layer is to be spread over all planted areas (except groundcover and turf), once every 6 months or as specified in maintenance schedule.
- n. The contractor shall make regular weekly checks to ensure that the plant material free from insect and pest.

#### **MAINTENANCE OF LAWN AREAS**

- a) The contractor shall mow all lawn areas using approved cutting equipment to maintain a close sward to a height of not less than 20mm and not more than 45mm for all grass types. Mowing shall be carried out weekly, except in dry weather and grass shall not be allowed to flower between cuts. All clippings to be gathered up and removed.

- b) All grass areas are to be watered during dry weather as often as is required to keep the grass green and the soil moist. The contractor shall make weekly inspections to determine the need for water.
- c) Fertilizer of NPK value 10-15-15 or similar approved be spread at a rate of 40gm/m<sup>2</sup> over all grass areas at 6 months intervals using approved spreading equipment to give an overall even spread. Every three months between the NPK application the grass areas will receive an application of 46-0-0 at 1kg/100m<sup>2</sup>. Grass area that has been fertilized shall be watered immediately. If the tops of the Axonopus turn red, a light application of lime using magnesium, limestone or agricultural lime in powder form is to be applied in dry weather at a rate of 50g/m<sup>2</sup>. After application this is to be well watered into the soil.
- d) The Horticulture Contractor shall apply top dressing of not more than 15mm depth of fine sand and granulated compost raked and spread evenly over the lawn areas to fill in the low spots and level the grass areas. The next top dressing shall be applied only after the grass has grown to a mow able height.
- e) There shall be at least two applications of top dressing during the maintenance period as per SCC. If depressions or bumps over 25mm deep or high occur in turf areas during the maintenance period as per SCC these are to be levelled out by lifting the turf and raising the soil level with sand/compost mix or trimming soil to level grades, followed by returfing.
- f) Grass areas are to be kept free from weeds, annual grasses, fungus and insect attack, and stones or other debris throughout the maintenance period as per SCC as often as is required. Assessment of these operations is to be prepared on the basis of the bi-weekly maintenance inspection chart.
- g) If compaction or consolidation takes place or hard panning or baking of the soil occurs, the soil areas are to be well watered first and lightly loosened by mechanical means such as spiking, slitting or hollow tinning using equipment approved by the owner/Engineer-In-Charge.

### 13 HORTICULTURE IRRIGATION SYSTEM

#### SCOPE OF WORK

The general character and the scope of work to be carried out under this contract is illustrated in the drawings and specifications attached herewith. The contractor shall carry out and complete the said work under this contract in every respect in conformity with the rules and regulations of the local authority. The contractor shall furnish all labour, supply and installation of all materials, appliances, tools and equipment necessary for the entire work and testing all the irrigation services installation as specified herein and as shown on the drawings. This also includes any material, appliances and equipment not specifically mentioned herein to make a complete installation properly connected and in working order.

In general, the work to be performed under this contract shall comprise of the following:

- All incidental works connected with irrigation services installation such as excavation of trenches and backfilling, provision of concrete thrust blocks, etc.
- Furnish and install a complete workable irrigation services installation as shown on the drawings and described in this specification and as per the latest Bureau of Indian Standards (BIS), and other relevant specifications including all that which is reasonably inferred.
- Complete installation of PVC pipe work, G.I pipe work or HDPE pipe work with all fixtures.
- Complete installation of sprinkler heads, section valves, isolation valves, quick coupling valves, etc.
- Complete installation of automation units including direct burial cables, solenoid valves, irrigation controllers, central controls etc. with all fixtures.

- Complete installation of pumps, filtration units, etc. with all fixtures.
- Co-operation with other vendors in putting the installation in place. Any work done without regard or consultation with other trades, shall be removed by the contractor without additional cost to the owner, to permit proper installation of all other work, as desired by the owner/Engineer-in-charge.
- Repair all damages done to the premises as a result of this installation and remove all debris left by those engaged for this installation to the satisfaction of Client.
- Cleaning of all irrigation fixtures, testing and proving the satisfactory performance of all fixtures at the time the project is handed over to the Client.
- It is the responsibility of the contractor to take care of all the fixtures fitted until the time of handing over to the owner.

## GENERAL REQUIREMENTS

### DRAWINGS AND SPECIFICATIONS

The drawings and specifications shall be considered as part of this contract and any work or materials shown in the drawings and not called for in the specifications and vice versa shall be executed as if specifically called for in both. The tender drawings indicate the extent and general arrangement of the fixtures, and are essentially diagrammatic. The drawings indicate the points of supply and termination of work, and shall be installed as indicated in the drawings.

However, any changes found essential to co-ordinate with this work and other trades shall be made without any additional cost & additional time to owner.

***The drawings and specifications are meant for the assistance and guidance of the contractor, and exact location, distance and levels will be governed by the individual building and site conditions. Therefore, approval of the Engineer-In-Charge shall be obtained before commencement of work.***

### SHOP DRAWINGS

The contractor shall submit to the employer four copies of the shop drawings for approval before proceeding with work in the assigned areas. The shop drawings will show any changes in layout of piping plan, pipe sizing, any shift in location of sprinkler heads, valves, etc.

### AS-BUILT DRAWINGS

On completion of construction works, contractor shall submit one complete set of original tracings and six prints of As-built drawings to the owner. Also the contractor shall furnish soft copy of "As-built" drawings. These drawings shall have the following information:

1. Exact run and sizing of all pipes
2. Depth of pipe laid from finished level at various locations
3. Location of sprinkler heads, types of sprinkler heads, valves, hose hydrant points
4. Location of all mechanical equipment with layout and piping connections.
5. All Warranty Cards given by the manufacturer duly filled shall be handed over to the Client.

### MANUFACTURER'S INSTRUCTIONS

Where manufacturer's have furnished specific instructions relating to the materials used in this job and methods of construction that are not specifically mentioned in these documents, such instructions shall be followed in all cases.

### MATERIALS

Materials shall be of approved make and quality specified. They shall conform to the respective Bureau of Indian Standard Specifications and supported by Manufacturing Certificate.

Samples of all materials shall be as per the list of approved brand manufacturer, which shall be got approved before placing order and the approved samples shall be deposited to the owner.

#### **GENERAL CONDITIONS**

The Contractor shall:

- Submit method statement for installation of the system and shall get approval before commencing the work
- Ensure that the irrigation system installed operates to its optimum efficiency.
- Ensure that there are no dry patches in the lawn area and water is effectively distributed to all the areas it is intended to be. A precipitation test should be completed-variation of 10% is allowable.
- Ensure that the dry areas like roads, pavements, etc., are not wetted.
- Ensure that the pump, valves, sprinklers, PVC pipes, etc., are installed and commissioned as per manufacturer's guidelines.
- Submit shop drawings of the area to be installed with proper placement of accessories as indicated in the tender drawing and shall get approval before commencement of work.
- Bring to the notice of owner any changes to be brought to the irrigation plan w.r.t pipe sizing/ routing, by way of shop drawings duly approved before proceeding with the installation.
- Locate hose point positions wherever required as indicated in the tender drawing and get approval from the Engineer-in-charge before proceeding.
- Ensure that the pump supplied shall give the required head range & discharge, and guarantee its operation to get the desired effect.
- Recommend the pump room sizing and the electrical requirements required at site in coordination with the supplier and submit the necessary details to the client for approval. The pump room shall also accommodate filtration unit and should have sufficient space for movement to carry out repairs/maintenance.
- Indicate the size and position of RCC NP2 class pipes to be placed at road/pathway/concrete structure crossings or wherever required as per site conditions.

#### **EARTHWORK EXCAVATION**

**Shall be as per clause nos. 1 and 2 (Carriage of Materials and Earthwork) covered earlier in this document.**

#### **SITE CLEANING ON COMPLETION OF CONSTRUCTION WORK**

All surplus pipes and fittings, valves, etc., and all tools and temporary structures shall be removed from the site as directed by the engineer-in-charge. All dirt, rubbish and excess earth from the excavation shall be removed and transported and disposed at a suitable place as directed by the engineer-in-charge and the construction site left clean to the satisfaction of the engineer-in-charge.

#### **CONTRACTOR SHALL RESTORE SETTLEMENT AND DAMAGES**

The contractor shall at his own cost make good, promptly during the whole period that the works are in hand, any settlement that may occur on the surfaces of roads, beams, footpaths, gardens, open spaces, etc. whether public or private caused by the trenches of his excavations and he shall be liable for any accidents caused thereby. He also shall, at his own expense and charge, repair and make good any damage done to the buildings and other properties.

#### **DISPOSAL OF SURPLUS**

The contractor shall at his own cost dispose within the site at specified places or as directed all surplus excavated materials not required to be used in the work.

#### **REMOVAL OF WATER**

The contractor shall at all times during the progress of the work keep the trenches and excavations free from water which shall be disposed off by him in a manner as will neither cause injury to public health

nor to public or private property, to the work completed or in progress to the surface of any roads of streets and cause any interference with the use of the same.

#### TRENCH WIDTH

The depth of excavated trenches shall be as per the table given below:

Pipe diameter	Excavated Depth
Up to 75mm	450 mm
90mm to 110mm	600 mm
above 110mm	750 mm

#### PROTECTION OF EXISTING SERVICES

All pipes, water mains, cables, etc., met with during the course of excavation shall be carefully protected and supported.

#### ROAD CROSSINGS

All pipelines laid below roads, driveways, structures, etc. shall be taken through suitable dia Hume Pipes to safeguard the pipe as well as the road from getting damaged during repair works. The Hume pipes shall be RCC Hume pipes of NP2 Class or HDPE or PVC pipe. The pipes shall be laid in trenches at a min. depth of 1000mm below the road level or depends on site condition. The location of the same shall be as indicated in the Shop Drawings.

#### CONSTRUCTION ACROSS ROADS

All works across roads shall be carried out as per the directions of the Engineer-In-Charge.

#### MODE OF MEASUREMENT

Measurement for excavation of pipes trenches shall be made per linear measurement under the respective category of soil classification encountered at site.

1. Ordinary soil
2. Hard soil (hard murrum/soft rock)
3. Hard rock required chiseling
4. Hard rock required blasting

#### MATERIALS & WORKMANSHIP

##### POLYVINYL CHLORIDE (PVC) PIPES AND FITTINGS

PVC Pipes of diameter 110mm to 250mm shall be of Class 4, 10 Kg/Cm<sup>2</sup>. Pipes of diameter 40 to 90mm shall be of Class 3, 6 kg/cm<sup>2</sup> and for diameter below 40mm shall be of Class 4, 10 kg/cm<sup>2</sup>. PVC pipes and fittings shall be jointed with solvent cement. The pipes shall conform to IS 4985. PVC Fittings shall be of injection moulded PVC conforming to IS 7834

##### Handling

Because of their lightweight, there may be a tendency for the PVC pipes to be thrown much more. Reasonable care should be taken in handling and storage to prevent damage to the pipes. On no account the pipes should be dragged on the ground. Pipes should be given adequate supports at all times.

##### Laying

Pipes shall be cut to size and chamfered well. Burrs if any shall be removed. Emery paper shall be used to roughen the surface to be jointed. Pipes & fittings shall be in the trench properly in same level and jointed using solvent cement accurately without any stress to achieve leak proof joints. The female end of the pipe should be facing the water flow.

### **Jointing**

The jointing of pipes to pipes/fittings shall be done as per the manufacturer's instructions/recommendations.

The PVC pipes and fittings shall be joined with solvent cement and the jointing shall be carried out as follows;

1. The inside edge and the outside edge of the pipe and fitting to be jointed will be chamfered by a file to a certain angle so that the solvent applied to the surface is not removed by the sharp edges.
2. All burrs from the internal and external surfaces should be removed.
3. The spigot should be marked with a pencil line and a distance equivalent to the socket depth. Clean the surface with emery paper within the marked area and inside the socket area.
4. Apply uniform coat of solvent cement on the external surface to the pipe and a lighter coat on the internal surface of the fitting.
5. Insert the pipe end into the socket of the fitting and push it in up to the mark.
6. Remove the excess solvent cement and hold the joint firmly in position for 30 seconds to dry. Gluing should be avoided in a rainy or foggy day.

### **VALVES**

#### **Air Release Valve**

The air release valve shall be a continuous double acting air vent valve for air as well as vacuum release, with cast iron body and cover, and stainless steel internal components. Operation is based upon a float lever mechanism that opens the orifice when small air pockets develop. The valve shall have a 1" threaded inlet and a 1/2" threaded outlet with a 3/32" orifice. The valve will operate over the pressure range of 0.1 to 12kg/cm<sup>2</sup>. Air release valves shall be installed on all high points along the mainline.

#### **Butterfly Valves**

The butterfly valves shall be of the flangeless wafer style and shall be sized as shown on the drawings. The body of valves shall be constructed from cast iron, the disc from bronze alloy and the shaft from 316 Grade stainless steel. The valve shall feature oil impregnated bronze stem bushings. The valve shall be designed for mounting between PN10 flanges and shall have a minimum operational pressure rating of 10kg/cm<sup>2</sup>.

Butterfly valves shall be installed only in vertical or horizontal positions unless otherwise required by the drawings. All valves shall be installed in accessible locations to facilitate easy operation, and easy removal for maintenance. It shall be either fitted on flanges or directly threaded to G.I. pipe nipple on either side and shall be installed with unions to facilitate easy removal of the valve from the pipeline. All valves shall be enclosed in suitable size valve boxes with openable lid if fixed in earth.

#### **Non-Return Valves**

The check valves shall be of the flangeless wafer type and shall be sized as shown on the drawings. The body shall be constructed from cast iron with plug, seat and bushings from bronze alloy, and spring and retaining screws from 316 Grade stainless steel. The valve shall be engineered to close in advance of water reversal to prevent water hammer at valve shut-off. The valve shall be designed for mounting between PN10 flanges and shall have a minimum working pressure of 10kg/cm<sup>2</sup>.

#### **Pressure Relief/Pressure Sustaining Valve**

The pressure relief valve shall be of cast iron body and bonnet with a minimum working pressure of 12 bar. Internal valve seat and trim shall be of stainless steel.

### **VALVE BOXES**

Valve boxes shall be of specified make and would be of appropriate size to accommodate the valve for easier operation/maintenance. The top cover of the valve box shall be flushed with the finished ground level.

Valves boxes shall be high impact resistant plastic, colored green. All covers shall feature locking bolts. All plastic valve boxes shall be supported by a simple block work construction.

Access to solenoid valves, ball valves and air release valves shall be through a circular tapered valve box measuring 254mm to diameter, 298mm bottom diameter and 260mm height.

Access to the butterfly valves shall be through a rectangular valve box of 482mm x 655mm (length and breadth) 304mm high.

#### **PUMPS**

It shall be centrifugal pump directly coupled to the motor in order to generate maximum efficiency which shall not be less than 50. The pump shall have impeller of CI /Bronze and shall have mechanical seal. Body and base shall be CI. The operating duty range of the pump shall allow the 5% variations on maximum efficiency of the desired characteristics

The pump shall be complete with the necessary accessories as per to the manufacturers recommendations. The general accessories shall be foot valve, suction and delivery manifolds and isolation / gate valves and check valves etc.

Control panel shall have dry run; overload, single phase presenter, ammeter, voltmeter & indicator lamp etc. complete. The panel for the pump shall be water proof. It shall have start delta starter/ Dual starter, MCB of the reputed makes. The cables for internal and motor connections shall be of appropriate size and shall have water proof joints if any.

#### **SPRINKLERS**

The full- or part-circle sprinkler shall be a single stream, water lubricated, gear drive type. The sprinkler shall be capable of both full circle and part circle operation in the same unit. The mode of operation shall be selected by inserting a flat blade screwdriver in the top of the rubber cap and turning a selector approximately 45 degrees. The Sprinkler shall not reverse direction during continuous operation in the full circle mode.

The part-circle sprinkler shall have adjustable arc coverage of 50 to 330 degrees. Arc adjustment should be possible to be performed with or without the rotor in operation and shall require only a flat blade screwdriver. The arc adjustment should be possible to be performed on both the right and left trip of the sprinkler. The sprinkler shall have a rotating nozzle turret independent of the riser stem. The portion of the riser stem that is in contact with the wiper seal shall be non-rotating. The sprinkler shall have a non-strippable drive mechanism and permit manual rotation of the pop-up stem in any direction. This shall have no effect on either the drive or the set arc. Once the manual rotation is terminated, the sprinkler shall automatically return the water stream to its preset arc. The sprinkler shall have a pressure activated, multi-function, soft electrometric wiper seal. This wiper seal shall prevent the sprinkler from sticking in the up position, and be capable of sealing the sprinkler riser stem to the sprinkler cap under normal operating pressures. The sprinkler shall have a screen attached to the drive housing to filter inlet water, protect the drive from clogging and simplify its removal for cleaning and flushing of the system. The sprinkler body shall have a 1"(26/34) female (NPT or BSP) bottom inlet. The sprinkler shall have a standard rubber cover which designates each adjustment opening from the top. The sprinkler shall have a two piece, front-load nozzle assembly which will allow the nozzle to be installed without a stator bushing change. The primary and secondary nozzle ports shall be contained in one of the parts and shall be unique to each nozzle size. The tertiary nozzle port shall be common to all of the other primary/secondary nozzle assemblies. The sprinkler shall have a selection of eight color-coded nozzles. All nozzles shall have three ports for optimal close-in, mid-range and long-range water distribution. The sprinkler shall have a stainless steel nozzle retention screw. The angle of trajectory shall be 25 degrees from horizontal. The sprinkler shall have a strong stainless steel retract spring for positive pop-down. The sprinkler shall have a standard check valve device capable of holding up to 10 feet (3,1 m) of head. Pop-up height as measured from the top of the covert the centerline of the nozzle orifice shall be at least 5 inches (127 cm). The sprinkler's overall height shall be 10 1/8 inches (25,7 cm) and the exposed diameter shall be 1 7/8 inches (4,8 cm).

The pop-up sprinklers, shall be installed as per the manufacturers guidelines. Swing joints shall be used to connect the sprinklers to the lateral lines. The top of the sprinkler shall always be flush with the finished ground level such as to ensure that the sprinkler top is not damaged during lawn mowing.

The positioning of sprinklers and the arc setting shall be done as mentioned in the drawing/as per site condition to ensure maximum coverage of the area to be wetted and to avoid water falling in dry areas. As a standard rule, 100% overlap from sprinkler to sprinkler shall be maintained as shown in the drawing, i.e., the throw radius of the sprinkler shall be the spacing to be maintained between sprinkler to sprinkler. However, in high windy areas where the wind velocity is very high and in undulating

terrains, the sprinkler-to-sprinkler spacing shall be reduced to prevent any dry patches occurring, to ensure effective coverage.

Spray sprinklers shall never be combined with Rotor sprinklers in the same section.

The various types of sprinklers proposed to be used are

**Type 1- Radius – 20mtr Flow- 1.25 Ips**

**Type 2- Radius – 18 Mtr Flow- 1.1 Ips**

**Type 3- Radius – 13 Mtr Flow- 0.6 LPS**

**Type 4 – Radius – 8 Mtr Flow- 0.25 LPS**

**Type 5 – Radius – 3 to 5 Mtr Flow – 0.12- 0.15 LPS**

#### **QUICK RELEASE COUPLERS**

Quick Release Couplers shall be of Brass body construction with a self-closing protective cover and of reputed make as specified. QRC valves shall be fixed on the Irrigation Main by G.I./HDPE Saddles and G.I. or Sch.80 threaded PVC Riser pipes. The top of the QRC shall be flushed with the finished ground level such that the retractable cap shall be above the ground level for easier operation.

The quick-coupler valves shall be plug-in type, underground water outlets for the temporary connection of hosepipes. Connection and operation shall be by means of special coupler keys inserted into the valve throat. The valves and keys are to be of the same manufacturer to ensure compatibility of the connection. The internal parts shall be removable for service. The keys shall be red bass with machined shanks for a positive seal. Valves shall have ¾" female pipe thread connection and keys shall have a ¾" male connection.

#### **Swivel Hose Ell**

Swivel hose Ell shall be of brass construction and used to connect to quick coupler keys so that hose can be turned a full 360 degrees without breaking the hose near the coupler key. Hose Ells shall be female pipe thread of ¾".

#### **DRIP IRRIGATION**

Irrigation of shrubs and trees shall be carried out by pressure compensating drippers, which shall work efficiently in the operating pressure range of 1.0 to 4.0 bar.

Trees shall be irrigated by 4lph/8lph pressure compensating and self-flushing drippers fixed on 16mm LLDPE tubes. The number of drippers and dripper capacity shall depend on the amount of water required by the tree and the duration of operation/day as directed by the Engineer-in-Charge.

The shrub plantings shall be irrigated by 16 mm drip tubing with in-built pressure compensating & self flushing drippers spaced at regular intervals of 50 cm c/c. The drip tubes shall be placed on the soil and shall be staked at every 10 mtr intervals to prevent lateral movement. The drip tubing shall be laid such that the pre-fixed drippers on drip tubing shall be facing the ground. The spacing between the drip tubing rows shall not be more than 600 mm or as directed by the Engineer-in-Charge.

#### **Screen/Disc Filter**

The screen filters shall have a heavy duty high rate durable filtration system with a maximum pressure rating of 10 bars. The filter cartridge shall be a stainless steel wedge wire screens of at least 100 Microns mesh size. In case a disc filter is used the disc element shall also provide for a 100 Micron size filtration.

The filter itself shall be powder coated or shall be epoxy lined and mounted on a stand with intake fittings of suitable variety or of durable engineering plastic. If more than one filter is used the same shall be mounted on a single common manifold with a common back wash arrangement.

The Mesh or the internals shall have no moving parts that may require maintenance or induce wear and tear

#### **Solenoid Valve**

The valve shall be of the normally closed type. The electric remote control valve shall be a normally closed 24 VAC 50/60 HZ (Cycles/sec) solenoid actuated globe/ angle pattern design. The valve pressure rating shall not be less than 150 PSi (10.35 bar). The valve body and bonnet shall be constructed of high impact, weather resistant PVC with stainless steel screws. The valve shall have manual open/close control for manual opening and closing of valve without electrically energizing the solenoids. The valve construction shall provide for all internal parts to be removable from the top of the



valve without disturbing the valve installation. The body shall have a removable O ringed plug for installation in either globe or angle configuration.

**Controllers:**

The controller shall be of a hybrid type that combines hydro-mechanical & microelectronic circuitry capable of fully automatic or manual operation. The controller shall be housed in a wall-mountable, weather resistant plastic cabinet with a key locking cabinet door suitable for either indoor or outdoor installation. The display shall show programming options and operating instructions in the chosen language and be easily changed to any other language without altering the programming or operation information. The controller shall have a Rapid Station Test Routine (ROUTINE) which enables the controller to diagnose field wiring and solenoid problems.

**Electrical Specification:**

Input required: 120 VAC, 60 HZ

Output: 26.5 VAC 1.9 A.

Power back up: Lithium coin cell battery maintains time 7 date during power outage (up to 10 yrs) while non volatile memory maintains the schedule (100 yr. life)

**Automation Cable:**

Automation cable of 2.5 sq. mm is used for common cable from controller and 1.5 sq. mm. is used for each valve from controller to the solenoid valve.

**TESTS AND QUALITY CONTROL**

**TEST FOR PUMPING UNIT**

Upon completion of the pump installation works, the Contractor shall provide qualified personnel at a time set by the Engineer for a final pump plant test. Prior to that time, the Contractor shall operate the pumps against closed mainline valves to test for leaks. The shut-off test shall be only as long as is required to satisfy the Engineer of the pump plant integrity. Any significant leak will require the Contractor to remove the fittings at the point of leak, replace the gasket with a new gasket, and re-test.

**POP-UP SPRINKLERS, QRC, ARV**

Pop-up spray/rotor sprinklers shall not be installed until all mains and lateral lines have been flushed thoroughly. Riser assemblies shall be snug and free of leaks. Where grade is not yet finalized, the head shall be set a minimum of 7.5cms above temporary grade.

**FINAL SYSTEM TEST**

After the completed irrigation system has been flushed and main pump plant tested, the system shall be pressure tested as follows:-

Vent all air from the system by opening all valves wide. The pump shall then be operated for a period of 2 hours. Sufficient water shall be passed through the pumps to assure that the pump does not overheat. One quick coupler valve may be operated to provide the passage of water. The pump shall be run in the "manual" position with someone in attendance at all times.

All main line joints, fittings, etc which shall be left exposed for the purpose of this test, shall be inspected for evidence of leakage. Any leak, however small, shall be corrected. Any major break in the mainlines requiring shut-down of the 2 hour test shall cause the test to be re-run in its entirety. The Engineer shall govern the re-scheduling of the test.

Upon completion of the pressure test and acceptance thereof by the Engineer, the automatic portion of the system shall be activated in a fully automatic manner and run through a complete cycle. The Contractor will program stations on the irrigation controller. Failure of any component to function in accordance with the design will require a complete new start on the final acceptance test. The Engineer will reschedule the time for re-testing.

The Contractor shall ensure himself that enough water is available for flushing and testing. Contractor shall be fully responsible for supplying enough water to flush and test the system to the full satisfaction of the owner and Engineer. Contractor must include supply of water into his price.

Contractor shall also be responsible for all necessary application with competent authorities in order to obtain electricity supply well within the contract period. Failure by authorities to provide electricity within completion date will in no way relieve Contractor from carrying out final system test

#### **REGULATIONS AND STANDARDS**

The installation shall conform in all respects to the following standards in general:

IS 12235 (Part 1 to 11): Methods of test for unplasticized PVC pipes

IS 4985 – 1988: Specifications for unplasticized PVC pipe

BS 4515: Specification for unplasticized PVC pipe fittings

IS 732 & IS 2274-1963: Indian Standard code of practice for electrical wiring and installation

The installation shall also be in conformity with the bylaws and requirements of the local authority in so far as these become applicable to the installation. Wherever this specification calls for a higher standard of materials and /or workmanship than those required by any of the above regulations and standards, then this specification shall take precedence over the said regulations and standards. Wherever drawings and specifications require something that may violate the regulations, the regulations shall govern.

#### **IRRIGATION SYSTEM COMPREHENSIVE MAINTENANCE**

The Contractor shall submit his proposed comprehensive maintenance schedule to the Engineer-in-charge for approval. The right to approve or reject the proposed maintenance schedule shall rest entirely with the Engineer-in-charge.

As a minimum the proposed maintenance schedule shall include the following:-

##### **Weekly**

1. Checking of program and application rates against whether station data and adjustment of application in rates.
2. Checking of water consumption against evapo-transpiration rates.
3. Visual inspections of testing of pump station equipment for correct performance.

##### **Bi-Weekly**

1. Operation of irrigation system during the day to check coverage and head alignment.
2. Checking of heads for clogging or malfunctioning.
3. Checking of valve manifolds for correct operation and pressure.
4. Checking of lateral lines and valve manifolds for leaks.

##### **Every 6 Months**

1. Review of entire system to ensure all switches gauges and controls are functioning properly.
2. Review of main line for leaks.
3. Flushing of all lateral lines
4. Valve exercise program

## **14.0 SWIMMING POOL SYSTEM**

### **SCOPE OF WORK**

The general character and the scope of work to be carried out under this contract is illustrated in the drawings and specifications attached herewith. The contractor shall carry out and complete the said work under this contract in every respect in conformity with the rules and regulations of the local authority. The contractor shall furnish all labour, supply and installation of all materials, appliances, tools and equipment necessary for the entire work and testing all the swimming pool services installation as specified herein and as shown on the drawings. This also includes any material, appliances and equipment not specifically mentioned herein to make a complete installation properly connected and in working order.

In general, the work to be performed under this contract shall comprise of the following:

- All incidental works connected with swimming pool services installation such as excavation of trenches and backfilling, provision of concrete thrust blocks, etc.
- Furnish and install a complete workable swimming pool services installation as shown on the drawings and described in this specification and as per the latest Bureau of Indian Standards (BIS), and other relevant specifications including all that which is reasonably inferred.
- Complete installation of PVC pipe work, G.I pipe work or HDPE pipe work with all fixtures.
- Complete installation of pumps, filtration units, etc. with all fixtures.
- Co-operation with other vendors in putting the installation in place. Any work done without regard or consultation with other trades, shall be removed by the contractor without additional cost to the Client, to permit proper installation of all other work, as desired by the Owner/Engineer-In-Charge.
- Repair all damages done to the premises as a result of this installation and remove all debris left by those engaged for this installation to the satisfaction of Client.
- Cleaning of all swimming pool fixtures, testing and proving the satisfactory performance of all fixtures at the time the project is handed over to the Client.
- It is the responsibility of the contractor to take care of all the fixtures fitted until the time of handing over to the Client.

## GENERAL REQUIREMENTS

### DRAWINGS AND SPECIFICATIONS

The drawings and specifications shall be considered as part of this contract and any work or materials shown in the drawings and not called for in the specifications and vice versa shall be executed as if specifically called for in both. The tender drawings indicate the extent and general arrangement of the fixtures, and are essentially diagrammatic. The drawings indicate the points of supply and termination of work, and shall be installed as indicated in the drawings.

However, any changes found essential to co-ordinate with this work and other trades shall be made without any additional cost.

***The drawings and specifications are meant for the assistance and guidance of the contractor, and exact location, distance and levels will be governed by the individual building and site conditions. Therefore, approval of the Engineer-In-Charge shall be obtained before commencement of work.***

### SHOP DRAWINGS

The contractor shall submit to the employer four copies of the shop drawings for approval before proceeding with work in the assigned areas. The shop drawings will show any changes in layout of piping plan, pipe sizing, any shift in location of Filtration units.

### AS-BUILT DRAWINGS

On completion of construction works, contractor shall submit one complete set of original tracings and two prints of As-built drawings to the Client. Also the contractor shall furnish soft copy of "As-built" drawings. These drawings shall have the following information:

- Exact run and sizing of all pipes
- Depth of pipe laid from finished level at various locations
- Location of all mechanical equipment with layout and piping connections.
- All Warranty Cards given by the manufacturer duly filled shall be handed over to the Client.

### MANUFACTURER'S INSTRUCTIONS

Where manufacturer's have furnished specific instructions relating to the materials used in this job and methods of construction that are not specifically mentioned in these documents, such instructions shall be followed in all cases.

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#### **MATERIALS**

Materials shall be of approved make and quality specified. They shall conform to the respective Bureau of Indian Standard Specifications and supported by Manufacturing Certificate.

Samples of all materials shall be as per the list of approved brand manufacturer, which shall be got approved before placing order and the approved samples shall be deposited with the Client.

#### **GENERAL CONDITIONS**

The Contractor shall,

- Submit method statement for installation of the system and shall get approval before commencing the work
- Ensure that the Filtration system installed operates to its optimum efficiency.
- Ensure that the filters, pump, flow fittings, valves, PVC pipes, etc., are installed and commissioned as per manufacturer's guidelines.
- Submit shop drawings of the area to be installed with proper placement of accessories as indicated in the tender drawing and shall get approval before commencement of work.
- Bring to the notice of owner/EIC any changes to be brought to the Swimming Pool and Fountain plan w.r.t pipe sizing/ routing, by way of shop drawings duly approved before proceeding with the installation.
- Ensure that the pump supplied shall give the required head range & discharge, and guarantee its operation to get the desired effect.
- Recommend the pump room sizing and the electrical requirements required at site in coordination with the supplier and submit the necessary details to the client for approval. The pump room shall also accommodate filtration unit and should have sufficient space for movement to carry out repairs/maintenance.
- Indicate the size and position of RCC NP2 class pipes to be placed at road/pathway/concrete structure crossings or wherever required as per site conditions.

#### **EARTHWORK EXCAVATION**

**Shall be as per clause nos 1 and 2 (Carriage of Materials and Earthwork) covered earlier in this document**

#### **SITE CLEANING ON COMPLETION OF CONSTRUCTION WORK**

All surplus pipes and fittings, valves, etc., and all tools and temporary structures shall be removed from the site as directed by the engineer-in-charge. All dirt, rubbish and excess earth from the excavation shall be removed and transported and disposed at a suitable place as directed by the engineer-in-charge and the construction site left clean to the satisfaction of the engineer-in-charge.

#### **CONTRACTOR SHALL RESTORE SETTLEMENT AND DAMAGES**

The contractor shall at his own cost make good promptly, during the whole period that the works are in hand, any settlement that may occur on the surfaces of roads, beams, footpaths, gardens, open spaces, etc. whether public or private caused by the trenches of his excavations and he shall be liable for any accidents caused thereby. He also shall, at his own expense and charge, repair and make good any damage done to the buildings and other properties.

#### **DISPOSAL OF SURPLUS**

The contractor shall at his own cost dispose within the site at specified places or as directed all surplus excavated materials not required to be used in the work.

#### **REMOVAL OF WATER**

The contractor shall at all times during the progress of the work keep the trenches and excavations free from water which shall be disposed off by him in a manner as will neither cause injury to public health nor to public or private property, to the work completed or in progress to the surface of any roads of streets and cause any interference with the use of the same.

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### PROTECTION OF EXISTING SERVICES

All pipes, water mains, cables, etc., met with during the course of excavation shall be carefully protected and supported.

### MATERIALS & WORKMANSHIP POLYVINYL CHLORIDE (PVC) PIPES AND FITTINGS

PVC Pipes of diameter 32mm to 250mm shall be of Class 4, 10 Kg/Cm<sup>2</sup>, PVC pipes and fittings shall be jointed with solvent cement. The pipes shall conform to IS 4985. PVC Fittings shall be of injection moulded PVC conforming to IS 7834

#### Handling

Because of their lightweight, there may be a tendency for the PVC pipes to be thrown much more. Reasonable care should be taken in handling and storage to prevent damage to the pipes. On no account the pipes should be dragged on the ground. Pipes should be given adequate supports at all times.

#### Laying

Pipes shall be cut to size and chamfered well. Burrs if any shall be removed. Emery paper shall be used to roughen the surface to be jointed. Pipes & fittings shall be in the trench properly in same level and jointed using solvent cement accurately without any stress to achieve leak proof joints. The female end of the pipe should be facing the water flow.

#### Jointing

The jointing of pipes to pipes/fittings shall be done as per the manufacturer's instructions/recommendations.

The PVC pipes and fittings shall be joined with solvent cement and the jointing shall be carried out as follows;

- The inside edge and the outside edge of the pipe and fitting to be jointed will be chamfered by a file to a certain angle so that the solvent applied to the surface is not removed by the sharp edges.
- All burrs from the internal and external surfaces should be removed.
- The spigot should be marked with a pencil line and a distance equivalent to the socket depth. Clean the surface with emery paper within the marked area and inside the socket area.
- Apply uniform coat of solvent cement on the external surface to the pipe and a lighter coat on the internal surface of the fitting.
- Insert the pipe end into the socket of the fitting and push it in upto the mark.
- Remove the excess solvent cement and hold the joint firmly in position for 30 seconds to dry. Gluing should be avoided in a rainy or foggy day.

### VALVES

#### Butterfly Valves

The butterfly valves shall be of the flangeless wafer style and shall be sized as shown on the drawings. The body of valves shall be constructed from cast iron, the disc from bronze alloy and the shaft from 316 Grade stainless steel. The valve shall feature oil impregnated bronze stem bushings. The valve shall be designed for mounting between PN10 flanges and shall have a minimum operational pressure rating of 10kg/cm<sup>2</sup>.

Butterfly valves shall be installed only in vertical or horizontal positions unless otherwise required by the drawings. All valves shall be installed in accessible locations to facilitate easy operation, and easy removal for maintenance. It shall be either fitted on flanges or directly threaded to G.I. pipe nipple on either side and shall be installed with unions to facilitate easy removal of the valve from the pipeline. All valves shall be enclosed in suitable size valve boxes with openable lid if fixed in earth.

### **Non-Return Valves**

The check valves shall be of the flangeless wafer type and shall be sized as shown on the drawings. The body shall be constructed from cast iron with plug, seat and bushings from bronze alloy, and spring and retaining screws from 316 Grade stainless steel. The valve shall be engineered to close in advance of water reversal to prevent water hammer at valve shut-off. The valve shall be designed for mounting between PN10 flanges and shall have a minimum working pressure of 10kg/cm<sup>2</sup>.

Measuring 254mm to diameter, 298mm bottom diameter and 260mm height.

Access to the butterfly valves shall be through a rectangular valve box of 482mm x 655mm (length and breadth) 304mm high.

### **FILTERS**

TOTALLY ANTI-CORROSIVE Polyester+Fibre Glass filter Fitted with pressure gauge panel, manual air bleeder, water drain and emptying plug. fitted with collector arms and diffuser made from unplasticized PVC and polypropylene. Filtration velocity 40m<sup>3</sup>/hr/m<sup>2</sup>. Max. working pressure : 2.5 kg/cm<sup>2</sup>.

### **MULTIPOINT VALVE**

6 way Multiport Valve for filtration, backwash, rinse, close and recirculation alongwith connections to the filter.

### **PUMPS**

It shall be centrifugal pump directly coupled to the motor in order to generate maximum efficiency which shall not be less than 50. The pump shall have impeller of CI /Bronze and shall have mechanical seal. Body and base shall be CI. The operating duty range of the pump shall allow the 5% variations on maximum efficiency of the desired characteristics

The pump shall be complete with the necessary accessories as per to the manufacturers recommendations. The general accessories shall be foot valve, suction and delivery manifolds and isolation / gate valves and check valves etc.

Control panel shall have dry run; overload, single phase presenter, ammeter, voltmeter & indicator lamp etc. complete. The panel for the pump shall be water proof. It shall have start delta starter/ Dual starter, MCB of the reputed makes. The cables for internal and motor connections shall be of appropriate size and shall have water proof joints if any.

### **TESTS AND QUALITY CONTROL**

#### **TEST FOR PUMPING UNIT**

Upon completion of the pump installation works, the Contractor shall provide qualified personnel at a time set by the Engineer for a final pump plant test. Prior to that time, the Contractor shall operate the pumps against closed mainline valves to test for leaks. The shut-off test shall be only as long as is required to satisfy the Engineer-in-charge of the pump plant integrity. Any significant leak will require the Contractor to remove the fittings at the point of leak, replace the gasket with a new gasket, and re-test.

### **REGULATIONS AND STANDARDS**

The installation shall conform in all respects to the following standards in general:

IS 12235 (Part 1 to 11): Methods of test for unplasticized PVC pipes

IS 4985 – 1988: Specifications for unplasticized PVC pipe

BS 4515: Specification for unplasticized PVC pipe fittings

IS 732 & IS 2274-1963: Indian Standard code of practice for electrical wiring and installation

The installation shall also be in conformity with the bylaws and requirements of the local authority in so far as these become applicable to the installation. Wherever this specification calls for a higher standard of materials and /or workmanship than those required by any of the above regulations and standards, then this specification shall take precedence over the said regulations and standards. Wherever drawings and specifications require something that may violate the regulations, the regulations shall govern.

**APPROVED MAKE OF MATERIALS FOR HARDSCAPE, HORTICULTURE AND ALLIED WORKS**

List of Makes of materials approved by the Engineer in charge are listed below (Refer materials whichever are applicable for the scope of work). However, approved equivalent materials of any other specialized firms may be used, in case it is established that the brands specified below are not available in the market subject to approval of the alternate brand by the Engineer in charge.

Sr. No.	Item	Manufacturer
<b>A</b>	<b>HARDSCAPE WORKS</b>	
1	CEMENT	INDIA CEMENT (CORAMANDEL), BIRLA GRASIM (BIRLA SUPER & ULTRA TECH), ACC, SHREE ULTRA
2	REINFORCEMENT STEEL	TISCO, RINL, SAIL
3	STRUCTURAL STEEL	TISCO, SAIL, RINL, JINDAL, ESSAR
4	WATER PROOFING COMPOUND (LIQUID)	FOSROC, PIDILITE, CICO
5	WATER STOPS	FOSROC, KANTAFLEX-BALCO
6	DISTEMPER & PAINTS	ASIAN PAINTS, NEROLAC, ICI, BERGER PAINTS
7	TEXTURED PAINT	SPECTRUM , ASIAN, ICI, RENOVO, OIKOS, ARMOUR
8	FIBRE MESH(RECRON 3S)	RELIANCE, COLORDEC
9	READY MIX CONCRETE	AS APPROVED BY ENGINEER-IN-CHARGE
10	GLAZED CERAMIC TILES	1ST QUALITY OF H & R, JOHNSON, KAJARIA, NITCO, ASIAN, RAK
11	SYNTHETIC ENAMEL	ASIAN PAINTS,NEROLAC , ICI, BERGER PAINTS
12	CEMENT PAINT	SNOWCEM INDIA, BERGER PAINTS
13	INTERLOCKING PAVER BLOCKS, FLEXIPAVER	SOBHA, BASANT BETONS, SURFACES INDIA
14	WHITE CEMENT	J.K., BIRLA
15	SUPER PLASTICIZERS	SIKA, FOSROC, BASF, ASIAN LABORATORIES
16	NON SHRINK GROUT,	BAL ENDURA, PIDILITE, FOSROC, BASF
17	CEMENT ADHESIVE	BAL ENDURA, MYK LATICRETE, BOSTIC
18	PIGMENT	SUDERSHAN CHEMICAL, TATA PIGMENT
19	CONCRETE KERB STONE	SOBHA, BASANT BETONS, SURFACES INDIA
20	ANCHOR FASTENER	HILTI, FISCHER
21	STAINLESS STEEL SCREWS	KUNDAN, ARROW, JINDAL
22	NUT & BOLTS	KUNDAN, PUJA, ATUL
23	HDPE/LDPE SHEET	HITECH RUBBER OR APPROVED EQUIVALENT
<b>B</b>	<b>IRRIGATION, WATERBODIES AND SWIMMING POOL</b>	
1	PVC/LLDPE PIPES	SUPREME/FINOLEX/ APPROVED BY ENGINEER IN CHARGE
2	PVC/LLDPE FITTINGS	SUPREME/FINOLEX / APPROVED BY ENGINEER IN CHARGE
3	SPRINKLERS	RAINBIRD /HUNTER
4	BALL VALVES	PLASSON /HIDROTEN MAKE
5	VALVE BOXES	RAINBIRD/HUNTER
6	QUICK COUPLING VALVES	HARIT/ ZTC
7	FILTERS	PLASTRO / AZUD
8	SOLENOID VALVES	RAINBIRD /HUNTER
9	AIR RELEASE VALVES	AUTOMAT/HIDROTEN
10	PRESSURE RELIEF VALVE	BERMAD/ OMEGA
11	CONTROLLER	RAINBIRD /HUNTER
12	FILTERS	ASTRAL / CERTIKIN / PROTEAM
13	MULTIPOINT VALVE / FRONTAL PIPE	ASTRAL / CERTIKIN / PROTEAM
14	FILTER MEDIA	AS APPROVED BY ENGINEER IN CHARGE
15	FILTER PUMPS	ASTRAL / CERTIKIN / PROTEAM
16	CHEMICAL DOSING SYSTEMS	ASTRAL / CERTIKIN / PROTEAM
17	CHEMICAL STORAGE TANKS	ASTRAL / CERTIKIN / PROTEAM
18	SUCTION SWEEPER SOCKETS	ASTRAL / CERTIKIN / PROTEAM
19	INLETS	ASTRAL / CERTIKIN / PROTEAM
20	DRAINS	ASTRAL / CERTIKIN / PROTEAM
21	GUTTER DRAINS	ASTRAL / CERTIKIN / PROTEAM

22	OVERFLOW GUTTER GRATINGS	ASTRAL / CERTIKIN / PROTEAM
23	UNDER WATER ILLUMINATIONS	SELIGER / OASE
24	SUCTION SWEEPER AND MAINTENANCE ACCESSORIES	ASTRAL / CERTIKIN / PROTEAM
25	BALL VALVES	ZOLOTO / HAWA / EQUIVALENT
26	BUTTERFLY VALVES	ZOLOTO / HAWA / EQUIVALENT
27	NRV	ZOLOTO / HAWA / EQUIVALENT
28	PIPING	SUPREME / FINOLEX
29	MCB/MCCB / ISOLATOR	ABB(T-MAX), SCHNEIDER(COMPACT NS SERIES), SEIMENS(3VL), L & T(D-SINE)
30	CABLE	UNIVERSAL, CCI, RALLISON, HAVELLS, NICCO, RPG CABLES, KEI, TORRENT CABLES
31	ELCB / ELMCB / RCCB	HAGER, SIEMENS, ABB, LEGRAND, SCHNIEDER
32	INDICATING METERS	SCHNEIDER, ABB, SOCMEC
33	INDICATING LAMPS	SCHNEIDER, ABB, SIEMENS, L&T
34	CT'S	KAPPA, GILBERT & MAXWELL, AE, MATRIX
35	MODULER TYPE LIGHT & POWER ACCESSORIES (SWITCHES, SOCKET ETC.) M.S. SWITCH BOXES	LEGRAND (MOSAIC RANGE), CLIPSAL (ZENCELO), NORTH WEST, MK(WRAPAROUND), ANCHOR (WOODS), CRABTREE(ATHENA)
36	PVC CONDUIT & ACCESSORIES(ISI MARKED)	BEC, AKG, PRECISION
37	M.S/G.I CONDUIT & ACCESSORIES(ISI MARKED)	BEC, AKG



**NAME OF PROJECT: CONSTRUCTION OF HPCL GREEN R&D CENTRE AT BENGALURU**  
**NAME OF WORK: HARDSCAPE, HORTICULTURE AND ALLIED WORKS**

<b>LIST OF TENDER DRAWINGS</b>		
<b>S. NO.</b>	<b>DRAWING NO.</b>	<b>TITLE</b>
<b>MASTER PLAN</b>		
1	MP-L-2003	Master plan - Irrigation detail
2	MP-L-2003 A1	Irrigation detail sheet 1
3	MP-L-2003 A2	Irrigation detail sheet 2
4	MP-L-2003 A3	Irrigation detail sheet 3
5	MP-L-2003 A4	Irrigation detail sheet 4
<b>SOFTSCAPE</b>		
1	MP-L-2012A	Entry median - Planting Plan - Part A
2	MP-L-2012B	Entry median - Planting Plan - Part B
3	MP-L-2011	Entrance Plaza - Planting Plan
4	B4,B7-L-2003	Planting Plan blocks 4 & 7(Backyards)
5	B3, B4 & B7 -L-2003	Planting Plan blocks 3, 4 & 7(Green, Red & Brown theme)
6	B5,B6-L-2003	Planting Plan blocks 5 & 6(Yellow & Blue theme)
7	B1,B2-L-2004	Block - 1 Planting plan
8	B1,B2-L-2003	Block - 2 Planting plan
9	MP-L-2013	Planting Plan - Employee Car parking
10	MP-L-2014	Planting Plan - Visitors Car Parking
<b>HARDSCAPE</b>		
1	B9-L-2001	Admin Block details
2	B3-L-2001	Block B3 Layout plan & details
3	B4,B7-L-2001	Block 4 & 7 Layout plan & details
4	B5,B6-L-2001	Block 5 & 6 Layout plan & details
5	B9-L-2001A	Circular Plaza
6	MP-L-2006A	Approach road central median - Details A
7	MP-L-2006B	Approach road central median - Details B
8	MP-L-2006C	Approach road central median - Details C
9	MP-L-2005	Entrance Plaza
10	B1,B2-L-2001	Block 1 & 2(Frontside)
11	B1,B2-L-2002	Block 1 & 2(Rearside)
12	MP-L-2001	Landscape Master plan
13	MP-L-2009	Amphitheatre - Plans and Sections
14	MP-L-2010	Lake Area - Plans and Sections
15	MP-L-2007	Employee car parking layout plan & details
16	MP-L-2008	Visitors car parking layout plan & details
<b>WATER BODY</b>		
1	MP-L-2003 C	Swimming pool - Mechanical Works Detail
2	MP-L-2003 C1	Swimming pool - Filtration Chamber Plumbing Detail
3	MP-L-2003D	Water body - Electromechanical Works Detail
4	B3-L-2001A	Block 3 - Water body detail
5	B19-L-2004	Swimming pool details