



e-Tender No. MUM/N/EN/Major/Important Bridges/Package-V, dated 23.04.2019

For

Construction of Major / Important Bridge No. 115, 144, 163, 166, 169, 173, 182 & 192 (Balance Work) between Vaitarna - Bhilad Railway station of Virar – Surat Section of Mumbai Division of Western Railway in connection with Western Dedicated Freight Corridor.

**TECHNICAL BID
(PACKET-A)**

(PARTICIPATION THROUGH E-TENDER ONLY)

E-tendering site- www.tenderwizard.com/DFCCIL

Help: Please contact Tender wizard helpdesk at 011-49424365

**TENDER DOCUMENT
April, 2019**

**Employer:
CHIEF GENERAL MANAGER / NORTH / MUMBAI
DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)
Under
MINISTRY OF RAILWAYS**

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**PART I
GENERAL
INSTRUCTIONS TO BIDDERS (ITB)**

1. **General:** All bidders must note that this being E-tender, bids received only through online on E-tendering portal www.tenderwizard.com/DFCCIL shall be considered as an offer. **Any bid submitted in paper form will not be received and opened and shall be summarily rejected.**

Further, following instructions should be noted by bidders

2. **Procedure for submission of E-tender:**

2.1 Bid Document obtaining process:

The Bidder who wish to view free Notification and tender documents can visit DFCCIL's website www.dfccil.gov.in OR www.tenderwizard.com/DFCCIL OR Central Procurement Portal www.eprocure.gov.in.

Interested bidders who wish to participate should visit website www.tenderwizard.com/DFCCIL, which is the ONLY website for bidding their offer. Further the procedure is as follows:

- Register yourself with M/s. Indian Telephone Industries (ITI) for obtaining Login ID and Password (after paying necessary charges). This is one time annual payment and applicable for bidding other tenders also.
- Obtain Class-III Digital Signature Certificate from ITI or any other digital signature issuing authority. In case bidder wish to obtain the digital signature certificate from ITI, they may contact Mobile numbers 7738875539/ 7666563870/ 7276698860.
- Using the login ID, password and digital signature enter the tender portal to purchase the tender document.
- The tender document charge has to be paid though DD/ BC drawing in favour of Dedicated Freight Corridor Corporation of India Limited payable at Mumbai and payment details to be filled uploaded along with the offer i.e. Bid in website.
- Pay processing fees through e-payment. This payment can be done only through e-payment gateway of ITI.

- With the payment of processing fee, the bidder can download the 'Technical bid' (Microsoft Excel file 'Technicalbid.xls') and 'financial bid' (Microsoft Excel file 'Financialbid.xls') by clicking the link "Show Form".
3. The tender document shall be submitted in online mode through website www.tenderwizard.com/DFCCIL.
 4. The bidder must ensure that the tender document submission before the closing time as the tender submission shall stop accepting the offer at prescribed date and time.
 5. Bidder can anytime change quoted rates before date & time of closing of tender.
 6. This tender being E-tender, the digital signature obtained from approved Controller of Certificate Authorities (CCA) shall only be considered as authentic. The process of obtaining digital signature has been specified as above in para 2.1
 7. Tenderer should submit the Tender Document cost and original EMD in Chief General Manager-Mumbai's Office on/or before date 14.06.2019 **up to 17.30 hrs.** duly mentioning the tender reference on the envelope. Scanned copy of Tender Document cost, EMD to be submitted with online tender. In case Tender Document cost, original EMD not received by the date 14.06.2019 **up to 17.30 hrs** offer will be summarily rejected.
 8. The following statutory documents are to be submitted in physical form on/or before the date 14.06.2019 **up to 17.30 hrs** in enclosed envelope duly mentioning the tender reference, **Otherwise, the offer of the tender shall be considered as invalid offer.:**
 1. **Tender document cost**
 2. **Original EMD**
 3. **Documents related to Sole Proprietorship Firm (if applicable)**
 - a) Sole Proprietorship Firm Para 1.3.6.2(a) Sole Proprietorship Firm shall submit the notarized copy of the affidavit.
 4. **Documents related to Partnership Firm (if applicable)**
 - a) Notarized copies of (i) registered / notarized Partnership Deed as per Para 1.3.6.2(b)(i) , (ii)Power of Attorney duly authorizing one or more

of the partners of the firm or any other person(s) as per Para 1.3.6.2(b)(ii).

5. Documents related to JV firm. (if applicable)

- a) Form 9, 11, 12 & 13 of the tender document,
- b) In case one or more of the members are JV firm then, 1) Notary certified copy of Partnership deed (Clause 65.15.1 (a)); 2) Consent of all the partners to enter into the Joint Venture Agreement on a stamp paper (Clause 65.15.1 (b)); C) Power of Attorney (duly registered as per prevailing law) in favour of one of the partners of the partnership firm to sign the JV (Clause 65.15.1 (c)).

In case one or more members of JV is/are Proprietary Firm or HUF then Affidavit on Stamp Paper of appropriate value declaring that his/her Concern is a Proprietary Concern and he/she is sole proprietor of the Concern OR he/she is in position of "KARTA" of Hindu Undivided Family (HUF) and he/she has the authority, power and consent given by other partners to act on behalf of HUF (Clause 65.15.2)

- c) In case one or more members is/are limited companies then, a) Notary certified copy of resolutions of the Directors of the Company, permitting the company to enter into a JV agreement (Clause 65.15.3 (a)); b) Power of Attorney (duly registered as per prevailing law) by the Company authorizing the person (Clause 65.15.3 (c))

d) Form No 1 as per Chapter II of Part IV.

- 9.** It is to be ensured by the tenderer that the documents such as Tender document, scan copy of EMD, scan copy of Documents related to Sole Proprietorship Firm, Partnership Firm and Companies registered under Companies Act as mentioned in the Para 1.3.6 of the tender document and Documents related JV mentioned in Para 65 and Form 9, 11, 12, 13 of the tender document such as mentioned and other documents as applicable should be uploaded with tender online before the time and date of closure of the tender document.

Note: The documents are to be submitted in physical form shall be in enclosed envelope and write "Kind attention to Dy. Chief Project Manager/ Engg-I/ DFCCIL-Mumbai" mentioning the tender number.

- 10.** Please attach all the addendum(s)/corrigendum(s)(if any) along with the tender document as per Clause 1.1.4 and then upload with the tender document.

11. **Financial bid (Microsoft Excel file) to be filled, saved and uploaded with digital signature.** Only the downloaded financial bid filed should be uploaded after filing and saving in document library. Do not upload scanned copy such as pdf or jpg file etc. of 'Financial Bid' in document library.
12. The bidder must obtain for itself on its own responsibility and its own cost all the information including risks, contingencies & other circumstances in execution of the work. It shall also carefully read and understand all its obligations & liabilities given in tender documents.
13. **Cost of biddings:** The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
14. Tenderer may carefully note that they are liable to be disqualified at any time during tendering process in case any of the information furnished by them is not found to be true. In addition, the EMD of such tenderer shall be forfeited. The decision of Employer in this respect shall be final and binding.
15. The bidder shall submit only one bid in the capacity of an individual or sole proprietor, partnership firm, company and Joint venture. Violation of this condition is liable to disqualify the tenders in which bidder has participated and EMD of all such tenderers shall stand forfeited.
16. The bidder is expected to examine all instructions, terms, conditions, forms.
17. Specifications and other information in the bidding document. Failure to furnish all information required by the bidding documents or submission of a bid not substantially responsive to the bidding document in every respect will be at the bidders risk and may result in rejection of his bid.
18. At any time prior to the deadline for submission of bids, Employer may for any reason whether at its own initiative or in response to any request by any prospective bidder amend the bidding documents by issuing Corrigendum, which shall be part of the Tender documents.
19. Employer may at its discretion extend the deadline for submission of the bids at any time before the time of submission of the bids.

20. Bid submission process:

The tender documents i.e. Technical Bid and Financial Bid with statutory documents should be submitted through online mode in website www.tenderwizard.com/DFCCIL only. up to **15.00** Hrs on 07.06.2019. The **“Packet - A (TECHNICAL BID)”** will be opened at **11.00** Hrs on 15.06.2019. Any modified date and time for submission of tenders shall be uploaded on website www.Dfccil.gov.in, www.tenderwizard.com/DFCCIL and Central Procurement Portal, eprocure.gov.in. The detail procedure of tender opening will be as per Para 1.3.5.

- Before uploading the Technical Bid and before quoting the rate and uploading the ‘Financial Bid’, bidders are advised to upload scanned copies of the following supporting document in ‘document library’. The list is indicative and not extensive.
1. **EMD Document confirming to 1.3.8 of General Information (Statutory document).**
 2. **Tender Fee Document confirming para 1.3.4.3 (Statutory Document)**
 3. **Supporting Documents for Eligibility Criteria as per Form 2A and 2B as per Chapter II of Part IV.(Statutory Document)**
 4. **Sole proprietorship Firm, Partnership Firm, JV Firm deed/Memorandum and Articles of Association of the firm or company, if applicable as per Para 1.36 of General Information (Statutory document).**
 5. **Power of attorney of the person signing the tender document or photocopy duly attested by Notary Public as per para 1.36 of General information (Statutory document)**
 6. **Offer letter as per Chapter II of Part IV (Statutory document)**
 7. **GST Registration Certificate (Statutory document).**
 8. Any other supporting document as required.
 - **After uploading above documents, bidder should quote their rates in the downloaded ‘Financial Bid’ file and save the file. After saving, the bidder can upload the filled file. The name of the downloaded ‘Financial Bid’ (‘Financialbid.xls’) file should not be changed.**

- The Bidder should submit the original EMD, Tender Document Fees in **Chief General Manager/North/Mumbai's Office up to 17.30 hrs on 14.06.2019. Failure of the same the offer of the bidder is shall be rejected.**
- Tenderer should submit the originals of statutory documents and other documents in Chief General Manager/North/Mumbai's Office up to **17.30 hrs. on 14.06.2019.** Documents other than statutory document should be submitted in Chief General Manager/North/Mumbai's Office within 7 days from opening. The bid is liable to be rejected in case of failure to submit the documents on time.

21. Opening of the tender

The "Packet-A (TECHNICAL BID)" will be opened online at **11.00 Hrs on 15.06.2019.** at the address mentioned in " Notice Inviting tender "and read out in the presence of such tenderer(s) as is/ are present. The detail procedure of tender opening will be as per para 1.3.5. Tenderers or their authorized representatives who are present shall sign register in evidence of their attendance.

Help desk for E- Tendering

1. For any difficulty in downloading & submission of tender document at website www.tenderwizard.com/DFCCIL, please contact at tenderwizard.com helpdesk no 011-49424365 or mobile no 7738875559/7666563870/7276698860.
2. Bidder manual & system requirement is available on website www.tenderwizard.com/DFCCIL for necessary help.

PART-I

Chapter-I

NOTICE INVITING TENDER

PART- I
Chapter I

DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

No: MUM/N/EN/Major/Important Bridges/Package-V, dated 23.04.2019

NOTICE INVITING e-TENDER
National Competitive Bidding

Dear Sirs,

Construction of Major / Important Bridge No. 115, 144, 163, 166, 169, 173, 182 & 192 (Balance Work) between Vaitarna - Bhilad Railway station of Mumbai Division of Western Railway in connection with Western Dedicated Freight Corridor.

- 1.1.1** Chief General Manager (North), Dedicated Freight Corridor Corporation of India Limited, 7th floor, Central Railway New Administrative Building, D.N. Road, Mumbai, India, invites e-tenders on two packet system on prescribed forms from firms/ Companies/ Joint Ventures having requisite experience and financial capacity for execution of the following work:

Table 1				
S. No	Name of work	Tender cost (Rs.)*	Earnest money (Rs.)*	Completion Period
1.	Construction of Major / Important Bridge No. 115, 144, 163, 166, 169, 173, 182 & 192 (Balance Work) between Vaitarna - Bhilad Railway station of Mumbai Division of Western Railway in connection with Western Dedicated Freight Corridor.	Rs. 29,500/- including GST	Rs. 67,59,58,528/-	08 months

* As per DFCCIL works manual

1.1.2 Eligibility Criteria:

Eligibility shall be assessed on applicants, fulfilling the technical capability and competence as well as for financial and organizational resources as specified in clause no. 1.3.13 (i) A & B of Preamble and General Instruction to tenders (Part - I, Chapter III).

- 1.1.3** The Tender document can be downloaded from DFCCIL's website www.dfccil.gov.in, www.tenderwizard.com/DFCCIL and Central Procurement Portal, eprocure.gov.in. **from 11.00 hrs on 26.04.2019 to 14.30 hrs on 07.06.2019.**
- 1.1.4** DFCCIL may issue addendum(s)/corrigendum(s) to the tender documents. In such case, the addendum(s)/corrigendum(s) shall be issued and placed on website www.dfccil.gov.in, www.tenderwizard.com/DFCCIL and [central procurement portal.eprocure.gov.in](http://centralprocurementportal.eprocure.gov.in) at least three days in advance of date fixed for opening of tenders. The tenderers who have downloaded the tender documents from website must visit the website and ensure that such addendum(s)/corrigendum(s) (if any) is also downloaded by them.
- 1.1.5** **The tender documents should be submitted through online mode in website www.tenderwizard.com/DFCCIL only. The offer submitted other than online will not be accepted.**
- 1.1.5.1** The tender documents shall be in two separate online packets viz **Packet - A containing TECHNICAL BID** and **Packet- B containing FINANCIAL BID**. Detailed credential as per the requirement of eligibility criteria and all tender papers except Bill of Quantities are to be submitted in Technical Bid. Summary of Prices (Form No.3) with % age above or below or at par on the amount of various **Schedules "A", "B", "C" and "D"** duly filled in along with Schedule of Prices (Form - 4) are to be submitted in "Financial Bid". **Packet- B also contains** Microsoft Excel file to be filled as Financial Bid, saved and Uploaded with digital signature. Only the downloaded financial bid form in excel file should be uploaded after filing and saving the file in document library. *Caution: Do not upload scanned copy such as pdf or jpg file etc. of 'Financial Bid' in document library.*
- 1.1.6** Tender shall be submitted as per "General Instruction to Tenderers" forming as part of the complete tender documents.

The tender documents should be submitted through online mode in website www.tenderwizard.com/DFCCIL only. The offer submitted other than online will not be accepted. Please refer 'Procedure for submission of E-tender' in Para 'Instructions To Bidder' (ITB), General of chapter I of Part I.

To participate in the E-Bid submission, it is mandatory for the bidders to have user ID & password to login www.tenderwizard.com/DFCCIL, which has to be obtained by submitting an annual registration charges of INR 2000/- + Service tax @ 14.5% to M/s ITI Ltd through e-payment or latest prevailing charges, which may be confirmed. Bidders have to pay the Tender Processing Fee to ITI Ltd through e-

payment at the time of submission of bid. Already registered vendors with M/s. ITI Ltd need not pay registration charges.

- 1.1.7** E-Tenders shall be opened online at the address given below at the time and date given in NIT in the presence of the tenderers or their authorized representatives intending to attend the opening.

Address of Office of the Chief General Manager/North/Mumbai (for submission & opening of tenders):

Chief General Manager/North/Mumbai, DFCCIL, 7th Floor, Central Railway New Administrative Building, Mumbai-400001, Maharashtra.

- 1.1.8** Tender shall be submitted as per “**Instructions to Bidders (ITB)**” forming a part of the tender document.

- 1.1.9 Any tender submitted through e-tendering without Earnest Money in the form as specified in tender documents shall not be considered and shall be summarily rejected.**

- 1.1.10** DFCCIL reserves the right to cancel the tenders before submission/opening of tenders, postpone the tender submission/opening date and to accept / reject any or all tenders without assigning any reasons thereof. DFCCIL's assessment of suitability as per eligibility criteria shall be final and binding.

- 1.1.11** Tenderers may note that they are liable to be disqualified at any time during tendering process in case any of the information furnished by them is not found to be true. EMD of such tenderer shall be forfeited. The decision of DFCCIL in this regard shall be final and binding.

- 1.1.12** The validity of offer shall be **90 days** from the date of opening of the tender.

- 1.1.13** Information as required as per various Forms to tender document should be submitted by the tenderers without fail strictly as per formats.

- 1.1.14** The tender document shall be submitted in online mode through website www.tenderwizard.com/DFCCIL.

PART-I
Chapter-II
GENERAL INFORMATION / DATA
SHEET



DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LTD
A Govt. of India (Ministry of Railways) Enterprises
7th Floor, New Administrative Building, D.N. Road, Mumbai-400001
NOTICE FOR INVITING BIDS (Online i.e. E-Tender)

Tender No	MUM/N/EN/Major/Important Bridges/Package-V,dated 23.04.2019
Name of work	Construction of Major / Important Bridge No. 115, 144, 163, 166, 169, 173, 182 & 192 (Balance Work) between Vaitarna - Bhilad Railway station of Mumbai Division of Western Railway in connection with Western Dedicated Freight Corridor.
(a) Type of Tender	Open Tender (Single stage two packet).
(b) Type of Contract	Works Contract.
(c) Tender Value	Rs. 67,59,58,528.00
(d) Completion Period	8 months
(e) Earnest Money	Rs. 67,59,586.00 (Paid through Demand Draft/ banker's Cheque, FDR payable in favour of "Dedicated freight Corridor corporation of India Limited, Mumbai")
(f) Cost of Tender document	Rs. 29,500.00 including GST (18%) To be paid by D.D./Banker's Cheque in favour of DFCCIL payable at Mumbai
(g) Tender Processing Fee	Rs 7,500/- plus GST (18%), taxes and duties as applicable (non refundable) through e- payment while uploading of tender
(h) Performance Bank Guarantee	Performance Guarantee (PG) have to be submitted within 30(thirty) days from the date of issue of Letter of Acceptance (LOA), amounting to 5% of the contract value in the form as give in clause 16.4 of GCC
(i) Retention Money / Security Deposit	5% of Contract Value
(j) Officer:	Chief General Manager (North), Mumbai Dedicated Freight Corridor Corporation of India Limited/Mumbai, 7th Floor, New Administrative Building, D.N. Road, Mumbai-400001
(k) E-Tendering Web Site	E-tendering site- www.tenderwizard.com/DFCCIL Help: Please contact Tender wizard helpdesk at 011-49424365
(L) Pre bidding Conference	On 14.05.2019 at 11.00 AM at office of Chief General Manager (North) Mumbai, 7th Floor, New Administrative Building, DN Road, 400001

DATE & TIME SCHEDULE	
Date of Uploading of NIT (Online Publishing date)	24.04.2019 at 11.00 Hrs.
Other Documents (Online Publishing date)	25.04.2019 at 11.00 Hrs.
Documents download/Sell date (Online)	From 26.04.2019 at 11.00 Hrs.
Bid submission Last date (Online)	07.06.2019 up to 15.00 Hrs.
Last date of submission of originals of statutory documents i.e. EMD & Tender Document Charge	14.06.2019 up to 17.30 Hrs.
Bid Opening date & Time (online)	15.06.2019 at 11.00 Hrs.

Chief General Manager (North), Mumbai Dedicated Freight Corridor Corporation of India Limited/Mumbai, 7th Floor, New Administrative Building, D.N. Road, Mumbai-400001

PART I
CHAPTER III

PREAMBLE & GENERAL
INSTRUCTION TO TENDERERS

PART- I

Chapter- III

PREAMBLE & GENERAL INSTRUCTIONSTOTENDERERS

1.3.1 Introduction

(i) General

Dedicated Freight Corridor Corporation of India Ltd. (DFCCIL), a public sector undertaking has been set up under the Indian Companies Act, 1956 for implementation of Dedicated Freight Corridor Project. Government of India is the sole shareholder of the DFCCIL.

Ministry of Railways (MOR), Government of India has planned to construct Dedicated Freight Corridor (DFC) covering about 3338 Kilometres on Eastern and Western Corridors. The coverage of Eastern Corridor is from Ludhiana to Dankuni and Western Corridor is planned from Jawaharlal Nehru Port, Mumbai to Rewari / Tughlakabad / Dadri near Delhi. There will be a linkage between two corridors at Dadri.

(ii) Dedicated Freight Corridor

Eastern DFC Route will be approximately 1839 Km long from Dankuni to Ludhiana via Dankuni– Asansole– Dhanbad– Gaya– Sonnagar - Mughalsarai- Allahabad- Kanpur- Tundla- Aligarh- Khurja- Bulandshahr–Meerut– Saharanpur– Ambala- Ludhiana.

Western DFC Route will be approximately 1520Kmlong from Dadri to JNPT via Rewari – Iqbalgarh - Vadodara-JNPT.

Proposed alignment of DFC has been generally kept parallel to existing Indian Railway line except provision of detours at some stations where the existing yards/cities are congested.

(iii) Scope of Work

DFCC has been entrusted with task of construction of Eastern and Western DFC. As a part of this endeavor, DFCC intends to invite sealed tender through national competitive bidding single stage two packet system for Construction of Major / Important Bridge No. 115, 144, 163, 166, 169, 173, 182 & 192 (Balance

Work) between Vaitarna - Bhilad Railway station of Mumbai Division of Western Railway in connection with Western Dedicated Freight Corridor.

The broad scope of work for this tender is to construct 8 nos Important / Major bridges on the proposed new double line DFC track between Vaitarna - Bhilad Railway station of Western Railway.

The new DFC bridges are planned on the upstream side spread over a length of about 25 KM. The natural ground is generally flat and runs very close to Arabian Sea. The water level in many of the bridges is affected by tidal variations in the sea downstream. River gradients are largely gentle being very near to the sea.

Engineering Features

The salient engineering features of the section and standards to be adopted are as

SN	Description	Details
1	Gradient	
A	Ruling Gradient	1:200 (compensated)
B	Steepest Gradient in yards	1:1200, 1:400 in exceptional cases with approval of DFCC
2	Formation	
A	Bank width for Double line	14.5 m
B	Slope Embankment	2:1 (H:V) (minimum)
C	Cutting width for Double line	18.85 mt
D	Slope of cutting (ordinary soil)	1:1 (H:V)
E	Blanketing thickness	As per specifications
3	Curves	
A	Maximum degree of curvature	2.5 Degree (700 mt Radius)
B	Curve Compensation	@ 0.04% per degree of curvature
4	Moving Dimensions	
A	Vertical MMD	7.1 m
B	Horizontal MMD	3.66 m
5	Vertical SOD	
A	For Light Overhead Structure like FOBs	8.43 m
B	For Heavy Overhead Structure like ROB	3.66 m

6	Horizontal SOD	2.825 m from centre of track up to 6670 mm above Rail Level
7	Track Centres	
A	Between two tracks of DFC	6 m (minimum) except where different distance prescribed as part of tender document
B	Between Existing track and DFC at proposed Bridge locations	As given General Arrangement Drawings of Proposed bridges as part of tender document
8	Bridges loading Standards	Axle Load = 32.5 tonne Tailing Load = 12 tonne per mtr Tractive effort = 110 tonne for single loco & 180 tonne for double and triple loco Braking force for loco = 20 % of loco weight Braking force for wagon = 13.4 % of axle load
9	Total No. of Bridges	8 nos. (Br. No. 115, 144, 163, 166, 169, 173, 182 & 192)
A	Number of Important bridges	NIL
B	Number of major bridges	NIL 2 nos. (Br. No. 115, 144, 163, 166, 169, 173, 182 & 192)

Scope of Work and Payment Criteria Bridge wise are as under:**1. Bridge No. 115 (3*7.1 m RCC Box)**

SN	Description of work	Scope of work	Payment Criteria
1.	Superstructures	NIL	Payment shall be made as per Schedule “B”.
2.	Pile Cap	NIL	
3.	Super Structure	NIL	
SN	Description of work	Payment Criteria	
1.	RCC M-50 Grade: NIL	Payment shall be made as per Schedule “C”.	
2.	RCC M-40 Grade : RCC Box	Payment shall be made as per Schedule “C”.	
3.	RCC M-35 Grade : Wearing Coat	Payment shall be made as per Schedule “C”	
4.	M-25 Grade : Toe Wall		
5.	PCC M-15 Grade		
6.	Embankment work :- Abutment A1 & A2 1. Earthwork 2. Subgrade 3. Blanketing material 4. Filter Media 5. Stone pitching, 6. Stone masonry steps 7. Stone packing behind abutment 8. Toe Drain 9. Valley Drain etc	Payment shall be made as per Schedule “A” and “C”	
7.	Misc. work 1. Painting work 2. Bridge Plaque 3. Coal tar paint 4. Railing 5. Bridge Name board 6. Dry lean concrete 7. 80/20 mm aggregate near DLC etc. 8. Any other work as directed by Engineer in charge.	Payment shall be made as per Schedule “A” and “C”	

2. Bridge No. 144 (3*14.14 m PSC I Girder)

SN	Description of work	Scope of work	Payment Criteria
1.	Piles	NIL	Payment shall be made as per Schedule “B”.
2.	Pile Cap	NIL	
3.	Superstructures	NIL	
SN	Description of work	Payment Criteria	
1.	RCC M-50 Grade : In Deck slab near expansion joint	Payment shall be made as per Schedule “C”.	
2.	RCC M-40 Grade : 1. Ballas Retainer 2. Seismic arrester 3. Trolley refuge 4. Footpath wall 5. Footpath slab 6. Dirt wall etc.	Payment shall be made as per Schedule “C”.	
3.	RCC M-35 Grade : Wearing Coat	Payment shall be made as per Schedule “C”	
4.	M-25 Grade : Toe Wall		
5.	PCC M-15 Grade		
6.	Embankment work :- Abutment A1 & A2 1. Earthwork 2. Subgrade 3. Blanketing material 4. Filter Media 5. Stone pitching, 6. Stone masonry steps 7. Stone packing behind abutment 8. Toe Drain 9. Valley Drain etc	Payment shall be made as per Schedule “A” and “C”	
7.	Misc. work 1. Railing 2. Painting work 3. Bridge Plaque 4. Coal tar paint 5. Bridge Name board 6. Dry lean concrete 7. 80/20 mm aggregate near DLC etc. 8. Any other work as directed by Engineer in charge.	Payment shall be made as per Schedule “A” and “C”	

3. Bridge No. 163 (3*19.00 m PSC Box Girder)

SN	Description of work	Scope of work	Payment Criteria
1.	Piles	36 Nos.	Payment shall be made as per Schedule "B".
2.	Pile Cap	4 Nos.	
3.	Superstructures	6 Nos. PSC Box Girder	
SN	Description of work	Payment Criteria	
1.	RCC M-50 Grade : NIL	Payment shall be made as per Schedule "C".	
2.	RCC M-40 Grade : 1. Pier 2. Pier cap 3. Abutment 4. Abutment cap 5. Dirtwall 6. Pedestal 7. Footpath wall 8. Trolley Refuge 9. Footpath slab 10. Seismic Arrester 11. Return Wall etc.	Payment shall be made as per Schedule "C".	
3.	RCC M-35 Grade : Wearing Coat	Payment shall be made as per Schedule "C"	
4.	M-25 Grade : Toe Wall		
5.	PCC M-15 Grade		
6.	Embankment work :- Abutment A1 & A2 1. Earthwork 2. Subgrade 3. Blanketing material 4. Filter Media 5. Stone pitching, 6. Stone masonry steps 7. Stone packing behind abutment 8. Toe Drain 9. Valley Drain etc	Payment shall be made as per Schedule "A" and "C"	
7.	Misc. work 1. Railing 2. Painting work 3. Bridge Plaque 4. Coal tar paint 5. Bridge Name board 6. Dry lean concrete 7. 80/20 mm aggregate near DLC etc. 8. Any other work as directed by Engineer in charge.	Payment shall be made as per Schedule "A" and "C"	

4. Bridge No. 166 (3*19.00 m PSC BOX Girder)

SN	Description of work	Scope of work	Payment Criteria
1.	Piles	20 Nos.	Payment shall be made as per Schedule “B”.
2.	Pile Cap	4 Nos.	
3.	Superstructures	6 Nos. PSC Box Girder	
SN	Description of work	Payment Criteria	
1.	RCC M-50 Grade : NIL	Payment shall be made as per Schedule “C”.	
2.	RCC M-40 Grade : 1. Pier 2. Pier cap 3. Abutment 4. Abutment cap 5. Dirtwall 6. Pedestal 7. Footpath wall 8. Trolley Refuge 9. Footpath slab 10. Seismic Arrester 11. Return Wall etc.	Payment shall be made as per Schedule “C”.	
3.	RCC M-35 Grade : Wearing Coat	Payment shall be made as per Schedule “C”	
4.	M-25 Grade : Toe Wall		
5.	PCC M-15 Grade		
6.	Embankment work :- Abutment A1 & A2 1. Earthwork 2. Subgrade 3. Blanketing material 4. Filter Media 5. Stone pitching, 6. Stone masonry steps 7. Stone packing behind abutment 8. Toe Drain 9. Valley Drain etc	Payment shall be made as per Schedule “A” and “C”	
7.	Misc. work 1. Railing 2. Painting work 3. Bridge Plaque 4. Coal tar paint 5. Bridge Name board 6. Dry lean concrete 7. 80/20 mm aggregate near DLC etc. 8. Any other work as directed by Engineer in charge.	Payment shall be made as per Schedule “A” and “C”	

5. Bridge No. 169 (4*19.80 m PSC Box Girder)

SN	Description of work	Scope of work	Payment Criteria
1.	Piles	NIL	Payment shall be made as per Schedule “B”.
2.	Pile Cap	2 Nos.	
3.	Superstructures	8 Nos. PSC Box Girder	
SN	Description of work	Payment Criteria	
1.	RCC M-50 Grade : NIL	Payment shall be made as per Schedule “C”.	
2.	RCC M-40 Grade : 1. Pier 2. Pier cap 3. Abutment 4. Abutment cap 5. Dirtwall 6. Pedestal 7. Footpath wall 8. Trolley Refuge 9. Footpath slab 10. Seismic Arrester 11. Return Wall etc.	Payment shall be made as per Schedule “C”.	
3.	RCC M-35 Grade : Wearing Coat	Payment shall be made as per Schedule “C”	
4.	M-25 Grade : Toe Wall		
5.	PCC M-15 Grade		
6.	Embankment work :- Abutment A1 & A2 1. Earthwork 2. Subgrade 3. Blanketing material 4. Filter Media 5. Stone pitching, 6. Stone masonry steps 7. Stone packing behind abutment 8. Toe Drain 9. Valley Drain etc	Payment shall be made as per Schedule “A” and “C”	
7.	Misc. work 1. Railing 2. Painting work 3. Bridge Plaque 4. Coal tar paint 5. Bridge Name board 6. Dry lean concrete 7. 80/20 mm aggregate near DLC etc. 8. Any other work as directed by Engineer in charge.	Payment shall be made as per Schedule “A” and “C”	

6. Bridge No. 173 (5*14.20 m PSC I Girder)

SN	Description of work	Scope of work	Payment Criteria
1.	Piles	NIL	Payment shall be made as per Schedule “B”.
2.	Pile Cap	NIL	
3.	Superstructures	20 Nos. PSC I Girder	
SN	Description of work	Payment Criteria	
1.	RCC M-50 Grade : NIL	Payment shall be made as per Schedule “C”.	
2.	RCC M-40 Grade : 1. Abutment cap 2. Dirtwall 3. Pedestal 4. Footpath wall 5. Trolley Refuge 6. Footpath slab 7. Seismic Arrester 8. Return Wall etc.	Payment shall be made as per Schedule “C”.	
3.	RCC M-35 Grade : Wearing Coat	Payment shall be made as per Schedule “C”	
4.	M-25 Grade : Toe Wall		
5.	PCC M-15 Grade		
6.	Embankment work :- Abutment A1 & A2 1. Earthwork 2. Subgrade 3. Blanketing material 4. Filter Media 5. Stone pitching, 6. Stone masonry steps 7. Stone packing behind abutment 8. Toe Drain 9. Valley Drain etc	Payment shall be made as per Schedule “A” and “C”	
7.	Misc. work 1. Railing 2. Painting work 3. Bridge Plaque 4. Coal tar paint 5. Bridge Name board 6. Dry lean concrete 7. 80/20 mm aggregate near DLC etc. 8. Any other work as directed by Engineer in charge.	Payment shall be made as per Schedule “A” and “C”	

7. Bridge No. 182 (1*19.8 m PSC BOX Girder)

SN	Description of work	Scope of work	Payment Criteria
1.	Piles	NIL	Payment shall be made as per Schedule “B”.
2.	Pile Cap	NIL	
3.	Superstructures	2Nos. PSC Box Girder	
SN	Description of work	Payment Criteria	
1.	RCC M-50 Grade : NIL	Payment shall be made as per Schedule “C”.	
2.	RCC M-40 Grade : 1. Open Foundation 2. Abutment 3. Abutment cap 4. Dirtwall 5. Pedestal 6. Footpath wall 7. Trolley Refuge 8. Footpath slab 9. Seismic Arrester 10. Return Wall etc.	Payment shall be made as per Schedule “C”.	
3.	RCC M-35 Grade : Wearing Coat	Payment shall be made as per Schedule “C”	
4.	M-25 Grade : Toe Wall		
5.	PCC M-15 Grade		
6.	Embankment work :- Abutment A1 & A2 1. Earthwork 2. Subgrade 3. Blanketing material 4. Filter Media 5. Stone pitching, 6. Stone masonry steps 7. Stone packing behind abutment 8. Toe Drain 9. Valley Drain etc	Payment shall be made as per Schedule “A” and “C”	
7.	Misc. work 1. Railing 2. Painting work 3. Bridge Plaque 4. Coal tar paint 5. Bridge Name board 6. Dry lean concrete 7. 80/20 mm aggregate near DLC etc. 8. Any other work as directed by Engineer in charge.	Payment shall be made as per Schedule “A” and “C”	

8. Bridge No. 192 (2*19.80m PSC Box Girder)

SN	Description of work	Scope of work	Payment Criteria
1.	Piles	NIL	Payment shall be made as per Schedule “B”.
2.	Pile Cap	NIL	
3.	Superstructures	4Nos. PSC Box Girder	
SN	Description of work	Payment Criteria	
1.	RCC M-50 Grade : NIL	Payment shall be made as per Schedule “C”.	
2.	RCC M-40 Grade : 1. Abutment 2. Abutment cap 3. Dirtwall 4. Pedestal 5. Footpath wall 6. Trolley Refuge 7. Footpath slab 8. Seismic Arrester 9. Return Wall etc.	Payment shall be made as per Schedule “C”.	
3.	RCC M-35 Grade : Wearing Coat	Payment shall be made as per Schedule “C”	
4.	M-25 Grade : Toe Wall		
5.	PCC M-15 Grade		
6.	Embankment work :- Abutment A1 & A2 1. Earthwork 2. Subgrade 3. Blanketing material 4. Filter Media 5. Stone pitching, 6. Stone masonry steps 7. Stone packing behind abutment 8. Toe Drain 9. Valley Drain etc	Payment shall be made as per Schedule “A” and “C”	
7.	Misc. work 1. Railing 2. Painting work 3. Bridge Plaque 4. Coal tar paint 5. Bridge Name board 6. Dry lean concrete 7. 80/20 mm aggregate near DLC etc. 8. Any other work as directed by Engineer in charge.	Payment shall be made as per Schedule “A” and “C”	

(iv) Scope of work is as per the requirements given in the Bid document but Not limited to:

- (a) Construction of RCC Abutment, Abutment Cap, Pier, Pier Cap, PSC/RCC Box girder including pile foundations/ open foundation as per approved GAD/Design.
- (b) Providing and fixing in position *Elastomeric bearings* as per approved drawing.
- (c) Providing and laying cement concrete wearing coat, drainage spouts, footpath, etc.
- (d) Providing and fixing in position single strip seal elastomeric type expansion joints.
- (e) Construction of Inspection platform, railing, ladders, pedestals, seismic arresters, etc.
- (f) Construction of Embankment on either end of bridges.
- (g) Other miscellaneous works for commissioning of Major / Important bridge work.

(v) **Cost of the work: The estimated cost of the tendered work is approximately Rs. 67,59,58,528/-**

(vi) The Tenderer shall be governed by General Conditions of Contract (GCC), Preamble and General Instructions to Tenderers (ITT) and Special Conditions of Contract (SCC). Wherever, there is a conflict in any condition between USSOR conditions, GCC and Special Conditions of Contract mentioned in the tender documents, the condition mentioned in Special Conditions of Contract will prevail. However, Engineer's decision in this connection shall be final and binding.

Part I, Chapter-IV and V of the tender document contains General Conditions of Contract and Special Conditions of Contract specific to this work and shall be applicable in the contract.

(vii) **Location**

Sr. No	Bridge No.	Chainage/ IR KM	Span	GAD No.
1	GAD of Br. No. 115 on Taki River.	82/6-8	6.665 + 6.640 + 6.665 m RCC Box	SOMA-DFCC-115-C-1001

2	GAD of Br. No. 144 on Juhi River	99/24-26	3x14.14 m PSC I-Girder	SOMA-DFCC-144-C-1001
3	GAD of Br. No. 163 on Kapsee River.	113/22-26	3x19.0 m PSC Girder	SOMA-DFCC-163-C-1001
4	GAD of Br. No. 166 on Dandi River.	118/2-4	3x19.0 m PSC Box Girder	SOMA-DFCC-166-C-1001
5	GAD of Br. No. 169 on Diversion on River		4x19.8 m PSC Box Girder	SOMA-DFCC-169-C-1001
6	GAD of Br. No. 173 on Diversion on Ban Khadi River		5x14.20 m PSC I-Girder	SOMA-DFCC-173-C-1001
7	GAD of Br. No. 182 on Dhobi Khadi	127/24-26	1x19.8 m PSC Box Girder	SOMA-DFCC-182-C-1001
8	GAD of Br. No. 192 on Gholvad River	113/18-20	2x19.8 m PSC Box Girder	SOMA-DFCC-192-C-1001

These above Major / Important bridges are to be executed in the jurisdiction of Mumbai Division of Western Railway. However, DFCCIL reserves right to change the site of work anywhere in adjacent / adjoining area of the work defined in Para 1.3.1 (iii) above in the jurisdiction of CGM/NORTH/MUMBAI/DFCCIL and the contractor shall be bound to execute the work without any extra cost.

1.3.2 (A) Tender Bid

The Tender Bid shall be submitted online **through uploading on e-tender web site Address:- www.tenderwizard.com/DFCCIL** as under:-

Packet - A

Eligibility/Qualifying element of the Tender Bid along with other documents mentioned in para 1.3.2 (b) (i), here in after called "TECHNICAL BID "

Packet -B

Price elements of the Tender Bid as per para 1.3.2 (b) (ii), herein after called "FINANCIAL BID".

The TECHNICAL BIDs (Packet - A) **received through e-tender with physical**

deposition of EMD, Tender Fee and other statutory documents shall be opened on the date of tender opening and the detailed scrutiny of TECHNICAL BID shall be carried out.

The "FINANACIAL BID" (Packet - B) **received through e-tender** shall be opened only of those tenderers who qualify in "Technical Bid".

The Financial Bid (Packet- B) of un-qualified tenderers shall not be process further and not opened. The detailed procedure for tender opening and processing is given in Para 1.3.5.

1.3.2(B) Form of Tender

The Tender documents shall be in **two separate packets** viz:-

"Packet - A" containing technical Bid and "Packet – B" containing financial Bid. Detailed credentials as per the requirement of eligibility criteria and all tender papers except Summary of Prices and Schedule of Prices are to be submitted through online e-tender in "TECHNICAL BID" i.e. Packet-A . Summary of Prices and Schedule of Prices with percentage above/below/at par duly filled in are to be submitted in "FINANCIAL BID" (Microsoft Excel file) to be filled, saved and uploaded with digital signature through online e-tender.

Completed tender documents in two packets viz. Packet-A and Packet-B shall be submitted through online e-tender on web site:-www.tenderwizard/DFCCIL.

Any tender received through online e-tender later than the time and date of submission of tenders i.e. 15.00 hrs on 07.06.2019 shall be rejected and unopened.

(i) Documents to be uploaded in support of TECHNICAL BID (Packet - A) :-

S. No	Description	Documents
(1)	Offer letter complete.	Form No. 1
(2)	Tenderer's credentials in accordance with para 1.3.13 (i) & (ii) of Preamble and General Instructions to Tenderers.	Form No. 2A, 2B & 2C
(3)	Earnest money in accordance with Para 1.3.8 and Cost of Tender Document in case of downloaded tenders in accordance with Para 1.3.4.3 of Preamble and General Instructions to Tenderers in an envelope.	
(4)	Written confirmation authorizing the signatory of the tender to commit the tenderer and other documents as per format as applicable, in accordance with para 1.3.6 of Preamble and General Instructions to Tenderers.	

(ii) Documents to be enclosed with the FINANCIAL BID (Packet B):-

S. No	Description	Documents
(1)	Summary of Prices, Schedule of Prices & Total Prices	Form No. 3 & 4

1.3.3 Tender Document

This tender document consists of following five parts:

PART / CHAPTERS	DESCRIPTION	PAGE NO.
PART – I	Important Instructions To Bidders (Tenderers) ITB before submitting their Tenders (Bids) through online.	3
Chapter I	Notice Inviting Tender	9
Chapter II	General Information / Data sheet	13
Chapter III	Preamble and General Instructions to Tenderers	16
Chapter IV	General Conditions of Contract	45
	Pre-Contract Integrity Pact	103
Chapter V	Special Conditions of Contract	112
PART – II	Technical Specifications	127
PART – III	Additional Technical Specifications	221
PART – IV	Tender Forms (including Schedule of Prices)	240
PART – V	Drawings	275

1.3.4 Sale and Submission of Tender Document

1.3.4.1 The Tender document can be downloaded from DFCCIL's website www.dfccil.gov.in, www.tenderwizard.com/DFCCIL and Central Procurement Portal, eprocure.gov.in. on payment of tender processing fee of the website. The tender document shall be submitted in online mode through website www.tenderwizard.com/DFCCIL. **The Tender Document cost of Rs. 25,000 + GST (18%) i.e. Total Rs. 29,500/- through Demand Draft / Banker's cheque payable in favour of "Dedicated Freight Corridor Corporation of India Limited, Mumbai"** The cost of the tender form is not refundable and also not transferable.

1.3.4.2 Bid Document obtaining process:

As per para 2.1 of Instructions to Bidders (ITB) of General chapter of Part I.

1.3.4.3 Clause applicable for tender submitted through e-tender

Tenderer/s are free to download tender documents at their own cost, for the purpose of perusal. Master copy of the tender document will be available in the office of Chief General Manager/North, DFCCIL, 7th floor, Central Railway New Administrative Building, D.N. Road, Mumbai-40001. After award of the work, an agreement will be drawn up. The agreement shall be prepared based on the master copy available in the office of CGM/North/Mumbai, Dedicated Freight Corridor Corporation of India Limited and not based on the tender documents submitted by the Tenderer. In case of any discrepancy between the tender documents submitted through e-tender and the master copy, later shall prevail and will be binding on the Tenderers. No claim on this account shall be entertained.

1.3.4.4 Cost of Tender documents downloaded from internet

Tender documents are available on Dedicated Freight Corridor Corporation of India Limited web site i.e. "www.tenderwizard.com/DFCCIL". The cost of the tender document as indicated above in para 1.3.4.1 above will have to be deposited by the tenderer in the form of Demand draft/banker's cheque payable in favour of 'Dedicated Freight Corridor Corporation of India Limited' along with the Tender document. Tenderer should submit the Tender Document cost in physical form in Chief General Manager/Mumbai 's Office on/or before date **14.06.2019 up to 17.30** hrs duly mentioning the tender reference on the envelope. **Scanned copy of Tender Document cost, EMD to be submitted with online tender.** In case tender document cost & original EMD not received by the date **14.06.2019 up to 17.30** hrs, offer will be summarily rejected. This should be paid separately and not included in the earnest money. In case, tender is not accompanied with the cost of the tender document as detailed above, tender will be summarily rejected.

1.3.4.5 Bid submission process:

As per para 20 of Instructions to Bidders (ITB) of General chapter of Part I.

1.3.4.6 EMD , Tender Fee and other Statutory documents sealed and super-scribed as a foresaid can also be sent by Registered post addressed to the Chief General Manager/North, DFCCIL, 7th floor, Central Railway New Administrative Building, D.N. Road, Mumbai-40001, India. EMD ,Tender Fee and other statutory documents received after **14.06.2019 up to 17.30** hrs shall not be considered. EMD, Tender Fee and other Statutory documents delivered or sent otherwise will be at the risk of the tenderers.

1.3.4.7 The rates should be quoted in Financial Bid (packet –B) (Microsoft Excel file) to be filled, saved and uploaded with digital signature. Only the downloaded financial bid filled should be uploaded after filling and saving. Don't upload pdf or jpg etc. scanned copy of "financial bid" in document library. The bids submitted without Excel file shall be summarily rejected.

1.3.4.8 Signing of All Bid Papers and completing Financial Bid:

This tender being E-tender, the digital signature obtained from approved Controller of Certificate Authorities (CCA) shall only be considered as authentic. The process of obtaining digital signature has been specified at General of Para-1 of ITB.

1.3.4.9 Care in Submission of Tenders – Before submitting a tender, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works are taken into account and that the quoted rates by tenderer in tender forms are adequate and all-inclusive in item of Taxes, Duties & Levies etc. in terms of General/Special Conditions of Contract for the completion of works to the entire satisfaction of the Employer .

1.3.4.10 Pre-bid conference: There will be pre-bid conference at **12.00 hours on 14.05.2019 at the office of Chief General Manager/North, DFCCIL, 7th floor, Central Railway New Administrative Building, D.N. Road, Mumbai-40001. Bidders should give their queries in writing at least 3 days prior to Pre-bid conference.** All interested firms / contractors may attend the Pre-bid conference. DFCCIL response to queries as well as addenda to bidding document will be posted on the DFCCIL's website. Non-attendance at the pre-bid conference will not be a cause for disqualification of the bidder.

All communication between the Employer and the tenderer shall be in writing. For the purposes of seeking clarification, the Employer's address is:

Dedicated Freight Corridor Corporation of India Limited

Attention: Chief General Manager / North / Mumbai

Telephone: 8511197490, Facsimile number:-022-22634184

Electronic mail address: LNRAO@DFCC.CO.IN and JVRATHOD@DFCC.CO.IN

1.3.4.11 Conditional tenders are liable to be rejected. DFCCIL however reserves the right to reject such tenders summarily without assigning any reasons whatsoever. The Railway also reserves the right to reject any special conditions stipulated by the Tenderer as considered unacceptable to the Railway and can call upon the Tenderer to withdraw such conditions. If any deviations from the General conditions/ special conditions/ specifications are proposed by the tenderer, they should be mentioned statement of deviation in Annexure`A' and not elsewhere in the tender documents.

1.3.4.12 If it is found at any stage of the finalization of the tender or during actual execution of the work that the information furnished in this tender ,including clarifications, is incorrect, the tenders are likely to be rejected.

1.3.4.13 Works Contract Tax or any other tax except GST:

Taxes prescribed by the Central government/State Government/Local bodies at the rate prescribed by them will be recovered from the bills from time to time.

1.3.4.14 The list of documents (Check list) to be attached along with the tender documents is as under:-

- Requisite Earnest Money in proper form.
- Tender fee in prescribed form.
- Various Pro-forma attached with tender document as per chapter II of Part IV.
- Offer Letter as per Form No1 of Chapter II of Part IV.
- Documents fulfilling the eligibility criteria as per Form No 2A and 2B as per chapter II of Part IV.
- List of personnel, organization available on hand and proposed to be engaged for the subject work.
- List of plants & machinery available on hand (own) and proposed to be inducted (Own & hired to be given separately) for the subject work.
- List of works completed in the last three financial years and current financial year giving description of work, organization for whom executed, approximate value of contract at the time of award, date of award, date of schedule completion of work, date of actual commencement of work, actual date of completion and completion cost. Supportive documents/certificates from the organizations with whom they had worked should also be enclosed. Certificate from private individuals for whom such works were executed will not be accepted.
- List of works on hand indicating description of work, contract value, date of award, value of work executed & approximate value of balance work yet to be done. Supportive documents/certificates from the organizations with

whom they are working should also be enclosed. Certificate from private individuals for whom such works are being executed will not be accepted.

- Method statement, PERT CHARTS & Construction schedule vis-à-vis deployment resources.
- MOU for JV and Partnership deed as per Forms 9,10,11,12 and 13 of Chapter II of Part IV.
- Power of Attorneys as per Form 12 & 13 of Chapter II of Part IV.
- All above documents duly signed & completed in all and signing each and every page of the document.

1.3.5 Opening of Tender:

- (a) Tender will be opened online at **11.00 hrs. on 15.06.2019**, in Chief General Manager (North), Dedicated Freight Corridor Corporation of India Limited, 7th floor, Central Railway New Administrative Building, D.N. Road, Mumbai, India, in the presence of the tenderers or their representatives as may be present at the prescribed date and time.
- (b) The outer sealed covers EMD , Tender Fee, Form 1,2A, 2B and 2C with other statutory documents shall be opened at **11.00 hrs on 15.06.2019**. Thereafter the packet of '**TECHNICAL BID (Packet- A)**' only of the tenderers whose EMD ,Tender Fee, stipulated Forms have been received in the office of Chief General manager/ North/ Mumbai/ DFCCIL office shall be opened and the contents thereof i.e. qualification details shall be read out. **FINANCIAL BID (Packet-B)** shall be opened subsequently after informing the parties participated.
- (c) After the opening of "TECHNICAL BID" (Packet-A) of all the tenderers, these Bids shall be scrutinized and analysed. If found necessary by the Employer, the tenderers shall be asked to furnish clarifications and the Employer may also hold discussions with the tenderers after giving due notice. The names of the tenderers whose Bid are considered complete and meet eligibility criteria shall be short listed.
- (d) The **FINANCIAL BID (Packet –B)** shall be opened on a subsequent date and time duly notified well in advance. The Financial Bids of only those tenderers shall be opened who are short listed after scrutiny of their Technical Bid. The Financial Bid of the tenders who do not qualify during scrutiny of Technical Bid shall not be opened. The time of opening, date and venue of online financial Bids of Shortlisted tenderer shall be advised to qualified tenderers well in advance to enable them to depute their representative. The earnest money of non-qualifying tenderers will be returned back within a reasonable period of completion of results of Technical Bid.
- 1.3.5.1** The Employer (DFCCIL) will notify Bidders in writing who have been rejected on the grounds of their Technical bids being substantially non-responsive to the requirements of the bidding document and their price bids i.e. FINANCIAL BID (Packet-B) submitted online will not be opened.

1.3.6 Constitution of the Firm:-

1.3.6.1 Tenderer shall clearly specify whether the tender is submitted on his own or on behalf of a partnership firm / Joint Venture (JV) / Company. The tenderer(s) who is / are constituents of the firm / Company, shall enclose notarized copies of the constitution of their concern, Partnership Deed and Power of attorney along with their tender. Tender documents in such cases shall be signed by such persons as may be legally competent to sign them on behalf of the firm / company as the case may be.

1.3.6.2 The tenderer shall give full details of the constitution of the Firm / JV / Company and shall also submit following documents (as applicable), in addition to documents mentioned above:

- (a) Sole Proprietorship Firm: The tenderer shall submit the notarized copy of the affidavit.
- (b) Partnership Firm : The tenderer shall submit notarized copies of (i) registered / notarized Partnership Deed and (ii) Power of Attorney duly authorizing one or more of the partners of the firm or any other person(s), authorized by all the partners to act on behalf of the firm and to submit & sign the tender, sign the agreement, witness measurements, sign measurement books, receive payments, make correspondences, compromise / settle / relinquish any claim (s) preferred by the firm, Sign "No claim Certificate", refer all or any dispute to arbitration and to take similar action in respect of all tenders / contracts or said tender / contract.
- (c) Joint Venture: The tenderer shall submit documents as mentioned in clause 65 of GCC.
- (d) Companies registered under Companies Act-1956: The tenderer shall submit (i) the copies of Memorandum of Association (MOA) and Articles of Association (AOA) of the company; and (ii) Power of attorney duly registered / notarized by the company (backed by the resolution of Board of Directors) in favour of the individual, signing the tender on behalf of company.

1.3.6.3 If it is mentioned in the tender submission that it is being submitted on behalf of / by a sole Proprietorship Firm / Partnership Firm / Joint venture / registered Company etc. but above-mentioned documents (as applicable) are not enclosed along with tender, the tender shall be summarily rejected.

If it is NOT mentioned in the tender submission that it is being submitted on behalf of / by a Sole Proprietorship Firm / Partnership Firm / Joint Venture / Registered Company etc., then the tender shall be treated as having been submitted by the individual who has signed the tender.

After opening of the tender, any document pertaining to the constitution of the Firm / Joint Venture etc. shall neither be asked nor be entertained / considered by DFCCIL.

1.3.6.4 A tender from Joint Venture / Partnership Firm etc. shall be considered only where permissible as per the tender conditions.

1.3.6.5 The DFCCIL will not be bound by any power of attorney granted by the tenderer or by changes in the composition of the Firm made subsequent to the submission of tender. It may, however, recognize such power of attorney and changes after obtaining proper legal advice.

1.3.7 Validity of Tender:-

Tenderer shall keep his offer open for a minimum period of 90 days from the date of opening of the tender or as mentioned in the Tender Notice.

1.3.8 Earnest Money:-

- (a) The tender must be accompanied by Earnest Money in favour of '**Dedicated Freight Corridor Corporation of India Limited, Mumbai**' deposited in any of the forms as mentioned in 1.3.8(c), failing which the tender will not be considered.
- (b) The earnest money shall remain deposited with the DFCCIL for the period of validity of the offer prescribed in this tender i.e. 90 days from the date of opening of tender. If the validity of the offer is extended, the validity of earnest money should also be extended failing which the offer after the expiry of the aforesaid period may not be considered by the DFCCIL.
- (c) The Earnest money should be in any of the following forms:
FDR/Banker's cheque / Demand Draft executed by State bank of India or any of the nationalized banks or any Indian Scheduled Bank.
- (d) It shall be understood that the tender documents have been sold/issued to the tenderer and the tenderer is permitted to tender in consideration of stipulation on his part, that after submitting his tender he will not resale from his offer or modify the terms and conditions, thereof in a manner not acceptable to the Employer. Should the tenderer fail to observe or comply with the said stipulation, the aforesaid amount shall be liable to be forfeited to the DFCCIL.
- (e) The earnest money of the unsuccessful tenderer(s) will, save as here- in- before provided, be returned to the unsuccessful tenderer(s) within a reasonable time but the DFCCIL shall not be responsible for any loss or depreciation that may happen for the due performance of the stipulation to keep the offer open for the period specified in the tender documents or to the earnest money while in their possession nor be liable to pay interest thereon.

- (f) The bidder has to submit the original EMD in physical form shall be in sealed Envelope along with the tender fee and Statutory documents addressed to Dy Chief project Manager/DFCCIL, Mumbai mentioning the tender Number on or before **14.06.2019 up to 17.30 hrs.**

NOTE: No interest shall be paid by DFCCIL on earnest money amount.

1.3.9 Execution of Contract Agreement:-

The Tenderer whose tender is accepted shall be required to appear in person at the office of **Chief General Manager/North, DFCCIL, 7th floor, Central Railway New Administrative Building, D.N. Road, Mumbai-40001** or if a firm or corporation, a duly authorized representative shall so appear and execute the contract agreement within 30 days after notice that the contract has been awarded to him. Failure to do so shall constitute a breach of the agreement affected by the acceptance of the tender in which case the full value of the earnest money accompanying the tender shall stand forfeited without prejudice to any other rights or remedies.

In the event of any tenderer whose tender is accepted refuses to execute the contract agreement as here in before provided, DFCCIL may determine that such tenderer has abandoned the contract and there upon his tender and acceptance thereof shall be treated as cancelled and DFCCIL shall be entitled to forfeit the full amount of the Earnest Money.

1.3.10 Security Deposit on Acceptance of Tender:

The security deposit / rate of recovery / mode of recovery on acceptance of tender shall be as per the Para 16.(1) to 16.(3) of General Conditions of Contract (GCC).

1.3.11 Tenderer's Address

The tenderer should state in the tender his postal address legibly and clearly. Any communication sent in time, to the tenderer by post at his said address shall be deemed to have reached the tenderer duly and in time. Important documents should be sent by registered post.

1.3.12 Right of DFCCIL to Deal with Tenders

- (a) The DFCCIL reserves the right of not to invite tenders for any of DFCCIL work or works or to invite open or limited tenders and when tenders are called to accept a tender in whole or in part or to reject any tender or all tenders without assigning reasons for any such action.
- (b) The authority for the acceptance of the tender will rest with the DFCCIL. It shall not be obligatory on the said authority to accept the lowest tender or any other tender and no tenderer(s) shall demand any explanation for the cause of rejection of his/their tender nor the DFCCIL undertake to assign reasons for declining to consider or reject any particular tender or tenders.

1.3.13 (i) Eligibility Criteria**(A): Technical Eligibility Criteria**

Criteria	Compliance Requirement		Documents
Requirement	Single Entity	Joint venture	Submission Requirements
<p>The tenderer / JV firm or Lead Member of JV firm must have satisfactorily completed at least one single work in last three previous financial years and the current financial year up to the date of submission of tender, of construction of any one of the following having minimum value of 35% of the Advertised value of tender:</p> <p>“The tenderer should have physically completed “Any work involving Construction of Elevated Metro / Flyover / Viaduct / Bridge / ROB having Steel / PSC / RCC / Composite Superstructure including Substructures”</p>	Must meet requirement	<p>Existing JV - Must meet requirement.</p> <p>Or</p> <p>Lead Member of proposed JV- Must meet requirement</p>	<p>The tenderer shall submit the completion certificates / certified completion certificates from the client (s) and or Photostat of original certificates of client. All documents either original or photocopy should be attested by Notary.</p>

Note:

1. Value of completed work done by a member in an earlier JV Firm shall be reckoned only to the extent of the concerned member's share in that JV firm for the purpose of satisfying his / her compliance to the above-mentioned technical eligibility criteria in the tender under consideration.
2. In case the tenderer/s is a partnership firm, the work experience shall be in the name of partnership firm only.

(B): Financial Eligibility Criteria

Criteria	Compliance Requirement		Documents
Requirement	Single Entity	Joint Venture	Submission Requirements
The contractual payments received by the tenderer / JV firm or the arithmetic sum of contractual payments received by all the members of the JV firm in the previous three financial year and the current financial year up to the date of submission of tender shall be at least 150% of advertised value of tender.	Must meet Requirement	Must meet requirement	TDS certificates/ Audited balance sheets and or Photostat of TDS certificates/Audited Balance sheets clearly indicating the contractual amount received. All documents either original or photocopy should be attested by Notary.

Note: 1. Contractual payments received by a Member in an earlier JV firm shall be reckoned only to extent of the concerned member's share in that JV Firm for the purpose of satisfying compliance of the above mentioned financial eligibility criteria in tender for considerations.

2. In case the tenderer/s is a partnership firm, the turnover etc. shall be in the name of partnership firm only.

1.3.13 (ii) Credentials of Tenderer

The tenderer shall provide satisfactory evidence in support of their technical and financial eligibility, which are acceptable to DFCCIL, as follows:

- (a) For Technical eligibility criteria, the details will be submitted in Form No. 2A along with supporting documents.
- (b) For Financial eligibility criteria, the details will be submitted in Form No. 2B along with supporting documents.
- (c) The tenderer shall submit the completion certificates/certified completion

certificates from the client(s) or Photostat of original certificates of client. All documents either original or photocopy should be attested by Notary. These certificates should indicate the details of works carried out and successful commissioning of similar type of work executed by the tenderer. Completion certificate from Govt. organisation /PSUs/Public Limited Company will be accepted. The certificate from Private individual/Private Company for whom such works are executed shall not be accepted. In case, the work is executed for Public Limited Company, copy of work order, bill of Quantity, TDS certificate payments received and copy of final/last bill paid by client shall be submitted.

The following will be applicable for evaluating the eligibility:

- (i) Similar nature of work physically completed within the qualifying period, i.e. last three financial year and current financial year (even though the work might have commenced before the qualifying period) shall only be considered in evaluating the eligibility.
- (ii) The total value of similar nature of work completed during the qualifying period and not the payment received within qualifying period alone, shall be considered. In case, the final bill of similar nature of work has not been passed and final measurements have not been recorded, the paid amount including statutory deductions is to be considered. If final measurements have been recorded and work has been completed with negative variation, then also the paid amount including statutory deductions is to be considered.

However, if final measurements have been recorded and work has been completed with positive variation but variation has not been sanctioned, original contract agreement value or last sanctioned contract agreement value whichever is lower, shall be considered for judging eligibility.
- (iii) As proof of sufficient financial capacity and organizational resources, contractor should have received total payments against satisfactory execution of all completed /on-going works of all types (not confined to only similar works) during the last three financial years and in the current financial year (up to the date of submission of the tender) of a value not less than 150% of advertised tender value.
- (iv) Tenderer shall submit a statement of contractual payments received during last three financial years and current financial year on the prescribed Performa as per Form No. 2B. The details shall be based on the form 16-A issued by the

employer i.e. the certificate of deduction of tax at source as per Income Tax Act 1961. The photocopies of Form 16-A shall be enclosed duly attested by Notary Public with seal and Notarial Stamp thereon or a certificate from auditor or audited balance sheet certified by Chartered Accountant clearly indicating the contractual amount received duly attested by Notary Public with seal and Notarial Stamp thereon.

(v) The tenderer shall be considered disqualified/in-eligible if:

- (a) The Tenderer or any of its partners and/or subcontractors included in the tender has been banned for business with Ministry of Railways/DFCCIL along with any of its attached and subordinate offices through an order issued by Ministry of Railways as per list available on Web site (<http://www.IndianRailways.gov.in/railwayboard>) of Railway Board pertaining to banning of Business, with the banning being valid as on the date of submission the Tender.
- (b) The Tenderer or any of its partners has suffered bankruptcy / insolvency or it is in the process of winding-up or there is a case of insolvency pending before any Court on the deadline of submission of application.

(vi) For the purposes of conversion of foreign currency to Indian rupees (INR) Bank Currency (BC) selling exchange rates as published by State Bank of India on the date 28 days prior to date of submission of tender shall be used. For few of the currencies where BC selling rates are not published by SBI or reserve bank of India, the exchange rate may be obtained from website-<http://www.oanda.com/currency/historical-rates> or <http://www.xe.com>.

(vii) For the purpose of evaluation of proposals, all values given in INR in eligible qualification criteria and the values provided by the applicants in the proposal in the currencies other than INR shall be converted into one i.e. INR as per exchange rate mentioned in para (vi) above.

1.3.14 Period of Completion

The entire work is required to be completed in all respects within 8 months (Eight months) from the date of issue of the acceptance letter. Time is the essence of contract. The contractor shall be required to maintain steady and regular progress to the satisfaction of the Engineer to ensure that the work will be completed in all respects within the stipulated time.

1.3.15 If the Tenderer/s deliberately gives any wrong information about credentials / documents in his / their tenders and thereby create(s) circumstances for acceptance of his/their tender, DFCCIL reserves the right to reject such tender at any stage, besides, shall suspend business with such tenderer. The EMD of such tenderers shall also be forfeited.

1.3.16 Quantum of work and materials:

The indicative schedule of quantities of various items of works is included in Form - 4 of the tender documents.

1.3.17 Employer not bound to accept any tender:

The employer shall not be bound to accept the lowest or any tender or to assign any reason for non-acceptance or rejection of a tender. The employer reserves the right to accept any tender in respect of the whole or any portion of the work specified in the tender papers or to reduce the work or to accept any tender for less than the tendered quantities without assigning any reason whatsoever.

1.3.18 Schedule of Prices

The Schedule-1 of the tender document lists out the Schedule of Prices for various items. Based on these, the total tender value has also been worked out.

1.3.19 Performance Guarantee: Refer relevant clause of GCC.

1.3.20 The tenderer shall furnish information for making payment through ECS/ NEFT / RTGS (Tender Form No. 8 placed at Part IV of the tender documents).

1.3.21 Negotiation:

Should DFCCIL decide to negotiate with a view to bring down the rates, the tenderer called for negotiations should furnish the following form of declaration before commencement of negotiations:

"I..... do declare that in the event of failure of contemplated negotiations relating to Tender No..... datedmy original tender shall remain open for acceptance on its original terms and conditions,".

1.3.22 Site Inspection:

Tenderers are requested to inspect the site and carry out careful examination to

satisfy them as to the nature of work involved and facilities available at the site. They should note carefully all the existing structures and those under construction through other agencies. They should also study the suitability of utilizing the different equipment and the machinery that they intend to use for the execution of the work. The tenderers should also select suitable sites for the purpose of locating their store yard, laboratory, staff quarters etc., and satisfy themselves with regard to the feasibility of transporting the girders, etc. from the yard to the final site of placement etc.

1.3.23 No form C & D shall be issued to the contractor for this work.

PART - I
CHAPTER - IV
GENERAL CONDITIONS OF CONTRACT

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CHAPTER IV

GENERAL CONDITIONS OF CONTRACT

DEFINITIONS AND INTERPRETATION

- 1. (1) Definition:-** In these General conditions of Contract, the following terms shall have the meaning assigned hereunder except where the context otherwise requires:-
- (a) “Railway” shall mean the President of the Republic of India or the Administrative Officers of the Railway/DFCCIL or of the Successor Railway / DFCCIL authorized to deal with any matters which these presents are concerned on his behalf.
 - (b) “General Manager of Railway ” shall mean the officer -in-charge of the General Superintendence and Control of the Railway and shall mean and include their successors, of the successor Railway;
 - (c) “Chief Engineer” shall mean the officer -in-charge of the Engineering Department of Railway and shall also include Chief Engineer (Construction), Chief Signal and Telecommunication Engineer, Chief Signal and Telecommunication Engineer(Construction), Chief Electrical Engineer, Chief Electrical Engineer(Construction) and shall also include GGM/GM/CPM of DFCCIL.
 - (d) “Divisional Railway Manager” shall mean the Officer in-charge of a Division of the Railway and shall also mean any officer nominated by Managing Director / DFCCIL and shall mean and include their successors of the successor Railway.
 - (e) “Engineer” and Employer’s Engineer shall mean the Chief General Manager of DFCCIL / PMC appointed by DFCCIL.
 - (f) “Engineer’s Representative” shall mean the Assistant Engineer, Assistant Signal and Telecommunication Engineer and Assistant Electrical Engineer, APM / PM / Dy.CPM / Add. CPM of DFCCIL in direct charge of the work and shall include any Sr. Sec. / Sec / Jr. Engineer / Executive / Sr. Executive, APM/PM / Dy CPM of DFCCIL of Civil Engineering / Signal & Telecommunication Engineering / Electrical Engineering Department appointed by the Railway / DFCCIL and shall mean and include the Engineer’s Representative of the successor Railway / DFCCIL.

- (g) “Contractor” shall mean the person / Firm / Company / JV whether incorporated or not who enters into the contract with the DFCCIL and shall include their executors, administrators, and successors and permitted assigns.
- (h) “Contract” shall mean and include the Agreement of Work Order, the accepted schedule of rates of the Schedule or Rates of Railway / DFCCIL modified by the tender percentage for items of work quantified, or not quantified, General Conditions of Contract, Special Conditions of Contracts, if any, Drawings, Specifications, Additional / Special Specifications, if any and tender forms, if any, and all other documents included as part of contract .
- (i) “Works” shall mean the works to be executed in accordance with the contract.
- (j) “Specifications” shall mean the Specifications for materials and works referred / mentioned in tender documents.
- (k) “Schedule of rates of Railway” shall mean the schedule of rates issued under the authority of the Chief Engineer from time to time and shall also includes Rates specified in tender document. Schedule of rates of State Govt.” shall mean the schedule of rates issued under the authority of the Chief Engineer/State Govt. Gujarat from time to time and shall also includes Rates specified in tender document
- (l) “Drawing” shall mean the maps, drawings, plans and tracings or prints there of annexed to the contract and shall include any modifications of such drawings and further drawings as may be issued by the Engineer from time to time.
- (m) “Constructional Plan” shall mean all appliances or things of whatsoever nature required for the execution, completion or maintenance of the works or temporary works (as hereinafter defined) but does not include materials or other things intended to form or forming part of the permanent work.
- (n) “Temporary Works” shall mean all temporary works of every kind required for the execution completion and/or maintenance of the works.
- (o) “Site” shall mean the lands and other places on, under, in or through which the works are to be carried out and any other lands or places provided by the Railway for the purpose of the contract.

- (p) "Period of Maintenance" shall mean the defect liability period from the date of completion of the works as certified by the Engineer.
- 1.(2) Singular and Plural:-** Words importing the singular number shall also include the plural and vice versa where the context requires.
- 1.(3) Headings & marginal headings:-**The headings and marginal headings in these general conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or the contract.

GENERAL OBLIGATION

- 2. (1) Execution Co-relation and intent of contract Documents:-**The contract documents shall be signed in triplicate by the DFCCIL and the Contractor. The contract documents are complementary, and what is called for by any one shall be as binding as if called for by all, the intention of the documents is to include all labour and materials, equipment and transportation necessary for the proper execution of work. Materials or work not covered by or properly inferable from any heading or class of the specifications shall not be supplied by the DFCCIL to the contractors unless distinctly specified in the contract documents. Materials or works described in words which so applied have a well-known technical or trade meaning shall be held to refer to such recognized standards.
- 2.(2)** If a work is transferred from the jurisdiction of one Railway to another Railway or to a Project Authority/ DFCCIL or vice versa while contract is in subsistence, the contract shall be binding on the Contractor and the Successor Railway/Project in the same manner & take effect all respects as if the Contractor and the Successor Railway/Project were parties there to from the inception and the corresponding officer or the Competent Authority in the Successor Railway/Project will exercise the same powers and enjoy the same authority as conferred to the Predecessor Railway/Project under the original contract/agreement entered into.
- 2.(3)** If for administrative or other reasons the contract is transferred to the Successor Railway/Successor Project Authority of DFCCIL the contract shall not withstanding any things contained herein contrary there to, be binding on the Contractor and the Successor Railway /Project Authority/ DFCCIL in the same manner and take effect in all respect as if the Contractor and the Successor

Railway/ successor Project Authority of DFCCIL had been parties thereto from the date of this contract. The contract shall be Administered/Managed by GGM/GM/CGM/nominated by DFCCIL.

- 3.(1) Law governing the contract:-**The contract shall be governed by the law for the time being in force in the Republic of India.
- 3.(2) Compliance to regulations and bye-laws:-**The contractor shall conform to the provision of any statute relating to the works and regulations and by-laws of any location authority and of any water and lighting companies or undertakings, with whose system the work is proposed to be connected and shall before making any variation from the drawings or the specifications that may be necessitated by so confirming give to the Engineer notice specifying the variation proposed to be made and the reasons for making the variation and shall not carry out such variation until he has received instructions from the Engineer in respect thereof. The contractor shall be bound to give all notices required by statute, regulations or bye-laws as aforesaid and to pay all fees and taxes payable to any authority in respect thereof.
- 4. Communications to be in writing:-** All notices, communications, reference and complaints made by the DFCCIL or the Engineer or the Engineer's representative or the contractor inters concerning the work shall be in writing and no notice, communication, reference or complaint not in writing shall be recognized.
- 5. Service of Notices on Contractors:-**The contractor shall furnish to the Engineer the name designation and address of his authorized agent and all complaints, notices, communications and references shall be deemed to have been duly given to the contractor if delivered to the contractor or his authorized agent or left at or posted to the address so given and shall be deemed to have been so given in the case of posting on day on which they would have reached such address in the ordinary course of post or on the day on which they were so delivered or left. In the case of contract by partners, any change in the constitution of the firm shall be forthwith notified by the contractor to the Engineer.
- 6. Occupation and use of land:-**No land belonging to or in the possession of the Railway / DFCCIL/State govt. shall be occupied by the Contractor without the permission of the Railway / DFCCIL. The Contractor shall not use, or allow to be used, the site for any purposes other than that of executing the works. Whenever non-Railway bodies / persons are permitted to use Railway/State Govt. premises with competent authority's approval, conservancy

charges as applicable from time to time may be levied.

7. **Assignment or subletting of contract:-** The contractor shall not assign or sublet the contract or any part thereof or allow any person to become interested therein any manner whatsoever without the special permission in writing of the DFCCIL. Any breach of this condition shall entitle the DFCCIL to rescind the contract under clause 62 of these conditions and also render the contractor liable for payment to the DFCCIL in respect of any loss or damage arising or ensuing from such cancellation. Provided always that execution of the details of the work by petty contractor under the direct and personal supervision of the Contractor or his agent shall not be deemed to be sub-letting under this clause. The permitted subletting of work by the contractor shall not establish any contractual relationship between the sub- contractor and the DFCCIL and shall not relieve the contractor of any responsibility under the contract.
8. **Assistance by the DFCCIL for the Stores to be obtained by the Contractor:-** Owing to difficulty in obtaining certain materials (including Tools & Plant) in the market, the DFCCIL may have agreed without any liability therefore to endeavour to obtain or assist the contractor in obtaining the required quantities of such materials as may be specified in the tender. In the event of delay or failure in obtaining the required quantities of the aforesaid material the contractor shall not be deemed absolved of his own responsibility and shall keep in touch with day to day positions regarding their availability and accordingly adjust progress of works including employment of labour and the DFCCIL shall not in any way be liable for the supply of materials or for the non-supply thereof for any reasons whatsoever nor for any loss or damage arising in consequence of such delay or no supply.
9. **Deleted**
10. **Carriage of materials:-** No forwarding orders shall be issued by the DFCCIL for the conveyance of contractor's materials, tools and plant by Rail which may be required for use in the works and the contractor shall pay full freight charges at public tariff rates therefore.
11. **Deleted**
12. **Representation on Works:-** The contractor shall, when he is not personally present on the site of the works place and keep a responsible agent at the works

during working hours who shall on receiving reasonable notice, present himself to the Engineer and orders given by the Engineer or the engineer's representative to the agent shall be deemed to have the same force as if they had been given to the Contractor. Before absenting himself, the contractor shall furnish the name and address of his agent for the purpose of this clause and failure on the part of the Contractor to comply with this provision at any time will entitle the DFCCIL to rescind the contract under clause 62 of these conditions.

13. **Relics and Treasures:-** All gold, silver, oil and other minerals of any description and all precious stones, coins, treasures relics antiquities and other similar things which shall be found in or upon the site shall be the property of the DFCCIL and the Contractor shall duly preserve the same to the satisfaction of the DFCCIL and shall from time to time deliver the same to such person or persons as the DFCCIL may appoint to receive the same.
14. **Excavated material:-**The contractor shall not sell or otherwise dispose of or remove except for the purpose of this contract, the sand, stones, clay, ballast, earth, rock or other substances or materials which may be obtained from any excavation made for the purpose of the works or any building or produced upon the site at the time of delivery of the possession thereof but all the substances, materials, buildings and produce shall be the property of the DFCCIL provided that the contractor may, with the permission of the Engineer, use the same for the purpose of the works either free of cost or pay the cost of the same at such rates as may be determined by the Engineer.
15. **Indemnity by Contractors:-** The contractor shall indemnify and save harmless the Railway/DFCCIL from and against all actions, suit proceedings losses, costs, damages, charges, claims and demands of every nature and description brought or recovered against the Railways /DFCCIL by reason of any act or omission of the contractor, his agents or employees, in the execution of the works or in his guarding of the same. All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the actual loss or damage sustained, and whether or not any damage shall have been sustained.
- 16.(1) **Security Deposit:-** The earnest money deposited by the contractor with this tender will be retained by the Railways / DFCCIL as part of security for the due and faithful fulfilment of the contract by the contractor. The balance to make up the security deposit, the rates for which are given below, may be deposited by the contractor in cash or may be recovered by percentage deduction from the

contractor's "on account" bills. Provided also that in case of defaulting contractor the DFCCIL may retain any amount due for payment to the contractor on the pending "on account bills" so that the amounts so retained may not exceed 10% of the total value of the contract.

16.(2) Recovery of Security Deposit:- Unless otherwise specified in the special conditions, if any, the Security Deposit / rate of recovery / mode of recovery shall be as under:-

- (a) Security Deposit for each work should be 5% of the contract value.
- (b) The rate of recovery should be at the rate of 10% of the bill amount till the full security deposit is recovered.
- (c) Security Deposits will be recovered only from the running bills of the contract and no other mode of collecting SD such as SD in the form of instruments like BG(except Note (ii) below); FD etc. shall be accepted towards Security Deposit.
Security deposit shall be returned to the contractor after the expiry of the Defect Liability Period in all the cases other than Note (i) mentioned below and after passing the final bill based on No Claim Certificate with the approval of the Competent Authority. The Competent Authority shall normally be the authority who is competent to sign the contract. If this competent authority is of the rank lower than JA grade / CGM, DFCCIL, then JA grade officer / CGM, DFCCIL (Concerned with the work) should issue the certificate. The certificate, inter alia, should mention that the work has been completed in all respects and that all the contractual obligations have been fulfilled by the contractor and that there is no due from the contractor to Railways / DFCCIL against the contract concerned. Before releasing the SD, an unconditional and unequivocal no claim certificate from the contractor concerned should be obtained.

Note:

- (i) After the work is physically completed, security deposit recovered from the running bills of a contractor can be returned to him if he so desires, in lieu of FDR / irrevocable Bank Guarantee for equivalent amount to be submitted by him.
 - (ii) In case of contracts of value Rs.50 crore and above, irrevocable Bank Guarantee can also be accepted as a mode of obtaining security deposit.
- 16.(3)** No interest will be payable upon the Earnest Money and Security Deposit or amounts payable to the contractor under the contract, but Government Securities deposited in terms of Sub-clause (1) of this clause will be payable with interest accrued thereon.

16.(4) Performance Guarantee (P.G.)

The procedure for obtaining Performance Guarantee is outlined below:

- (a) The successful bidder shall have to submit a Performance Guarantee (PG) within 30 (thirty) days from the date of issue of Letter Of Acceptance (LOA). Extension of time for submission of PG beyond 30 (thirty) days and upto 60 days from the date of issue of LOA may be given by the Authority who is competent to sign the contract agreement. However, a penal interest of 15% per annum shall be charged for the delay beyond 30 (thirty) days, i.e. from 31st day after the date of issue of LOA. In case the contractor fails to submit the requisite PG even after 60 days from the date of issue of LOA, the contract shall be terminated duly forfeiting EMD and other dues, if any payable against that contract. The failed contractor shall be debarred from participating in re-tender for that work.
- (b) The successful bidder shall submit the performance Guarantee in any of the following forms amounting to 5% of the contract value:-
 - (i) Deleted
 - (ii) irrevocable Bank Guarantee
 - (iii) Government Securities including State Loan Bonds at 5 percent below the market value
 - (iv) Deposit receipts, pay orders, Demand Drafts and Guarantee Bonds. These forms of Performance Guarantee could be either of the State Bank of India or of any of the Nationalized Banks;
 - (v) Guarantee Bonds executed or Deposits Receipts tendered by all Scheduled Banks;
 - (vi) A Deposit in the Post Office Saving Bank;
 - (vii) A deposit in the National Savings Certificates.
 - (viii) Twelve years National Defence Certificates;
 - (ix) Ten years Defence Deposits;
 - (x) National Defence Bonds; and
 - (xi) Unit Trust Certificates at 5 per cent below market value or at the face value whichever is less.

Note: The instruments as listed above will also be acceptable for Guarantees in case of Mobilization advance.

- (c) The performance Guarantee shall be submitted by the successful bidder after the letter of acceptance has been issued, but before signing of the contract

agreement. The agreement should normally be signed within 30 **(thirty) days (however, in case of delay in submission of BG as per clause no. 16.4 (a), the agreement shall be executed within 60 days)** after the issue of LOA and the Performance Guarantee shall also be submitted within this time limit. This P. G. shall be initially valid up to the stipulated date of completion plus 60 days beyond that. In case, the time limit for completion of work gets extended, the contractor shall get the validity of Performance Guarantee extended to cover such extended time for completion of work plus 60 days.

- (d) The value of PG to be submitted by the contractor will not change for variation upto 25 % (either increase or decrease). In case during the course of execution, value of the contract increases by more than 25 % of the original contract value, an additional performance guarantee amounting to 5 % (five percent) for the excess value over the original contract value shall be deposited by the contractor.
- (e) The performance Guarantee (PG) shall be released after the physical completion of the work based on the 'completion certificate' issued by the competent authority stating that the contractor has completed the work in all respects satisfactorily. The security deposit shall, however, be released only after the expiry of the defect liability period and after passing the final bill based on 'No Claim Certificate' from the contractor.
- (f) Whenever the contract is rescinded, the security deposit shall be forfeited and the Performance Guarantee shall be encashed. The balance work shall be got done independently without risk and cost of the failed contractor, the failed contractor shall be debarred from participating in the tender for executing the balance work. If the failed contractor is a JV or a partnership firm, then every member / partner of such a firm shall be debarred from participating in the tender for the balance work in his / her individual capacity or as a partner of any other JV / partnership firm.
- (g) The Engineer shall not make a claim under the Performance Guarantee except for amounts to which the President of India / DFCCIL is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:
 - (i) Failure by the contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer may claim the full amount of the Performance Guarantee.

- (ii) Failure by the contractor to pay President of India / DFCCIL any amount due, either as agreed by the contractor or determined under any of the Clauses/conditions of the agreement, within 30 days of the service of the notice to the effect by Engineer.
- (iii) The contract being determined or rescinded under provision of the GCC the Performance Guarantee shall be forfeited in full and shall be absolutely at the disposal of the President of India.

17. Force Majeure Clause:- If at any time, during the continuance of this contract, the Performance in whole or in part by either party of any obligation under this contract shall be prevented or delayed by reason of any war, hostility, acts of public enemy, civil commotion, sabotage, serious loss or damage by fire, explosions, epidemics, strikes, lockouts or act of God (hereinafter, referred to events) provided, notice of the happening of any such event is given by either party to the other within 30 days from the date of occurrence thereof, neither party shall by reason of such event, be entitled to terminate this contract nor shall either party have any claim for damages against the other in respect of such non-performance of delay in performance, and works under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist, and the decision of the Engineer as to whether the works have been so resumed or not shall be final and conclusive, PROVIDED FURTHER that if the performance in whole or in part of any obligation under this contract is prevented or delayed by reason of any such event for a period exceeding 120 days, either party may at its option terminate the contract by giving notice to the other party.

17-A Extension of time in Contracts:- Subject to any requirement in the contract as to completion of any portion or portions of the works before completion of the whole, the contractor shall fully and finally complete the whole of the works comprised in the contract (with such modifications as may be directed under conditions of this contract) by the date entered in the contract or extended date in terms of the following clauses:-

- (i) **Extension due to modification:-** If any modifications have been ordered which in the opinion of the Engineer have materially increased the magnitude of the work, then such extension of the contracted date of completion may be granted as shall appear to the Engineer to be reasonable in the circumstances, provided moreover that the Contractor shall be responsible for requesting such extension of the date as may be considered necessary as soon as the cause

thereof shall arise and in any case not less than one month before the expiry of the date fixed for completion of the works.

- (ii) **Extension for delay not due to DFCCIL or Contractor:-** If in the opinion of the Engineer the progress of work has any time been delayed by any act or neglect of DFCCIL's employees or by other contractor employed by the DFCCIL under sub-clause (4) of clause 20 of these conditions or in executing the work not forming part of the contract but on which contractor's performance necessarily depends or by reasons of proceeding taken or threatened by or dispute with adjoining or to neighbouring owners or public authority arising otherwise through the Contractor's own default etc. or by the delay authorized by the Engineer pending arbitration or in consequences of the contractor not having received in due time necessary instructions from the DFCCIL for which he shall have specially applied in writing to the Engineer or his authorized representative then upon happening of any such event causing delay, the contractor shall immediately give notice thereof in writing to the Engineer within 15 days of such happening but shall nevertheless make constantly his best endeavours to bring down or make good the delay and shall do all that may be reasonably required of him to the satisfaction of the Engineer to proceed with the works. The contractor may also indicate the period for which the work is likely to be delayed and shall be bound to ask for necessary extension of time. The Engineer on receipt of such request from the contractor shall consider the same and shall grant such extension of time as in his opinion is reasonable having regard to the nature and period of delay and the type and quantum of work affected thereby.

No other compensation shall be payable for works so carried forward to the extended period of time, the same rates, terms and conditions of contract being applicable as if such extended period of time was originally provided in the original contract itself.

- (iii) **Extension for delay due to DFCCIL:-** In the event of any failure or delay by the DFCCIL to hand over the Contractor possession of the lands necessary for the execution of the works or to give the necessary notice to commence the works or to provide the necessary drawings or instructions or any other delay caused by the DFCCIL due to any other cause whatsoever, then such failure or delay shall in no way affect or vitiate the contract or alter the character thereof or entitle the contractor to damages or compensation therefore, but in any such case, the DFCCIL may grant such extension or extensions of the completion date as may be considered reasonable.

17-B Extension of time for delay due to contractor:- The time for the execution of the work or part of the works specified in the contract documents shall be deemed to be the essence of the contract and the works must be completed not later than the date(s) as specified in the contract. If the contractor fails to complete the works within the time as specified in the contract for the reasons other than the reasons specified in clause 17 and 17-A, the DFCCIL may, if satisfied that the works can be completed by the contractor within reasonable short time thereafter, allow the contractor for further extension of (Performa at Form No. 14) time as the Engineer may decide. On such extension the DFCCIL will be entitled without prejudice to any other right and remedy available on that behalf, to recover from the contractor as agreed damages and not by way of penalty a sum equivalent to $\frac{1}{2}$ of 1% of the contract value of the works for each week or part of the week.

For the purpose of this clause, the contract value of the works shall be taken as value of work as per contract agreement including any supplementary work order/contract agreement issued. Provided also, that the total amount of liquidated damages under this condition, shall not exceed the under noted percentage value or of the total value of the item or groups of items of work for which a separate distinct completion period is specified in the contract.

- (i) For contract value up to Rs. 2 lakhs - 10% of the total value of the contract
- (ii) For contracts valued above Rs. 2 lakhs- 10% of the first Rs.2 lakhs and 5% of the balance

Further competent authority while granting extension to the currency of contract under clause 17.(B) of GCC may also consider levy of token penalty as deemed fit based on the merit of the case. Provided further, that if the DFCCIL is not satisfied that the works can be completed by the Contractor and in the event of failure on the part of the contractor to complete the work within further extension of time allowed as aforesaid, the DFCCIL shall be entitled without prejudice to any other right or remedy available in that behalf, to appropriate the contractor's security deposit and rescind the contract under clause 62 of these conditions, whether or not actual damage is caused by such default.

18.(1) Illegal Gratification:- Any bribe, commission, gift or advantage given, promised or offered by or on behalf to the contractor or his partner, agent or servant or, anyone on his behalf, to any officer or employee of the DFCCIL, or to any person on his behalf in relation to obtaining or execution of this or any other contract

with the DFCCIL shall, in addition to any criminal liability which he may incur, subject contractor to the rescission of the contract and all other contracts with the DFCCIL and to the payment of any loss or damage resulting from such decision and the DFCCIL shall be entitled to deduct the amounts so payable from any moneys due to the Contractor(s) under this contract or any other contracts with the DFCCIL.

- 18.(2)** The contractor shall not lend or borrow from or have or enter into any monetary dealings and transactions either directly or indirectly with any employee of the DFCCIL and if he shall do so, the DFCCIL shall be entitled forthwith to rescind the contract and all other contracts with the DFCCIL. Any question or dispute as to the commission or any such offence or compensation payable to the DFCCIL under this clause shall be settled by the General Manager/ROB /CPM of the DFCCIL, in such a manner as he shall consider fit and sufficient and his decision shall be final and conclusive. In the event of rescission of the contract under this clause, the contractor will not be paid any compensation whatsoever except payments for the work done up to the date of rescission.

EXECUTION OF WORKS

- 19.(1) Contractor's understanding:-** It is understood and agreed that the contractor has, by careful examination, satisfied himself as to the nature and location of the work, the conformation of the ground, the character, quality and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the progress of the works, the general and local conditions, the labour conditions prevailing therein and all other matters which can in any way affect the works under the contract.
- 19.(2) Commencement of works:-**The contractor shall commence the works within 15 days after the receipt by him of an order in writing to this effect from the Engineer and shall proceed with the same with due expedition and without delay.
- 19.(3) Accepted Programme of work:-** The contractor who has been awarded the work shall as soon as possible but not later than 30 days after the date of receipt of the acceptance letter in respect of contracts with initial completion period of two years or less or not later than 90 days for other contracts have to submit the detailed programme of work indicating the time schedule of various items of works in the form of Bar Chart/PERT/CPM. He shall also submit the details of organization (in terms of labour and supervisors) plant and

machinery, that he intends to utilize (from time to time) for execution of the work within stipulated date of completion. The programme of work amended as necessary by discussions with the Engineer, shall be treated as the agreed programme of the work for the purpose of this contract and the contractor shall endeavour to fulfill this programme of work. The progress of work will be watched accordingly and the liquidated damages will be with reference to the overall completion date. Nothing stated herein shall preclude the contractor in achieving earlier completion of item or whole of the works than indicated in the programme.

- 19.(4) Setting out of works:-** The contractor shall be responsible for the correct setting out of all works in relation to original points, lines and levels of reference at his cost. The contractor shall execute the work true to alignment, grade, levels and dimensions as shown in the drawing and as directed by the Engineer's representative and shall check these at frequent intervals. The contractor shall provide all facilities like labour and instruments and shall co-operate with the Engineer's representative to check all alignment, grades, levels and dimensions. If, at any time, during the progress of the works any error shall appear or arise in any part of the work, the contractor, on being required so to do by the Engineer's representative shall, at his own cost rectify such errors, to the satisfaction of the Engineer's representative. Such checking shall not absolve the contractor of his own responsibility of maintaining accuracy in the work. The contractor shall carefully protect and preserve all bench marks, sight rails, pegs and other things used in setting out the work.
- 20.(1) Compliance to Engineer's instructions:-**The Engineer shall direct the order in which the several parts of the works shall be executed and the contractor shall execute without delay all orders given by the Engineer from time to time but the contractor shall not be relieved thereby from responsibility for the due performance of the works in all respects.
- 20.(2) Alterations to be authorized:-**No alterations in or additions to or omissions or abandonment of any part of the works shall be deemed authorized, except under instructions from the Engineer, and the contractor shall be responsible to obtain such instructions in each and every case in writing from the Engineer.
- 20.(3) Extra works:-** Should works over and above those included in the contract require to be executed at the site, the contractor shall have no right to be entrusted with the execution of such works which may be carried out by another contractor or contractors or by other means at the option of the DFCCIL.

- 20.(4) Separate contracts in connection with works:-** The DFCCIL shall have the right to let other contracts in connection with the works. The contractor shall afford other contractors reasonable opportunity for the storage of their materials and the execution of their works and shall properly connect and coordinate his work with theirs. If any part of the contractors work depends for proper execution or result upon the work of another contractor(s), the contractor shall inspect and promptly report to the Engineer any defects in such works that render it unsuitable for such proper execution and results. The contractor's failure so-to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of his work, except as to defects which may develop in the other contractor's work after the execution of his work.
- 21. Instruction of Engineer's Representative:-** Any instructions or approval given by the Engineer's representative to contractor in connection with the works shall bind the contractor as though it had been given by the Engineer provided always as follows:
- (a) Failure of the Engineer's representative to disapprove any work or materials shall not prejudice, the power of the Engineer thereafter to disapprove such work or material and to order the removal or breaking up thereof.
 - (b) If the Contractor shall be dissatisfied by reason of any decision of the Engineer's representative, he shall be entitled to refer the matter to the Engineer who shall there upon confirm or vary such decision.
- 22.(1) Adherence to specifications and drawings:-** The whole of the works shall be executed in perfect conformity with the specifications and drawings of the contract. If contractor performs any works in a manner contrary to the specifications or drawings or any of them and without such reference to the Engineer he shall bear all the costs arising or ensuing therefore and shall be responsible for all loss to the DFCCIL.
- 22.(2) Drawings and specifications of the works:-** The contractor shall keep one copy of drawings and specifications at the site, in good order, and such contract documents as may be necessary available to the Engineer or the Engineer's representative.
- 22.(3) Ownership of drawings and specifications:-** All drawings and specifications and copies thereof furnished by the DFCCIL to the Contractor are deemed to be the property of the DFCCIL. They shall not be used on other works

and with the exception of the signed contract set, shall be returned by the contractor to the DFCCIL on completion of the work or termination of the contract.

- 22.(4) Compliance with Contractor's request for details:-** The Engineer shall furnish with reasonable promptness, after receipt by him of the contractor's request for the same, additional instructions by means of drawings or otherwise, necessary for the proper execution of the works or any part thereof. All such drawing and instructions shall be consistent with the contract Documents and reasonably inferable there from.
- 22.(5) Meaning and intent of specification and drawings:-** If any ambiguity arises as to the meaning and intent of any portion of the specifications and drawings or as to execution or quality of any work or material, or as to the measurements of the works the decision of the Engineer thereon shall be final subject to the appeal (within 7 days of such decision being intimated to the contractor) to the Chief Engineer/ General Manager/CGM who shall have the power to correct any errors, omissions, or discrepancies in aforementioned items and whose decision in the matter in dispute or doubt shall be final and conclusive.
- 23 Working during night:-** The contractor shall not carry out any work between sun-set and sun-rise without the previous permission of the Engineer.
- 24. Damage to Railway / DFCCIL property or private life and property:-**The contractor shall be responsible for all risk to the work and for trespass and shall make good at his own expense all loss or damage whether to the works themselves or to any other property of the Railway or the lives, persons or property of others from whatsoever cause in connection with the works until they are taken over by the Railway / DFCCIL and this although all reasonable and proper precautions may have been taken by the contractor, and in case the Railway / DFCCIL shall be called upon to make good any costs, loss or damages, or to pay an compensation, including that payable under the provisions of the Workmen's Compensation Act or any statutory amendments thereof to any person or persons sustaining damages as aforesaid by reason of any act, or any negligence or omissions on the part of the contractor the amount of any costs or charges including costs and charges in connection with legal proceedings, which the Railway / DFCCIL may incur in reference thereto, shall be charged to the contractor. The Railway / DFCCIL shall have the power and right to pay or to defend or compromise any claim of threatened legal proceedings or in anticipation of legal proceedings being instituted consequent on the action or default of the

contractor, to take such steps as may be considered necessary or desirable to ward off or mitigate the effect of such proceedings, charging to contractor, as aforesaid any sum or sums of money which may be paid and any expenses whether for reinstatement or otherwise which may be incurred and the propriety of any such payment, defence or compromise, and the incurring of any such expenses shall not be called in question by the contractor.

25. Sheds, stores houses and Yards:-The contractor shall at his own expense provide himself with sheds, stores houses and yards in such situations and in such numbers as in the opinion of the Engineer is requisite for carrying on the works and the contractor shall keep at each such sheds, stores houses and yard a sufficient quantity of materials and plant in stock as not to delay the carrying out of the works with due expedition and the Engineer and the Engineer's representative shall have free access to the said sheds, store houses and yards at any time for the purpose of inspecting the stock of materials or plant so kept in hand, and any materials or plan which the Engineer may object to shall not be brought upon or used in the works, but shall be forthwith removed from the sheds, store houses or yards by the contractor. The contractor shall at his own expenses provide and maintain suitable mortar mills, soaking vats or any other equipments necessary for the execution of the works.

26. Provision of efficient and competent Staff at work sites by the Contractor:-

26.1 The contractor shall place and keep on the works at all times efficient and competent staff to give the necessary directions to his workmen and to see that they execute their work in sound and proper manner and shall employ only such supervisors, workmen and labourers in or about the execution of any of these works as are careful and skilled in the various trades.

26.2 The contractor shall at once remove from the works any agents, permitted sub-contractor, supervisor, workman or labourer who shall be objected to by the Engineer and if and whenever required by the Engineer, he shall submit a correct return showing the names of all staff and workmen employed by him.

26.3 In the event of the Engineer being of the opinion that the contractor is not employing on the works a sufficient number of staff and workmen as is necessary for the proper completion of the works within the time prescribed, the contractor shall forthwith on receiving intimation to this effect deploy the additional number of staff and labour specified by the Engineer within seven days of being so required and

failure on the part of the contractor to comply with such instructions will entitle the DFCCIL to rescind the contract under clause 62 of these conditions.

26A. Deployment of Qualified Engineers at Work Sites by the Contractor :-

26A.1 The contractor shall also employ Qualified Graduate Engineer or Qualified Diploma Holder Engineer, based on value of contract, as may be prescribed by the Ministry of Railways through separate instructions from time to time.

26A.2 In case the contractor fails to employ the Engineer, as aforesaid in Para 26A.1, he shall be liable to pay penalty at the rates, as may be prescribed by the Ministry of Railways through separate instructions from time to time for the default period for the provisions, as contained in Para 26A.1.

26A.3 Deleted

27.(1) Workmanship and testing:- The whole of the works and / or supply of materials specified and provided in the contract or that may be necessary to be done in order to form and complete any part thereof shall be executed in the best and most substantial workman like manner with materials of the best and most approved quality of their respective kinds, agreeable to the particulars contained in or implied by the specifications and as referred to in and represented by the drawings or in such other additional particulars, instructions and drawings may be found requisite to be given during the carrying on of the works and to the entire satisfaction of the Engineer according to the instructions and directions which the contractors may from time to time receive from the Engineer. The materials may be subjected to tests by means of such machines, instruments and appliances as the Engineer may direct and wholly at the expense of the contractor.

27.(2) Removal of improper work and materials:- The Engineer or the Engineer's Representative shall be entitled to order from time to time:

- (a) The removal from the site within the time specified in the order of any materials which in his opinion are not in accordance with the specifications or drawings.
- (b) the substitution of proper and suitable materials, and
- (c) the removal and proper re-execution, notwithstanding any previous tests thereof or on account payments therefore, of any work which in respect of

materials or workmanship; is not in his opinion in accordance with the specifications and in case of default on the part of the contractor in carrying out such order the DFCCIL shall be entitled to rescind the contract under clause 62 of these conditions.

- 28. Facilities for inspection:-** The contractor shall afford the Engineer and the Engineer's Representative every facility for entering in and upon every portion of the work at all hours for the purpose of inspection or otherwise and shall provide all labour, materials, planks, ladders, pumps, appliances and things of every kind required for the purpose and the Engineer and the Engineer's Representative shall at all times have free access to every part of the works and to all places at which materials for the works are stored or being prepared.
- 29. Examination of work before covering up:-** The contractor shall give 7 days' notice to the Engineer or the Engineer's representative whenever any work or materials are intended to be covered up in the earth, in bodies or walls or otherwise to be placed beyond the reach of measurements in order that the work may be inspected or that correct dimensions may be taken before being so covered, placed beyond the reach of measurement in default whereof, the same shall at the option of the Engineer or the Engineer's representative be uncovered and measured at the contractor's expense or no allowance shall be made for such work or materials.
- 30. Temporary Works:-** All temporary works necessary for the proper execution of the works shall be provided and maintained by the contractor and subject to the consent of the Engineer shall be removed by him at his expenses when they are no longer required and in such manner as the Engineer shall direct. In the event of failure on the part of the contractor to remove the temporary works, the Engineer will cause them to be removed and cost as increased by supervision and other incidental charges shall be recovered from the contractor. If temporary huts are provided by the contractor on the Railway / DFCCIL land for labour engaged by him for the execution of works, the contractor shall arrange for handing over vacant possession of the said land after the work is completed; if the contractor's labour refuse to vacate, and have to be rejected by the Railway / DFCCIL necessary expenses incurred by the Railway / DFCCIL in connection therewith shall be borne by the contractor.
- 31.(1) Contractor to supply water for works:-** Unless otherwise provided in the contract, the contractor shall be responsible for the arrangements to obtain supply of water necessary for the works.

31.(2) Deleted

31.(3) Deleted

31.(4)(a) Contractor to arrange supply of Electric power for works:- Unless otherwise provided in the contract, the contractor shall be responsible for arrangements to obtain supply of electric power for the works.

31.(4)(b) Deleted

32. Property in materials and plant:- The materials and plant brought by the Contractor upon the site or on the land occupied by the Contractor in connection with the works and intended to be used for the execution thereof shall immediately, they are brought upon the site of the said land, be deemed to be the property of the Railway / DFCCIL. Such of them as during the progress of the works are rejected by the Engineer under Clause 25 of these conditions or are declared by him not to be needed for the execution of the works or such as on the grant of the certificate of completion remain unused shall immediately on such rejection, declaration or grant cease to be deemed the property of the Railway / DFCCIL and the Contractor may then (but not before) remove them from the site or the said land. This clause shall not in any way diminish the liability of the Contractor nor shall the Railway / DFCCIL be in any way answerable for any loss or damage which may happen to or in respect of any such materials or plant either by the same being lost, stolen, injured or destroyed by fire, tempest or otherwise.

33.(1) Tools, Plant and Materials Supplied by DFCCIL:- The Contractor shall take all reasonable care of all tools, plant and materials or other property whether or a like description or not belonging to the DFCCIL and committed to his charge for the purpose of the works and shall be responsible for all damage or loss caused by him, his agents, permitted subcontractor, or his workmen or others while they are in his charge. The Contractors shall sign accountable receipts for tools, plants and materials made over to him by the engineer and on completion of the works shall hand over the unused balance of the same to the Engineer in good order and repair, fair wear and tear excepted, and shall be responsible for any failure to account for the same or any damage done thereto.

33.(2) Hire of DFCCIL / Railway's Plant:- The DFCCIL may hire to the Contractor such plant as concrete mixers, compressors and portable engines for use during execution of the works on such terms as may be specified in the special conditions

or in a separate agreement for Hire of Plant.

- 34.(1) Precaution during progress of works:-** During the execution of works, unless otherwise specified, the Contractor shall at his own cost provide the materials for and execute all shoring, timbering and strutting works as is necessary for the stability and safety of all structures, excavations and works and shall ensure that no damage, injury or loss is caused or likely to be caused to any person or property.
- 34.(2) Roads and Water courses:-** Existing roads or water courses shall not be blocked, cut through, altered, diverted or obstructed in any way by the Contractor, except with the permission of the Engineer. All compensations claimed for any unauthorized closure, cutting through, alterations, diversion or obstruction to such roads or water courses by the Contractor or his agent or his staff shall be recoverable from the Contractor by deduction from any sums which may become due to him in terms of contract, or otherwise according to law.
- 34.(3) Provision of access to premises:-** During progress of work in any street or thoroughfare, the Contractor shall make adequate provision for the passage of traffic, for securing safe access to all premises approached from such street or thoroughfare and for any drainage, water supply or means of lighting which may be interrupted by reasons of the execution of the works and shall react and maintain at his own cost barriers, lights and other safeguards as prescribed by the Engineer, for the regulation of the traffic, and provide watchmen necessary to prevent accidents. The works shall in such cases be executed night and day if so ordered by the Engineer and with such vigour so that the traffic way be impeded for as short a time as possible.
- 34.(4) Safety of Public:-** The Contractor shall be responsible to take all precautions to ensure the safety of the public whether on public or DFCCIL/Railway property and shall post such look out men as may in the opinion of the Engineer be required to comply with regulations pertaining to the work.
- 35. Deleted.**
- 36.(1) Suspension of works:-** The Contractor shall on the order of the Engineer, suspend the progress of the works or any part thereof for such time or times and in such manner as the Engineer may consider necessary and shall during such suspension properly protect and secure the work so far as is necessary in the opinion of the Engineer. If such suspension is:-

- (a) Provided for in the contract, or
- (b) Necessary for the proper execution of the works or by the reason of weather conditions or by some default on the part of the Contractor, and/or
- (c) Necessary for the safety of the works or any part thereof.

36.(2) The Contractor shall not be entitled to the extra costs, if any, incurred by him during the period of suspension of the works, but in the event of any suspension ordered by the Engineer for reasons other than aforementioned and when each such period of suspensions exceeds 14 days, the contractor shall be entitled to such extension of time for completion of the work as the Engineers may consider proper having regard to the period or periods of such suspensions and to such compensations as the Engineer may consider reasonable in respect of salaries or wages paid by the Contractor to his employees during the periods of such suspension.

36.(3) Suspension lasting more than 3 months:- If the progress of the works or any part thereof is suspended on the order of the Engineer for more than three months at a time, the Contractor may serve a written notice on the Engineer requiring permission within 15 days from the receipt thereof to proceed with the works or that part thereof in regard to which progress is suspended and if such permission is not granted within that time the Contractor by further written notice so served may, but is not bound to, elect to treat the suspension where it affects part only of the works as an omission of such part or where it affects the whole of the works, as an abandonment of the contract by the DFCCIL.

37. Rates for items of works:- The rates, entered in the accepted Schedule of Rates of the Contract are intended to provide for works duly and properly completed in accordance with the general and special (if any) conditions of the contract and the specifications and drawings together with such enlargements, extensions, diminutions, reductions, alterations or additions as may be ordered in terms of Clause 42 of these conditions and without prejudice to the generality thereof and shall be deemed to include and cover superintendence and labour, supply, including full freight, of materials, stores, patterns, profiles, moulds, fittings, centring, scaffolding, shoring props, timber, machinery, barracks, tackle, roads, pegs, posts, tools and all apparatus and plant required on the works, except such tools, plant or materials as may be specified in the contract to be supplied to the Contractor by the DFCCIL, the erection, maintenance and removal of all temporary works and, buildings, all watching, lighting, bailing, pumping and draining, all prevention of or compensation for trespass, all barriers and arrangements for the

safety of the public or of employees during the execution of works, all sanitary and medical arrangements for labour camps as may be prescribed by the DFCCIL, the setting of all work and of the construction, repair and upkeep of all centre lines, bench marks and level pegs thereon, site clearance, all fees duties, royalties, rent and compensation to owners for surface damage or taxes and impositions payable to local authorities in respect of land, structures and all material supplied for the work or other duties of expenses for which the Contractor may become liable or may be put to under any provision of law for the purpose of or in connection with the execution of the contract, and all such other incidental charges or contingencies as may have been specially provided for in the specifications.

38. Deleted

39.(1) Rates for extra items of works:- Any type of work carried out by the Contractor on the instructions of the Engineer which is not included in the accepted schedules of rates shall be executed at the rates set forth in the "Schedule of Rates of Railway" i.e. Schedule "D" in present tender modified by the tender percentage and such items are not contained in the latter, at the rate agreed upon between the Engineer and the Contractor before the execution of such items of work and the Contractors shall be bound to notify the Engineer at least seven days before the necessity arises for the execution of such items of works that the accepted schedule of rates does not include rate or rates for the extra work involved. The rates payable for such items shall be decided at the meeting to be held between the Engineer and Contractor, in as short a period as possible after the need for the special item has come to the notice. In case the Contractor fails to attend the meeting after being notified to do so or in the event of no settlement being arrived at, the DFCCIL shall be entitled to execute the extra works by other means and the Contractor shall have no claim for loss or damage that may result from such procedure.

39.(2) Provided that if the Contractor commences work or incurs any expenditure in regard thereto before the rates as determined and agreed upon as lastly hereunto fore-mentioned, then and in such a case the Contractor shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of determination of rates as aforesaid according to the rates as shall be fixed by the Engineer. However if the Contractor is not satisfied with the decision of the Engineer in this respect he may appeal to the CGM within 30 days of getting the decision of the Engineer, supported by analysis of the rates claimed. The CGM's decision after hearing both the parties in the matter would be final and binding on the Contractor and the DFCCIL.

- 40.(1) Handing over of works:-** The Contractor shall be bound to hand over the works executed under the contract to the DFCCIL complete in all respects to the satisfaction of the Engineer. The Engineer shall determine the date on which the work is considered to have been completed, in support of which his certificate shall be regarded as sufficient evidence for all purposes. The Engineer shall determine from time to time, the date on which any particular section of the work shall have been completed, and the contractor shall be bound to observe any such determination of the Engineer.
- 40.(2) Clearance of site on completion:-** On completion of works, the Contractor shall clear away and remove from the site all constructional plant, surplus materials, rubbish and temporary works of every kind and leave the whole of the site and works clean and in a workman like condition to the satisfaction of the Engineer. No final payment in settlement of the accounts for the works shall be paid, held to be due or shall be made to the, Contractor till, in addition to any other condition necessary for final payment, site clearance shall have been affected by him, and such clearance may be made by the Engineer at the expense of the Contractor in the event of his failure to comply with this provision within 7 days after receiving notice to that effect. Should it become necessary for the Engineer to have the site cleared at the expenses of the Contractor, the DFCCIL shall not be held liable for any loss or damage to such of the Contractor's property as may be on the site and due to such removal there from which removal may be effected by means of public sales of such materials and property or in such a way as deemed fit and convenient to the Engineer.

VARIATIONS IN EXTENT OF CONTRACT

- 41. Modification to contract to be in writing:** - In the event of any of the provisions of the contract requiring to be modified after the contract documents have been signed, the modifications shall be made in writing and signed by the DFCCIL and the Contractor and no work shall proceed under such modifications until this has been done. Any verbal or written arrangement abandoning, modifying, extending, reducing or supplementing the contract or any of the terms thereof shall be deemed conditional and shall not be binding on the DFCCIL unless and until the same is incorporated in a formal instrument and signed by the DFCCIL and the Contractor, and till then the DFCCIL shall have the right to repudiate such arrangements.
- 42.(1) Powers of modification to contract:-** The Engineer on behalf of the DFCCIL

shall be entitled by order in writing to enlarge or extend, diminish or reduce the works or make any alterations in their design, character position, site, quantities, dimensions or in the method of their execution or in the combination and use of materials for the execution thereof or to order any additional work to be done or any works not to be done and the contractor will not be entitled, to any compensation for any increase/reduction in the quantities of work but will be paid only for the actual amount of work done and for approved materials supplied against a specific order.

42.(2) (i) Unless otherwise specified in the contract, the accepted variation in quantity of each individual item of the contract would be up to 25% of the quantity originally contracted, except in case of foundation work. The contractor shall be bound to carry out the work at the agreed rates and shall not be entitled to any claim or any compensation whatsoever up to the limit of 25% variation in quantity of individual item of works.

(ii) In case of earthwork, the variation limit of 25% shall apply to the gross quantity of earth work and variation in the quantities of individual classifications of soil shall not be subject to this limit.

(i) In case of foundation work, no variation limit shall apply and the work shall be carried out by the contractor on agreed rates irrespective of any variation.

42.(3) Valuation of variations:- The enlargements, extensions, diminution, reduction, alterations or additions referred to in sub-clause (2) of this clause shall in no degree affect the validity of the contract but shall be performed by the Contractor as provided therein and be subject to the same conditions, stipulations and obligations as if they had been originally and expressively included and provided for in the specifications and drawings and the amounts to be paid therefore shall be calculated in accordance with the accepted schedule of rates. Any extra items / quantities of work falling outside the purview of the provisions of sub-clause (2) above shall be paid for at the rates determined under clause-39 of these conditions.

42.(4) Variations In Quantities During Execution Of Works Contracts :- The procedure detailed below shall be adopted for dealing with variations in quantities during execution of works contracts:

1. Individual NS items in contracts shall be operated with variation of plus or minus 25% and payment would be made as per the agreement rate.
2. In case an increase in quantity of an individual item by more than 25% of the agreement quantity is considered unavoidable, the same shall be got executed by floating a fresh tender. If floating a fresh tender for operating that item is considered not practicable, quantity of that item may be operated in excess of 125% of the agreement quantity subject to the following conditions:
 - (a) Operation of an item by more than 125% of the agreement quantity needs the approval of DFCCIL;
 - (i) Quantities operated in excess of 125% but up to 140% of the agreement quantity of the concerned item, shall be paid at 98% of the rate awarded for that item in that particular tender;
 - (ii) Quantities operated in excess of 140% but up to 150% of the agreement quantity of the concerned item shall be paid at 96% of the rate awarded for that item in that particular tender;
 - (iii) Variation in quantities of individual items beyond 150% will be prohibited and would be permitted only in exceptional unavoidable circumstances with the concurrence of associate finance and shall be paid at 96% of the rate awarded for that item in that particular tender.
 - (b) The variation in quantities as per the above formula will apply only to the Individual items of the contract and not on the overall contract value.
 - (c) Execution of quantities beyond 150% of the overall agreemental value should not be permitted and, if found necessary, should be only through fresh tenders or by negotiating with existing contractor, with approval of DFCCIL .
3. In cases where decrease is involved during execution of contract:
 - (a) The contract signing authority can decrease the items upto 25% of individual item.
 - (b) For decrease beyond 25% for individual items or 25% of contract agreement value, the approval of competent authority, after obtaining 'No Claim Certificate' from the contractor and with finance concurrence, giving detailed reasons for each such decrease in the quantities.

- (c) It should be certified that the work proposed to be reduced will not be required in the same work.
4. The limit for varying quantities for minor value items shall be 100% (as against 25% prescribed for other items). A minor value item for this purpose is defined as an item whose original agreement value is less than 1 % of the total original agreement value.
 5. No such quantity variation limit shall apply for foundation items.
 6. As far as SOR items are concerned, the limit of 25% would apply to the value of SOR schedule as a whole and not on individual SOR items. However, in case of NS items, the limit of 25% would apply on the individual items irrespective of the manner of quoting the rate (single percentage rate or individual item rate).
 7. - Deleted -
 8. - Deleted -
 9. - Deleted -
 10. The aspect of vitiation of tender with respect to variation in quantities should be checked and avoided. In case of vitiation of the tender (both for increase as well as decrease of value of contract agreement), sanction of the competent authority as per schedule of power of DFCCIL as per single tender should be obtained.

Note: Variation to be approved should be limited so as not to completely change the scope, character and purpose of the original contract.

CLAIMS

- 43.(1) Monthly Statement of Claims:-** The Contractor shall prepare and furnish to the Engineer once in every month an account giving full and detailed particulars of all claims for any additional expenses to which the Contractor may consider himself entitled to and of all extra or additional works ordered by the Engineer which he has executed during the preceding month and no claim for payment for and such work will be considered which has not been included in such particulars.

- 43.(2) Signing of “No Claim” Certificate:-** The Contractor shall not be entitled to make any claim whatsoever against the DFCCIL under or by virtue of or arising out of this contract, nor shall the DFCCIL entertain or consider any such claim, if made by the Contractor, after he shall have signed a “No Claim” Certificate in favour of the DFCCIL in such form as shall be required by the DFCCIL after the works are finally measured up. The contractor shall be debarred from disputing the correctness of the items covered by “No Claim” Certificate or demanding a clearance to arbitration in respect thereof.

MEASUREMENTS, CERTIFICATES AND PAYMENTS

- 44. Quantities in schedule annexed to Contract:-** The quantities set out in the accepted schedule of rates with items of works quantified are the estimated quantities of the works and they shall not be taken as the actual and correct quantities of the work to be executed by the Contractor in fulfilment of his obligations under the contract.
- 45. Measurement of works:-** The Contractor shall be paid for the works at the rates in the accepted schedule of rates and for extra works at rates determined under Clause 39 of these conditions on the measurements taken by the Engineer or the Engineer’s representative in accordance with the rules prescribed for the purpose by the DFCCIL. The quantities for items the unit of which in the accepted schedule of rates is 100 or 1000 shall be calculated to the nearest whole number, any; fraction below half being dropped and half and above being taken as one; for items the unit of which in the accepted schedule of rates is single, the quantities shall be calculated to two places of decimals. Such measurements will be taken of the work in progress from time to time and at such intervals as in the opinion of the Engineer shall be proper having regard to the progress of works. The date and time on which “on account” or final measurements are to be made shall be communicated to the Contractor who shall be present at the site and shall sign the results of the measurements (which shall also be signed by the Engineer or the Engineer’s representative) recorded in the official measurements book as an acknowledgement of his acceptance of the accuracy of the measures. Failing the Contractor’s attendance the work may be measured up in his absence and such measurements shall, notwithstanding such absence, be binding upon the Contractor whether or not he shall have signed the measurement books provided always that any objection made by him to measurement shall be duly investigated and considered in the manner set out below:-

- (a) It shall be open to the Contractor to take specific objection to any recorded measurements or Classification on any ground within seven days of the date of such measurements. Any re-measurement taken by the engineer or the Engineer's representative in the presence of the Contractor or in his absence after due notice has been given to him in consequence of objection made by the Contractor shall be final and binding on the Contractor and no claim whatsoever shall thereafter be entertained regarding the accuracy and classification of the measurements.
- (b) If an objection raised by the Contractor is found by the Engineer to be incorrect the Contractor shall be liable to pay the actual expenses incurred in measurements.

46.(1) "On-Account" Payments:- The Contractor shall be entitled to be paid from time to time by way of "One-Account" payment only for such works as in the opinion of the Engineer's or the Engineer's representative's has executed in terms of the contract.

All payments due on the Engineer's or the Engineer's representative's certificates of measurements shall be subject to any deductions which may be made under these presents and shall further be subject to, unless otherwise required by Clause 16 of these conditions, a retention of ten percent by way of security deposits, until the amount of security deposit by way of retained earnest money and such retentions shall amount to 10% of the total value of the contract provided always that the Engineer may by any certificate make any correction or modification in any previous certificate which shall have been issued by him and that the Engineer may withhold any certificate if the works or any part thereof are not being carried out to his satisfaction.

46.(2) Rounding off amounts:- The total amount due on each certificate shall be rounded off to the nearest rupee i.e. sum less than 50 paise shall be omitted and sums of 50 paise and more upto Re. 1/- will be reckoned as Re. 1/-

46.(3) On Account Payments not prejudicial to final settlement:- "On-Account" payments made to the Contractor shall be without prejudice to the final making up of the accounts (except where measurements are specifically noted in the Measurement Book as "Final Measurements" and as such have been signed by the Contractor) and shall in no respect be considered or used as evidence of any facts stated in or to be inferred from such accounts nor of any particular quantity of work having been executed nor of the manner of its execution being

satisfactory.

- 46.(4) Manner of payment:** - Unless otherwise specified payments to the Contractor will be made by cheque but no cheque will be issued for an amount less than Rs. 100/-

46A PRICE VARIATION CLAUSE:

- 46A.1** The amounts payable to the contractor and valued at base prices in accordance with Scheduled shall be adjusted for rises or falls in the cost of labour, materials, fuel, cement and steel occurring during operative period, by addition or deduction of the amounts determined by the formulae prescribed in this sub clause. To the extent that full compensation for any rise or fall in costs to the contract, the Contract Price shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.

The amounts to be added to or deducted from the On Account Payment / RA Bill for changes in cost shall be determined from the following formula.

$$V_n = V_1 + V_2 + V_3 + V_4 + V_5$$

Where,

V_n = Amount to be added to or deducted from RA Bill.

V_1 = Amount to be added or deducted from RA Bill for changes in cost due to labour

V_2 = Amount to be added or deducted from RA Bill for changes in cost due to material other than Cement, Steel and POL.

V_3 = Amount to be added or deducted from RA Bill for changes in cost due to POL.

V_4 = Amount to be added or deducted from RA Bill for changes in cost due to Cement.

V_5 = Amount to be added or deducted from RA Bill for changes in cost due to Steel (including HTS).

I. Formula for Labour Component (V_1) –

$$V_1 = 0.85 \times P \times K_1 / 100 \times (C_1 - C_0) / C_{0s}$$

Where,

V_1 = Amount to be added to or deducted from RA Bill for changes in cost due to labour.

P = Cost of work done during the under consideration.

K_1 = Percentage of Labour component as stated in Table given below.

C_0 = Consumer price index number (Base 2001 = 100) for Industrial Workers taken as a Surat, as published in RBI Bulletin during the month of opening the bids.

C_1 = Consumer price index number (Base 2001 = 100) for Industrial Workers taken as a Surat, as Published in RBI Bulletin, for the month preceding the month of last day of the period to which the RA Bill pertains to.

II. Formula for Material Component (V_2) –

$$V_2 = 0.85 \times P \times K_2 / 100 \times (I_1 - I_0) / I_0$$

Where,

V_2 = Amount to be added or deducted from RA Bill for changes in cost due to material.

P = Cost of work done during the period under consideration.

K_2 = Percentage of Materials component (excluding Steel, POL and Cement) as stated in Table given below.

I_0 = Wholesale price index number for ALL COMMODITIES as published in RBI Bulletin during the month of opening the bids.

I_1 = Wholesale price index number for ALL COMMODITIES as published in RBI Bulletin, for the month preceding the month of last day of the period to which the RA Bill pertains to.

III. Formula for Petrol, Oil & Lubricants (POL) Components (V_3) –

$$V_3 = 0.85 \times P \times K_3 / 100 \times (P_1 - P_0) / P_0$$

Where,

V_3 = Amount to be added to or deducted from RA Bill for changes in cost due to POL.

P = Cost of Work done during the period under consideration.

K_3 = Percentage of Petrol Oil & Lubricant Component as stated in Table given below.

P_0 = Index number for Wholesale Price in India **(II) Mineral Oils** as published in RBI Bulletin during the month opening the bids.

P_1 = Index number for Wholesale Price in India **(II) Mineral Oils** as published in RBI Bulletin for the month preceding the month of last day of the period to which the RA Bill pertains to.

Formula for Cement Component (V_4) –

$$V_4 = 0.85 \times P \times K_4 / 100 \times (CM_1 - CM_0) / CM_0$$

Where,

V_4 = Amount to be added to or deducted from RA Bill changes in cost due to cement.

P = Cost of work done during the period under consideration.

K_4 = Percentage of Cement as stated in **Table given below**.

CM_0 = Index number for Wholesale Price in India **(III) Manufactured Product (I) Non-Metallic Products (c) Cement** as published in RBI Bulletin during the month opening the bids.

CM_1 = Index number for Wholesale Price in India **(III) Manufactured Product (I) Non-Metallic Products (c) Cement** as published in RBI Bulletin for the month preceding the month of last day of the period to which the RA Bill pertains to.

IV. Formula for Steel Component (V_5) –

$$V_5 = 0.85 \times P \times K_5 / 100 \times (S_Q - S_B) / S_B$$

Where,

V_4 = Amount to be added to or deducted from RA Bill for changes in cost due to cement.

P = Cost of work done during the period under consideration.

K_5 = Percentage of steel as stated in **Table given below**.

S_Q = The index Number of commodities ‘MS Bright Bars of group item (d) Mild Steel-Long Products under (N) MANUFACTURE OF BASIC METAL’ of Wholesale Price Index published by Office of Economic Adviser, Govt. of India, Ministry of Commerce & Industry Department of Industrial Policy & Promotion (DIPP) in the month on the day 28 days prior to the last day of the period to which a particular RA Bill is related.

S_B = The index Number of commodities ‘MS Bright Bars of group item (d) Mild Steel-Long Products under (N) MANUFACTURE OF BASIC METAL’ of Wholesale Price Index published by Office of Economic Adviser, Govt. of India, Ministry of Commerce & Industry Department of Industrial Policy & Promotion (DIPP) in the month on the day 28 days prior to the closing date of submission of Bids.

Following percentage will govern the adjustment for the entire Contract:

Labour (K ₁)	- 22.5
POL (K ₃)	- 12.5
Cement (K ₄)	- 10
Steel (K ₅)	- 40
Other Materials (K ₂)	- 15

The following conditions shall prevail for adjustment of changes in cost:

- i. The operative period of the contract shall mean the period commencing from the date of work order issued to the Contractor and ending on the date on which the time allowed for the completion of the works specified in the contract for work expires, taking into consideration the extension of time, if any, for completion of contract of contract in Cases other than those where such extension is necessitated on account of default of the Contractor. The decision of the Employer as regards the operative period of the contract shall be final and binding on the contractor on account of delay in completion or inadequate progress under the relevant contract provisions, the price adjustment amount for the balance of work from the date of levy of liquidated damages shall be worked out by pegging the respective indices to the levels corresponding to the date from which such liquidated damages are levied or by taking the indices of the month preceding the month to which RA Bill pertains, whichever is favourable to the Employer.
- ii. The price variation under these clauses shall not be payable for any additional atoms required to be executed during the completion of the work.
- iii. These clause is operative both ways, i.e if the price variation as calculated above is on the plus side, payment on account of the price variation shall be allowed to the Contractor and if it is on the negative side, the Employer shall be entitled to recover the same from Contractor and amount shall be deductible from any amount due and payable under the contract.
- iv. To the extent that full compensation for any rise or fall in costs to the Contractor is not entirely covered by the provision of this or other clauses in the contract, the contract prices included in the contract shall be deemed to include to cover the contingency of such other actual rise fall in costs.

46A.2 Price Variation During Extended Period of Contract

The price adjustment as worked out above, i.e. either increase or decrease shall be applicable up to the stipulated date of completion of work including the extended period of completion where such extension has been granted under Clause 17-A of the General Conditions of Contract. However, where extension of time has been granted due to contractor's failure under Clause 17-B of the General Conditions of Contract, price adjustment shall be done as follows:

- (a) In case the indices increase above the indices applicable to the last month of original completion period or the extended period under Clause 17-A, the price adjustment for the period of extension granted under Clause 17-B shall be limited to the amount payable as per the Indices applicable to the last month of the original completion period or the extended period under Clause 17-A of the General Conditions of Contract; as the case may be.
- (b) In case the indices fall below the indices applicable to the last month of original/extended period of completion under Clause 17-A, as the case may be; then the lower indices shall be adopted for the price adjustment for the period of extension under Clause 17-B of the General Conditions of Contract.

47.0 Maintenance of works:- The Contractor shall at all times during the progress and continuance of the works and also for the period of maintenance specified in the Tender Form after the date of passing of the certificate of completion by the Engineer or any other earlier date subsequent to the completion of the works that may be fixed by the Engineer be responsible for and effectively maintain and uphold in good substantial, sound and perfect condition all and every part of the works and shall make good from time to time and at all times as often as the Engineer shall require, any damage or defect that may during the above period arise in or be discovered or be in any way connected with the works, provided that such damage or defect is not directly caused by errors in the contract documents, act of providence or insurrection or civil riot, and the contractor shall be liable for and shall pay and make good to the DFCCIL or other persons legally entitled thereto whenever required by the Engineer so to do, all losses, damages, costs and expenses they or any of them may incur or be put or be liable to by reasons or in consequence of the operations of the Contractor or of his failure in any respect.

48.(1) Certificate of completion of works:- As soon as in the opinion of the Engineer, the works has been completed and has satisfactorily passed any final test or

tests that may be prescribed, the Engineer shall issue a certificate of completion duly indicating the date of completion in respect, of the work and the period of maintenance of the work shall commence from the date of completion mentioned in such certificate. The Engineer may also issue such a certificate indicating date of completion with respect to any part of the work (before the completion of the whole of work), which has been both completed to the satisfaction of the Engineer and occupied or used by the DFCCIL. When any such certificate is given in respect of part of a work, such part shall be considered as completed and the period of maintenance of such part shall commence from the date of completion mentioned in the completion certificate issued for that part of the work.

48.(2) Contractor not absolved by completion Certificate:- The Certificate of completion in respect of the works referred to in sub-clause (1) of this clause shall not absolve the Contractor from his liability to make good any defects imperfections, shrinkages or faults which may appear during the period of maintenance specified in the tender arising in the opinion of the Engineer from materials or workmanship not in accordance with the drawings or specifications or instruction of the Engineer, which defects, imperfections, shrinkages or faults shall upon the direction in writing of the Engineer be amended and made good by the Contractor at his own cost: and in case of default on the part of Contractor the Engineer may employ labour and materials or appoint another Contractor to amend and make good such defects, imperfections, shrinkages and faults and all expenses consequent thereon and incidental thereto shall be borne by the Contractor and shall be recoverable from any moneys due to him under the contract.

49.0 Approval only by maintenance Certificate:- No certificate other than maintenance certificate referred to in Clause 50 of the conditions shall be deemed to constitute approval of any work or other matter in respect of which it is issued or shall be taken as an admission of the due performance of the contract or any part thereof or of the accuracy of any claim or demand made by the Contractor or of additional varied work having been ordered by the Engineer nor shall any other certificate conclude or prejudice any of the powers of the Engineer.

50.(1) Maintenance Certificate:- The Contract shall not be considered as completed until a Maintenance Certificate shall have been signed by the Engineer stating that the works have been completed and maintained to his satisfaction. The Maintenance Certificate shall be given by the Engineer upon the expiration of the period of maintenance or as soon thereafter as any works ordered during such period pursuant to sub clause (2) Clause 48 of these conditions shall have been

completed to the satisfaction of the Engineer and full effect shall be given to this Clause notwithstanding the taking possession of or using the works or any part thereof by the DFCCIL.

50.(2) Cessation of DFCCIL Liability: - The DFCCIL shall not be liable to the Contractor for any matter arising out of or in connection with the contract of the execution of the works unless the contractor shall have made a claim in writing in respect thereof before the issue of the Maintenance Certificate under this clause.

50.(3) Unfulfilled Obligations:- Notwithstanding the issue of the Maintenance certificate the Contractor and (subject to sub-clause 2 of this clause) the DFCCIL shall remain liable for the fulfilment of any obligation incurred under the provision of the contract prior to the issue of the maintenance Certificate which remains unperformed at the time such certificate is issued and for the purposes of determining the nature and extent of any such obligations the contract shall be deemed to remain in force between the parties thereto.

51.(1) Final Payment:- On the Engineer's certificate of completion in respect of the works, adjustment shall be made and the balance of account based on the Engineer or the Engineer's representative's certified measurements of the total quantity of work executed by the contractor upto the date of completion and on the accepted schedule or rates and for extra works on rates determined under Clause 39 of these conditions shall be paid to the Contractor subject always to any deduction which may be made under these presents and further subject to the Contractor having delivered to the Engineer either a full account in detail of all claims he may have on the DFCCIL in respect of the works or having delivered "No Claim Certificate" and the Engineer having after the receipt of such account given a certificate in writing that such claims are correct, that the whole of the works to be done under the provisions of the Contracts have been completed, that they have been inspected by him since their completion and found to be in good and substantial order, that all properties, works and things, removed, disturbed or injured in consequence of the works have been properly replaced and made good and all expenses and demands incurred by or made upon the DFCCIL for or in the respect of damage or loss by from or in consequence of the works, have been satisfied agreeably and in conformity with the contract.

51.(2) Post Payment Audit:- It is an agreed term of contract that the DFCCIL reserves to itself the right to carry out a post-payment audit and or technical examination of the works and the final bill including all supporting vouchers, abstracts etc. and to

make a claim on the contractor for the refund any excess amount paid to him if as a result of such examination any over-payment to him is discovered to have made in respect of any works done or alleged to have been done by him under the contract.

51A. Production of vouchers etc. by the Contractor:-

- (i) For a contract of more than one crore of rupees, the contractor shall, whenever required, produce or cause to be produced for examination by the Engineer any quotation, invoice, cost or other account, book of accounts, voucher, receipt, letter, memorandum, paper of writing or any copy of or extract from any such document and also furnish information and returns verified in such manner as may be required in any way relating to the execution of this contract or relevant for verifying or ascertaining cost of execution of this contract (the decision of the engineer on the question of relevancy of any documents, information or return being final and binding in the parties).The contractor shall similarly produce vouchers; etc., if required to prove to the Engineer, that materials supplied by him, are in accordance with the specifications laid down in the contract.
- (ii) If any portion of the work in a contract of value more than one crore of rupees be carried out by a sub-contractor or any subsidiary or allied firm or company (as per Clause 7 of the General Conditions of Contract),the Engineer shall have power to secure the books of such sub-contract or any subsidiary or allied firm or company, through the contractor, and such books shall be open to his inspection.
- (iii) The obligations imposed by sub clause (i) & (ii) above is without prejudice to the obligations of the contractor under any statute rules or orders binding on the contractor.

52.0 Withholding and lien in respect of sums claimed:- Whenever any claim or claims for payment of a sum of money arises out of or under the contract against the contractor, the DFCCIL shall be entitled to withhold and also have a lien to retain such sum or sums in whole or in part from the security, if any, deposited by the contractor and for the purpose aforesaid, the DFCCIL shall be entitled to withhold the said cash security deposit or the security if any, furnished as the case may be and also have a lien over the same pending finalization or adjudication of any such claim. In the event of the security being insufficient to cover the claimed amount or amounts or if no security has been taken from the contractor, the DFCCIL shall be entitled to withhold and have a lien to the extent of the such claimed amount or amounts referred to supra, from any sum or sums

found payable or which at any time thereafter may become payable to the contractor under the same contract or any other contract with this or any other DFCCIL or any Department of the Central Government pending finalization or adjudication of any such claim.

It is an agreed term of the contract that the sum of money or moneys so withheld or retained under the lien referred to above, by the DFCCIL will be kept withheld or retained as such by the DFCCIL till the claim arising out of or under the contract is determined by the arbitrator (if the contract governed by the arbitration clause) or by the competent court as the case may be and that the contractor will have no claim for interest or damages whatsoever on any account in respect of such withholding or retention under the lien referred to supra and duly notified as such to the contractor. For the purpose of this clause, where the contractor is a partnership firm or a limited company, the DFCCIL shall be entitled to withhold and also have a lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner/limited company, as the case may be whether in his individual capacity or otherwise.

52A. Lien in respect of claims in Other Contracts:-

- (i) Any sum of money due and payable to the contractor (including the security deposit returnable to him) under the contract may be withheld or retained by way of lien by the DFCCIL, against any claim of this or any other DFCCIL or any other Department of the Central Government in respect of a payment of a sum of money arising out of or under any other contract made by the contractor with this or any other Department of the Central Government.
- (ii) However, recovery of claims of DFCCIL in regard to terminated contracts may be made from the Final Bills, Security Deposits and Performance Guarantees of other contract or contracts, executed by the contractor. The Performance Guarantees submitted by the Contractor against other contracts, if required, may be withheld and encashed. In addition, 10% of each subsequent 'on-account bill' may be withheld, if required, for recovery of DFCCIL's dues against the terminated contract.
- (iii) It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the DFCCIL will be kept withheld or retained as such by the DFCCIL till the claim arising out of or under any other contract is either mutually settled or determined by arbitration, if the other contract is governed by arbitration clause or by the competent court as the case may be and contractor shall have no claim for interest or damages whatsoever on this account or on any other ground in respect of any sum of money withheld or retained under this clause and duly notified as such to the contractor.

- 53.0 Signature on Receipts for Amounts:-** Every receipt for money which may become payable or for any security which may become transferable to the Contractors under these presents, shall, if signed in the partnership name by anyone of the partners of a Contractor's firm be a good and sufficient discharge to the DFCCIL in respect of the moneys or security purported to be acknowledged thereby and in the event of death of any of the Contractor, partners during the pendency of the contract it is hereby expressly agreed that every receipt by anyone of the surviving Contractor partners shall if so signed as aforesaid be good a sufficient discharge as aforesaid provided that nothing in this clause contained shall be deemed to prejudice or effect any claim which the DFCCIL may hereafter have against the legal representative of any contractor partner so dying for or in respect to any breach of any of the conditions of the contract, provided also that nothing in this clause contained shall be deemed to prejudice or effect the respective rights or obligations of the Contractor partners and of the legal representatives of any deceased Contractor partners interse.

LABOUR

- 54.0 Wages to Labour:-** The Contractor shall be responsible to ensure compliance with the provision of the Minimum Wages Act, 1948 (hereinafter referred to as the "said Act" and the Rules made there under in respect of any employees directly or through petty contractors or subcontractors employed by him on road construction or in building operations or in stone breaking or stone crushing for the purpose of carrying out this contract.

If, in compliance with the terms of the contract, the Contractor supplied any labour to be used wholly or partly under the direct orders and control of the DFCCIL whether in connection with any work being executed by the Contractor or otherwise for the purpose of the DFCCIL such labour shall, for the purpose of this clause, still be deemed to be persons employed by the Contractor.

If any moneys shall, as a result of any claim or application made under the said Act be directed to be paid by the DFCCIL, such money shall be deemed to be moneys paid by it as aforesaid within seven days after the same shall have been demanded, the DFCCIL shall be entitled to recover the same from any moneys due or accruing to the Contractor under this or any other Contract with the DFCCIL.

- 54A. Apprentices Act:-** The Contractor shall be responsible to ensure compliance with the provisions of the Apprentices Act, 1961 and the Rules and Orders issued

there under from time to time in respect of apprentices directly or through petty contractors or sub-contractors employed by him for the purpose of carrying out the Contract.

If the contractor directly or through petty contractors or sub-contractors fails to do so, his failure will be a breach of the contract and the DFCCIL may, in its discretion, rescind the contract. The contractor shall also be liable for any pecuniary liability arising on account of any violation of the provisions of the Act.

Note: The contractors are required to engage apprentices when the works undertaken by them last for a period of one year or more and / the cost of works is rupees one lakh or more.

55.0 Provisions of payments of Wages Act: - The Contractor shall comply with the provisions of the Payment of Wages Act, 1936 and the rules made there under in respect of all employees directly or through petty contractors or sub-contractors employed by him in the works. If In compliance with the terms of the contract, the Contractor directly or through petty contractors of sub-contractors shall supply any labour to be used wholly or partly under the direct orders and control of the Engineer whether in connection with the works to be executed hereunder or otherwise for the purpose of the Engineer such labour shall never the less be deemed to comprise persons employed by the contractor and any moneys which may be ordered to be paid by the Engineer shall be deemed to be moneys payable by the Engineer on behalf of the Contractor and the Engineer may on failure of the contractor to repay such money to the DFCCIL deduct the same from moneys due to contractor in the terms of contract. The DFCCIL shall be entitled to deduct from any moneys due to the contractor (whether under this contract or any other contract) all moneys paid or payable by the DFCCIL by the way of compensation of aforesaid or for costs of expenses in connection with any claim thereto and the decision of the Engineer upon any question arising out of the effect or force of this clause shall be final and binding upon the Contractor.

55A. Provisions of Contract labour (Regulation and Abolition) Act, 1970:

55A.(1) The contractor shall comply with the provision of the contract labour (Regulation and Abolition) Act, 1970 and the Contract labour (Regulation and Abolition) Central Rules 1971 as modified from time to time, wherever applicable and shall also indemnify the DFCCIL from and against any claims under the aforesaid Act and the Rules.

55A.(2) The Contractor shall obtain a valid licence under the aforesaid Act as modified from time to time before the commencement of the work and continue to have a valid licence until the completion of the work. Any failure to fulfil the requirement shall attract the penal provision of the Contract arising out of the resultant non-execution of the work.

55A.(3) The Contractor shall pay to the labour employed by him directly or through subcontractors the wages as per provision of the aforesaid Act and the Rules wherever applicable. The Contractor shall notwithstanding the provisions of the contract to the contrary, cause to be paid the wages to labour indirectly engaged on the works including any engaged by subcontractors in connection with the said work, as if the labour had been immediately employed by him.

55A.(4) In respect of all labour directly or indirectly employed in the work for performance of the contractor's part of, the contract, the Contractor shall comply with or cause to be complied with the provisions of the aforesaid Act and Rules wherever applicable.

55A.(5) In every case in which, by virtue of the provisions of the aforesaid Act or the Rules, the DFCCIL is obliged to pay any amount of wages to a workman employed by the Contractor or his sub-contractor in execution of the work or to incur any expenditure on account of the Contingent, liability of the DFCCIL due to the contractor's failure to fulfil his statutory obligations under the aforesaid Act or the rules the DFCCIL will recover from the Contractor, the amount of wages so paid or the amount of expenditure so incurred, and without prejudice to the rights of the DFCCIL under the section 20, sub-section (2) and section 2, sub-section (4) of the aforesaid Act, the DFCCIL shall be at liberty to recover such amount or part thereof by deducting it from the security deposit and/ or from any sum due by the DFCCIL to the contractor whether under the contract or otherwise. The DFCCIL shall not be bound to contest any claim made against it under sub-section (1) of section 20 and sub-section (4) of section 21 of the aforesaid Act except on the written request of the contractor and upon his giving to the DFCCIL full security for all costs for which the DFCCIL might become liable in contesting such claim. The decision of the DFCCIL regarding the amount actually recoverable from the contractor as stated above shall be final and binding on the Contractor.

55B. Provisions of Employees Provident Fund and Miscellaneous Provisions Act, 1952 :

The Contractor shall comply with the provisions of Para 30 & 36-B of the Employees Provident Fund Scheme, 1952; Para 3 & 4 of Employees' Pension Scheme, 1995; and Para 7 & 8 of Employees Deposit Linked Insurance Scheme, 1976; as modified from time to time through enactment of "Employees Provident Fund & Miscellaneous Provisions Act, 1952", wherever applicable and shall also indemnify the DFCCIL from and against any claims under the aforesaid Act and the Rules.

55C. Provisions of "The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996" and "The Building and Other Construction Workers' Welfare Cess Act, 1996" :

The tenderers, for carrying out any construction work, must get themselves registered with the Registering Officer under Section-7 of the Building and Other Construction Workers Act, 1996 and rules made thereto by the concerned State Govt. and submit certificate of Registration, issued from the Registering Officer of the concerned State Govt. (Labour Dept.). As per this Act, the tenderer shall be levied a cess @1% of cost of construction work, which would be deducted from each bill. Cost of material, when supplied under a separate schedule item, shall be outside the purview of cess.

56.0 Reporting of Accidents of Labour:- The Contractor shall be responsible for the safety of all employees directly or through petty contractors or sub- contractor employed by him on the works and shall report serious accidents to any of them however and wherever occurring on the works to the Engineer or the Engineers Representative and shall made every arrangements to render all possible assistance.

57.0 Provision of Workmen's Compensation Act:- In every case in which by virtue of the provisions of section 12 sub-section (1) of the Workmen's Compensation Act 1923, DFCCIL is obliged to pay compensation to a workman directly or through petty contractor or subcontractor employed by the Contractor in executing the work, DFCCIL will recover from the Contractor the amount of the compensation so paid, and, without prejudice to the rights of DFCCIL under Section 12 Sub-section (2) of the said Act, DFCCIL shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by DFCCIL to the Contractor whether under these conditions or otherwise, DFCCIL shall not be bound to contest any claim made against it under Section 12 Sub-section (1) of the said Act except on the written request of the Contractor and upon his giving to DFCCIL full security for all costs for which DFCCIL might become liable in consequence of contesting such claim.

- 57A. Provision of Mines Act:-** The contractor shall observe and perform all the provisions of the Mines Act, 1952 or any statutory modifications or re-enactment thereof for the time being in force and any rules and regulations made there under in respect of all the persons directly or through the petty contractors or sub-contractors employed by him under this contract and shall indemnify the DFCCIL from and against any claims under the Mines Act, or the rules and regulations framed there under, by or on behalf of any persons employed by him or otherwise.
- 58.0 DFCCIL not to provide quarters for Contractors:-** No quarters shall normally be provided by the DFCCIL for the accommodation of the contractor or any of his staff employed on the work.
- 59.(1) Labour Camps:-** The contractor shall at his own expense make adequate arrangements for the housing, supply of drinking water and provision of latrines and urinals for his staff and workmen, directly or through the petty contractors or sub-contractors and for temporary crèche (Bal-mandir) where 50 or more women are employed at a time. Suitable sites on DFCCIL land, if available, may be allotted to the contractor for the erection of labour camps, either free of charge or on such terms and conditions that may be prescribed by the DFCCIL. All camp sites shall be maintained in clean and sanitary conditions by the contractor at his own cost.
- 59.(2) Compliance to rules for employment of labour:-** The contractor(s) shall conform to all laws, by-laws rules and regulations for the time being in force pertaining to the employment of local or imported labour and shall take all necessary precautions to ensure and preserve the health and safety of all staff employed directly or through petty contractors or sub-contractors on the works.
- 59.(3) Preservation of peace:-** The contractor shall take requisite precautions and use his best endeavours to prevent any riotous or unlawful behaviour by or amongst his workmen and other employed directly or through the petty contractors or sub-contractors on the works and for the preservation of peace and protection of the inhabitants and security of property in the neighbourhood of the works. In the event of the DFCCIL requiring the maintenance of a special Police Force at or in the vicinity of the site during the tenure of works, the expenses thereof shall be borne by the contractor and if paid by the DFCCIL shall be recoverable from the contractor.

- 59.(4) Sanitary arrangements:-** The contractor shall obey all sanitary rules and carry out all sanitary measures that may from time to time be prescribed by the Railway Medical Authority and permit inspection of all sanitary arrangements at all times by the Engineer, the Engineer's Representative of the Medical staff of the DFCCIL. Should the contractor fail to make the adequate sanitary arrangements, these will be provided by the DFCCIL and the cost therefore recovered from the contractor.
- 59.(5) Outbreak of infectious disease:-** The contractor shall remove from his camp such labour and their families as refuse protective inoculation and vaccination when called upon to do so by the Engineer or the Engineer's representative on the advice of the DFCCIL. Should cholera, plague or other infectious disease break out, the contractor shall burn the huts, beddings, clothes and other belongings of or used by the infected parties and promptly erect new huts on health sites as required by the engineer, failing which within the time specified in the Engineer's requisition, the work may be done by the DFCCIL and the cost therefore recovered from the contractor.
- 59.(6) Deleted**
- 59.(7) Medical facilities at site: -** The Contractor shall provide medical facilities at the site as may be prescribed by the Engineer on the advice of the DFCCIL in relation to the strength of the Contractor's resident staff and workmen.
- 59.(8) Use of intoxicants: -** The sale of ardent spirits or other intoxicating beverages upon the work or in any of the buildings, encampments or tenements owned, occupied by or within the control of the contractor or any of his employees shall be forbidden and the Contractor shall exercise his influence and authority to the utmost extent to secure strict compliance with this condition.
- 59.(9) Non-employment of female labour: -** The Contractor shall see that the employment of female labour on / in Cantonment areas, particularly in the neighbourhood of soldier's barracks, should be avoided as far as possible.
- 59.(10) Restrictions On The Employment Of Retired Engineers Of Railway/DFCCIL Services Within one Year Of Their Retirement :** The Contractor shall not, if he is a retired Government Engineer of Gazetted rank, himself engage in or employ or associate a retired Government Engineer of Gazetted rank, who has not completed one year from the date of retirement, in connection with this contract in any manner whatsoever without obtaining prior permission of the President and if the Contractor is found to have contravened this provision it will constitute a

breach of contract and administration will be entitled to terminate the contract and forfeit Earnest Money Deposits (EMD), Performance Guarantee (PG) and Security Deposits (SD) of that contract.

- 60.(1) Non-employment of labours below the age of 15:-** the Contractor shall not employ children below the age of 15 as labourers directly or through petty contractors or subcontractors for the execution of work.
- 60.(2) Medical Certificate of fitness for labour:-** It is agreed that the contractor shall not employ a person above 15 and below 19 years of age for the purpose of execution of work under the contract unless a medical certificate of fitness in the prescribed form (Proforma at Form No.15) granted to him by a certifying surgeon certifying that he is fit to work as an adult is obtained and kept in the custody of the contractor or a person nominated by him in this behalf and the person carries with him, while at work; a token giving a reference to such certificate. It is further agreed that the responsibility for having the adolescent examined medically at the time of appointment or periodically till he attains the age of 19 years shall devolve entirely on the contractor and all the expenses to be incurred on this account shall be borne by him and no fee shall be charged from the adolescent or his parent for such medical examination.
- 60.(3) Period of validity of medical fitness certificate:-** A certificate of fitness granted or renewed for the above said purposes shall be valid only for a period of one year at a time. The certifying surgeon shall revoke a certificate granted or renewed if in his opinion the holder of it is, no longer fit for work in the capacity stated therein. Where a certifying surgeon refuses to grant or renew a certificate or revoke a certificate, he shall, if so required by the person concerned, state his reasons in writing for doing so.
- 60.(4) Medical re-examination of labourer:-** Where any official appointed in this behalf by the Ministry of labour is of the opinion that any person employed in connection with the execution of any work under this contract in the age group 15 to 19 years is without a certificate of fitness or is having a certificate of fitness but no longer fit to work in the capacity stated in the certificate, he may serve on the Contractor, or on the person nominated by him in the regard, a notice requiring that such persons shall be examined by a certifying surgeon and such person shall not if the concerned official so directs, be employed or permitted to do any work under this contract unless he has been medically examined and certified that he has been granted a certificate of fitness or a fresh certificate of fitness, as the case may be.

EXPLANATIONS:

- (1) Only qualified medical practitioners can be appointed as “Certifying Surgeons” and the term “Qualified Medical Practitioners” means a person holding a qualification granted by an authority specified in the Schedule to the Indian Medical Degrees Act, 1916 (VII to 1916) or in the Schedule to the Indian Medical Council Act, 1933 (XXVII) of 1933.
- (2) The Certifying surgeon may be a medical officer in the service of State or Municipal Corporation.

DETERMINATION OF CONTRACT

- 61.(1) Right of DFCCIL of determine the contract:-** The DFCCIL shall be entitled to determine and terminate the contract at any time should, in the DFCCIL’s opinion, the cessation of work becomes necessary owing to paucity of funds or from any other cause whatever, in which case the value of approved materials at site and of work done to date by the Contractor will be paid for in full at the rate specified in the contract. Notice in writing from the DFCCIL of such determination and the reasons therefore shall be conclusive evidence thereof.
- 61.(2) Payment on determination of contract:-** Should the contract be determined under sub clause (1) of this clause and the Contractor claims payment for expenditure incurred by him in the expectation of completing the whole of the work, the DFCCIL shall admit and consider such claims as are deemed reasonable and are supported by vouchers to the satisfaction of the Engineer. The DFCCIL’s decision on the necessity and propriety of such expenditure shall be final and conclusive.
- 61.(3)** The contractor shall have no claim to any payment of compensation or otherwise, howsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not derive in consequence of determination of contract.
- 62.(1) Determination of contract owing to default of contractor: -** If the Contractor should: -
- (i) Becomes bankrupt or insolvent, or
 - (ii) Make an arrangement with of assignment in favour of his creditors, or agree

- to carry out the contract under a Committee of Inspection of his creditors, or
- (iii) Being a Company or Corporation, go into liquidation (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), or
 - (iv) Have an execution levied on his goods or property on the works, or
 - (v) Assign the contract or any part thereof otherwise than as provided in Clause 7 of these conditions, or
 - (vi) Abandon the contract, or
 - (vii) Persistently disregard the instructions of the Engineer, or contravene any provision of the contract, or
 - (viii) Fail to adhere to the agreed programme of work by a margin of 10% of the stipulated period, or
 - (ix) Fail to remove materials from the site or to pull down and replace work after receiving from the Engineer notice to the effect that the said materials or works have been condemned or rejected under clause 25 and 27 of these conditions, or
 - (x) Fail to take steps to employ competent or additional staff and labour as required under clause 26 of the conditions
 - (xi) Fail to afford the Engineer or Engineer's representative proper facilities for inspecting the work or any part thereof as required under clause 28 of the conditions, or
 - (xii) Promise, offer or give any bribe, commission, gift or advantage either himself or through his partner, agent or servant to any officer or employee of the DFCCIL or to any person on his or on their behalf in relation to the execution of this or any other contract with this DFCCIL.
 - (xiii)(A) At any time after the tender relating to the contract, has been signed and submitted by the Contractor, being a partnership firm admit as one of its partners or employee under it or being an incorporated company elect or nominate or allow to act as one of its directors or employee under it in any capacity whatsoever any retired engineer of the gazetted rank or any other retired gazetted officer working before his retirement, whether in the

executive or administrative capacity, or whether holding any pensionable post or not, in the DFCCIL for the time being owned and administered by the President of India before the expiry of one year from the date of retirement from the said service of such Engineer or Officer unless such Engineer or Officer has obtained permission from the President of India or any officer duly authorized by him in this behalf to become a partner or a director or to take employment under the contract as the case may be, or

(xiii) (B) Fail to give at the time of submitting the said tender:-

- (a) The correct information as to the date of retirement of such retired engineer or retired officer from the said service, or as to whether any such retired engineer or retired officer was under the employment of the Contractor at the time of submitting the said tender, or
- (b) The correct information as to such engineers or officers obtaining permission to take employment under the contractor, or
- (c) Being a partnership firm, the correct information as to, whether any of its partners was such a retired engineer or a retired officer, or
- (d) Being in incorporated company, correct information as to whether any of its directors was such a retired engineer or a retired officer, or
- (e) Being such a retired engineer or retired officer suppress and not disclose at the time of submitting the said tender the fact of his being such a retired engineer or a retired officer or make at the time of submitting the said tender a wrong statement in relation to his obtaining permission to take the contract or if the contractor be a partnership firm or an incorporated company to be a partner or director of such firm or company as the case may be or to seek employment under the contractor.

Then and in any of the said clause, the Engineer on behalf of the DFCCIL may serve the Contractor with a notice (Pro-forma at Form No.16) in writing to that effect and if the contractor does not within seven days after the delivery to him of such notice proceed to make good his default in so far as the same is capable of being made good and carry on the work or comply with such directions as aforesaid of the entire satisfaction of the Engineer, the DFCCIL shall be entitled after giving 48 hours notice (Pro-forma at Form No. 17) in writing under the hand of the Engineer to rescind the contract as a whole or in part or parts (as may be specified in such notice) and after expiry of 48 hours notice, a final termination notice (Proforma at Form No. 18) should be issued and adopt the following courses:

To measure up or the whole or part of the work from which the contractor has been removed and get it completed by another contractor, the manner

and method in which such work is completed shall be in the entire discretion of the Engineer whose decision shall be final.

62.(2) Right of DFCCIL after, rescission of contract owing to default of contractor:

In the event of any or several of the courses, referred to in sub-clause (1) of the clause, being adopted.

- (a) the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any commitments or made any advances on account of or with a view to the execution of the works or the performance of the contract and contractor shall not be entitled to recover or be paid any sum for any work thereto for actually performed under the contract unless and until the Engineer shall have certified the performance of such work and the value payable in respect thereof and the contractor shall only be entitled to be paid the value so certified.
- (b) The Engineer or the Engineer's representative shall be entitled to take possession of any materials, tools, implements, machinery and buildings on the works or on the property on which these are being or ought to have been executed, and to retain and employ the same in the further execution of the works or any part thereof until the completion of the works without the contractor being entitled to any compensation for the use and employment thereof or for wear and tear or destruction thereof.
- (c) The Engineer shall as soon as may be practicable after removal of the contractor fix and determine ex-parte or by or after reference to the parties or after such investigation or enquiries as he may consider fit to make or institute and shall certify what amount(if any) had at the time of rescission of the contract been reasonably earned by or would reasonably accrue to the contractor in respect of the work then actually done by him under the contract and what was the value of any unused, or partially used materials, any constructional plan and any temporary works upon the site. The legitimate amount due to the contractor after making necessary deductions and certified by the Engineer should be released expeditiously.

STATEMENT OF DISPUTES - INDIAN RAILWAY ARBITRATION RULES

63.0 Matters finally determined by the DFCCIL – All disputes and differences of any kind whatsoever arising out of or in connection with the contract, whether during the progress of the work or after its completion and whether before or after the determination of the contract, shall be referred by the contractor to the Director /General Manager/CPM, DFCCIL and the Director/General Manager/CPM, DFCCIL shall within 120 days after receipt of the contractor's representation make and notify decisions on all matters referred to by the contractor in writing provided that matter for which provision has been made in clauses 8, 18, 22.(5), 39, 43.(2), 45.(a), 55, 55A.(5), 57, 57A, 61.(1), 61.(2) and 62.(1) to (xiii)(B) of General Conditions of contract or in any special clause of the conditions of the contract shall be deemed as 'excepted matters' (matters not arbitrable) and decisions of the DFCCIL authority, thereon shall be final and binding on the contractor; provided further that 'excepted matters' shall stand specifically excluded from the purview of the arbitration clause.

64. (1) Demand for Arbitration:-

64. (1) (i) In the event of any dispute or difference between the parties hereto as to the construction or operation of this contract, or the respective rights and liabilities of the parties on any matter in question, dispute or difference on any account or as to the withholding by the DFCCIL of any certificate to which the contractor may claim to be entitled to, or if the DFCCIL fails to make a decision within 120 days, then and in any such case, but except in any of the 'excepted matters' referred to in clause 63 of these conditions, the contractor, after 120 days but within 180 days of his presenting his final claim on disputed matters shall demand in writing that the dispute or difference be referred to arbitration.

64.(1) (ii) The demand for arbitration shall specify the matters which are in question, or subject of the dispute or difference as also the amount of claim item wise. Only such dispute or difference, in respect of which the demand has been made, together with counter claims or set off, given by the DFCCIL, shall be referred to arbitration and other matters shall not be included in the reference.

64.(1) (iii) (a) The arbitration proceedings shall be assumed to have commenced from the day, a written and valid demand for arbitration is received by the DFCCIL.

(b) The claimant shall submit his claim stating the facts supporting the claims along with all the relevant documents and the relief or remedy sought against each claim within a period of 30 days from the date of appointment of the Arbitral Tribunal.

(c) The DFCCIL shall submit its defence statement and counter claim(s), if any, within a period of 60 days of receipt of copy of claims from Tribunal thereafter, unless otherwise extension has been granted by Tribunal.

(d) The place of arbitration would be New Delhi/Mumbai. The decision of DFCCIL shall be final and binding.

64.(1) (iv) No new claim shall be added during proceedings by either party. However, a party may amend or supplement the original claim or defence thereof during the course of arbitration proceedings subject to acceptance by Tribunal having due regard to the delay in making it.

64.(1) (v) – If the contractor(s) does/do not prefer his/their specific and final claims in writing, within a period of 90 days of receiving the intimation from the DFCCIL that the final bill is ready for payment, he/they will be deemed to have waived his/their claim(s) and the DFCCIL shall be discharged and released of all liabilities under the contract in respect of these claims.

64.(2) Obligation During Pendency of Arbitration:– Work under the contract shall, unless otherwise directed by the Engineer, continue during the arbitration proceedings, and no payment due or payable by the DFCCIL shall be withheld on account of such proceedings, provided, however, it shall be open for Arbitral Tribunal to consider and decide whether or not such work should continue during arbitration proceedings.

64.(3) Appointment of arbitrator

64.(3)(a)(i) In cases where the total value of all claims in question added together does not exceed Rs.25,00,000 (Rupees twenty five lakhs only), the Arbitral tribunal shall consist of a sole arbitrator nominated by the MD/DFCCIL. The sole arbitrator shall be appointed within 60 days from the day when a written and valid demand for arbitrator is received by MD/DFCCIL .

64.(3)(a)(ii) In cases not covered by the clause 64(3)(a)(i), the Arbitral Tribunal shall consist of a Panel of three officials, as the arbitrators. For this purpose, the DFCCIL will send a panel of more than 3 names of DFCCIL officers which may also include the name(s) of Officer(s) empanelled to work as Arbitrator to the contractor within 60 days from the day when a written and valid demand for arbitration is received by the MD/DFCCIL. Contractor will be asked to suggest to MD/DFCCIL at least 2 names out of the panel for appointment as contractor's nominee within 30 days

from the date of dispatch of the request by DFCCIL. The MD/DFCCIL shall appoint at least one out of them as the contractor's nominee and will, also simultaneously appoint the balance number of arbitrators either from the panel or from outside the panel, duly indicating the 'presiding arbitrator' from amongst the 3 arbitrators so appointed. MD/DFCCIL shall complete this exercise of appointing the Arbitral Tribunal within 30 days from the receipt of the names of contractor's nominees. While nominating the arbitrators it will be necessary to ensure that one of them is from the Accounts department. An officer of selection grade of accounts department shall be considered of equal status to the officers in SA grade of other department of DFCCIL for the purpose of appointment of arbitrator.

64.(3)(a)(iii) If one or more of the arbitrators appointed as above refuses to act as arbitrator, withdraws from his office as arbitrator, or vacates his/their office/offices or is/are unable or unwilling to perform his functions as arbitrator for any reason whatsoever or dies or in the opinion of the MD/DFCCIL fails to act without undue delay, the MD/DFCCIL shall appoint new arbitrator/arbitrators to act in his/their place in the same manner in which the earlier arbitrator/arbitrators had been appointed. Such re-constituted tribunal may, at its discretion, proceed with the reference from the stage at which it was left by the previous arbitrator(s).

64.(3) (a) (iv) The arbitral Tribunal shall have power to call for such evidence by way of affidavits or otherwise as the arbitral Tribunal shall think proper, and it shall be the duty of the parties hereto to do or cause to be done all such things as may be necessary to enable the arbitral Tribunal to make the award without any delay. The arbitral Tribunal should record day-to-day proceedings. The proceedings shall normally be conducted on the basis of documents and written statements.

64.(3)(a)(v) While appointing arbitrator(s) under sub-clause (i), (ii) & (iii) above, due care shall be taken that he/they is/are not the one/those who had an opportunity to deal with the matters to which the contract relates or who in the course of his/their duties as DFCCIL servant(s) expressed views on all or any of the matters under dispute or differences. The proceedings of the arbitral Tribunal or the award made by such Tribunal will, however, not be invalid merely for the reason that one or more arbitrator had, in the course of his service, opportunity to deal with the matters to which the contract relates or who in the course of his/their duties expressed views on all or any of the matters under dispute.

64.(3)(b)(i) The arbitral award shall state item wise, the sum and reasons upon which it is based. The analysis and reasons shall be detailed enough so that the award could

be inferred there from.

- 64.(3)(b)(ii)** A party may apply for corrections of any computational errors, any typographical or clerical errors or any other error of similar nature occurring in the award of a tribunal and interpretation of a specific point of award to tribunal within 60 days of receipt of the award.
- 64.(3)(b)(iii)** A party may apply to tribunal within 60 days of receipt of award to make an additional award as to claims presented in the arbitral proceedings but omitted from the arbitral award.
- 64.(4)** In case of the Tribunal, comprising of three Members, any ruling on award shall be made by a majority of Members of Tribunal. In the absence of such a majority, the views of the Presiding Arbitrator shall prevail.
- 64.(5)** Where the arbitral award is for the payment of money, no interest shall be payable on whole or any part of the money for any period till the date on which the award is made.
- 64.(6)** The cost of arbitration shall be borne by the respective parties. The cost shall inter-alia include fee of the arbitrator(s), as per the rates fixed by the DFCCIL from time to time and the fee shall be borne equally by both the parties.
- 64.(7)** Subject to the provisions of the aforesaid Arbitration and Conciliation Act 1996 and the rules there under and any statutory modifications thereof shall apply to the arbitration proceedings under this clause.

JOINT VENTURE (JV) FIRMS IN WORKS TENDERS

- 65.0 Participation of Joint Venture (JV) Firms In Works Tender:** This Clause shall be applicable for works tenders of value as approved and communicated by Railway Board /DFCCIL from time to time.
- 65.1** Separate identity / name shall be given to the Joint Venture Firm.
- 65.2** Number of members in a JV Firm shall not be more than three.
- 65.3** A member of JV Firm shall not be permitted to participate either in individual capacity or as a member of another JV Firm in the same tender.

- 65.4** The tender form shall be purchased and submitted only in the name of the JV Firm and not in the name of any constituent member.
- 65.5** Normally Earnest Money Deposit (EMD) shall be submitted only in the name of Employer “Dedicated Freight Corridor Corporation of India Limited” A/C JV Firm and not in the name of constituent member. However, in exceptional cases EMD in the name of Employer “Dedicated Freight Corridor Corporation of India Limited” A/C JV Firm and in the name of Lead Member can be accepted subject to written confirmation from JV members to the effect, that EMD submitted by the Lead Member may be deemed as EMD submitted by JV Firm.
- 65.6** One of the members of the JV Firm shall be its Lead Member who shall have a majority (at least 51%) share of interest in the JV Firm and also, must have satisfactorily completed in the last three previous financial years and the current financial year upto the date of opening of the tender, one similar single work for a minimum value of 35% of advertised tender value and as defined in technical eligibility criteria. The other members shall have a share of not less than 20% each in case of JV Firms with upto three members. In case of JV Firm with foreign member(s), the Lead Member has to be an Indian Firm with a minimum share of 51%.
- 65.7** A copy of Memorandum of Understanding (MoU) executed by the JV members shall be submitted by the JV Firm along with the tender. The complete details of the members of the JV Firm, their share and responsibility in the JV Firm etc. particularly with reference to financial, technical and other obligations shall be furnished in the MOU. (The MOU format for this purpose is enclosed along with the tender, Form No. 9).
- 65.8** Once the tender is submitted, the MoU shall not be modified / altered / terminated during the validity of the tender. In case the tenderer fails to observe/comply with this stipulation, the full Earnest Money Deposit (EMD) shall be liable to be forfeited.
- 65.9** Approval for change of constitution of JV Firm shall be at the sole discretion of the Employer (DFCCIL). The constitution of the JV Firm shall not be allowed to be modified after submission of the tender bid by the JV Firm, except when modification becomes inevitable due to succession laws etc. and in any case the minimum eligibility criteria should not get vitiated. However, the Lead Member shall continue to be the Lead Member of the JV Firm. Failure to observe this requirement would render the offer invalid.

- 65.10** Similarly, after the contract is awarded, the constitution of JV Firm shall not be allowed to be altered during the currency of contract except when modification become inevitable due to succession laws etc. and in any case the minimum eligibility criteria should not get vitiated. Failure to observe this stipulation shall be deemed to be breach of contract with all consequential penal action as per contract conditions.
- 65.11** On award of contract to a JV Firm, a single Performance Guarantee shall be submitted by the JV Firm as per tender conditions. All the Guarantees like Performance Guarantee, Bank Guarantee for Mobilization Advance, Machinery Advance etc. shall be accepted only in the name of the JV Firm and no splitting of guarantees amongst the members of the JV Firm shall be permitted.
- 65.12** On issue of LOA (Letter Of Acceptance), an agreement among the members of the JV Firm (to whom the work has been awarded) shall be executed and got registered before the Registrar of the Companies under Companies Act or before the Registrar/Sub-Registrar under the Registration Act, 1908. This JV Agreement shall be submitted by the JV Firm to the DFCCIL before signing the contract agreement for the work. In case the tenderer fails to observe/comply with this stipulation, the full Earnest Money Deposit (EMD) shall be forfeited and other penal actions due shall be taken against partners of the JV and the JV. This Joint Venture Agreement shall have, inter-alia, following Clauses :
- 65.12.1** Joint And Several Liability - Members of the JV Firm to which the contract is awarded, shall be jointly and severally liable to the Employer (DFCCIL) for execution of the project in accordance with General and Special Conditions of Contract. The JV members shall also be liable jointly and severally for the loss, damages caused to the Railways / DFCCIL during the course of execution of the contract or due to non-execution of the contract or part thereof.
- 65.12.2** Duration of the Joint Venture Agreement - It shall be valid during the entire currency of the contract including the period of extension, if any and the defect liability period after the work is completed.
- 65.12.3** Governing Laws - The Joint Venture Agreement shall in all respect be governed by and interpreted in accordance with Indian Laws.
- 65.13** Authorized Member - Joint Venture members shall authorize one of the members on behalf of the Joint Venture Firm to deal with the tender, sign the agreement or enter into contract in respect of the said tender, to receive payment, to witness joint

measurement of work done, to sign measurement books and similar such action in respect of the said Tender/contract. All notices/correspondences with respect to the contract would be sent only to this authorized member of the JV Firm.

65.14 No member of the Joint Venture Firm shall have the right to assign or transfer the interest right or liability in the contract without the written consent of the other members and that of the employer (DFCCIL) in respect of the said tender/contract.

65.15 Documents to be enclosed by the JV Firm along with the tender:

65.15.1 In case one or more of the members of the JV Firm is/are partnership firm(s), following documents shall be submitted:

(a) Notary certified copy of the Partnership Deed,

(b) Consent of all the partners to enter into the Joint Venture Agreement on a stamp paper of appropriate value (in original).

(c) Power of Attorney (duly registered as per prevailing law) in favour of one of the partners of the partnership firm to sign the JV Agreement on behalf of the partnership firm and create liability against the firm.

65.15.2 In case one or more members is/are Proprietary Firm or HUF, the following documents shall be enclosed:

Affidavit on Stamp Paper of appropriate value declaring that his/her Concern is a Proprietary Concern and he/she is sole proprietor of the Concern OR he/she is in position of "KARTA" of Hindu Undivided Family (HUF) and he/she has the authority, power and consent given by other partners to act on behalf of HUF.

65.15.3 In case one or more members is/are limited companies, the following documents shall be submitted:

(a) Notary certified copy of resolutions of the Directors of the Company, permitting the company to enter into a JV agreement, authorizing MD or one of the Directors or Managers of the Company to sign JV Agreement, such other documents required to be signed on behalf of the Company and enter into liability against the company and/or do any other act on behalf of the company.

(b) Copy of Memorandum and Articles of Association of the Company.

(c) Power of Attorney (duly registered as per prevailing law) by the Company authorizing the person to do/act mentioned in the para (a) above.

65.15.4 Deleted

65.16 Credentials & Qualifying Criteria : Technical and financial eligibility of the JV Firm shall be adjudged based on satisfactory fulfillment of the following criteria :

65.16.1 Technical Eligibility Criteria : As defined in Preamble and General Instructions to tenderers.

65.16.2 Financial Eligibility Criteria : As defined in Preamble and General Instructions to tenderers.

PRE-CONTRACT INTEGRITY PACT

PART-I
CHAPTER IV (B)

Annexure – I

PRE CONTRACT INTEGRITY PACT

1.4.1 General

This pre-bid pre-contract Agreement (hereinafter called the Integrity Pact) is made on _____ day of the month of _____ 2019, between, on one hand, the DFCCIL acting through Shri _____ Designation of the officer, (hereinafter called the CLIENT, which expression shall mean and include, unless the context otherwise requires, his successors in office and assigns) of the First Part and M/s _____ represented by Shri _____, Chief Executive Officer (hereinafter called the “BIDDER/SELLER” which expression shall mean and include, unless the context otherwise requires, his successors and permitted assigns) of the Second part.

WHEREAS the CLIENT proposes to procure (Name of the Stores/Equipment/Item, Name of the Consultancy Service, Name of works Contract, Name of Services) and the [A] is willing to offer/has offered for stores or works.

WHEREAS the [A] is a private company/public company/Government undertaking/partnership/ registered export agency, constituted in accordance with the relevant law in the matter and the CLIENT is a PSU performing its functions on behalf of the President of India.

NOW, THEREFOR,

To avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to:-

Enabling the CLIENT to obtain the desired said (Name of the Stores/Equipment/Items, Name of the Consultancy Service, Name of Works Contract, Name of Services) at a competitive price in conformity with the defined specifications by avoiding the high cost and the distortionary impact of corruption on public procurement, and

Enabling BIDDERS to abstain from bribing or including in any corrupt practice in order to secure [B] by providing assurance to them that their competitors will also abstain from bribing

and other corrupt practices and the CLIENT will commit to prevent corruption, in any form, by its officials by following transparent procedures.

The parties hereto hereby agree to enter into Integrity Pact and agree as follows:

Commitments of the CLIENT

- 1.1 The CLIENT undertakes that no official of the CLIENT, connected directly or indirectly with the [B], will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefits or any other advantage from the [A] either for themselves or for any person, organization or third party related to the [B], in exchange for the advantage in the bidding process, bid evaluation, contracting or implementation process related to the [B].
- 1.2 The CLIENT will, during the pre-contract stage, treat all BIDDERS alike, and will provide to all BIDDERS the same information and will not provide any such information to any particular BIDDER which could afford an advantage to that particular[A] in comparison to other BIDDERS.
- 1.3 All the officials of the CLIENT will report to the appropriate Government office any attempted or completed breaches of the above commitments as well as any substantial suspicion of such a breach.
2. In case any such preceding misconduct on the part of such official (s) is reported by the [A] to the CLIENT with full and verifiable facts and the same is prima facie found to be correct by the CLIENT, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by the CLIENT and such a person shall be debarred from further dealings related to the [B] process. IN such a case while an enquiry is being conducted by the CLIENT the proceedings under the [B] would not be stalled.

Commitments of BIDDERS

3. The [A] commits itself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of its bid or during any pre-contract or post-contract stage in order to secure the [B] contract or in furtherance to secure it and in particular committee itself to the following:-

- 3.1 The [A] will not offer, directly or through intermediaries any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the CLIENT, conducted directly or indirectly with the bidding process, or to any person, organisation or third party related to the [B] in exchange for any advantage in the bidding, evaluation, contracting and implementation of the [B].
- 3.2 The [A] further undertakes that it has not given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the CLIENT or otherwise in procuring the Contract of forbearing to do or having done any act in relation to the obtaining or execution of the [B] or any other [B] with the Government for showing or forbearing to show favour or disfavour to any person in relation to the [B] or any other [B] with the Government.
- 3.3 [A] shall disclose the name and address of agents and representatives and Indian [A] shall disclose their foreign principals or associates.
- 3.4 [A] shall disclose the payments to be made by them to agents/brokers or any other intermediary, in connection with this bid/document.
- 3.5 The [A] further confirms and declares to the CLIENT that the [A] is the original manufacturer/integrator/authorized government sponsored export entity of the defence stores and has not engaged any individual or firm or company whether Indian or foreign to intercede, facilitate or in any way to recommend to the CLIENT or any of its functionaries, whether officially or unofficially to the award of the [B] to the [A] nor has any amount been paid, promised or intended to be paid to any such individual, firm or company in respect of any such intercession, facilitation or recommendation.
- 3.6 The [A] either while presenting the bid or pre-contract negotiations or before signing the [B] shall disclose any payments he has made, is committed to or intends to make to officials of the CLIENT or their family members, agents, brokers or any other intermediaries in connection with the [B] and the details of services agreed upon for such payments.
- 3.7 The [A] will not collude with other parties interested in the [b] to impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the [B].
- 3.8 The [A] will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.
- 3.9 The [A] shall not use improperly, for purposes of competition or personal gain, or pass on to others, any information provided by the CLIENT as part of the business relationship, regarding plans, technical proposals and business

details, including information contained in any electronic data carrier. The [A] also undertakes to exercise due and adequate care lest any such information is divulged.

- 3.10 The [A] commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts.
- 3.11 The [A] shall not instigate or cause to instigate any third person to commit any of the actions mentioned above.
- 3.12 If the [A] or any employee of the [A] or any person acting on behalf of the [A], either directly or indirectly, is a relative of any of the officers of the CLIENT, or alternatively, if any relative of an officer of the CLIENT has financial interest/stake in the BIDDERS firm, the same shall be disclosed by the [A] at the time of filling of tender.

The term 'relative' for this purpose would be as defined in section 6 of the Companies Act 1956.

- 3.13 The [A] shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of the CLIENT.

4. **Previous Transaction:**

- 4.1 The [A] declares that no previous transgression occurred in the last three years immediately before signing of this Integrity Pact, with any other company in any country in respect of any corrupt practices envisaged hereunder or with any Public Sector Enterprise in India or any Government Department in India that could justify BIDDERS exclusion from the tender process.
- 4.2 The [A] agrees that if it makes incorrect statement on this subject, [A] can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

5. **Earnest Money (Security Deposit)**

- 5.1 While submitting commercial bid, the [A] shall deposit an amount _____ (to be specified in RFP) as Earnest Money/Security Deposit, with the CLIENT through any of the following instruments:
 - (i) Bank Draft or a Pay Order in favour of _____
 - (ii) A confirmed guarantee by an Indian Nationalized Bank, promising payment of the guaranteed sum of the CLIENT on demand within three working days without any demur whatsoever and without seeking any

reasons whatsoever. The demand for payment by the CLIENT shall be treated as conclusive proof of payment.

- (iii) Any other mode or through any other instrument (to be specified in the RFP)
- 5.2 The Earnest Money/Security Deposit shall be valid upto a period of five years or the complete conclusion of the contractual obligations to the complete satisfaction of both the BIDDER and the CLIENT, including warranty period, whichever is later.
- 5.3 In case of the successful [A] a clause would also be incorporated in the Article pertaining to Performance Guarantee in the [B] that the provisions of Sanction for Violation shall be applicable for forfeiture of Performance Bond in case of a decision by the CLIENT to forfeit the same without assigning any reason for imposing sanction for violation of this pact.
- 5.4 No interest shall be payable by the CLIENT to the [A] on Earnest Money/Security Deposit for the period of its currency.

6. **Sanctions for Violations:**

- 6.1 Any breach of the aforesaid provisions by the [A] or any one employed by it or acting on its behalf (whether with or without the knowledge of the [A] shall entitle the CLIENT to take all or any one or the following actions, wherever required.
 - (i) To immediately call of the pre-contract negotiations without assigning any reason or giving any compensation to the [A]. However, the proceedings with the BIDDER(s) would continue.
 - (ii) The Earnest Money Deposit (in pre-contract stage) and /or Security Deposit/performance Bond (after the [B] is signed) shall stand forfeited fully and the CLIENT shall not be required to assign any reason therefore.
 - (iii) To immediately cancel the [B], if already signed, without giving any compensation to the [A].
 - (iv) To recover all sums already paid by the CLIENT, and in case of an Indian [A] with interest thereon at 2% higher than the prevailing Prime Lending Rate of State Bank of India, while in case of a [A] from the country other than LIBOR. If any outstanding payment is due to the [A] from the CLIENT in connection with any other [B], such outstanding payment could also be utilized to recover the aforesaid sum and interest.

- (v) To encash the advance bank guarantee and performance bond/ warranty bond, if furnished by the [A], in order to recover the payments, already made by the CLIENT, along with interest.
 - (vi) To cancel all or any other Contracts with the [A]. The [A] shall be liable to pay compensation for any loss or damage to the CLIENT resulting from such cancellation/ rescission and the CLIENT shall be entitled to deduct the amount so payable from the money(s) due to the [A].
 - (vii) To debar the [A] from participating in future bidding processes of the Government of India for a minimum period of five years, which may be further extended at the discretion of the CLIENT.
 - (viii) To recover all sums paid in violation of this Pact by [A] to any middleman or agent or broker with a view to securing [B] the contract.
 - (ix) In cases where irrevocable Letters of Credit have been received in respect of any [B] signed by the CLIENT with the [A], the same shall not be opened.
 - (x) Forfeiture of Performance Bond in case of a decision by the CLIENT to forfeit the same without assigning any reason for imposing sanction for violation of this pact.
- 6.2 The CLIENT will entitled to take all or any of the actions mentioned at para 6.1(i) to (x) of this Pact also on the Commission by the [A] or any one employed by it or acting on its behalf (whether with or without the knowledge of the [A], of an offence as defined in chapter IX of the Indian Penal Code, 1860 or Prevention of Corruption Act, 1988 or any other stature enacted for prevention of corruption.
- 6.3 The decision of the CLIENT to the effect that a breach of the provisions of this Pact has been committed by the [A] shall be final and conclusive on the [A]. However, the [A] can approach the independent Monitor(s) appointed for the purposes of this Pact.

7. Fall Clause

- 7.1 The [A] undertakes that it has not supplied /is not supplying similar product/system or sub systems at a price lower than that offered in the present bid in respect of any other Ministry/Department of the Government of the India or PSU and if it is found at any stage that similar product/ systems or sub systems was supplied by the [A] to any other Ministry/ Department of the Government India or a PSU at a lower price, then that very price, with due allowance for elapsed time, will be applicable to the present case and the

difference in the cost would be refunded by the [A] to the CLIENT, if the [B] has already been concluded.

8. **Independent Monitors**

- 8.1 The CLIENT has appointed Independent Monitors (hereinafter referred to as Monitors) for this Pact in consultant with the Central Vigilance Commission (Names and Addresses of the Monitors to be given).
- 8.2 The task of the Monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this pact.
- 8.3 The monitors shall not be subject to instructions by the representatives of the parties and perform their functions neutrally and independently.
- 8.4 Both the parties accept that the Monitors have the right to access all the documents relating to the project/ procurement, including minutes of meetings.
- 8.5 As soon as the Monitor notices, or has reason to believe, a violation of this Pact, he will so inform the Authority designed by the CLIENT.
- 8.6 The BIDDER(s) accepts that the Monitors has the right to access without restriction to all project documentation of the CLIENT including that provided by the BIDDER. The [A] will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor shall be under contractual obligation to that treat the information and documents of the [A] with confidentiality.
- 8.7 The CLIENT 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 parties. The parties will offer to the Monitor the option to participate in such meetings.
- 8.8 The Monitor will submit a written report to the MD/DFCCIL within 8 to 10 weeks from the date of reference or intimation to him by the CLIENT/BIDDER and, should the occasion arise, submit proposals for correcting problematic situations.

9. **Facilitation of Investigation**

In case of any allegation of violation of any provisions of this Pact of payment of commission, the CLIENT or its agencies shall be entitled to examine all the documents including the Books of Accounts of the [A] and the [A] shall provide necessary information and documents in English and shall extend all possible help for the purpose of such examination.

10. **Law and Place of Jurisdiction**

This Pact is subject to Indian Law. The place of performance and jurisdiction is the seat of the CLIENT.

11. **Other Legal Actions**

The action stipulated in this Integrity Pact is without prejudice to any other legal action that may follow in accordance with the provisions of the extant law in force relating to any civil or criminal proceedings.

12. Validity

12.1 The validity of this Integrity Pact shall be from date of its signing and extend upto 5 years or the complete execution of the [B] to the satisfaction of both the CLIENT and the [A], including warranty period, whichever is later. In case [A] is unsuccessful, this Integrity Pact shall expire after six months from the date of the signing of the [B].

12.2 Should one or several provisions of this pact turn out to be invalid; the remainder of this Pact shall remain valid. In this case, the parties will strive to come to an agreement to their original intentions.

13. The parties hereby sign this Integrity Pact at _____on

CLEINT

Name of the Officer

Designation

Deptt. /Ministry/ PSU

BIDDER

CHIEF EXECUTIVE OFFICER

Witness

1. _____

2. _____

Witness

1. _____

2. _____

PART - I

CHAPTER V

SPECIAL CONDITIONS OF CONTRACT

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SPECIAL CONDITIONS OF CONTRACT

- 1.5.1** This Tender shall be governed by Preamble and General instructions to tenderers, General condition of Contract, Special conditions of contract, Technical Specifications, Additional Technical specifications (if any), Drawings, Forms, Annexures, etc.
- 1.5.2** If there are varying or conflicting provisions in the documents forming part of the contract, Engineer shall be deciding authority with regard to the intentions of the provision and decision of Engineer will be final and binding on the contractor.
- 1.5.3** **Scheme of work:-** Within a period of 30 days beginning from the date of issue of Letter of Acceptance of Tender, the Contractor shall submit the detailed time schedule for execution of work and various documents enumerated in tender papers to the employer.
- 1.5.4** **Deleted**
- 1.5.5** **Quality Assurance Plan**
- All materials used in the work shall be of the best quality as per codes. Quality Assurance Plan shall include for materials used and for workmanship of work. The contractor shall submit Quality Assurance Plan for the substructure and foundation. The contractor shall also ensure that the Employer's prescribed Quality Assurance Standards are rigidly followed in for the construction of substructure and foundation. These are to be approved from the client / DFCCIL
- (a) The Contractor shall adopt a suitable Quality Assurance Programme according to approved instructions, drawings, specifications, etc.
- (b) The Superstructure launching scheme shall be approved by DFCCIL through Employer's Representative before start of launching of Girders.
- 1.5.6** **Expenses of Employer' Representative** – All the expenses of Engineer's

representative shall be borne by the Employer whether the inspected material is finally utilised in work or not.

1.5.7 The decision of the Engineer shall be final in respect of acceptability or otherwise of any material, fittings, component or equipment required for the work.

1.5.8 This programme of the Contractor shall generally cover the followings: -

1.5.8.1 The organization to manage and implement the Quality Assurance programme.

1.5.8.2 The documentation control system:

- (i) Basic control system.
- (ii) Adopted at manufacturer's work
- (iii) Adopted at the Contractor Depot and work site.

1.5.8.3. Procedure adopted for:

- (i) Source Inspection.
- (ii) Incoming raw material inspection.
- (iii) Verification of material purchased.
- (iv) Fabrication Controls.
- (v) Site erection controls.

1.5.8.4 Inspection and Test Procedure for:

- (i) Manufacture and quality control procedure.
- (ii) Field activity.

1.5.8.5 System of handling and storage.

1.5.8.6 System of quality audit.

1.5.8.7 System of maintenance of records.

1.5.8.8 For the purpose of obtaining 'On Account Payment', the Contractor shall submit along with the invoice, the documents indicated in the prescribed quality Assurance standards which should inter alia cover the following as may be applicable in each case.

- (i) Material test reports on raw materials used.
- (ii) Material type and routine test report on components specification.

- (iii) Inspection Plan with reports of the inspection Plan check points.
- (iv) Routine test report.
- (v) Factory test results as required under the specification.
- (vi) Quality audit report including test check report of Employer's representative if any.

1.5.9 Deleted

1.5.10 Work By Other Agencies

- (a) Any other works undertaken at the same time by the Engineer direct or through some other agency at the same time or section where the contractor is carrying out his work will not entitle the contractor to prefer any claim regarding any delays or hindrances he may have to face on this account but the Employer shall grant a reasonable extension of time to the contractor. The contractor shall comply with any instruction which may be given to him by the Employer in order to permit simultaneous execution of his own works and those undertaken by other contractors or the DFCCIL without being entitled on this account on any extra charge.
- (b) The contractor shall not be entitled to any extra payment due to hindrance resulting from normal Railway operations, such as delay on account of adequate number of and duration of blocks not being granted, operational delay in movement of work trains extension of time to the contractor.

1.5.11 Infringement of patents:

- (a) The Contractor is forbidden to use any patents or registered drawings, process or pattern in fulfilling his contract without the previous consent in writing of the owner of such patent, drawing, pattern or trade mark, except where these are specified by the Employer himself. Royalties where payable for the use of such patented processes, registered drawings of patterns shall be borne exclusively by the Contractor. The contractor shall advise the Employer of any proprietary right that may exist on such processed drawings or patterns which he may use of his own accord.
- (b) In the case of patent taken out by the Contractor of the drawings or patterns registered by him, or of those patents, drawings, or patents for which he holds a licence, the signing of the Contract automatically gives the Employer the right to repair by himself the purchased articles covered by the patent

or by any person or body chosen by him and to obtain from any sources he desires the component parts required by him in carrying out the repair work. In the event of infringement of any patent rights due to above action of the Employer, he shall be entitled to claim damages from the contractor on the grounds of any loss of any nature which he may suffer e.g. in the case of attachment because of counterfeiting.

- (a) **Indemnification by contractor:-** In the event of any claim or demand being made or action being brought against the Employer for infringement of later patent in respect of any equipment, machine, plant, work or thing used or supplied by the Contractor under this contract or in respect of any methods of using or working by the Employer of such equipment machine, plant work or thing, the contractor shall indemnify the employer and keep him indemnified and harmless against all claims, costs, charges and expenses arising from or incurred by reason of such claim provided that the Employer shall notify the contractor immediately any claim is made and that the contractor shall be at liberty, if he so desires with the assistance of the Employer if required but at the Contractor's expense, to conduct all negotiations for the settlement of the same or any litigation that may arise there from and provided that no such equipment, machine, plant work or thing, shall be used by the Employer for any purpose or in any manner other than that for which they have been supplied by the Contractor and specified under this contract.

1.5.12 Insurance:-

Before commencing of works, it shall be obligatory for the contractor to obtain, at his own cost, insurance cover in the joint name of the contractor and employer from reputed companies under the following requirements:

- (a) Liability for death of or injury to any person/ employer's staff / animals or things or loss of or damage to any property / things / the work of other contractor (other than the work) arising out of the performance of the Contract.
- (b) Construction Plant, Machinery and equipment brought to site by the Contractor.
- (c) Any other insurance cover as may be required by the law of the land.

The contractor shall provide evidence to the employer / Engineer before commencement of work at site that the insurances required under the contract

have been effected and shall within 60 days of the commencement date, provide the insurance policies to the Employer/Engineer, the contractor shall, whenever, called upon, produce to the engineer or his representative the evidence of payment of premiums paid by him to ensure that the policies indeed continue to be in force.

The Contractor shall also obtain any additional insurance cover as per the requirements of the Contract.

The Employer/Engineer shall not be liable for or in respect of any damages or compensation payable to any workman or other person in the employment of the Contractor or his sub-contractor or petty contractor / other contractor working there. The Contractor shall indemnify and keep indemnified the employer / Engineer against all such damages and compensation for which the contractor is liable.

The Policies of the contractor shall remain in force throughout the period of execution of the works and till the expiry of the defect liability period except for any specific insurance covers necessary for shorter period.

If the Contractor fails to effect or keep in force or provide adequate cover as acceptable to the engineer in the insurance policies mentioned above, then in such cases, the engineer may effect and keep in force any such insurance or further insurance on behalf of the Contractor. The recovery shall be made at the rate of 1.5 times the premium/premiums paid by the engineer in this regard from the payment due to the Contractor or from the contractor's Performance security. However, the Contractor shall not be absolved from his responsibility and /or liability in this regard.

1.5.13 Accident:-

- (a)** The contractor shall, in respect of all staff engaged by him or by his sub-contractor, indemnify and keep the employer at all times indemnified and protected against all claims made and liabilities incurred under Workman's Compensation Act, the Factories Act and the Payment of Wages Act, and rules made there under from time to time or under any other labour and Industrial Legislation made from time to time.
- (b)** The contractor shall indemnify and keep the employer indemnified and harmless against all actions, suits, claim demands, costs, charges or expenses arising in connection with any death or injury sustained by any person or persons sustained due to the acts or omission of the contractor, his sub-contractors, his agents or his staff during the executions of this contract irrespective of whether such liability arises under the Workman's

Compensation Act, or Fatal Accident Act or any other statute in force for the time being.

- (c) The contractor' liability to meet third party claims of the type outlined above will be applicable only in cases where accidents have been caused by workmanship, material, execution or negligence on the part of the contractor and further the liability of the contractor will be limited to Rs.5 lakh for any one accident.
- (d) The contractor shall be responsible for all repairs and rectification of damages to completed works or works under execution due to DFCCIL accidents, thefts, pilferage or any other cause, without delay to minimize or to avoid traffic detentions, in a section until the installation are provisionally handed over to the employer.

1.5.14 Safety Measures:-

- (a) The contractor shall take all precautionary measures in order to ensure the protection of his own personnel moving about or working on the railway premises, but shall then conform to the rules and regulations of the Railway if and when, in the course of the work there is likely to be any danger to persons in the employment of the contractor due to running traffic while working in the Railway siding and premises, the contractor shall provide flagman or look out men for protection of such persons. The employer shall remain indemnified by the contractor in the event of any accident occurring in the normal course of work, arising out of the failure of contractor or his men to exercise reasonable precaution at all places of work.
- (b) Blasting of rocks for foundation work shall be done only after due notice is given to the employer and time/s and date /s for blasting operations agreed to by the employer. Blasting, if required to be done in the vicinity of the track, shall not be undertaken until the Employer's flagmen on duty take necessary step to protect trains and the track is adequately protected by the contractor against damage by blasted rock .The contractor shall follow detailed instructions which will be issued to him regarding blasting operations in the vicinity of tracks.
- (c) The contractor shall abide by all Railway regulations in force for the time being and ensure that the same are followed by his representatives, Agents

or sub -contractors or workmen. He shall give due notice to his employees and workers about provision of this para.

- (d) The works must be carried out most carefully without any infringement of the Indian Railway Act or the General and Subsidiary Rules in force on the Railway, in such a way that they do not hinder Railway operation or affect the proper functioning of or damage any DFCCIL equipment, structure or rolling stock except as agreed to by the employer, provided that all damage and disfiguration caused by the contractor at his own cost failing which cost of such repairs shall be recovered from the contractor.
- (b) If safety of track or track drainage etc. is affected as a consequence of works undertaken by the contractor, the contractor shall take immediate steps to restore normal conditions. In case of delay, the employer shall, after giving due notice to the contractor in writing, take necessary steps and recover the costs from the contractor.

1.5.15 Guarantee / Defect Liability Period:-

- (a) The Contractor shall guarantee that all the works executed under this contract shall be free from all defects and faults in material, workmanship and manufacture and shall be of acceptable standards for the contracted work and in full conformity with the technical specifications, drawings and other contract stipulations, **for a period of 6 months from the date of taking over by the Employer**
- (b) During the period of guarantee the Contractor shall keep available an experienced engineer / man power to attend to any defective works / installations resulting from defective erection and/or defect in the installation supplied by the Contractor. This engineer shall not attend to rectification of defects which arise out of normal wear and tear and come within the purview of routine maintenance work. The contractor shall bear the cost of modifications, additions or substitutions that may be considered necessary due to faulty materials or workmanship for the satisfactory working of the equipment. The final decision shall rest with the Engineer his successor(s)/Nominee.
- (c) During the period of Guarantee the Contractor shall be liable for the replacement at site of any parts which may be found defective in the executed work whether such parts / structural elements of his own

manufacture or those of his sub-contractor / supplier whether arising from faulty materials, workmanship or negligence in any manner on the part of the Contractor provided always that such defective parts as are not repairable at site are promptly returned to the Contractor if so required by him at his (Contractor's) own expenses. In case of parts of executed work detected during guarantee period, contractor should replace all such items irrespective of the fact whether all such items have failed or not. The Contractor shall bear the cost of repairs carried out on his behalf by the Employer at site. In such a case, the contractor shall be informed in advance of the works proposed to be carried out by the Employer.

- (d) If it becomes necessary for the Contractor to replace or renew any defective portion of the structural elements until the expiration of six month from the date of such replacement or renewal or until the end of the above mentioned period whichever is later.

Such extension shall not apply in case of defects of a minor nature, the decision of the CGM or his successor/nominee being final in the matter. If any defect be not remedied within a reasonable time during the aforesaid period the Employer may proceed to do work at the Contractor's risk and expense, but without prejudice to any other rights and remedies which the Employer may have against the Contractor in respect of such defects or faults.

- (e) The repaired or renewal parts structure shall be delivered / supplied and erected / executed on site free of charge to the employer.
- (f) Any materials, fittings, components or equipment's / structure supplied under items for supplying / providing and fixing in schedule shall also be covered by the provisions of this paragraph. The liability of the Contractor under the guarantee will be limited to re-supply of components / structure installation and fittings.

1.5.16 Final Acceptance:-

- (a) The final acceptance of the entire work executed shall take effect from the date of expiry of the period of guarantee / Defect Liability period as defined in paragraph 1.5.15 above of the expiry of the last of the respective periods of guarantee of various ROBs , provided in any case that the Contractor

has complied fully with his obligations under clause 1.5.15 in respect of each R O B , provided also that the attention has been paid by way of maintenance by the Employer.

- (b) If on the other hand the contractor has not so complied with his obligation under Para 1.5.15 above in respect of any work, the Employer may either extend the period of guarantee in respect of that work until the necessary works are carried out by the Contractor or carry out those works or got them carried out suo moto on behalf of the Contractor at the Contractor's expenses. After expiry of the period of guarantee for each work, a certificate of final acceptance for the section shall be issued by the Employer and the last of such certificate will be called the last and final acceptance certificate. The contract shall not be considered as completed until the issue of final acceptance certificate by the Employer.
- (c) The Employer shall not be liable to the Contractor for any matter arising out of or in connection with the contract or execution of the work unless the Contractor shall have made a claim in writing in respect thereof before the issue of final acceptance certificate under this clause.

Notwithstanding the issue of final acceptance certificate the Contractor and the Employer (subject to sub-clause as above) shall remain liable for fulfilment of any obligation incurred under the provision of the contract prior to the issue of final acceptance certificate which remains unperformed at the time such certificate is issued and for determining the nature and extent of such obligation the contract shall be deemed to remain in force between the parties hereto.

1.5.17 Payment:-

Payment will be governed by the terms specified in Part-I, Chapter IV and in accordance with accepted schedule of prices, read with relevant para of the other parts and Chapters of the Tender Papers. The employer retains the right to withhold money due to the contractor arising out of this contract for any default of the contractor .

- (i) The Contractor shall, whenever required, produce or cause to be produced for examination by the Employer any quotation / invoice, cost of other account, book of account, voucher, receipt letter, memorandum paper or writing or any copy of or extract from any such document and also furnish

information and returns verified in such manner as may be required in anyway relating to the execution of this contract or relevant for verifying or ascertaining the cost of the execution of this Contract (the decision of the employer on the question of relevancy of any documents, information or return being final and binding on the parties). The Contractor shall similarly produce vouchers etc., if required, to prove to the Employer that materials supplied by him are in accordance with the specifications laid down in the contract.

- (ii) If any portion of the work be carried out by a sub-contractor or any subsidiary or allied firm or company the Employer shall have power to secure the books of such sub-contractor or any subsidiary or allied firm or company, through the Contractor, and such books shall be open to his inspection. The Contractor should seek prior permission from the employer for subletting whole and/or part of the work to any sub-contractor.
- (iii) The obligations imposed by sub-clause (i) and (ii) above are without prejudice to the obligation of the Contractor under any statute, rules or order binding to the Contractor or other conditions of the contract.
- (iv) It is an agreed term of the contract that the employer reserves the right to carry out post-payment Audit and/or technical examination of the works and the final bill, including all supporting vouchers, abstracts etc. and to make a claim on the Contractor for the refund of any excess amount paid to him if as a result of such examination any over payment to him is discovered to have been made in respect of any work done or alleged to have been done by him under the contract.

1.5.18 All payments in respect of the contract during the currency of the contract shall be made through Electronic Clearing System (ECS) / National Electronic Funds Transfer (NEFT/RTGS). The successful tenderer on award of contract must submit ECS/NEFT/RTGS Mandate Form complete in all respects as detailed at Form No. 8 of the tender document. However, if the facility of ECS/NEFT/RTGS is not available at a particular location, the payments shall be made by cheque.

1.5.19 Performance Guarantee:-

- (i) The Bank Guarantee for performance Guarantee shall remain valid until a date 60 days (or as specified in the Contract) after expiry of Defects Liability Period.

- (ii) The Bank Guarantee for performance Guarantee shall be submitted invariably in the format given in the bidding document.
- (iii) The performance Guarantee shall be released 21 days after issue of performance certificate.

1.5.20 Advances to Contractors :- (Applicable for Advertised tender of value more than Rs. 25.00 crore)

(a) Mobilisation Advance –

This shall be limited to 10% of the Contract value and payable in 2 stages as indicated below:

Stage I – 5% of Contract value on signing of the contract agreement.

Stage II – 5% on mobilisation of site-establishment, setting up officers, bringing in equipment and actual commencement of work.

The 1st stage of advances shall be payable immediately after signing of Contract documents. The 2nd stage of advance shall be payable at the time of mobilisation, after submission of a utilisation certificate by the Contractor that the stage I advance has been properly utilized in the Contract.

(b) Advance Against Machinery and Equipment-

This advance shall be limited to maximum of 10% of the Contract value against new Machinery & Equipment, involving substantial outlay, brought to site and essentially required for the work. This advance shall not exceed 75% of the purchase price of such Equipment and shall be payable when hypothecated to the President of India by a suitable bond or alternatively covered by an irrevocable Bank Guarantee for full cost of the Plant & Equipment from a Nationalised Bank in India or the State Bank of India in a form acceptable to Railways / DFCCIL. The Plant & Equipment shall be insured for the full value and for the entire period, they are required for the work. This Plant & Equipment shall not be removed from the site of work without prior written permission of the Engineer. No advance should be given against old Plant & Machinery.

(c) Advances for accelerating progress of the work during course of execution of Contract-

This Advance is to be decided on the merits of each case and shall be restricted to a maximum of 5% of Contract Value. This is to be granted by the Competent Authority on the recommendations of the Chief General Manager in consultation with the

Associate Finance. While recommending this advance for sanction of General Manager, the Chief Engineer in-charge shall also confirm that progress of the contract work has been as per milestones/targets laid down and no extension to Date of completion of the Contract has been given on Contractor's account.

(d) Advances in Exceptional Cases-

Competent Authority of DFCCIL are further empowered to grant advances in exceptional cases up to a maximum of Rs.20 lacs in respect of even contracts of values less than Rs. 25 Crore, if considered absolutely essential, depending on the merits of each case and circumstances in each situation, to be recommended by the Chief General Manager and in consultation with the Associate Finance.

(e) The above Advances are subject to the following conditions-

- i) The Advance shall carry an interest at the rate to be decided by the Railway Board, Ministry of Railway and communicated at the beginning of every Financial year, to be applicable for the tenders to be opened in that Financial Year. The rate of interest on advance shall be 10 % (Ten Percent) for tender to be opened in Financial Year 2019-20.
- ii) Advances except those against machinery and equipment, shall be payable against irrevocable guarantee (Bank Guarantee, FDRs, KVPs/NSCs) of the least 110% of the value of the sanctioned advances amount (covering principal plus interest). The Bank Guarantee shall be from a Nationalised Bank in India or State Bank of India in a form acceptable to the DFCCIL.
- iii) The recovery shall commence when the value of contract executed reaches 15% of original contract value and shall be completed when the value of work executed reaches 85% of the original contract value. The instalments on each "on account bill" will be on pro-rata basis:
- iv) That the grant of advance is primarily in DFCCIL's own interest;
- v) That a Contractor does not receive advances for same work from different officers;
- vi) That arrangements are made with the Accounts Officer for proper accounts being kept with regard to payment and recovery of these advances; and
- vii) That all necessary precautions are taken to secure Government from the possibility of loss and for preventing the system becoming more general or continuing longer than what be absolutely necessary for proper progress of the work.

(f) Method of Recovery of Interest –

Interest shall be recovered on the advances outstanding for the period commencing from the date of payment of advance till date of particular on-account bill (through which

recovery of principal is effected) and adjusted fully against on-account bill along with pro-rata principal recovery. In the event of any short-fall, the same be carried forward to the next on-account bill and shall attract interest.

The Bank Guarantee for such advances shall clearly cover at least 110% of the value of the sanctioned advance (covering principal plus interest).

1.5.21 Arbitration: - Refer to clause 63 of GCC.

1.5.22 Supervision of work : The work will be supervise by Employer's officials or Project Management Consultant (PMC) which will be engage by Employer for supervision and management of contract. PMC so engage will be called as Employer's Representatives (ER).

1.5.23 In this contract, system of RFI (Request for inspection) will be followed. Under the RFI system, prior to execution of the work RFI shall be submitted to Employer / Employer Representative who will be supervising the works.

1.5.24 Mandatory updation of Labour data on Railway's shramikkalyan portal by Contractor.

A. Contractor is to abide by the provisions of payments of Wages act & Minimum Wages act in terms of clause 54 and 55 of General Condition of Contract. In order to ensure the same, an application has been developed and hosted on website 'www.shramikkalyan.indianrailways.gov.in' Contractor shall register his firm/company etc. and upload requisite details of labour and their payment in this portal. These details shall be available in public domain. The Registration/ updation of portal shall be done as under:

- (a) Contractor shall apply for onetime registration of his company/firm etc. in the shramikkalyan portal with requisite details subsequent to issue of Letter of Acceptance. Engineer shall approve the Contractor's registration on the portal within 7 days of receipt of such request.
- (b) Contractor once approved by any Engineer, can create password with login ID of (PAN No). for subsequent use of portal for all LOAs issued in his favour.
- (c) The contractor once registered on the portal, shall provide details of his Letter of Acceptance (LOA)/ Contract Agreement on shramikkalyan portal within 15 days of issue of any LOA for approval of concerned Engineer. Engineer shall update (if required) and approve the details of LOA filled by Contractor within 7 days of receipt of such request.

- (d) After approval of LOA by Engineer, Contractor shall fill the salient details of Contract labours engaged in the Contract and ensure updating of each wage payment to them on shramikkalyan portal on monthly basis.
- (e) It shall be mandatory upon the Contractor to ensure correct and prompt uploading of all salient details of engaged contractual labour & payments made thereof after each wage period.

B. While processing payment of any 'On Account bill' or 'Final bill' or release of 'Advances' or 'Performance Guarantee / Security deposit' Contractor shall submit a certificate to the Engineer or Engineer's representatives that "I have uploaded the contract details of Contract labours engaged in connection with this contract and payments made to them during the wage period in Railway's shramikkalyan portal _____ at _____ 'www.shramikkalyan.indianrailways.gov.in' till _____Month_____Year".

1.5.25 Certain plant and Machineries are available at / near about the Bridges work site. Contractor may hire these machineries for the use of this contract work. The hiring rates shall be decided by Employers based on working condition of individual machineries. If contractor hires the plant / machinery it will be contractor's responsibility to transport these machineries at their work site, any repair of machinery is required then same shall be carried out by contractor at their own cost. These plant & machinery shall be properly maintained by contractor & shall be returned back to Employer (at location specified by Employer), for this no extra payment will be made by Employer. The contractor has to deploy his own operator, supervisor for using this machinery, all consumables shall be arranged by contractor at their own cost, no separate payment will be made by Employer.

The Bank Guarantee's shall be taken from contractor for hiring of plant and machinery. The total amount of Bank Guarantee shall be decided by competent authority based on value of plant and machinery to be hired.

PART - II

PART - II

TECHNICAL SPECIFICATION

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1.0	CODES & SPECIFICATIOS.	
1.1	List of codes and specification	Apart from the basic data, specifications etc. all items of works shall be governed by the following codes and Specification as revised/corrected/amended up to 28 days before the date of submission of the tender.
1.1.1	Indian Railway Standard Codes and specifications (IRS)	<ol style="list-style-type: none"> 1. Indian Railway Brides rules, specifying the loads for Design of Superstructure and substructure of Bridge and for assessment of the strength of Existing adopted in 1941 – Revised – 1964 (Third Reprint – 2014). 2. DFC Loading Standards – 32.5T axle loading 3. Indian Railway Schedule of Dimensions for Board Gauge. 4. DFC Schedule of Dimensions 5. Indian Railway Code for Practice of Plan/Reinforced and Prestressed concrete for general / bridge construction (Concreted Bridge Code) Second Revision 1997. 6. Indian Railway Bridge Manual 1998 incorporating up-to-date corrections slips 7. Indian Railways Permanent Way Manual. 8. Indian Railways Works Manual. 9. IRS Sub-structure & Foundation Code. 10. IRS: Manual on the design and construction of well and pile foundation. 11. Guidelines for earthwork in railway projects: Guideline No. GE:G-1, July, 2003. 12. Report No. RDSO/2007/GE: 0014: Guidelines and Specifications for Design of formation for Heavy Axle Load 13. Report No. GE:R-50: Transitional System on approaches of bridges issued by RDSO. 14. RDSO Specification No. GE: IRS-2 (Final): Specification for mechanically produced blanketing material for railway formation including guidelines for laying. 15. Indian Railway – Engineering Code.
1.1.2	Indian roads congress codes and specifications	<ol style="list-style-type: none"> 1. IRC: 5 Standard Specifications and Codes of Practice for Road Bridges Section – I – General features of design. 2. IRC: 6 Standard Specifications and Codes of Practice for Road Bridges – Section – II – Loads and Stresses – Seismic provisions of this standard are to be adopted for the bridge design.

		<ol style="list-style-type: none"> 3. IRC : 21 Standard Specifications and Codes of Practice for Road Bridges – Section – III –Cement concrete (Plain & reinforced) 4. IRC : 22 Standard Specifications and Codes of Practice for Road Bridges – Section – VI – Composite Construction. 5. IRC : 83 (Part – III) - Standard Specifications and Codes of Practice for Road Bridges – Section – IX – Bearings Part -III. Pot, POT cum PTFE Pin and Metallic Guide Bearings 6. IRC-78:Sub-structure for Road Bridges. 7. IRC-87:Design and erection of false work for road bridges. 8. Specifications for Road and Bridge Works issued by Ministry of Road Transport & Highways (MORTH). 9. SP 6, 7, 16, 21,22,23,24,34,36, 52,60.
1.1.3	Indian standard specifications	<ol style="list-style-type: none"> 1. IS : 975 (all 5 parts) – Design loads (other than earthquakes) for buildings and structures. 2. IS : 456 Plain and reinforced concrete. 3. IS:269 Indian Standard Specifications for Ordinary & Low Heat Portland Cement. 4. IS : 8112 43 Grade OPC. 5. IS : 383 Coarse and fine aggregate from natural sources for concrete. 6. IS : 2386 (all 8 parts) – Tests for aggregates for concrete 7. IS : 3025 (all 49 parts) – Methods of sampling and test for water and waste water. 8. IS : 3085 Method of test for permeability of cement mortar and concrete. 9. IS:1199 Indian Standard Specifications for Method of Sampling and analysis of concrete. 10. IS :7320 Concrete slump test apparatus. 11. IS : 5515 Compaction factor apparatus. 12. IS : 1791 Batch type concrete mixers. 13. IS : 4634 Methods of testing performance of batch type concrete mixers. 14. IS:2722 Indian Standard Specifications for Portable Swing Weight batches for concrete (Single and Double Bucket type) 15. IS : 6925 Methods of test for determination of water soluble chlorides in concrete admixtures.

		<p>16. IS : 9103 Admixtures for concrete.</p> <p>17. IS : 516 Method of test for strength of concrete.</p> <p>18. IS : 4031 (all 15 parts) – Physical tests for hydraulic cement.</p> <p>19. IS : 5513 Vicat apparatus.</p> <p>20. IS : 10080 Vibration machine for casting standard cement mortar cubes</p> <p>21. IS : 10262 Concrete mix design.</p> <p>22. IS:4926 Indian Standard Specifications for ready Mixed concrete.</p> <p>23. IS : 1892 Subsurface investigations.</p> <p>24. IS : 2720 (all 41 parts) – method of tests for soil.</p> <p>25. IS : 2132 Thin walled tube sampling of soils.</p> <p>26. IS :2131 Standard penetration test for soils.</p> <p>27. IS : 2911 (Part I to IV) - Code of practice for design and construction of pile Foundations</p> <p>28. IS : 13920 Ductile detailing of reinforced concrete structures subjected to seismic forces.</p> <p>29. IS : 5624 Foundation bolts.</p> <p>30. IS : 3955 Design and construction of well foundations.</p> <p>31. IS:875 (Part 3) – 1987 – Code of Practice for Design Loads (Other than Earthquakes) for Buildings and Structures – Wind Loads (Second Revision)</p> <p>32. IS: 1786-1985-High Strength Deformed Steel Bars & Wires for Concrete Reinforcement (Third Revision).</p> <p>33. IS:432 (Part-I & Part-II) – 1982 – Mild Steel, Medium Tensile Steel Bars and Hard Drawn.</p> <p>34. IS: 280 Mild steel wire for general purposes.</p> <p>35. IS: 2502 Code of practice for bending and fixing of Bars for concrete reinforcement.</p> <p>36. IS: 1343 Prestressed concrete.</p> <p>37. IS: 14268 Prestressing Strands.</p> <p>38. IS: 4082 Recommendations of stacking and storage of construction materials at site.</p>
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		<p>39. IS: 800 General construction in steel.</p> <p>40. IS-2062-1992-Steel for General Structural Purposes – Specifications (Fourth Revision)</p> <p>41. IS: 1261 – 1959 – Seam Welding in Mild Steel (Reaffirmed 1998)</p> <p>42. IS: 1367 – Technical Supply conditions for Threaded steel fasteners.</p> <p>43. IS: 3502:1994-Steel Chequered Plates – Specifications (Second Revision).</p> <p>44. IS : 7215 – 1974 – Tolerances for Fabrication of Steel Structures (Reaffirmed 1995, Sixth Reprint July, 1997)</p> <p>45. IS: 816 Metal arc welding for general construction in mild steel.</p> <p>46. IS: 819 Resistance spot welding for light assemblies in mild steel.</p> <p>47. IS:814-1991-Covered Electrodes for Manual Metal Arc Welding (Fifth Revision)</p> <p>48. IS: 1323 – 1982-Oxy-acetylene Welding for Structural Work in Mild Steel (Second Revision)</p> <p>49. IS:1161 – 1998 – Steel Tubes for Structural Purposes – Specifications (Fourth Revisions)</p> <p>50. IS:8629 (Parts I to III) – 1977 – Protection of Iron and Steel Structures from Atmospheric Corrosion (Reaffirmed 2002).</p> <p>51. IS:3757 – 1985 – High Strength Bolts.</p> <p>52. IS:6623 – 1985 - High Strength Nuts.</p> <p>53. IS:6911 – Stainless Steel.</p> <p>54. IS : 1363 (all 3 parts) – Hexagon head bolts, screws and nuts of product grade C.</p> <p>55. IS : 6639 Hexagonal bolts for steel structures.</p> <p>56. IS : 102 Ready mixed paints, brushing, red lead, non-settling priming.</p> <p>57. IS: 123 Ready mixed paints, brushing, finishing, semi-gloss, for general purposes to Indian Colours etc.</p> <p>58. IS: 104 Ready mixed paint, brushing, zinc chrome, priming.</p> <p>59. IS: 2074 Ready mixed paint, air drying, red oxide-zinc chrome.</p> <p>60. IS: 34 White lead for paints.</p> <p>61. IS: 2339 Aluminum paints for general purposes, in dual container.</p> <p>62. IS: 2751 Code of Practice for Welding of Mild Steel Bars used for reinforced concrete construction.</p>
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		<p>63. IS: 3400 (all 22 parts) – Methods of tests for vulcanized rubbers.</p> <p>64. SP 70: 2001 Handbook on construction safety practices.</p> <p>65. IS: 3764 Safety code for excavation work.</p> <p>66. IS: 4081 Safety code for blasting and related drilling operations.</p> <p>67. IS: 7293 Safety code for working with construction machinery.</p> <p>68. IS: 7205-1974-Safety Code for erection of Structural Steel Work (Fifth Reprint July, 2001).</p> <p>69. SP 22 (S&T): 1992 Explanatory Hand Book on codes for Earth Quake Engineering.</p> <p>70. IS: 3696:1987 (Part – I & Part-II) Safety code for scaffolds and Ladders.</p> <p>71. IS 3016 :1965 Code of practice for Fire precaution in welding and cutting operations.</p> <p>72. IS 14881:2001Method for Blast Vibration Monitoring – Guidelines.</p> <p>73. IS : 1852 Rolling and cutting tolerances for hot rolled steel products.</p> <p>74. IS : 817 Training and testing of metal arc welders.</p> <p>75. IS : 1270 Metric steel tape measure.</p> <p>76. IS : 1200 (all relevant parts) – Method of measurement of building and civil Engineering works.</p> <p>77. IS : 786 Conversion factors and conversion tables.</p>
1.1.4	Other International Codes	<p>1. En 1990-2002 (Eurocode – Basis of Structural Design) – (For Safety, comfort deformation including twist and deflection)</p> <p>2. EN 1991-2-2003 (Eurocode 1 – Action on Structures, part 2 – Traffic Loads on Bridges)- (Natural frequency range and Loading for fatigue estimation)</p> <p>3. EN 1992 – 1:2004. (Eurocode 2 – Design of Concrete Structures, Part – 1 –General Rules and Rules for Buildings).</p> <p>4. EN 1992 – 1-1:2004</p>

		<p>(Eurocode 3 – Design of Steel Structures, Part 1 – 1 -1 General Rules) – (Classification of cross sections).</p> <p>5. EN 1993 – 1-8:2002</p> <p>(Eurocode 3 – Design of Steel Structures, Part 1 – 8 Design of Joints) – (Classification of HSFG Bolts).</p> <p>6. EN 1993 – 1-9:2002</p> <p>(Eurocode 3 – Design of Steel Structures, Part 1 – 9 Fatigue Strength of Steel Structures).</p> <p>7. EN 1993 – 2:2004</p> <p>(Eurocode 3 – Design of Steel Structures, Part 2 – Steel Bridges) – (Requirements for fatigue assessment, Road and Rail Bridges).</p> <p>8. EN 1994 – 2:2003</p> <p>(Eurocode 4 – Design of Composite Steel & Concrete Structures, Part 2 – Rules for Bridges) – (Width of effective flange, shear connectors).</p>
1.1.5	UIC Codes	<p>1. UIC 774 – 3R –Track Bridge interaction Recommendation for calculation (for Forces due to LWR).</p> <p>2. UIC-772R: Bearings of rail bridges.</p>
1.1.6	BS Codes	<p>1. BS – 3784 Grade “A” Specifications for Poly tetrafluroethylene.</p> <p>2. BS-5350: Standard Method of test of adhesives, Part C9, Floating roller peel test.</p> <p>3. BS-5400 : Part – 1 General Statement.</p> <p>4. BS-5400 : Part – 2 Specifications for loads.</p> <p>5. BS-5400: Part – 3 Code of Practice for Steel Bridges.</p> <p>6. BS-5400: Part – 5 Code of Practice for composite Bridges</p> <p>7. BS-5400 : Part- 9 Bridge Bearings.</p> <p>8. BS-5400: Part-10 Code of Practice for Fatigue.</p> <p>9. BS-1449,3484, 1134, 5296.</p>
	The above list is only for guidance and the consultant is responsible and shall propose the lists that are followed in the design basis report.	
	<p>NOTE:</p> <p>1. The list given above is by no means exhaustive. All IS, IRC and IRS Codes pertaining to the work shall be applicable.</p>	

	2. Where the drawings and specifications described a portion of the work in only general terms and not in complete detail it shall be understood that only the best general practice is to prevail, materials and workmanship of the best quality are to be employed and the instructions of the Employer's Representative are to be complied with.	
2.0	SPECIFICATIONS FOR EARTHWORK IN FORMATION	
2.1	General	This section deals with the Design of Railway Formation (Only design for slope stability for high bank), Selection of Materials for Construction, Execution of Earthwork in formation, Quality Control of the Earth work, Maintenance of Records and Quality Assurance. The earth work should be carried out as per the provisions of "Guidelines for Earthwork in Railway Projects-2003 (with latest amendments)" issued by RDSO/ Lucknow except for specific provisions made for 32.5 tonne axle load given in the succeeding paragraph.
2.2		<p>This Section covers the following activities:</p> <ol style="list-style-type: none"> Survey for fixing the working alignment on the bridge and its approaches and establishment of working bench marks. Earth Work in formation on approaches of bridges, laying of a blanket layer thereon with suitable materials and protective works like drains between Western Railway and DFC where found necessary etc.
2.3		<p>The works to be executed can broadly be grouped as under:</p> <ol style="list-style-type: none"> Setting out the alignment of proposed bridge and establishing working, bench marks and alignment references, taking the details from bench marks and alignment references established by the Employer earlier. This work has to be done once before starting the bridge work and once after the completion. Preparation of working plans and longitudinal sections, comprising bridge and its approach. Carrying out the work of Earthwork in formation in banks with Contractor's earth, including laying blanket layer where found necessary with Contractor's material. The earth work and blanket layer have to be compacted with suitable machinery at Optimum moisture content (OMC).
2.4	Survey and establishment of working bench marks and alignment references:	
2.4.1		The Contractor will make necessary arrangements for detailed Survey for setting out of the centreline and taking cross sections as necessary along the bridge and its approaches. The contractor will be entirely responsible for accurate setting out of the works and safe guarding all survey monuments, bench marks, beacons, etc. The work of setting out shall be deemed to be a part of the general works preparatory to the execution of work and no separate payment shall be made for the same.
2.4.2		The GADs of Bridges and Approach Earthwork are attached in Part V of Tender document. These details should be studied by the Contractor in the first instance after his detailed field inspection. In case any major changes are considered

		necessary to suit the available site condition, the same should be proposed by the contractor and got approved from the Employer's Representative. This work should be done before start of any work at site.	
2.4.3		For the work proposed in the present contract, the work of Design of formation, Design of sub grade & sub soil, Design of thickness of blanket layer is not contemplated except for Stability Analysis of side slopes of embankment if height of the bank exceeds 6 m. Detailed design of Transition System on approaches and any Retaining Walls, side drains and the entire bridge structure including protection works will be supplied by Employer.	
2.5	Railway formation		
2.5.1		To achieve the objective of constructing embankment in bridge approaches which would give trouble free service, the design and construction procedures should be such that it should be able to sustain the track geometry under anticipated traffic densities and axle loads during service under most adverse conditions of weather and maintenance of track structure, which are likely to be encountered. This necessitates that: (i) firstly, sub-grade in bank should be structurally sound so as not to fail in shear strength under its own loads and live loads; and (ii) secondly, any settlement due to compaction and consolidation in sub grade and sub-soil should be within the permissible limits.	
2.5.2		Top width of formation should be adequate to accommodate double track laid with concrete sleepers with standard ballast section, and still leave a minimum 1200mm cess on either side. It should be regulated in accordance with extant instructions of Indian Railways and DFCC specifications/ Drawings. Drawings of Embankment on bridge approaches is enclosed in Part V of Tender document.	
2.5.3		Contractor should arrange the land for quarry of earth for carrying out earthwork in bridge approaches in such a manner that borrow pits are sufficiently away from the toe of the embankments to prevent slope/base failures due to lateral escapement of soil. The minimum distance to be provided between borrow pits and toe of the bank will be decided by the Employer's Representative, in each case, on its merits.	
2.6	Provision of blanket layer		
		To avoid failure of track formation due to inadequate bearing capacity and to safeguard against swelling and shrinking, a blanket layer having adequate thickness and constructed with suitable materials should be provided in banks wherever considered necessary by the Employer's Representative. For this purpose, blanket system consisting of two layers has been proposed. Properties and thickness of each layer of blanket and that of under laid embankment fill material is detailed in clause 2.7.	
2.7	Specifications of blanket material		
		Blanket material should generally conform to following specifications a. The material should be coarse granular and well graded. b. Two-layer system consisting of blanket as top layer and under laid by prepared sub grade on embankment will be adopted as per the specifications given below:	
S N	Layer	Specification	DFC loading
1	Blanket- Well graded Sand Gravel Layer	i. $C_u > 7$ and C_c between 1 and 3 ii. Fines (passing 75 micron): 3% to 10%	60cm for SQ2

		<div>iii. Los Angeles Abrasion Value < 40 %</div> <div>iv. Minimum CBR value 25 of the Blanket material compacted at 100 % of the MDD</div> <div>v. Size gradation within specified range of enveloping curve (as per para 2.7.2)</div>	<div>SQ2/SQ3 are soil below blanket.</div> <div>Blanket compacted up to 100 % MDD</div>
2	Layer 1: Prepared Subgrade (Good/ Imported Soil)	<div>SQ2/SQ3 & Limit Fines – 12 – 50 % (avoid SQ1) Plasticity Index < =12</div> <div>Compaction</div>	<div>100 cm</div> <div>CBR > = 8 generally, but not < 7 in isolated cases</div> <div>98% MDD</div>
3	Embankment Fill	<div>CBR > = 4 - 5 (of compacted soil upto 97%)</div> <div>(organic soil to be avoided)</div> <div>Compaction</div>	<div>CBR > = 5 generally, but not < 4 is isolated cases</div> <div>97% MDD</div>
4	Total Thickness (Blanket + Layer 1)		160 cm
Category of Soil Quality:			
Soil Quality	Description w.r.t. Fine Particles (< 75 micron)		
SQ1	Soil containing fines > 50 %		
SQ2	Soil containing fines from 12% to 50 %		
SQ3	Soil containing fines < 12 %		
2.7.1		Gradation size analysis and percentage of fines analysis of blanket material should be determined using wet sieve analysis as per procedure of IS: 2720 (Part IV) - 1985.	
2.7.2		The enveloping curve indicating specified range for size gradation of blanket material is available as fig. 9 in RDSO’s Report No. RDSO/2007/GE: 0014 – Guidelines and specifications for Design of Formation for Heavy Axle Load.	
2.7.3		unsuitable soil for construction: Soils to be avoided are: - <div>a. Organic clays, organic silts, peat, chalk, dispersive soil, poorly graded gravel and sand with uniformity coefficient less than 2,</div> <div>b. Clay and silt of high plasticity (CH & MH).</div>	
2.8	<div>Selection of blanket material</div> <div>roper survey of area close to the proposed bridge, at different locations needs to be carried out to identify suitable sources for blanket material required. Aim of such source identification survey is to use naturally available material, which is cheap and conforms to the specifications laid down.</div> <div>i. Blanket material may also be obtained by proper blending of two or more soils. Before approving such sources, trials for blending to judge the final product, needs</div>		

	<p>to be done. Detail methodology of blending to be adopted to produce large quantity of blanket material with consistent quality, needs also to be laid down in advance.</p> <p>ii. Quarry dust or material specifically manufactured through crushers using boulders, rocks, etc. as raw material, conforming to the blanket material specification could also be used as blanketing material.</p> <p>NOTE: For production of blanket material by mechanical means as elaborated in b & c above, reference will be made to specification no. GE: IRS-2 (final) specification for mechanically produced blanketing material for Railway formation including guidelines for laying.</p> <p>iii. In any case, before planning for use of any material for formation of blanket, Employer's Representative's specific approval is to be taken for the use of that particular material and also for the location from where such material will be quarried.</p>
2.9	Side slope of Embankment
	<p>The side slopes to be adopted for the banks in the length of the proposed work under this contract should generally confirm to the following:</p> <p>In Banks in all soils : 2:1 (Horizontal: Vertical) However, the contractor will have to design the slopes to check the slope stability wherever height of the bank/cutting is more than 6 m.</p>
2.10	Execution of formation Earth work
	<p>i. Earthwork in formation in embankment shall be carried out with suitable soil from outside railway land to be arranged by the contractor at its own cost. o borrow pits for this purpose shall be allowed on the railway land.</p> <p>ii. The work shall be executed in conformity to RDSO 'Guidelines for Earthwork in Railway Projects'-2003 (with latest amendments), which forms a part of the contract documents except where specific provision has been made to 32.5 tonne axle load under scope of this bid.</p> <p>iii. The contractor shall, at its own cost, identify the soil, suitable for Railway formation, which he proposes to use in construction of the embankment and obtain the approval of Employer's Representative for use of such said soil.</p> <p>iv. The work of execution of earth work in embankment shall be carried out and completed by the contractor as per the approved drawings and specifications.</p> <p>v. Adequate drainage must be ensured for the worst service conditions. The top of formation should have cross slope of 1 in 30 from centre of embankment. Further elaboration on drainage has been given subsequently.</p> <p>vi. Suitable and cost-effective erosion control system considering soil matrix, topography and hydrological conditions to protect the side slopes of bank should be provided. Further elaborations on this measure have been given subsequently.</p>

		<p>vii. Execution of earth work has to be carried out in systematic manner so as to construct formations of satisfactory quality which would give trouble free service. The activities and adoption of good practices involved in execution of earthwork are covered under following headings: -</p> <ul style="list-style-type: none"> a. Preliminary works - Taking of initial levels and plotting cross sections – b. General aspects – c. Compaction of earth work – d. Placement of Back-Fills on Bridge Approaches and Similar Locations e. Drainage Arrangement in Bank f. Erosion control of slopes on banks g. Other aspects
2.11	Preliminary works	
2.11.1	Preparation of Natural Ground	<p>Preparation of natural ground surface may be carried out as follows:</p> <ul style="list-style-type: none"> a) Site clearances: <ul style="list-style-type: none"> i. Full formation width at ground level plus additional extra width of 1 m on both sides should be cleared of all obstructions viz. vegetation, trees, bushes, building, fences, abandoned structures etc. and thereafter it should be dressed and levelled. Depressions if any, should be filled with suitable soil duly compacted. Finally, levelled surface should be properly compacted by mechanical means to get a level and uniform ground surface ii. When bank is constructed on ground having steep slope then the ground surface should be suitably benched so that new material of bank gets well bonded with the existing ground surface. b) Setting out of construction limits <p>Centerline of the alignment and full construction width should be demarcated with reference pegs and dog belling about 90 cm away from proposed toe of the bank. Care should be taken not to disturb the pegs during construction. Pegs should be preferably painted for identification.</p> c) Selection of borrow area <ul style="list-style-type: none"> i. Borrow area should be selected sufficiently away from the alignment and outside DFCC/IR land ii. Borrow area should be selected for soil, suitable to be used in construction, d) Selection of Fill Material

		<p>i. Except for unsuitable soils, any type of locally available soil can be used as an Embankment Fill material. OMC & MDD of the selected fill material should be tested in the laboratory as per laid down frequency. Moreover, the embankment fill material should be such that CBR Value of more than or equal to 5 is generally achieved after compaction.</p> <p>ii. Organic soils are to be avoided as fill material.</p> <p>iii. Use of material should be planned in such a way that soil with higher percentage of coarse-grained particles is placed on the upper layers of the embankment.</p>
2.12	General aspects	
		<p>a. Field trial for compaction on a test section shall be conducted on fill material to assess the optimum thickness of layer and optimum number of passes for the type of roller planned to be used to arrive at desired density. Procedure for field compaction trials is given in Annexure – IV of ‘RDSO Guidelines for Earthwork in Railway Projects’ for guidance.</p> <p>b. If the soil has less than required moisture content, necessary amount of water shall be added to it either in borrow pits or after the soil has been spread loosely on the embankment. Addition of water may be done through flooding or irrigating the borrow areas or sprinkling the water on the embankment through a truck mounted water tank sprinkling system. Use of hose pipe for water need to be avoided.</p> <p>c. If the soil is too wet, it shall be allowed to dry till the moisture content reaches to acceptable level required for the compaction.</p> <p>d. Placement moisture content of soil should be decided based on the field trial and site conditions. The objective should be to compact near OMC to achieve uniform compaction with specified density in most efficient manner.</p> <p>e. Clods or hard lumps of soil of borrow area shall be broken to 75 mm or lesser size before placing on embankment.</p> <p>f. Each layer should be compacted with recommended type of roller up to required level of compaction, commencing from the sides, before putting next upper layer.</p>
2.13	Compaction of earth work	
		<p>i) Performance of the embankment would depend to large extent on the quality of compaction done during execution. To ensure proper compaction, precautions/ guidelines for this have been given in ‘RDSO Guidelines for Earthwork in Railway Projects - 2003’. This should invariably be followed.</p>
2.14	Placement of back-fills on bridge approaches and similar locations	

		<p>i. The back fills resting on natural ground may settle in spite of heavy compaction and may cause differential settlements, vis-à-vis, abutments, which rest on comparatively much stiffer base. To avoid such differential settlements, while on one hand it is essential to compact the back fill in the properly laid layers of soil, on the other hand, the back fill should be designed carefully to keep;</p> <p>a) Settlements within tolerable limits. b) Coefficient of sub grade reaction should have gradual change from approach to the bridge,</p> <p>ii. Back-fills on bridges approaches shall be placed in accordance to RDSO's Report No. GE: R-50. An indicative drawing of Transition System on approaches of bridges has been given in Volume IV. Back filling shall be done as specified in clause no. 605 of Indian Railway Bridge Manual except that thickness of bolder filling shall be 1,200 mm.</p> <p>iii. Fill material being granular and sandy type soil, therefore need to be placed in 150 mm or less thick layers and compacted with vibratory plate compactors.</p> <p>iv. While placing backfill material, benching should be made in approach embankment to provide proper bonding.</p>
2.15	Drainage arrangement in banks	
		Drainage of Embankment: In bank, since cross slope is provided, there is no need of side drains. However, drain with boulder lining is to be provided in longitudinal direction between W. Rly embankment and DFC embankment
2.16	Erosion control of slopes on banks	
		<p>i. Exposed sloping surface of bank experiences surface erosion caused due to the action of exogenous wind and water resulting into loss of soil, leading to development of cuts, rills/gullies adversely affecting the cess width, soil matrix, steepening of slopes etc which depends on type of soil, climatic conditions, topography of area, length of slope etc. Bio-Technical solution, a most commonly method is described below:</p> <p>ii. Bio- Technical Solution In this system, vegetation is provided on exposed slopes. It is suited for soil with some clay fraction. Method consists of preparing slope area by grading it for sowing seeds or planting root strips of locally available creeping grass. Its root goes up to 50 to 75mm deep into the slopes serving as a soil anchor and offering added resistance to erosion.</p>
2.17	Execution of earthwork.	
		<p>a. The spreading of material in layers of desired thickness over the entire width of embankment should be done by mechanical means and finished by a motor grader. The motor grader blade shall have</p>

		<p>hydraulic control suitable for initial adjustment and maintain the same so as to achieve the slope and grade.</p> <p>b. Thickness of layer is decided based on field compaction trials. However, as a good practice thickness of layer should be generally kept as 300 mm for fill material and 250 mm for blanket material in loose state before compaction.</p> <p>c. Fill shall be placed and compacted in layers of specified thickness. The rate of progress should be, as far as possible, uniform so that the work is completed to final level almost at the same time.</p> <p>d. The rolling for compaction of fill material should commence from edges towards center with minimum overlap of 200 mm between each run of the roller. In final pass, roller should simply move over the surface without vibration so that top surface is properly finished.</p> <p>e. Extra bank width of 500 mm on either side shall be rolled to ensure proper compaction at the edges. The extra soil would be cut and dressed to avoid any loose earth at the slopes. This should preferably be done with help of grade cutter.</p> <p>f. At the end of the working day, fill material should not be left uncompacted. Care should be taken during rolling to provide suitable slope on top of the bank to facilitate quick shedding of water and avoid ponding on formation.</p> <p>g. During construction of formation, there may be rainfall to the extent that rain cuts may develop on the surface of formation due to erosion of soil. Care should be taken that these rain cuts are not allowed to develop wide and deep otherwise these locations will remain weak spots. The contractor must ensure at its own cost, to attend/ repair such rain cuts, as a regular measure to the satisfaction of the Employer's Representative.</p> <p>h. Top of the formation should be finished to a cross slope of 1 in 30 from center of formation.</p> <p>i. Once the top surface of the formation has been finished to proper slope and level, movement of either empty or loaded Road vehicle for transportation of ballast, sleepers etc. should be avoided, as these movements will cause development of unevenness, ruts on the surface which will accumulate water and weaken the formation.</p> <p>j. Wherever new bank is likely to overlap existing bank, suitable benching of existing slope shall be done before new earthwork is taken up to provide proper bonding material left on the benched slope. Care needs to be taken to avoid entry of rainwater into the formation from this weak junction, otherwise this would result in development of weak formation, slope failure, maintenance problem due to uneven settlement etc.</p>
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2.18	Quality assurance of earthwork.	
		To achieve effective performance of permanent assets created in New line, adequate quality control/checks at all stages of construction viz. selection of construction materials, adoption of method, use of suitable machinery for construction and during execution of work is essential. Following quality control system needs to be adopted during execution of earthwork.
2.18.1	Setting up of Lab at Construction Site.	
		<p>A Field Laboratory shall be set up by the contractor at site. This lab shall have equipment which are required for daily field tastings. All other tests (like material source approval, concrete mix design etc.) can be carried out at NABL approved lab. The NABL approved Lab as far as possible shall be near to the work location. However, approval of Employer/Employer's Representatives shall be obtained before engaging the NABL lab for testing purpose.</p> <p>The field lab should be manned adequately by trained official and staff capable of carrying out required investigation, testing and quality control at site.</p>
2.18.2	Quality Check of Earthwork	<p>Quality of execution of formation earthwork shall be controlled through exercise of checks on the borrow material, blanket material, compaction process, drainage system and longitudinal & cross sectional profiles of the embankment. The Summary of quality control of Earthwork has been given in Annexure –VII RDSO Guidelines for Earthwork in Railway Projects'. The details of quality control procedure are as follows: -</p> <p>a. Quality Control on Construction Material</p> <p>This is required to ascertain the suitability of the material for construction of embankment and to decide the OMC and MDD, which become the quality control inputs for compaction control. Control tests are required to be done for borrow material as well as blanket material by the contractor to the satisfaction of the Employer's Representative.</p> <p>b. Borrow Material</p> <p>Fill material proposed to be used would have to be assessed for its suitability, after conducting soil classification and other relevant tests as per site requirement. Further tests, if needed, should be performed as directed by Employer's Representative to fully assess the material. On the basis of the tests, areas for borrow material, from outside the Railway land, needs to be earmarked. Once the material has been found fit for use as fill material for embankment, further lab tests, to assess OMC, MDD/ Relative Density, need to be conducted. In case, slope stability analysis, as explained in para 2.9 is required, tri axial test will also be done to find effective shear parameters. It would be in the interest of the effective shear parameters. It would be in the interest of the execution agency to have frequent tests conducted on its own to judge the suitability of the material to avoid any complication at a later stage. However, the final acceptance of the borrow material shall be at the site where it is laid, as follows:</p>

		<p>i. Frequency of Testing at Site: At least one test at every change of soil strata subject to minimum of one test for every 5000 cum to assess suitability of fill material and to lay down OMC and MDD/Relative Density.</p> <p>ii. Acceptance Criteria: Materials conforming to para 5.0 of 'RDSO Guidelines for Earthwork in Railway Projects' need only to be used for construction of embankment.</p> <p>c. Blanket Material</p> <p>The source of blanket material, needs to be identified based on tests & studies conducted as elaborated above and conformity of the material to the Specification as laid down in para 2.7 above. It would be desirable to have a check on quality of material at source/manufacturing point so that major deviation in quality of the material being sent to site does not exist. It would be in the interest of the Contractor to have such tests conducted on his own to avoid any complication at a later stage. The frequency of such test could be laid down by the Employer's Representative, if need be. However, the final acceptance of the blanket material shall be at the site where it is laid, as follows:</p> <p>i. Frequency of Tests at Site: Minimum one test per bridge approach.</p> <p>ii. Method of Test: Test to be conducted are given in para 2.7 of this section. Blanket material should be tested as per IS: 2720 (Part 4) to plot particle size distribution curve, so as to assess its suitability. It would be necessary to carry out wet analysis to assess actual percentage of fines. To expedite testing work, dry sieve analysis may be carried out if variation between results of dry and wet analysis is not significant and adequate margin exists with respect to acceptance criteria. However, in such cases also, wet analysis has to be carried out at frequent interval to verify the extent of variation. In any situation, acceptance of blanket material would be based on wet analysis only. The samples for wet analysis should be prepared as per para 4.3 of IS: 2720 (part 4). Los Angeles Abrasion Values shall be worked out based on IS: 2386 Part IV-1963.</p> <p>iii. Acceptance Criteria: The material should generally conform to specification as given at para 2.7 above.</p>
2.18.3	Quality Control Checks on Finished Earthwork	<p>A. Compacted Earth: Degree of compaction of each layer of compacted soil should be ascertained by measurement of dry density/Relative Density of soil at locations selected in specified pattern. The method of sampling, frequency of tests, method of tests to be conducted and acceptance criteria to be adopted are as under. All tests shall be carried out by the Contractor in the presence of the Employer's Representative's representative.</p> <p>i. Method of Sampling Various methods of selection of sample points for check of in-situ dry density are in vogue. The sampling adopted has to be such that effectiveness of proper compaction having been done for the entire area under consideration can be judged. For this, the Employer's Representative shall lay down the method adopted in detail depending on site conditions and accordingly records of checks</p>

		<p>done shall be properly maintained. However, in absence of such procedure laid down, following method should be adopted.</p> <p>Suggested method of sampling:.</p> <p>a. For Blanketing material and top 1.6 m of bank. For each layer, a minimum of one sample for every 4 m width of that particular layer at an interval of 50 m along the formation. Position of test location in every adjoining 4 m width shall be staggered. For subsequent layer, the stagger should be such that the point of sampling does not fall vertically on the earlier sampling points of the layer immediately below. Additional sampling points can be taken, as considered necessary. Test to be done are:-</p> <ul style="list-style-type: none"> ○ Bulk density ○ Moisture content ○ Dry density ○ Degree of compaction ○ CBR values <p>b. For embankment material below top 1.6 m of bank. For each layer, a minimum of one sample for every 5 m width of that particular layer at an interval of 25 m along the formation. Position of test location in every adjoining 4 m width shall be staggered. For subsequent layer, the stagger should be such that the point of sampling does not fall vertically on the earlier sampling points of the layer immediately below. Additional sampling points can be taken, as considered necessary</p> <ul style="list-style-type: none"> ● Bulk density ● Moisture content ● Dry density ● Degree of compaction ● CBR values <p>In case of bridge approaches or special locations closer frequency may be adopted as directed by the Employer's Representative.</p>		
		B. Method of in-situ dry density measurements: Any of the following methods could be adopted as per the requirements at site:		
	Method of measurement	Procedure of test	Parameters to be measured	Remarks

	i. Sand replacement method	As per IS-2720 (Part 28) 1974	a) In-situ Dry Density b) Moisture content	May be adopted for all type of soils
	ii. Core Cutter Method	As per IS-2720 (Part 28) 1975	-do-	In some of the coarse- grained soils (with little fines) taking core cutter samples is difficult. In such cases, sand replacement method may be used for density measurement.
	iii. CBR values	AS per IS 2720 (P-31)	CBR Values	Adopted for all type of soils
		<p>C. Acceptance Criteria :</p> <p>i. Coarse grained soils which contains fines passing 75 micron IS Sieve, upto 5 percent should have the Density Index (Relative Density) a minimum of 70% as obtained in accordance with IS: 2720 (Part 14) - 1983.</p> <p>ii. For other soils, field dry density should not be less than maximum attainable dry density obtained in field compaction trial. However, in field compaction trial, the maximum attainable dry density should not be less than 98% of MDD values as obtained by Heavy Compaction Test (IS: 2720 (part 8-1983) in the laboratory. In case, there are difficulties in achieving 98% of the MDD values as obtained by Laboratory test, in the field trials, the same may be relaxed up to 95% of MDD with the specific approval of the Employer's Representative recording reasons of such relaxation.</p> <p>iii. CBR values should not be less that the values specified in para 2.7. Formation level</p> <p>iv. Finished top of sub-grade level may have variation from design level by ± 25 mm and finished top of blanket layer may also be permitted to have variation from design level by plus 25 mm. The ballast should be placed only on level formation without ruts or low pockets.</p> <p>v. Cross Slope: Cross slope should be within 1 in 28 to 1 in 30.</p> <p>vi. Side slopes: Side slope should in no case be steeper than designed side slope. Provision of berm width should not be less than the designed width.</p> <p>vii. Formation width: Formation width should not be less than the specified width.</p> <p>viii. Speed of section during opening: Design and quality of construction should be such, so as to ensure opening of new lines, gauge conversions and doublings at full sectional speed and the same can be maintained throughout the service life from geo-technical considerations.</p>		
2.19	Maintenance of records.			

		<p>At work site, details of works along with materials being used are to be properly recorded so that work of satisfactory quality can be achieved which can also be verified at later stage. Records are also required to be maintained to develop completion drawings and other details, which would become permanent records of the section and could be helpful in future to plan developmental activities and remedial measures if need be. Some of important records to be maintained by the Contractor are as follows:</p> <p>a) Quality Control Records</p> <p>(i) Quality control records for earthwork shall be maintained as per Annexure of “RDSO guidelines for earthwork in Railway Project”. These records shall be maintained to the satisfaction of Employer’s Representative.</p> <p>ii) Details of machineries engaged in execution of earth work including its output as per proforma to be decided by the Employer’s Representative.</p> <p>iii) Permanent Records: The contractor shall prepare completion drawing of embankments indicating details of special construction features like toe-walls, breast wall, catch and side drains cross section of embankment, type of soil in sub grade and depth of blanketing material, geological features etc.</p> <p>These permanent records shall be handed over to the Employer’s Representative at the time of handing over of the section on completion of the work.</p>
2.20	Requests for inspection	
		<p>A request for inspection completes with all necessary information to allow assessment shall be submitted to the Employer’ Representative for the following activities and approval must have been received prior to commencing any follow-on activity.</p> <ol style="list-style-type: none"> Acceptance of preparation of Natural Ground. Acceptance of selection of fill material and field trial of compaction. Acceptance of first & subsequent layers of filling; layer wise (each layer). Acceptance of selection of back fills for bridge approaches. Acceptance of first & subsequent layers of backfills (layer wise each layer). Acceptance of selection of blanketing material. Acceptance of first & subsequent layers of blanketing (each layer). Acceptance of formation on completion.

ANNEXURE 'A' TO SECTION – 2 – SPECIFICATION FOR EARTH WORK		
1.1	Various aspects of designing a sub-grade & subsoil	
		For the work of proposed bridge and approaches designed for 32.5tonne axle load in the present contract, the work of Design of formation, Design of sub grade & sub soil, Design of thickness of blanket layer is not contemplated except for Stability Analysis of side slopes of embankment wherever height exceed 6 m, design of retaining walls and side drains, are to be carried out by the contractor.
1.2	Design of thickness and selection of material	
		Depth of Blanket Layer Depth of blanket layer of specified material depends primarily on type of sub grade soil and axle load of the traffic. Depth of blanket material will be governed by DFCC's specifications as contained in clause 2.7 of this section.
1.3	Design of side slope of embankment	
		<p>I. Slope stability analysis should be carried out to design stable slopes for the embankment. Usually, slopes of 2:1 of embankment up to height of 6 m would be safe for most of the soils. However, this analysis has to be carried out in detail for any height of embankment in following situations:</p> <ol style="list-style-type: none"> When subsoil is soft, compressible & marshy type for any depth. When subgrade soil (fill material) has very low value of cohesion C' such that C'/OH (where H is height of embankment and O is bulk density of soil) is negligible, i.e in range of 0.01 or so. When highest water table is within $1.5xH$ (H is the height of embankment), below ground level, then submerged unit weight of soil below water level should be taken. <p>II. In cutting slope, softening of soil occurs with the passage of time, and therefore, long term stability is the most critical, and should be taken into consideration while designing the cuttings.</p> <p>III. Slope stability analysis may also be carried out using standard computer programme / especially made for this purpose. However, the efficacy of the software used should have approval the Employer's Representative</p>

ANNEXURE ' B' TO SECTION – 2 – SPECIFICATION FOR EARTH WORK		
1.1	Compaction	<p>i. Each layer should be compacted to the desired density over its entire width commencing from the sides, before the next layer is commenced. There should be minimum overlap of 150mm between each run of the rollers. Care should be taken during rolling to suitably slope the surface of the bank to facilitate the shedding; and to minimize absorption of rainwater; special attention being given to the prevention of ponding.</p> <p>ii. The suitability of various rolling equipment for different types of soils should be as per the sound Engineering practices Guidelines given in RDSO instructions for earthwork may be referred as given in Annexure-V (of the guidelines).</p> <p>iii. Extra wide bank by 50 cm on either side shall be rolled and then dressed to size for avoiding any loose earth at the shoulders</p> <p>iv. Five samples shall be collected for testing of each compacted layer of 1000m².</p>
1.2	Compaction of Sandy or Silty Soils with Moderate Cohesion	<p>i. With the moderate cohesion, the compaction in layers by rollers is most effective. Vibratory roller has been found more effective than the static roller and greater thickness of layers can be allowed.</p> <p>ii. The water content at which a soil is compacted has an effect on all the physical properties of compacted soil, however, physio chemical properties remain unchanged. Embankment soil shall attain moisture density equilibrium during weather cycles and the bank/ cutting should be safe during service conditions. Therefore, design parameters should be carefully selected to cater for the most unfavorable conditions.</p> <p>a. The quarry shall be approved after testing the soil samples in the laboratory for determination of soil parameters.</p> <p>b. The moisture content at which a specific amount of compaction will produce maximum dry density in a soil shall be worked out by laboratory testing and ensured in the field.</p> <p>iii. Water content as desired, and densities should be specified as obtained in the field trials, as per IS: 10379- 1982. For guidance during field trials to determine the thickness of layers, dry densities to be achieved and optimum moisture content, laboratory tests for heavy compaction as per IS:2720 (Pt. VIII) - 1983 should be carried out for obtaining these. Densities obtained in field trials normally should be around Maximum Dry Densities as obtained from these tests and should form the basis for specifications and control. The moisture content controls may not be specified and 98% of such densities as achieved in field trials are only specified.</p>

		<p>iii. For compaction controls, IS:2720 (Pt. XXXVIII)-1976 should be used for field trials.</p> <p>iv. Any relaxation in the above-mentioned specifications, if approval of the Employer's Representative.</p>
1.3	Compaction of Clays	<p>i. Main objectives of compacting predominantly clayey soils is to achieve a uniform mass of soil with no voids between the chunks of clays they are placed during the earthwork. If moisture content is too high, rollers tend to sink into the soil and if too low, the chunks would not yield to rolling by rollers. Maximum Dry Densities and Optimum Moisture Contents should be found from laboratory tests for heavy compaction as specified in IS: 2720 (Pt. VIII)-1983. the laboratory results may only be used for arriving at those practically achievable values of densities and optimum moisture contents as obtained from the field trials as per IS: 10379-1982.</p> <p>ii. Sheep-foot rollers are most effective in breaking the clods and filling large spaces. The layer thickness should be equal to the depth of the feet of roller plus 50mm. For specifications of sheep-foot rollers ARE: 4616-1968 may be referred.</p>
1.4	Sub-Grade Compaction	After site clearance, all pockets and depressions left in the soil, if any, should be made good and compacted suitably.
1.5	Method of Compaction	<p>i. Earthwork should be done in layer not exceeding 300 mm to 600 mm thick in the loose state with the static and vibratory rollers respectively. The thickness of the loose layer should be decided after the preliminary trial with the equipment proposed to be used, as per IS Code; 10379-1982. The layer should be compacted preferably at or near the water content thus determined with suitable rollers to achieve the desired density of 98 % of MDD as obtained from heavy compaction as per IS: 2720 (Pt. VIII) - 1983. It would be necessary to use right type of compaction equipment for proper and speedy compaction. For quality control of earthwork, however, only practically achievable values of densities would be indicated as obtained from the field trials.</p> <p>ii. The performance of rollers is dependent mainly on the type of soil. The different type of rollers and the types of soil for which they are more suitable are given in Annexure-V of RDSO guideline.</p> <p>iii. Before the work is commenced, field compaction trials should be conducted as per IS Code: 10379-1982 for deciding upon the most desirable moisture content and economical thickness of layer and the number of passes required to achieve the specified density. Heavy compaction tests should be first carried out on the soil from the borrow pit areas to ascertain the optimum moisture content and the maximum dry density.</p>

1.6	Moisture Content	The objective should be to compact near OMC or above to achieve the density as specified in most efficient manner.
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3.0	SPECIFICATIOS FOR BRIDGES	
3.1	Abbreviations	<p>a) IRS : Indian Railway Standard</p> <p>b) IRC : Indian Road Congress</p> <p>c) RDSO : Research Design Standard Organization</p> <p>d) CBC : Concrete Bridge Code</p> <p>e) BIS : Bureau of Indian Standard</p> <p>f) MORTH : Ministry of Road, Transport & Highways</p> <p>g) UIC : Union Internationale des Chemins (International Union of Railways)</p>
3.2	Setting Out	<p>(a) The methods to be adopted for verifying the details of bench marks and alignment pillars established by the Employer at discrete intervals of lengths all along the length of the proposed work of DFCCIL and establishment of working bench marks and alignment references by the Contractor and getting them checked by the Employer's Representative has been dealt in detail in Para 1 above (Specification for Earth work).</p> <p>(b) Alignment for Bridges In order to facilitate the setting out of work, the centre line of the bridge must be accurately established by the contractor and got approved by the Employer's Representative.</p> <p>(c) Survey Tower For carrying out accurate survey work for major river crossings, survey tower shall be built one on each bank and one inside the river where required and possible. The tower shall be built in duplicate, securely founded and braced, the inner tower shall support the instrument only and the outer shall support the observer. The two towers should be entirely independent of each other. The height of the tower shall not be less than the pier height. The contractor shall be solely responsible for planning and erection of suitable types of towers, which should be maintained throughout the construction period.</p>
3.3	Painting on Bridges	
3.3.1		<p>Permanent markers like Bridge number, Direction of flow, Bridge Plaques, Bridge Boards, Flood Gauges, HFL, Danger level etc. shall be provided as per Indian Railway Standards by the Contractor without any payment. Contract cost shall be treated to have included the cost of all these items.</p> <ol style="list-style-type: none"> 1. The date of painting of superstructure should be painted in white on the outside of the left girder of the first span. In the case of important bridges, the left girder at each end should bear the date of painting 2. The highest flood level line should be painted distinctly by a 25mm broad white line along with the year of its occurrence, in figures 100mm deep as follows:

		<p>(a) For bridges upto 60 metres in length, on the downstream side of one abutment.</p> <p>(b) For bridges over 60 metres in length, on each of the abutments on the downstream side or on the down</p> <p>(c) For buried type abutments, on the piers near the end spans.</p> <p>3. At all the bridges, flood level gauges should be provided on abutments or on piers of the end spans. The marking should be in metres divided into ten parts commencing from the underside of the girders towards the bed. The marking and the figures should be painted in black on white background. Where necessary, piers and abutments may be plastered with cement mortar 380 mm wide for providing the gauges. The HFL mark in white paint should be made by the side of the gauge.</p> <p>4. The direction of flow should be distinctly marked in white on an abutment or pier.</p> <p>5. Plaques showing particulars of foundations should be fixed over every abutment and pier in accordance with 11/7 of Indian Railways Bridge Manual- 1998.</p> <p>6. Name boards at all the bridges should be fixed at either approach at a distance of about 15 metres from the abutment indicating the name of the river and the number and length of spans.</p> <p>7. Plaques containing Bridge numbers and indicating direction of flow should be provided on parapet wall as detailed in Annexure 2/1 of Indian Railways Bridge Manual -1998.</p> <p>8. At all canal crossing, the full supply level should be marked distinctly in the same way as the HFL line for other bridges.</p> <p>9. Danger level should be distinctly marked in red</p>
3.4	Others	
3.4.1	Precaution during progress of works	During the execution of works, unless otherwise specified the contractor shall at his own cost provide the materials for and execute all shoring, timbering and strutting works or any other temporary works as is necessary for the stability and safety of all structures, excavations and works. It shall be ensured that no damage, injury or loss is caused or likely to be caused to any person or property.
3.4.2	Roads and Water Courses	Existing roads or water courses shall not be blocked, cut through, altered, diverted or obstructed in any way by the Contractor, except with the permission of the Employer's Representative. All compensations claimed for any unauthorized closure, cutting for any unauthorized closure, cutting through, alteration, diversion or obstruction to such roads or water courses by the Contractor or his agent staff shall be recoverable from the Contractor by deduction from any sums which may become due to him in terms of contract, or otherwise according to law.
3.4.3	Provision of Access to	During progress of work in any street or thoroughfare, the Contractor shall make adequate provision for the passage of traffic, for securing

	Premises	safe access to all premises approached from such street or through fare and for any drainage, water supply or means of lighting which may be interrupting by reason of the execution of the works and shall react and maintain at his own cost barriers, lights and other safeguards as prescribed by the Employer's Representative, for the regulation of the traffic, and provide watchmen necessary to prevent accidents. The works shall in such cases be executed night and day if so ordered by the Employer's Representative and with such vigour so that the traffic may be impeded for as short a time as possible.
3.4.4	Safety of Public	The contractor shall be responsible to take all precautions at its own cost to ensure the safety of the public whether on public or Railway property and shall post such look out men as may in the opinion of the Employer's Representative be required to comply with regulations pertaining to the work.
3.4.5	Operational Safety	Where the work to be executed is in proximity of the running railway track, the contractor will be required to observe all precautions and carryout all works that may be necessary to ensure the safety of the running track/trains etc. without imposition of any speed restriction thereon as may be directed by the Employer's Representative or his authorised representative. No claim whatsoever will be entertained for either any inconvenience caused to the contractor or for the re-scheduling of the operations or for any other reasons on this account. The contractor shall ensure that the materials are not stacked close to the railway track, which may endanger the safety of trains and workmen.
3.4.6	Excavation effecting existing Track	While doing excavation for minor bridges / major bridge / important bridge, falling on DFCC routes, special care has to be taken to ensure that formation of the existing line is not excavated, for that matter any activity involved in construction / execution of proposed bridges on DFCC routes shall not endanger the safety of existing running line of Indian Railways. If excavation or any other activity involving working and or modification and or alteration of the existing permanent way then, before execution of such work, contractor shall prepare a drawing clearly indicating such alternation / modification of the existing permanent way, and the protection measure intended to be taken by the contractor to ensure safety of the existing running line. The effectiveness of design of such protection measures is the sole responsibility of the contractor and the contractor shall indemnify the Employer towards the losses incurred due to failure of such protection measure. These protection measures duly indicating the extent of alternation / modification to the existing formation shall be incorporated in the design and drawing submitted during preliminary design submission as per Employer's Requirement - Design. Such work shall not be undertaken unless and until these drawings are approved by the Employer's Representative.
3.4.7	Contractors offer for different items of works	The offer given by contractor for the setting of all work and of and level pegs thereon, site clearance, all fees, duties, royalties, rent and compensation to owners for surface damage or taxes and impositions payable to local authorities in respect of land, structures and all material supplied for the work or other duties or expenses for which

		the contractor may become liable or may be put to under any provision of law for the purpose of or in connection with the execution of the contract, and all such other incidental charges or contingencies as may have been specially provided for in the specifications.
3.4.8	Land for Construction	The land has already been acquired by Employer.
3.4.9	Resources Report	The contractor shall submit to the Employer's Representative each month a detailed list by trade classification, of manpower employed during the report period as also a list of all serviceable major items of construction plant and equipment on site.
3.4.10	Measurements	All measurements shall be made in the metric system.
3.5	Excavation, Backing, Backfill & Weep-holes	
	Excavation	
3.5.1	Site Clearance	The contractor shall remove all vegetation, trees, structures and any foreign material at the site. The area shall be stripped to remove roots of grass/trees, and other organic materials shall be burnt and /or removed to approved disposal areas or other locations as indicated by the Employer's Representative.
3.5.2	General Requirement	The Contractor shall furnish all labour, equipment and materials required for complete performance of the work in accordance with the drawings and as described herein.
3.5.3	Drainage in the vicinity of excavation	<p>(i) The contractor shall control the grading in the vicinity of all excavations so that the surface of the ground in vicinity is properly sloped or diked to prevent surface water from running into the excavated areas during construction.</p> <p>(ii) Excavations shall include the removal of the materials required to execute the work properly and shall be made with sufficient clearance to permit the placing, inspection and setting of form and completion of all works for which the excavation was made.</p> <p>(iii) Sides and bottoms of excavation shall be cut sharp and true. Undercutting shall not be permitted. Earth sides of excavation shall not be used in lieu of form work for placement of concrete unless authorized, in special cases, by the Employer's Representative, where limitations of space for larger excavation necessitate such a decision.</p> <p>(iv) When machines are used for excavation, the last 300 mm before reaching the required level shall be excavated by hand or by such equipment that will leave the soil at the required final level, in its natural condition.</p> <p>(v) Suitability for bearing of the bottom of excavation shall be determined by the Employer's Representative.</p> <p>(vi) The bottom of excavations shall be trimmed to the required levels and when carried below such levels, by error, shall be brought to level by filling with lean concrete as specified, at the contractor's cost.</p>

		<p>(vii) If the contractor is directed by the Employer's Representative to excavate to a lower level than the level indicated on the drawings such additional excavation shall not be paid for separately and the overall amount quoted by the contractor are deemed to include such variations.</p> <p>(viii) The contractor shall be responsible for assumption and conclusions regarding the nature of materials to be excavated and the difficulty of making and maintaining the required excavations and performing the work required as shown on the drawing and in accordance with these specifications. Cofferdams, sheeting, shoring, bracing, draining, dewatering, etc. shall be furnished and installed as required and the cost thereof shall be included in the offer quoted by him for the item of excavation. The contractor shall be held responsible for any damage to any part of the work and property caused by collapse of sides of excavations. Material may be salvaged if it can be done with safety for the work and structures, as approved by the Employer's Representative. However, no extra claim shall be entertained for material not salvaged or any other damage to contractor's property as a result of the collapse. He shall not be entitled to any claim for additional payment for having to re-do the excavation as a result of the same.</p> <p>(ix) All excavation for installation of underground facilities such as piping, sewer lines, tunnels, ducts, drain lines, etc. shall be open cuts.</p> <p>(x) Excavations for foundations where specified shall be carried at least 100 mm below the proposed bottom of structural concrete and then be brought to the required level by placing lean concrete of 1:4:8 mix, with aggregate of 40 mm maximum nominal size. The work will not be paid extra and is deemed to be included in the rate quoted by the contractor.</p> <p>(xi) Where excavation requires bracing, sheeting, or shoring etc. the contractor shall submit, drawings showing arrangement and details of proposed installations to the Employer's Representative and shall not proceed until he has received</p> <p>a) The contractor will make his own assessment of the strata underneath and will provide for excavation through all types of soils and the offer given by him while submitting his tender and this aspect shall be deemed to have been duly considered by the contractor in his offer.</p>
3.5.4	Excavation in Rock – hard, Soft or Decomposed	<p>(i) Blasting material required for excavation work included in this tender shall be arranged by the contractor from any authorized dealer of such approved material. Necessary assistance in the form of recommendation for procurement of the material will be given by the Employer. The contractor shall be fully responsible for entering into agreement with any authorized magazine contractor in respect of rates, regularity of supply magazine contractor in respect of rates, regularity of supply etc. Contractor will also obtain necessary license for transporting, stocking and use of explosive and draft only suitably qualified and licensed personnel for handling the explosives.</p>

		<p>(ii) Blasting: Contractor will be responsible that all rules under the Explosives Act or other local rules in force shall be fully observed. All blasting works shall be done in accordance with the stipulations contained in the Indian Standards Specification No. IS:4081. Blasting shall be done by employing qualified personnel and under careful supervision. Blasting shall only be carried out at certain specified times as directed by the Employer's Representative. Proper precautions for safety of persons and property shall be taken. Where blasting is to be carried out in the proximity of other structures, sand bags etc. shall be used on top of the blast holes to prevent the rock fragments from causing damage to adjacent structures and other property. The unit rate for excavation involving blasting shall be inclusive of the cost of providing all necessary material, labour and arranging for such precautions.</p> <p>(iii) Control blasting has to be resorted to while working in close proximity of running track. Entire activity starting from placement of ballast material into the blast holes followed by blasting and examination of unexploded charges should be carried out under traffic block. Traffic block will be arranged by the employer. In the event if, traffic block is not arranged, contractor has to carry out excavation by other means like mechanical chiseling or any other suitable method not requiring the use of explosives. Contractor will not be entitled for any kind of compensation due to non availability of traffic block and deployment of such other means for excavation. Though, control blasting will be resorted to while working in the close proximity of the running track, to ensure that existing track is not infringed by rock fragment and to ensure safety of the trains running on existing lines. Despite taking all such precautions if, after blasting, the existing track is infringed in any manner by rock fragment, contractor will ensure removal of such debris from the track before cancellation of traffic block and as directed by the Employer's Representative.</p>
	Unexploded Charge	<p>(iv) The number of blasts to be fired and the actual number of shots heard shall be compared and the person responsible shall satisfy himself by examination that all blasts have exploded before any person working in the area is permitted to re approach the work site. The withdrawal of the unexploded charge shall not be permitted under any circumstances. The tamping of the unexploded charge shall be flooded with water and the hole marked in distinguishable manner. Another hole shall be made at a distance of about 450 mm off the old hole and fired in the usual way. This process shall be continued till the original blast is exploded.</p>
3.5.5	Decomposed or Soft Rock	Excavation in "decomposed or soft rock" shall be carried out by deployment of machinery, or by blasting or by crow bars and pick axes etc. or by a combination of these methods.
3.5.6	Chiseling in Hard Rock	Where blasting is prohibited or not practicable, excavation shall be carried out by chiselling. The decision of the Employer's Representative in this regard shall be final.

3.5.7	Backing	<p>(i) A backing of dry rubble walling will be provided behind abutments and wing walls for facilitating proper drainage. It shall be provided to dimensions in accordance with the drawings. This item of work shall deem to have been included by the contractor in his offer.</p> <p>(ii) The material used should be broken stone of quality approved by Employer's Representative. The stones used will be of least dimension of 15 cm in any direction and not friable. Materials selected from out of excavated material may be permitted to be used .by Employer's Representative.</p>
3.5.8	Backfill	<p>(i) After completion of foundation footings, and abutments and wings walls and other construction below the elevation of the final grades and prior to backfilling, all forms, temporary shoring, timber etc. shall be removed and the excavation cleaned of all trash, debris, and perishable materials. Backfilling shall begin only with the approval of the Employer's Representative. It may however be noted that nothing extra will be payable for backfilling the earth behind abutments and wing walls</p> <p>(ii) Backfilling shall be done with inorganic materials, obtained from the excavation or borrow pits, if suitable and subject to the approval of the Employer's Representative. In case of unsuitability of excavated material the contractor will have to arrange backfill material from outside and nothing extra will be payable on this account.</p> <p>(iii) Backfill shall not be dropped directly upon or against any structure or facility where there is danger of displacement or damage.</p> <p>(iv) Backfill shall be placed in horizontal layers not to exceed 20 cm in thickness. Each layer shall be compacted with proper moisture content and with such equipment as may be required to obtain a density equal to or greater than 95% of maximum as determined by the relevant Indian Standards. Trucks or heavy determined by the relevant Indian Standards. Trucks or heavy equipment for depositing or compacting backfill shall not be used within 1.5 m of building walls, piers, or other facilities which may be damaged by their weight or operation. The methods of compaction shall be subject to the approval of the Employer's Representative. Pushing of earth for backfilling shall not be adopted under any circumstances.</p> <p>(v) Backfill adjacent to pipes shall be hand placed, free of stones, concrete, etc. compacted uniformly on both sides of the pipe and where practicable, to a depth of 300 mm over the top of pipes. While tamping around pipe, care shall be taken to avoid unequal pressures.</p> <p>(vi) On completion of structures, the earth surrounding them shall be accurately finished to line and grade as shown on the drawings. Finished surface shall be free of irregularities and depressions and shall be within 50mm of the specified level.</p>

		<p>(vii) The back fills resting on natural ground may settle in spite of heavy compaction and may cause differential settlements, vis-a-vis, abutments, which rest on comparatively much stiffer base. To avoid such differential settlements, while on one hand it is essential to compact the back fill in the properly laid layers of soil, on the other hand, the back fill should be designed carefully to keep;</p> <p>(i) Settlements within tolerable limits. (ii) Coefficient of sub grade reaction should have gradual change from approach to the bridge,</p> <p>(viii) Fill material being granular and sandy type soil, therefore need to be placed in 150mm or lesser thick layers and compacted with vibratory plate compactors.</p> <p>(ix) While placing backfill material, benching should be made in approach embankment to provide proper bonding.</p>
3.6	Weep Holes	
3.6.1	General	<p>Weep Holes shall be provided in abutment wing wall and return wall and backfill as shown on drawing or directed by the Employer's Representative to drive moisture from the backfilling. Weep holes shall be provided with PVC pipe as shown in the drawing.</p> <p>The offer given by the contractor will be deemed to include cost of materials, carriage, all leads and lifts tools and plants complete in all respects for providing weep holes including cleaning of weep holes.</p>
4.0	REINFORCEMENT STEEL	
4.1	General	<p>steel used in the works shall be Fe – 500 conforming to IS 1786 (latest revision) manufactured by approved manufacturer (list enclosed in Employers Requirement)</p> <p>All reinforcement work shall be executed in conformity with the designs and drawings and all work shall generally be carried out in accordance with the relevant Indian Standards Specifications (IS: 2502).</p>
4.2	Inspection & Testing	<p>Every bar shall be inspected before assembling on the work and any defective, brittle, excessively rusted or burnt bars shall be removed. Cracked ends of bars shall be cut out.</p> <p>Physical Test as per IS:2062, IS:1786</p> <p>i) Upto 10mm Dia - one sample per 25 MT or part thereof. ii) Above 10mm Dia - one sample per 40 MT or part thereof.</p> <p>The various physical test shall be carried out as per IS: 226, IS: 1608, IS:1599, IS:1387.</p>
4.3	Lapping & Welding	<p>Every bar shall be inspected before assembling on the work and any defective, brittle, excessively rusted or burnt bars shall be removed. Cracked ends of bars shall be cut out.</p> <p>Physical Test as per IS:2062, IS:1786</p> <p>(i) As far as possible, bars of the maximum length available shall be used. Laps shown on drawings or otherwise specified by the Employer's Representative will be used. In case the contractor wishes to use shorter bars, laps shall be provided at the contractor's</p>

		<p>cost in the manner and at the locations approved by the Employer's Representative. Amount quoted by the contractor is inclusive of all such provisions.</p> <p>(ii) As and when necessary, welded laps shall be provided as specified by the Employer's Representative.</p>
4.4	Spacing, Supporting & Cleaning	<p>i) All reinforcement shall be placed and maintained in the position shown on the drawing.</p> <p>ii) The contractor shall provide approved types of supports for maintaining the top bars of the slab in position during concreting. All cover blocks shall be of concrete (not sand cement mortar) and of the same strength as that of the surrounding concrete and properly compacted and vibrated on a vibrating table.</p> <p>They shall be cured for a minimum period of 14 days before they are used in the works.</p> <p>iii) 16 SWG GI wire shall be used as binding wire. All bars crossing one another shall be bound with this wire twisted tight to make the skeleton of network rigid so that the reinforcement is not displaced during placing of concrete.</p> <p>iv) Bars must be cleaned before concreting commences of all scale, rust or partially set concrete which may have been deposited there during placing of a previous lift of concrete.</p> <p>The bars shall be cleaned with dry gunny bags if they are coated lightly with rust or other impurities. On no account shall the bars be oiled or painted nor shall mould oil used on the formwork be allowed to come in contact with the bars. Cement wash to bars will not be permitted.</p>
4.5	Welding	<p>i) Wherever specified, all welding shall be carried out in accordance with IS: 2571. Only qualified welders shall be permitted to carry out such welding.</p> <p>ii) For cold twisted reinforcement, welding operations must be controlled to prevent a supply of amounts of heat larger than what can be dissipated. The extreme non-twisted end portion shall be cut off before welding. Electrodes with ductile coating should be used.</p> <p>v) The welding procedure shall be approved by the Employer's Representative and tests shall be made to prove the soundness of the welded connection.</p>
4.6	Protective Coatings	<p>In order to offer adequate resistance against corrosion reinforcement bars shall be provided with suitable protective coatings depending upon the environmental conditions. The recommended anti corrosive treatment to Untensioned steel reinforcement for the bridges is with CPCC treatment of CECRI.</p>
4.7	Cement-Polymer Composite Coating System	<p>This system consists application of one coat of rapid setting primer followed by a coat of cement polymer sealing product. The primer and sealing product is formulated with resin mixed with cement as a pigment. Rapid setting primer and sealing coats both are patented items. This system has been developed mainly as a factory/shop</p>

	(CPCC)	<p>process. The approach behind development of this system is that the base metal of re-bars, contains p electrons which get readily released in corrosive environment leading to oxidation of iron and thereby formation of Fe₂O₃(rust) as principal deterrent. In order to prevent this oxidation a surface coating capable of interacting/nullifying the released electrons is provided. Further reinforcing steel, in concrete during service life, is exposed to an alkaline and this necessitates introduction of a top coat which should be compatible to primer and alkaline environment. To meet these two contingencies, suitable polymers are carefully tailored through the formation of a single phase in the poly-blend which provides the necessary mechanical and physical properties.</p> <p>Briefly the following steps are involved in the process:</p> <p>A. Surface Preparation: the surface of the steel reinforcing bars to be coated is cleaned by abrasive (dry sand) blast cleaning to the near white metal in accordance with SSPC-SP10/NAC No.2-1994.It includes the following procedures.</p> <ol style="list-style-type: none"> i. Prior to blast cleaning visible deposits of oil or grease are removed by suitable cleaning method. ii. Cleaning dry compressed air is used for nozzle blasting. iii. Dry uniformly graded silica sand is used for blast cleaning which should be free from contaminants. <p>IV. Dust and residues are removed from prepared surface by brushing, blowing off with clean, dry air, vacuum cleaning.</p> <p>V. The prepared surface shall meet the visual standards of comparisons as in SSPC-VIS1 of SSPC-VIS 2.</p> <p>B. Application of the coating:</p> <ol style="list-style-type: none"> i) The coating is applied to the cleaned surface as soon as possible after cleaning and before oxidation of the surface discernible to the unaided eye occurs. However, the application of the coating should not be delayed more than 4 hrs after cleaning. ii) A rapid setting primer shall be applied over the prepared surface of the reinforcing steel either by brushing or dipping. iii) After 30 minutes of application of the primer a cement polymer sealing coat shall be applied either by brushing or dipping. vi) The coated rods shall be handled after 6 hours. <p>C. Inspection and Testing: Coated rebars shall be checked for average dry thickness, uniformity of thickness, defects such as cracks, peeling, bulging and uncoated areas etc. Coating shall be tested for adhesion, bond strength, abrasion resistance, chemical resistance as per specifications laid down by the manufacturer.</p> <p>D. Details specification of chemicals/solutions and quality control aspects, if required, may be obtained from CECRI. Karaikudi.</p>
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5.0	STRUCTURAL CONCRETE	
5.1	Cement	<p>i) The cement used shall be any of the following, with the prior approval of the Employer's Representative for all permanent structures:</p> <p>a) 33 Grade Ordinary Portland cement conforming to IS: 269. b) 43 Grade Ordinary Portland cement conforming to IS: 8112. c) 53 Grade Ordinary Portland cement conforming to IS: 12269.</p> <p>Note 1 : The sulphate resisting cement conforming to IS: 12330 shall be used only in such conditions where the concrete is exposed to the risk of excessive sulphate attack e.g. concrete in contact with soil or ground water containing excessive amount of sulphate. It shall not be used under such conditions where concrete is exposed to risk of excessive chlorides and sulphates attack both.</p>
5.2	Aggregates	<p>i) Aggregates shall comply with the requirements of IS:383 where required by the Employer's Representative, aggregates shall be subjected to the tests specified in IS: 383. These tests shall be done in accordance with IS: 2386 (Part I) to IS: 2386 (Part VIII).</p> <p>ii) The nominal maximum size of the aggregate should be as large as possible within the limits specified but in no case greater than one-fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement and pre-stressing tendons thoroughly and fill corners of the formwork.</p> <p>iii) For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of the aggregates should usually be restricted to 5 mm less than minimum clear distance between the main bars, cables, strands or sheathing where provided or 5 mm less than minimum cover to the reinforcement, whichever is smaller. . However, in lightly reinforced concrete members such as solid slabs with widely spaced reinforcement limitation of the size of the aggregate may not be so important and the nominal maximum size may sometimes be as great as or even greater than the minimum cover</p> <p>iv) For reinforced concrete and Prestressed concrete works a nominal maximum size of 20 mm is generally considered satisfactory. In special cases larger size aggregate may be specifically permitted by the Employer's Representative but in no case the nominal maximum size shall be more than 40 mm.</p>
5.3	Fine Aggregates (Sand)	<p>i) Creek/ Marine sand shall not be used in permanent work.</p> <p>ii) Sand, if found too coarse, shall be suitably blended with finer sand obtained from approved sources to obtain the desired grading. The provision of two types of sand, their stacking separately and their mixing in the specified proportions shall be at the contractor's cost. The sand shall not contain silt, shale, clay and other week particles more than a total of 3% by weight.</p>

		<p>iii) The grading of the sand shall conform to IS: 2386. The sand shall be screened on a 4.75 mm size screen to eliminate over size particles. The sand shall be washed in screw type mechanical washers in potable water to remove excess silt, clay and chlorides. The screening and washing of sand shall be completed at least one day before using it in concrete.</p> <p>The washed sand shall be stored on a sloping platform and in such a manner as to avoid contamination.</p>										
5.4	Coarse Aggregates	<p>i) Coarse aggregates for the works shall be crushed stone conforming to IS: 383, obtained from approved sources. Only quarries having jaw crushers with choke feeding arrangements producing aggregates of nearly cubical shape shall be approved.</p> <p>ii) Coarse aggregate containing flat or flaky pieces or mica shall be rejected.</p> <p>iii) The aggregates shall be subjected to tests in accordance with IS: 2386 as may be ordered by the Employer's Representative.</p> <p>iv) Aggregate shall be stored in such a way as to prevent segregation of sizes and avoid contamination with fines and other undesirable material.</p>										
5.5	Water	<p>i) Water used for washing of aggregates and for mixing and curing concrete shall be clean and free from injurious amounts of oils, acids, alkalis, salts, sugar, organic materials or other substances that may be deleterious to concrete or steel.</p> <p>ii) The permissible limits for solids shall be as follows:</p> <p>Maximum Permissible Limit</p> <table><tr><td>Organic</td><td>200 mg/l</td></tr><tr><td>Inorganic</td><td>3000 mg/l</td></tr><tr><td>Sulphates (as SO4)</td><td>500 mg /l</td></tr><tr><td>Chlorides (as Cl)</td><td>2000 mg/l for plain concrete work 1000 mg/l for reinforced concrete works and 500 mg /l for Prestressed concrete works</td></tr><tr><td>Suspended matter</td><td>2000 mg/l</td></tr></table> <p>iii) In case of doubt regarding development of strength, the suitability of water for making concrete shall be ascertained by the compressive strength and initial setting time tests specified as below:</p> <p>The sample of water taken for testing shall represent the water proposed to be used for concreting due account being paid to seasonal variation. The sample shall not receive any treatment, before testing other than that envisaged in the regular supply of water proposed for use in concrete. The sample shall be stored in a clean container previously rinsed out with similar water.</p>	Organic	200 mg/l	Inorganic	3000 mg/l	Sulphates (as SO4)	500 mg /l	Chlorides (as Cl)	2000 mg/l for plain concrete work 1000 mg/l for reinforced concrete works and 500 mg /l for Prestressed concrete works	Suspended matter	2000 mg/l
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Suspended matter	2000 mg/l											

		<p>Average 28 days compressive strength of least three 15 cm concrete cubes prepared with water proposed to be used shall not be less than 90 percent the average of strength of three similar concrete cube prepared with distilled water. The cubes shall be prepared cured and tested in accordance with the requirements of IS:516.</p> <p>The initial setting time of test block made with the appropriate cement and the water proposed to be used shall not be less than 30 minutes and shall not differ by +30 minutes from the initial setting time of control test block prepared and tested in accordance with the requirements of IS: 4031.</p> <p>iv) The pH value of water shall generally be not less than 6.</p> <p>v) Water found satisfactory for mixing is also suitable for curing concrete. However, water used for curing should not produce any objectionable stain or unsightly deposit on the concrete surface. The presence of tannic acid or iron compounds is objectionable.</p>
5.6	Reinforcement Steel	<p>i) Steel used in the works shall be high yield strength deformed TMT Fe 500 steel bars/corrosion resistant conforming to IS: 1786-1985 (latest revision) manufactured by those agencies having BIS license.</p> <p>ii) All reinforcement work shall be executed in conformity with the drawings supplied and instructions given by the Employer's Representative and shall generally be carried out in accordance with the relevant Indian Standards Specifications (IS: 2502).</p>
5.7	Concrete admixtures	
5.7.1	General	<p>i) The Employer's Representative may permit the use of admixtures for imparting special characteristics to the concrete or mortar on satisfactory evidence that the use of such admixtures does not adversely affect the properties of concrete or mortar particularly with respect to strength, volume change durability and has no deleterious effect on reinforcement.</p> <p>ii) The admixtures, when permitted, shall conform to IS: 9103.</p> <p>iii) Calcium chloride or admixtures containing calcium chloride shall not be used in structural concrete containing reinforcement, prestressing tendon or other embedded metal.</p> <p>iv) The admixture containing Cl & SO₃ ions shall not be used.</p> <p>v) Admixtures containing nitrates shall also not be used. Admixtures based on thiocyanate may promote corrosion and therefore shall be prohibited.</p> <p>vi) Concrete admixtures are proprietary items of manufacture and shall be obtained only from established manufactures with proven track record as given in list of approved suppliers in employer's requirement. Naphthalene or melamine-based admixtures as approved by the Employer only shall be used in the work. The admixture shall be non-air entraining type.</p>

		<p>vii) The contractor shall provide the following information concerning each admixture after obtaining the same from the manufacturer:</p> <ul style="list-style-type: none"> a) The chemical names of the main ingredients in the admixtures. b) The chloride content, if any, expressed as a percentage by the weight of the admixture. c) Values of dry material content, ash content and relative density of the admixture which can be used for Uniformity Tests. d) Whether or not the admixture leads to the entrainment of air when used as per the manufacturer's recommended dosage, and if so to what extent. e) Where two or more admixtures are proposed to be used in any one mix, confirmation as to their compatibility. f) There would be no increase in risk of corrosion of the reinforcement or other embodiments as a result of using the admixture. g) Retardation achieved in initial setting time. h) Normal dosage and detrimental effects, if any, of under dosage and over dosage.
5.7.2	Physical and Chemical Requirements	<p>Admixture shall conform to the requirements of IS: 9103. In addition, the following conditions shall be satisfied.</p> <ul style="list-style-type: none"> a) "Plasticisers" and "Super Plasticisers" shall meet the requirements indicated for "Water reducing Admixture". b) The air content of freshly mixed concrete in accordance with the pressure method given in IS: 1199 shall not be more than 1 percent higher than of the corresponding control mix. c) There shall be no chloride content in admixture when in accordance with IS: 6925. d) uniformity tests on the admixtures are essential to compare qualitatively the composition of different samples taken from batch or from the same batch at different times.

		<p>e) All tests relating to the concrete admixtures shall be conducted periodically at an independent laboratory and compared with the data given by the manufacturer.</p> <p>f) While Qualifying the admixture the infra- red spectrograph plot should be given. Each batch of the supply should be tested for I.R Spectrograph and prove the consistency of supply.</p>
5.8	Storage of materials	
5.8.1	General	<p>i) Storage of materials shall be as per IS:4082.</p> <p>ii) All materials may be stored at proper places so as to prevent their deterioration or intrusion by foreign matter and to ensure their satisfactory quality and fitness for the work. The storage space must also permit easy inspection. removal and restoring of the materials. All such materials even though stored in approved godowns / places, must be subjected to acceptance test prior to their immediate use.</p>
5.8.2	Aggregates	<p>i) Aggregate stockpiles may be made on ground that is denuded of vegetation, is hard and well drained. If necessary, the ground shall be covered with 50mm plank.</p> <p>ii) Coarse aggregates, unless otherwise agreed by the Employer's Representative in writing, shall be delivered to the site in separate sizes (2 sizes when nominal size is 25 mm or less and 3 sizes when the nominal size is 32 mm or more). Aggregates placed directly on the ground shall be removed from the stockpile within 30cm of the ground until the final cleaning up of the work, and then only the clean aggregate will be permitted to be used.</p> <p>iii) In the case of fine aggregates, these shall be deposited at the mixing site not less than 8 hours before use and shall have been tested and approved by the Employer's Representative.</p>
5.8.3	Cement	<p>i) Cement shall be transported, handled and stored on the site in such a manner as to avoid deterioration or contamination. Cement shall be stored above ground level in perfectly dry and water-tight sheds and shall be stacked not more than eight bags high. Wherever bulk storage containers are used their capacity should be sufficient to cater to the requirement at site and should be cleaned at least once every 3 months. Cement older than 3 months from the date of manufacture shall not be used.</p> <p>ii) Each consignment shall be stored separately so that it may be readily identified and inspected and cement shall be used in the sequence in which it is delivered at site. Any consignment or part of a consignment of cement which had deteriorated in any way, during storage, shall not be used in the works and shall be removed from the site by the Contractor without charge to the Employer.</p>

5.8.4	Cement Testing	A sample shall be tested for every 1000 bags. Tests shall be carried out for fineness, initial and final setting time, and compressive strength (IS: 4031) and the result approved by the Employer's Representative before use of the cement in permanent works. Samples shall be taken immediately on receipt of cement at site. The methods and procedure of sampling shall be in accordance with IS: 3535. The Employer's Representative may specify other forms of sampling and tests including chemical analysis, (IS: 4032) in case in his opinion the cement is of doubtful quality; The costs of all such tests on cement shall be borne by the contractor.									
5.8.5	Untensioned Reinforcement Steel	<p>Supply from approved supplier as per the list enclosed in Employers Requirement will be taken and no re rolled steel shall be incorporated in the work. The reinforcement bars, when delivered on the job, shall be stored above the surface of the ground upon platforms, skids or other supports, and shall be protected from mechanical injury and from deterioration by exposure.</p> <p>Every bar shall be inspected before assembling on the works and any defective, brittle, excessively rusted or burnt bars shall be removed. Cracked ends of bars shall be cut out.</p>									
5.9	Design Mix	For all items of concrete only design mix shall be used. Prior to the start of construction" the Contractor shall design the mix and submit to the Employer's Representative for approval, the proportions of materials, including admixtures to be used. Water-reducing admixtures (including plasticizers or super- plasticizers) may be used at the Contractor's option, subject to the approval of the Employer's Representative.									
5.9.1	Requirements of Consistency	<p>The mix shall have the consistency which will allow proper placement and consolidation in the required position. Every attempt shall be made to obtain uniform consistency.</p> <p>The optimum consistency for various types of structures shall be as indicated in Table below, or as directed by the Employer's Representative. The slump of concrete shall be checked as per IS: 516.</p> <table border="1"> <thead> <tr> <th>SL</th><th></th><th>Slump (mm)</th></tr> </thead> <tbody> <tr> <td>1</td><td>RCC structures with widely spaced reinforcement, e.g. solid columns, piers, abutment, well footings, etc.</td><td>40-50</td></tr> <tr> <td>2</td><td>RCC structures with fair degree of congestion of reinforcement, e.g. pier and abutment caps, well caps etc.</td><td>50 - 75</td></tr> </tbody> </table>	SL		Slump (mm)	1	RCC structures with widely spaced reinforcement, e.g. solid columns, piers, abutment, well footings, etc.	40-50	2	RCC structures with fair degree of congestion of reinforcement, e.g. pier and abutment caps, well caps etc.	50 - 75
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5.9.2	Durability	<p>The durability of concrete depends on its resistance to deterioration & re environment in which it is placed. The resistance of concrete to weathering, chemical attack, abrasion, frost and fire depends largely upon its quality and constituent materials. Susceptibility to corrosion of the steel is governed by the cover provided and the permeability of concrete. The cube crushing strength alone is not a reliable guide to the quality and durability of concrete; it must also have adequate cement content and a low water-cement ratio.</p> <p>The general environment to which the concrete will be exposed during its working life is classified into five levels of severity that is mild, moderate, severe, very severe and extreme as described below :</p> <table><tr><th>Environment</th><th>Exposure condition</th></tr><tr><td>MODERATE</td><td>Concrete surface protected against weather or aggressive conditions. Concrete surface sheltered from severe rain or freezing whilst wet. Concrete exposed to condensation, concrete structure continuously under water, Concrete in contact with non- aggressive soil/ground water.</td></tr><tr><td>SEVERE</td><td>Concrete surface exposed to severe rain, alternate wetting & drying or occasional freezing or severe condensation. Concrete exposed to aggressive subsoil / ground water or coastal environment.</td></tr><tr><td>EXTREME</td><td>Concrete structure surfaces exposed to sea water spray, corrosive fumes or severe freezing conditions whilst wet. Concrete structure surfaces exposed to abrasive action, surfaces of members in tidal zone. All other exposure conditions which are adverse to exposure conditions covered above.</td></tr></table>	Environment	Exposure condition	MODERATE	Concrete surface protected against weather or aggressive conditions. Concrete surface sheltered from severe rain or freezing whilst wet. Concrete exposed to condensation, concrete structure continuously under water, Concrete in contact with non- aggressive soil/ground water.	SEVERE	Concrete surface exposed to severe rain, alternate wetting & drying or occasional freezing or severe condensation. Concrete exposed to aggressive subsoil / ground water or coastal environment.	EXTREME	Concrete structure surfaces exposed to sea water spray, corrosive fumes or severe freezing conditions whilst wet. Concrete structure surfaces exposed to abrasive action, surfaces of members in tidal zone. All other exposure conditions which are adverse to exposure conditions covered above.
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5.9.3	Permeability	<p>One of the main characteristics influencing the durability of any concrete is its permeability. Therefore, tests for permeability shall be carried out for concrete bridges as recommended below. With strong, dense aggregates a suitably low permeability is achieved by having a sufficiently low water-cement ratio, by ensuring as thorough compaction of the concrete as possible and ensuring sufficient hydration of cement through proper curing methods. Therefore, for given aggregates, the cement content should be sufficient to provide adequate workability with a low water-cement ratio so that concrete can be completely compacted by vibration. Test procedure for penetration measuring permeability has been given in Appendix-G of IRS Concrete Bridge Code. The depth of penetration of moisture shall not exceed 25 mm.</p> <p>Permeability Test</p> <p>Permeability test shall be mandatory for all RCC/PSC bridges under severe, very severe and extreme environment; Under mild and moderat environment permeability test shall be mandatory for all major bridges and for other bridges permeability test is desirable to the extent possible. Permeability test is required for RCC/PSC structural element only</p>								

5.9.4	Maximum Water Cement Ratio	<p>The limits for maximum water cement ratio for design mix shall be based on environmental conditions. The limits for maximum water-cement ratio for different environmental conditions shall be as given in Table below:</p> <table><tr><th rowspan="2">Environment</th><th colspan="3">Maximum Water-Cement Ratio</th></tr><tr><th>Plain Concrete (PCC)</th><th>Reinforced Concrete (RCC)</th><th>Prestressed Concrete (PSC)</th></tr><tr><td>Moderate</td><td>0.50</td><td>0.45</td><td>0.40</td></tr><tr><td>Severe</td><td>0.45</td><td>0.40</td><td>0.40</td></tr><tr><td>Extreme</td><td>0.40</td><td>0.35</td><td>0.35</td></tr></table>	Environment	Maximum Water-Cement Ratio			Plain Concrete (PCC)	Reinforced Concrete (RCC)	Prestressed Concrete (PSC)	Moderate	0.50	0.45	0.40	Severe	0.45	0.40	0.40	Extreme	0.40	0.35	0.35
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Extreme	0.40	0.35	0.35																		
5.9.5	Minimum Grade of Concrete	<p>From durability consideration, depending upon the environment to which the structure is likely to be exposed during its service life, minimum grade of concrete shall be as given in Table below:</p> <table><tr><th rowspan="2">Environment</th><th colspan="3">Minimum Grade of Concrete</th></tr><tr><th>Plain Concrete (PCC)</th><th>Reinforced Concrete (RCC)</th><th>Prestressed Concrete (PSC)</th></tr><tr><td>Moderate</td><td>M-25</td><td>M-30</td><td>M-35*</td></tr><tr><td>Severe</td><td>M- 30</td><td>M-40</td><td>M-50</td></tr><tr><td>Extreme</td><td>M-30</td><td>M-45</td><td>M-50</td></tr></table> <p>* Min. grade of concrete shall be M-40 for pretensioned PSC structures.</p>	Environment	Minimum Grade of Concrete			Plain Concrete (PCC)	Reinforced Concrete (RCC)	Prestressed Concrete (PSC)	Moderate	M-25	M-30	M-35*	Severe	M- 30	M-40	M-50	Extreme	M-30	M-45	M-50
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Extreme	M-30	M-45	M-50																		
5.9.6	Cementitious Material Content	<p>Maximum cementitious material content shall be limited to 500 kg/m3. Depending upon environment to which structure is likely to be exposed during its service life, minimum cementitious Material content in concrete shall be as given in Table below:</p> <table><tr><th rowspan="2">Environment</th><th colspan="3">Cementitious Material Content in Kg/m3</th></tr><tr><th>Plain Concrete (PCC)</th><th>Reinforced Concrete (RCC)</th><th>Prestressed Concrete (PSC)</th></tr><tr><td>Moderate</td><td>300</td><td>350</td><td>400</td></tr><tr><td>Severe</td><td>380</td><td>400</td><td>430</td></tr><tr><td>Extreme</td><td>400</td><td>430</td><td>440</td></tr></table>	Environment	Cementitious Material Content in Kg/m3			Plain Concrete (PCC)	Reinforced Concrete (RCC)	Prestressed Concrete (PSC)	Moderate	300	350	400	Severe	380	400	430	Extreme	400	430	440
Environment	Cementitious Material Content in Kg/m3																				
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Extreme	400	430	440																		

5.9.7	Requirements for Design Mixes : Trial Mixes (for Strength)	<p>i) The Contractor is entirely responsible for the design of the concrete mixes. The design is however to be approved by the Employer's Representative. At least 8 weeks before commencing any concreting in the works, the contractors shall make trial mixes using samples of coarse aggregates, sand, water, super plasticiser and cement, typical of those to be used in the works, and which have been tested in an approved laboratory. A clean dry mixer shall be used and the first batch discarded.</p> <p>ii) The cement content for different grades of concrete and the required average strength at 28 days for which the mixes shall be design are specified below:</p>																															
		<table><thead><tr><th>Grade of Concrete/Max. Size of Aggre- gate (mm)</th><th>Characteristic Strength (Fck) at 28 days</th><th>Target Strength (fcm) Mpa 28 days</th><th>Mean Grade of concrete/Max.</th></tr></thead><tbody><tr><td>M 20/10</td><td>20</td><td>29</td><td></td></tr><tr><td>M 20/10</td><td>20</td><td>29</td><td></td></tr><tr><td>M 35/20</td><td>35</td><td>44</td><td></td></tr><tr><td>M 35/40</td><td>35</td><td>44</td><td></td></tr><tr><td>M 45/20</td><td>45</td><td>54</td><td></td></tr><tr><td>M 45/40</td><td>45</td><td>54</td><td></td></tr></tbody></table>	Grade of Concrete/Max. Size of Aggre- gate (mm)	Characteristic Strength (Fck) at 28 days	Target Strength (fcm) Mpa 28 days	Mean Grade of concrete/Max.	M 20/10	20	29		M 20/10	20	29		M 35/20	35	44		M 35/40	35	44		M 45/20	45	54		M 45/40	45	54				
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		<p>iii) The mixes are designed to yield mean strengths (f'cm) greater than the corresponding specified characteristics strengths (f' ck) as indicated in above Table. The difference between f'cm and f'ck is called the "Current Margin". The value of the current margin has been set at 9 Mpa for all grades of concrete. The concrete mixes shall be designed on the basis of required strength, desired workability, the maximum size of aggregate and also the various grades of cement as specified in IS: 10262-1982, Clause 3.1.1. Accordingly, the required cement content shall be ascertained. The contractor may be allowed to use either approved Super plasticizers or increased cement content to achieve the required strengths. All costs for design of concrete mixes and maintaining a quality control during concreting will be borne by the contractor.</p> <p>iv. For each grade a total of 18 cubes shall be made. Of these 18 cubes made, no more than 6 may be made on any day and further, of the 6 cubes made in one day not more than 2 cubes may be made from any single batch. 9 of these cubes, each representing a different batch of concrete shall be tested at the age of 7 days and the remaining 9 cubes shall be tested the age of 28 days. The making of cubes, their curing, storing, transporting and testing shall be in accordance with Indian Standards IS: 516. The test shall be carried out in a laboratory approved by the Employer's Representative.</p> <p>v. If the average strength of the concrete cubes falls below the required target mean strength (f'cm) fresh preliminary mixes for cubes of compressive strength at 28 days greater than the required that grade</p>																															

		<p>shall be made as before, until the trial mixes yield average target mean strength (f'_{cm}) at that age.</p> <p>VI. Whenever there is a significant change in the quality of any of the ingredients for concrete, the Employer's Representative may at his discretion order the carrying out of fresh trial mixes. All costs for trial mixes and tests shall be to the Contractor's account and held to be included in the quoted amount.</p> <p>VII. Before commencing the works the Contractors shall submit to the Employer's Representative for approval full details of the preliminary trial mixes and tests.</p> <p>VIII. When the proportions of a concrete mix have been approved by the Employer's Representative, the contractor shall not vary the quality or source of the materials or the mix without the written approval of the Employer's Representative.</p>												
5.9.8	Size of Coarse Aggregate	The size (maximum nominal) of coarse aggregates for concrete to be used in various components shall be as given in Table below												
		<table border="1"> <thead> <tr> <th></th><th>Components</th><th>Max. Nominal Size of Coarse Aggregate (mm)</th></tr> </thead> <tbody> <tr> <td>i)</td><td>Nominal mix</td><td>40</td></tr> <tr> <td>ii)</td><td>RCC solid type piers & Abutments</td><td>40/20</td></tr> <tr> <td>Iii)</td><td>All other RCC work</td><td>20</td></tr> </tbody> </table> <p>The proportions of the various individual sizes of aggregates shall be so adjusted that the grading produces densest mix and the grading curve corresponds to the maximum nominal size adopted for the concrete mix.</p>		Components	Max. Nominal Size of Coarse Aggregate (mm)	i)	Nominal mix	40	ii)	RCC solid type piers & Abutments	40/20	Iii)	All other RCC work	20
	Components	Max. Nominal Size of Coarse Aggregate (mm)												
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5.10	Coatings for Concrete	<p>In order to provide adequate resistance against corrosion of embedded material in RCC structures, concrete shall be provided with suitable coating depending upon the environmental conditions.</p> <p>The recommended coating is as under:</p>												
		<table border="1"> <tbody> <tr> <td>Super Structure of Bridges</td><td>Substructure of bridges (in affected part only)</td><td>All structure</td></tr> <tr> <td>Epoxy- Phenolic IPN coating</td><td>Coaltar epoxy coating</td><td>No coating is necessary</td></tr> <tr> <td>Or CECRI Integrated four coat system</td><td></td><td></td></tr> <tr> <td colspan="2">Aggressive Environment (Severe, Very severe & Extreme)</td><td>Non aggressive environment (Mild & Moderate)</td></tr> </tbody> </table>	Super Structure of Bridges	Substructure of bridges (in affected part only)	All structure	Epoxy- Phenolic IPN coating	Coaltar epoxy coating	No coating is necessary	Or CECRI Integrated four coat system			Aggressive Environment (Severe, Very severe & Extreme)		Non aggressive environment (Mild & Moderate)
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Aggressive Environment (Severe, Very severe & Extreme)		Non aggressive environment (Mild & Moderate)												
5.11	Equipment	<p>Unless specified otherwise, equipment for production, transportation and compaction of concrete shall be as under:</p> <p>(a) For Production of Concrete-The number of concrete batching and mixing plants to be deployed shall be decided by the</p>												

		<p>contractor so as to complete the work within the stipulated time.</p> <p>All measuring devise of the equipment shall be maintained in a clean and serviceable condition. Its accuracy and calibration shall be checked over the range in use, when set up at each site and thereafter periodically as directed by the Employer's Representative.</p> <p>(b) For Concrete Transportation Qty. depending upon actual Requirement.</p> <p>i) Concrete dumpers - Minimum 2 tonnes capacity</p> <p>ii) Powered hoists - Minimum 0.5 tonnes capacity</p> <p>iii) Chutes</p> <p>iv) Buckets handled by cranes</p> <p>v) Transit truck mixer</p> <p>vi) Concrete pump</p> <p>vii) Concrete distributor booms</p> <p>viii) Belt conveyor</p> <p>ix) Cranes with skips</p> <p>x) Tremies</p> <p>xi) Air compressor</p> <p>xii) Any other equipment to suit the working condition</p> <p>c) For Compaction of Concrete</p> <p>e) Adequate standby arrangement should be available for all equipment.</p> <table border="1"> <tr> <td>i</td><td>Internal Vibrators</td><td>Size 25 mm to 70 mm</td></tr> <tr> <td>ii</td><td>Form Vibrators</td><td>Min. 500 Watts</td></tr> <tr> <td>iii</td><td>Screed Vibrators</td><td>Full width of carriageway (upto two lanes)</td></tr> </table>	i	Internal Vibrators	Size 25 mm to 70 mm	ii	Form Vibrators	Min. 500 Watts	iii	Screed Vibrators	Full width of carriageway (upto two lanes)
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5.12	Mixing Concrete	<p>i) Concrete shall be mixed either in a mini mobile batching plant or in a batching and mixing plant as per these specifications. Hand mixing shall not be permitted. The mixer or the plant shall be at an approved location considering the properties of the mixes and the transportation arrangements available with the Contractor. The mixer or the plant shall be approved by the Employer's Representative. (However, decision regarding permitting mini mobile batching plant will rest with Employer's representative).</p> <p>ii) Mixing shall be continued till materials are uniformly distributed and a uniform colour of the entire mass is obtained, and each</p>									

		<p>individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement.</p> <p>iii) Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Employer's Representative, the first batch of concrete from the mixer shall contain only two thirds of the normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of mix to another.</p>
5.13	Transporting, Placing and Compaction of Concrete	<p>i) The method of transporting and placing concrete shall be approved by the Employer's Representative. Concrete shall be transported and placed as near as practicable to its final position, so that no contamination, segregation or loss of its constituent materials takes place. Concrete shall not be freely dropped into place from a height exceeding 1.5 metres.</p> <p>ii) When concrete is conveyed by chute, the plant shall be of such size and design as to ensure practically continuous flow. Slope of the chute shall be so adjusted that the concrete flows without the use of excessive quantity of water and without any segregation of its ingredients. The delivery end of the chute shall be as close as possible to the point of deposit. The chute shall be thoroughly flushed with water before and after each working period and the water used for this purpose shall be discharged outside the formwork.</p> <p>iii) All formwork and reinforcement contained in it shall be cleaned and made free from standing water, dust, immediately before placing of concrete.</p> <p>iv) No concrete shall be placed in any part of the structure until approval of the Employer's Representative has been obtained.</p> <p>v) If concreting is not started within 24 hours of the approval being given, it shall have to be obtained again from the Employer's Representative. Concreting then shall proceed continuously over the area between the construction joints. Fresh concrete shall not be placed against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed.</p> <p>vi) Except where otherwise agreed to by the Employer's Representative, concrete shall be deposited in horizontal layers to a compacted depth of not more than 450 mm.</p> <p>vii) Concrete when deposited shall have a temperature of not more than 40°C. It shall be compacted in its final position within 30 minutes of its discharge from the mixer, unless carried in properly designed agitators, operating continuously, when this time shall be within 1 hour of the addition of cement to the mix and within 30 minutes of its discharge from the agitator. In all such matters, the Employer's Representative's decision shall be final.</p> <p>viii) Concrete shall be thoroughly compacted by vibration or other means during placing and worked around the reinforcement, embedded fixtures and into corners of the formwork to produce a dense homogenous void-free mass having the required surface</p>

		<p>finish. When vibrators are used, vibration shall be done continuously during the placing of each batch of concrete until the expulsion of air has practically ceased and in a manner that does not promote segregation. Over vibration shall be avoided to minimize the risk of forming a weak surface layer. When external vibrators are used, the design of formwork and disposition of vibrator shall be such as to ensure efficient compaction and to avoid surface blemishes. Vibrations shall not be applied through reinforcement and where vibrators of immersion type are used, contact with reinforcement and all inserts like ducts etc., shall be avoided. The internal vibrators shall be inserted in an orderly manner and the distance between insertions should be about one and half times the radius of the area visibly affected by vibration. Additional vibrators in serviceable condition shall be kept at site so that they can be used in the event of breakdowns.</p> <p>ix) Mechanical vibrators used shall comply with IS. 2502, IS: 2506, IS: 2514 and IS. 4656.</p>
5.14	Construction Joints	
5.14.1	General	<p>i) Construction joints shall be avoided as far as possible and in no case the locations of such joints shall be changed or increased from those shown on the drawings, except with express approval of the Employer's Representative. The joints shall be provided in a direction perpendicular to the member axis. Sequencing of concrete placement should be organized in such a way that cold joints are totally eliminated. The sequence of concreting shall be submitted for approval of Employer's Representative prior to concreting of the structural element.</p> <p>ii) Concreting shall be carried out continuously upto the construction joints, the position and arrangement of which shall be predetermined by the designer.</p> <p>iii) The use of construction joints in Prestressed concrete work should preferably be avoided. However, if found necessary they shall be kept to the minimum by adopting proper construction techniques.</p> <p>iv) The construction joints shall comply with the provisions given at para 5.14.2, 5.14.3, 5.14.4. Properly designed reinforcement shall be provided for transfer of full tensile stress across the joints prior to casting of the next lift.</p>
5.14.2	The Position of Construction of Joints	<p>i) Construction joints should be positioned to minimise the effect of the discontinuity on the durability, structural integrity and appearance of the structure.</p> <p>ii) As far as possible, joints should be positioned in non-aggressive zones but if aggressive zones cannot be avoided, joints should be sealed.</p> <p>iii) Joints should be positioned where they are readily accessible for preparation and concreting the preparation of the joints is more likely</p>

		<p>to be satisfactory where the cross-section is relatively small and where reinforcement is not congested.</p> <p>iv) As far as possible, joints for fair faced concrete should be located where they conform with the architectural features of the construction. Unless they are masked in this way, the position of the joints are always obvious, even when the concrete is given a textured finish.</p> <p>v) If substantial changes in the cross-section of a member are necessary, the joints should be formed where they minimise stresses caused by temperature gradients and shrinkage.</p> <p>vi) Joints should be located away from regions of maximum stress caused by loading particularly where shear and bond stresses are high. Construction joints between slabs and ribs in composite beam should be avoided. As a general rule joints in column are made as near as possible to the beam hunching, joints in beams and slabs should normally be made at the centre or within the middle third of the span.</p>
5.14.3	Preparing the Surface of the Joint	<p>i) The minimum number of joints should be used and their construction should be simple. They should be either horizontal or vertical.</p> <p>ii) Where concrete is placed in vertical members e.g. walls columns and the like, the lift of concrete shall finish level or at right angles to the axis of the member, the joint line making the features of the finished work. Concreting shall be carried out continuously up to the construction joint.</p> <p>iii) Laitance, both on the horizontal and vertical surfaces of the concrete, should be removed before fresh concrete is cast. The surface should be roughened to promote good adhesion. Various methods for removal can be used but they should not dislodge the coarse aggregate particles. Concrete may be brushed with a stiff brush soon after casting while the concrete is still fresh and while it has only slightly stiffened.</p> <p>iv) If the concrete has partially hardened, it may be treated by wire brushing or with a high pressure water jet, followed by drying with an air jet, immediately before the new concrete is placed.</p> <p>v) Fully hardened concrete should be treated with mechanical hand tools or grit blasting, taking care not to split or crack aggregate particles.</p> <p>vi) The best time for treating the joint is a matter of judgment because it depends on the rate of setting and hardening (which in itself is dependent on the temperature of the concrete). Before further concrete is cast, the surface should be thoroughly cleaned to remove debris and accumulated rubbish, one effective method being air jet.</p> <p>vii) Where there is likely to be a delay before placing the next concrete lift, protruding reinforcement should be protected. Before the next lift is placed, rust loose mortar, or other contamination should be removed from the bars and where conditions are particularly aggressive and there has been a substantial delay between lifts, the concrete should be cut back to expose the bars for a length of about 50 mm to ensure that contaminated concrete is removed.</p>

		viii) In all cases, when construction joints are made, it should be ensured that the joint surface is not contaminated with release agents, dust, or curing membrane and that the reinforcement is fixed firmly in position at the correct cover.
5.14.4	Concreting at Construction Joints	<p>(i) When the formwork is fixed for the next lift, it should be inspected to ensure that no leakage can occur from the fresh concrete. It is a good practice to fix a 6 mm thick sponge which seals the gap completely.</p> <p>(ii) The practice of first placing a layer of mortar or grout is not recommended. The old surface should be soaked with water without leaving puddles, immediately before starting concreting; then the new concrete should be thoroughly compacted against it. When fresh concrete is cast against existing mature concrete or masonry the older surfaces should be thoroughly cleaned and soaked to prevent the absorption of water from the new concrete. Standing water should be removed shortly before the new concrete is placed and the new concrete should be thoroughly vibrated in the region of the joint.</p>
5.15	Concreting under water	<p>i) The permanent structure shall not be allowed to come in contact with seawater for at least 72 hours. When it is necessary to deposit concrete under water, the methods, equipment, materials and proportions of mix to be used shall be got approved from the Employer's Representative before any work is Started. Concrete shall contain 10% more cement than that is required for the same mix placed in the dry.</p> <p>ii) In case cofferdams are required, the same shall be provided. Nothing extra shall be paid on this account. Cofferdams shall be sufficiently tight to ensure still water conditions, if practicable, and in any case to reduce the flow of water to less than 3 meters per minute through the space into which concrete is to be deposited. Cofferdams in still water shall be sufficiently tight to prevent loss of mortar through the joints in the walls. Pumping of water shall not be done while concrete is being placed or until 24 hours thereafter. To minimize the formation of laitance, great care shall be exercised not to disturb the concrete as far as possible while it is being deposited.</p> <p>iii) All under-water concreting shall be carried out by tremie method only, using tremie of appropriate diameter. The number and spacing of the tremies should be worked out to ensure proper concreting. The tremie concreting when started should continue without interruption for the full height of the member being concreted. The concrete production and placement equipment should be sufficient to enable the underwater concrete to be completed uninterrupted within the stipulated time. Necessary stand-by equipment should be available for emergency situation.</p> <p>iv) The top section of the tremie shall have a hopper large enough to hold one full batch of the mix or the entire contents of the transporting bucket as the case may be. The tremie pipe shall not be less than 200mm in diameter and shall be large enough to allow</p>

		<p>a free flow of concrete and strong enough to withstand the external pressure of the water in which it is suspended, even if a partial vacuum develops inside the pipe. Preferably, flanged steel pipe of adequate strength for the job shall be used. A separate lifting device shall be provided for each tremie pipe with its hopper at the upper end. Unless the lower end of the pipe is equipped with an approved automatic check valve, the upper end of the pipe shall be plugged with a wadding of gunny sacking or other approved material before delivering the concrete to the tremie pipe through the hopper, so that when the concrete is forced down from the hopper to the pipe, it will force the plug (and along with it any water in the pipe) down the pipe and out of the bottom end, thus establishing a continuous stream of concrete. It will be necessary to raise slowly the tremie in order to allow a uniform flow of concrete, but it shall not be emptied so that water is not allowed to enter above the concrete in the pipe, at all times after placing of concrete is started and until all the required quantity has been placed. The lower end of the tremie pipe shall be kept below the surface of the plastic concrete. This will cause the concrete to build up from below instead of flowing out over the surface and thus avoid formation of layers of laitance. If the charge in the tremie is lost while depositing, the tremie shall be raised above the concrete surface and unless sealed by a check valve, it shall be replugged at the top end, as at the beginning, before refilling for depositing further concrete.</p>
5.16	Curing of concrete	
5.16.1	General	<p>i) Concreting operations shall not commence until adequate arrangements for concrete curing have been made by the Contractor.</p> <p>ii) Curing and protection of concrete shall start immediately after compaction of the concrete to protect it from:</p> <ul style="list-style-type: none"> a) Premature drying out particularly by solar radiation and wind b) High internal thermal gradients c) Leaching out by rain and flowing water d) Rapid cooling during the first few days after placing e) Low temperature f) Vibration and impact which may disrupt the concrete and interfere with its bond to the reinforcement. <p>iii) Where members are of considerable size and length, with high cement content accelerated curing methods may be applied, as approved by the Employer's Representative.</p>
5.16.2	Moist Curing	<p>The concrete should be kept constantly wet for a minimum period of 14 (fourteen) days. Water should be applied on unformed surfaces as soon as it can be done without marring the surface and on formed surfaces immediately after the forms are stripped. The concrete shall be kept constantly wet by ponding or covered with a layer of sacking</p>

		canvas, hessian or a similar absorbent material. When air temperature is expected to drop below 5 ⁰ C during the curing period, additional covering of cotton/gunny bags straw or other suitable blanketing material shall be provided so that concrete temperature at surface does not fall below 10 ⁰ C.
5.16.4	Curing Compound	<p>Curing compound shall be used only with the prior approval of the Employer's Representative. Approved curing compounds may be used in lieu of moist curing with the permission of the Employer's Representative. Such compounds shall be applied to all exposed surfaces of the concrete along with stripping of form work. Tests shall be done to ascertain:</p> <p>i) Loss of moisture in concrete with and without curing compound.</p> <p>ii) Cube strength of concrete with moist curing and curing compound.</p> <p>iii) Permeability of concrete.</p>
5.16.4	Steam Curing	<p>Steam curing can be advantageously used to save time of curing of concrete for transfer of prestress. The optimum steam curing cycle for a particular situation can only be determined by trial and error. However, it has been found satisfactory to use a presteaming period of 4 to 5 hour or rate of temperature rise between 22-33⁰ per hour and a maximum curing temperature of 66-82⁰ C for a period such that entire curing cycle does not exceed 18 hour. Rapid temperature changes during the cooling period should be avoided and drop in ambient temperature in the enclosure is not sharper than 20⁰ C per hour. The reuse of casting beds and forms along with 18 hour steam curing makes it a total 24 hour cycle. Prestress to members in pretension beds should be transferred immediately after the termination of steam curing, while the concrete and forms are still warm, other wise the temperature within the enclosure shall be maintained at over 15⁰ C until the prestress is transferred to the concrete. The steam curing will be considered complete when the concrete has reached the minimum strength at Stress transfer or handling strength.</p>
5.17	Finishing	<p>i) Immediately after removal of forms, exposed bars or bolt, if any, shall be cut inside the concrete member to a depth of at least 50 mm below the surface of the concrete and the resulting holes mm below the surface of the concrete and the resulting holes.</p> <p>ii) All construction and expansion joints in the completed work shall be left carefully tooled and free from any mortar and concrete.</p>

		<p>Expansion joint filler shall be left exposed for its full length with clean and true edges.</p> <p>iii) The finished surfaces of concrete after removal of formwork should be such that no touching up is required. All fins caused by form joints, if any, shall be ground using electric surface grinder.</p> <p>iv) Immediately on removal of forms, the concrete work shall be examined by the Employer's Representative before any defects are made good.</p> <p>a) The work that has sagged or contains honeycombing to an extent detrimental to structural safety or architectural appearance shall be rejected.</p> <p>b) Surface defect of a minor nature may be accepted. On acceptance of such work by the Employer's Representative, the same shall be rectified as directed by Employer's Representative.</p>
5.18	Tests & Standards of Acceptance	<p>i) Concrete shall conform to the surface finish and tolerance as prescribed in these specifications for respective components.</p> <p>ii) Random sampling and lot by lot of acceptance inspection shall be made for the 28 days cube strength of concrete.</p> <p>iii) Concrete under acceptance shall be notionally divided into lots for the purpose of sampling, before commencement of work. The delimitation of lots shall be determined by the following:</p> <p>a) No individual lot shall be more than 30 cum in volume.</p> <p>b) At least one cube forming an item of the sample representing the lot shall be taken from concrete of the same grade and mix proportions cast on any day.</p> <p>c) Different grades of mixes of concrete shall be divided into separate lots.</p> <p>d) Concrete of a lot shall be used in the same identifiable component of the bridge</p>
5.19	Sampling and Testing	<p>i) Concrete for making 3 test cubes shall be taken from a batch of concrete at point of delivery into construction, according to procedure laid down in IS: 1199.</p> <p>ii) A random sampling procedure to ensure that each of the concrete batches forming the lot under acceptance inspection has equal chance of being chosen for taking cubes shall be adopted.</p>

		<p>iii) 150 mm cubes shall be made, cured and tested at the age of 28 days for compressive strength in accordance with IS: 516. The 28 day test strength result for each cube shall form an item of the sample.</p>														
5.20	Test Specimen & Sample Strength	<p>i) Three test specimens shall be made from each sample for testing at 28 day. Additional cubes may be required for various purposes such as to determine the strength of concrete at 7 days or for any other purpose.</p> <p>ii) The test strength of the sample shall be the average of the strength of 3 cubes. The individual variation should not be more than ± 15 percent of average. When individual variation exceeds this limit, the procedure for the fabrication of specimen and calibration of the testing machines should be checked.</p>														
5.21	Frequency	<p>The minimum frequency of sampling of concrete of each grade shall be in accordance with Table below:</p> <table><tr><td>At one</td><td>least</td></tr><tr><td>Quantity of work concrete in work m³</td><td>No. of samples</td></tr><tr><td>1-5</td><td>1</td></tr><tr><td>6-15</td><td>2</td></tr><tr><td>16-30</td><td>3</td></tr><tr><td>31-50</td><td>4</td></tr><tr><td>51 and above</td><td>4 plus one additional sample for each additional 50 m³ or part thereof</td></tr></table> <p>sample shall be taken from each shift of work.</p>	At one	least	Quantity of work concrete in work m ³	No. of samples	1-5	1	6-15	2	16-30	3	31-50	4	51 and above	4 plus one additional sample for each additional 50 m ³ or part thereof
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5.22	Acceptance Criteria	<p>Acceptance criteria will be as per clause no. 8.7.6 of IRS- Concrete Bridge Code</p> <p>i) Whenever a mix is redesigned due to a change in the quality of aggregate or cement or for any other reason, it shall be considered a new mix and initially subject to the acceptability criteria above.</p> <p>ii) If the concrete produced at site does not satisfy the above strength requirements, the Employer's Representative will reserve the right to require the contractor to improve the methods of batching, the quality of the ingredients and redesign the mix with increased cement content, if necessary. The Contractor shall not be entitled to claim any extra cost for the extra cement used for the modifications</p>														

		<p>stipulated by the Employer's Representative for fulfilling the strength requirement specified.</p> <p>iii) It is the complete responsibility of the contractor to redesign the concrete mixes by approved standard methods and to produce the reinforced concrete conforming to the specification and the strength requirements approved by the Employer's Representative. It is expected that the contractor will have competent staff to carry out this work.</p> <p>iv) As frequently as the Employer's Representative may require, testing shall be carried out in the field for:</p> <ul style="list-style-type: none"> a) Moisture content and absorption and density of sand and aggregate. b) Silt content of sand. c) Grading of sand and aggregates. d) Slump test of concrete. e) Concrete cube test. f) Permeability test for concrete as per DIN 1048 (Part-I). g) Density and pH value of Plasticizer. <p>v) The Contractor shall provide and maintain on site at all times, until the works are completed, equipment and staff required for carrying out these tests. The Contractor shall grant the Employer's Representative or his representative full access to his laboratory at all times and shall produce on demand complete records of all tests carried out on site.</p> <p>vi) Before concreting commences on any section of the works the Contractor shall obtain approval of the Employer's Representative or his representative as regards the formworks and reinforcements conforming with the drawings. He shall also indicate to the Employer's Representative in writing and obtain his approval for positions of construction joints.</p>
5.23	Cracks	<p>i) If cracks develop in concrete construction, which in the opinion of the Employer's Representative may be detrimental to the strength of the construction, the Contractor at his own expense shall test the construction item. If under such test loads the cracks develop further, the Contractor shall dismantle the construction, carry away the debris, replace the construction and carry out all consequential work thereto.</p>

		<p>ii) If any cracks develop in the concrete construction, which in the opinion of the Employer's Representative, are not detrimental to the stability of the construction, the Contractor at his own expense shall grout the cracks with polymer cement grout of approved quality and also at his own expense and risk shall make good to the satisfaction of the Employer's Representative, which in the opinion of the Employer's Representative has suffered damage either in appearance or stability owing to such cracks. The Employer's Representative's decision as to the extent of the liability of the Contractor in the above matter shall be final and binding.</p> <p>iii) Record of such repairs will be kept.</p>																								
5.24	Defective Concrete	Should any concrete be found honeycombed or in any way defective which may be suspected to affect the performance of the structure, shall be rejected outright. However, some surface defects like minor honeycombing etc. not affecting the structural properties shall on the instruction of the Employer's Representative be repaired as per the approved procedure. The complete cost of such repairs will have to be borne by the contractor. Records of repair done will be maintained.																								
5.25	Tolerance in Concrete Elements	The Tolerances for Finished Concrete Bridge Structures shall be governed by IRS – Bridge Code and shall be as follows:																								
		<table> <tr> <th>Sl. No.</th><th>Description</th><th>Tolerances</th></tr> <tr> <td>1.</td><td>Shift from alignment</td><td>+/- 25 mm</td></tr> <tr> <td>2.</td><td>Deviation from plumb or specified , batter for face of exposed piers</td><td>(1 in 250, subjected to maximum value of 0.05 times the lateral dimension of pier).</td></tr> <tr> <td>3.</td><td>Deviation from plumb or specified batter for face of back filled abutments.</td><td>1 in 125</td></tr> <tr> <td>4.</td><td>Cross Sectional dimensions of piers, abutments and girders.</td><td>(- 5mm + 20 mm)</td></tr> <tr> <td>5.</td><td>Thickness of deck slab of bridges</td><td>+ 6 mm - 3 mm</td></tr> <tr> <td>6.</td><td>Size and location of openings</td><td>+ 12 mm</td></tr> <tr> <td>7.</td><td>Plan dimensions of footings (formed)</td><td>+ 50 mm - 25 mm</td></tr> </table>	Sl. No.	Description	Tolerances	1.	Shift from alignment	+/- 25 mm	2.	Deviation from plumb or specified , batter for face of exposed piers	(1 in 250, subjected to maximum value of 0.05 times the lateral dimension of pier).	3.	Deviation from plumb or specified batter for face of back filled abutments.	1 in 125	4.	Cross Sectional dimensions of piers, abutments and girders.	(- 5mm + 20 mm)	5.	Thickness of deck slab of bridges	+ 6 mm - 3 mm	6.	Size and location of openings	+ 12 mm	7.	Plan dimensions of footings (formed)	+ 50 mm - 25 mm
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		8.	Plan dimensions of footings (unformed excavation)	+ 75 mm - 00 mm	
		9.	Thickness of footings	+ No limit - 5%	
		10.	Footing eccentricity	0.02 times the width of the footing in the direction of deviation but not more than 50mm	
		11.	Reduced level of top of footing / pier / bed block	+/- 5 mm	
		12.	Centre to centre distance of pier and abutments at pier top	+/- 30 mm	
		13.	Centre to Centre distance of bearings along span	+/- 5 mm	
		14.	Centre to centre distance of pier bearings across span	+/- 5 mm	
5.26	False work & framework				
5.26.1	False Work				
5.26.1.1	General	<p>False work shall be designed to meet the requirements of the permanent structure, taking into account the actual conditions of materials, environment and site conditions.</p> <p>Careful attention shall be paid to the detailing of connections and function with a view to avoiding gross errors leading to significant damage or failure.</p>			
5.26.1.2	Loads	<p>False work shall be designed to cater for following loads:</p> <ol style="list-style-type: none"> Dead load of wet concrete and reinforcement; Weight of formwork; Plant and equipment including impact; Impact due to deposition of concrete; Construction personnel; Prestressing loads; Lateral loads; Wind loads; Force due to water current, if any. 			
5.26.1.3	Materials	<p>All the materials shall conform to the specified quality consistent with the intended purpose and actual site condition as applicable.</p>			

5.26.1.4	False work Plans	<p>False work plans shall include the following information:</p> <ul style="list-style-type: none"> a) Design Assumptions – All major design values and loading conditions shall be shown on these drawings. They include assumed values of superimposed load, rate of placement, mass of moving equipment which may be operated on formwork, foundation pressures, camber diagrams and other pertinent information, applicable. b) Type of material, size, lengths and connection details. c) Sequence of removal of forms and shores. d) Anchors, form ties, shores and braces. e) Field adjustment of the form during placing of concrete. f) Working scaffolds and gangways. g) Weep holes, vibrator holes, or access doors for inspection and placing of concrete. h) Construction joints, expansion joints. i) Sequence of concrete placements and minimum/maximum elapsed time between adjacent placements. j) Chamfer strips or grade strips for exposed corners and construction joints. k) Foundation details for false work. l) Special provisions such as protection from water, ice and debris at stream crossings. m) From coatings and release agents. n) Means of obtaining specified concrete. o) Location of box outs, pipes, ducts, conduits and miscellaneous inserts in the concrete, attached to or penetrating the forms. p) Location and spacing of rubber pads where shutter vibrators are used.
5.26.2.1	General	<ul style="list-style-type: none"> i) The formwork shall conform to the shapes, lines and dimensions shown on the drawings such that the relevant tolerances of finished concrete as specified are achieved. ii) Formwork shall be so constructed and supported as to remain sufficiently rigid during the placement and compaction of the concrete and shall be sufficiently water-tight to prevent loss of water – or mortar from concrete. The formwork and false work must be designed keeping in view all loads and forces. iii) Forces for finished surfaces should be smooth and mortar tight. If wood forms are used, the boards must be uniform in the thickness, tongued and grooved, smoothly finished on the surface next to the concrete, evenly matched and tightly placed, except where the

		desired surface or appearance requires special treatment. The use of forms of plywood/similar product which can absorb water is recommended.
5.26.2.2	Design of Form Work	<p>i) The contractor shall furnish the design and drawing of complete form work (i.e. the forms as well as their supports) for approval of the Employer's Representative before any erection is taken up. If proprietary system of formwork is used, the contractor shall furnish detailed information to the Employer's Representative for approval.</p> <p>ii) Notwithstanding any approval or review of drawing and design by the Employer's Representative, the contractor shall be entirely responsible for the adequacy and safety for formwork.</p> <p>iii) The foundation of all supports shall be designed to suit the bearing capacity of soil to support the designed loads without settlement.</p> <p>iv) The contractor shall prepare detailed shop drawing showing the arrangement of formwork for structural members including shoring system, horizontal and diagonal bracing system, details of foundation etc. The sizes of individual members shall be as per approved design calculations.</p>
5.26.2.3	Finishing	<p>i) No surface finishing will normally be provided. If minor defects are noticed, the surface should be rendered. The required finish shall be obtained by use of properly designed formwork of closely jointed boards. The surface may be improved by carefully removing all fins and other projections thoroughly washing down and then filling the most noticeable surface blemished with a cement and fine aggregate paste. For major defects, if noticed any repairs should be carried out only with prior approval of the Employer's Representative.</p> <p>ii) Moulds for pretension works shall be sufficiently strong and rigid to withstand, without distortion the effects of placing and compacting concrete as well as those of prestressing in the case of manufacture by the individual mould process where the prestressing tendon is supported by the mould before transfer.</p>
5.26.2.4	Cleaning & Treatment of Forms	All rubbish, particularly chippings, shavings and sawdust shall be removed from the interior of the forms before the concrete is placed and the formwork in contact with the concrete shall be cleaned and thoroughly wetted or treated with an approved release agent. Care shall be taken that such approved release agent is kept out of contact with the reinforcement.

5.27	Stripping Time	<p>i) Forms shall not be struck until the concrete has reached a strength at least twice the stress to which the concrete may be subjected at the time of removal of formwork. The strength referred to shall be that of concrete using the same cement and aggregates, with the same proportions and cured under conditions of temperature and moisture similar to those existing on the work. Where possible, the formwork shall be left longer as it would assist the curing.</p> <p>ii) In normal circumstances and where ordinary Portland cement is used, forms may generally be removed after the expiry of the following periods :</p>																											
		<table> <tr> <td>a)</td><td>Walls, columns and vertical faces of all structural members</td><td>24 to 48 hours as may be decided by the Employer's Representative.</td></tr> <tr> <td>b)</td><td>Slabs (props left under)</td><td>3 days</td></tr> <tr> <td>c)</td><td>Beam soffits (props left under)</td><td>7 days</td></tr> <tr> <td>d)</td><td>Removal of props under slabs:</td><td></td></tr> <tr> <td></td><td>1) Spanning up to 4.5 m</td><td>7 days</td></tr> <tr> <td></td><td>2) Spanning over 4.5 m</td><td>21 days</td></tr> <tr> <td>e)</td><td>Removal of props under slabs :</td><td></td></tr> <tr> <td></td><td>1) Spanning up to 6 m</td><td>14 days</td></tr> <tr> <td></td><td>2) Spanning over 6 m</td><td>21 days</td></tr> </table>	a)	Walls, columns and vertical faces of all structural members	24 to 48 hours as may be decided by the Employer's Representative.	b)	Slabs (props left under)	3 days	c)	Beam soffits (props left under)	7 days	d)	Removal of props under slabs:			1) Spanning up to 4.5 m	7 days		2) Spanning over 4.5 m	21 days	e)	Removal of props under slabs :			1) Spanning up to 6 m	14 days		2) Spanning over 6 m	21 days
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		<p>iii) For other cements, the stripping time recommended for ordinary Portland cement be suitably modified with the consent of Employer's Representative.</p> <p>iv) The number of props left under, their sizes and disposition shall be such as to be able to safely carry the full dead load of the slab or beam as the case may be together with any live load likely to occur during curing or further construction.</p> <p>v) Where the shape of the element is such that the formwork has re-entrant angles, the formwork shall be removed as soon as possible after the concrete has set, to avoid shrinkage crack occurring due to the restraint imposed.</p> <p>vi) The forms should be so constructed as to be removable in the sections without marring or damaging the surface of the concrete. Forms should be removed as soon as possible in order to make necessary repairs and finish the surface. As soon as forms are removed, list of major/minor defects noticed in concrete should be</p>																											

		prepared. Repairing methodology should be approved by Employer's Representative. After making the necessary repairs, the surface should be finished with wood float so as to free from streaks, discolorations or other imperfections. Plastering should not be permitted and a steel trowel should not be used to finish surfaces.
5.28	Removal of Formwork	<p>i) The scheme for removal of formwork (i.e. de-shuttering and decentring) shall be planned in advance and furnished to the Employer's Representative for scrutiny and approval. No formwork or any part thereof shall be removed without prior approval of the Employer's Representative.</p> <p>ii) The formwork shall be so removed as not to cause any damage to concrete. centring shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stresses due to its own weight uniformly and gradually to avoid any shock or vibration.</p> <p>iii) Where there are re-entrant angles in the concrete sections, the formwork should be removed at these sections as soon as possible after the concrete has set in to avoid cracking due to shrinkage of concrete.</p>
5.29	Specialised Formwork	<p>i) Specialized formwork may be required in the case of slip formwork, underwater concreting etc. Such specialized formwork shall be designed and detailed by competent agencies and a set of complete working drawings and installation instructions shall be supplied to the Employer's Representative. The site personnel shall be trained in the erection and dismantling as well as operation of such specialized formwork. In case proprietary equipment is used the supplier shall supply drawings, details, installation instructions, etc. in the form of manuals along with the formwork. Where specialized formwork is used close coordination with the design of permanent structure is necessary.</p> <p>ii) For slip form the rate of slipping the formwork shall be designed for each individual case taking into account various parameters including the grade of concrete, concrete strength, concrete temperature, ambient temperature, concrete admixtures, etc.</p> <p>iii) In order to verify the time and sequence of striking/removal of specialized formwork, routine field tests for the consistency of concrete and strength development are mandatory and shall be carried out before adoption.</p> <p>iv) For specialized formwork, the form lining material should be steel sheet of appropriate thickness.</p>

6.0	PRESTRESSED CONCRETE WORKS	
6.1	General	
6.1.1	Codes & Standards	<p>i) Prestressed Concrete works shall comply with the requirements and standards given in the present specifications. However, it shall be the responsibility of the contractor to adopt the latest version of the relevant technical specifications with all the correction slips.</p> <p>ii) Installation of cables, prestressing operation and grouting shall be entrusted to only trained and qualified personnel. All prestressing accessories must be procured from authorised manufacturers with in-house testing facilities. The prestressing operations shall be supervised by authorized representative of approved prestressing equipment manufacturing company.</p> <p>iii) Manufacturer's recommendations regarding end blocks and special arrangements in anchorage zones applicable to their particular system shall be observed. Ducts used shall be such that destructive galvanic action will not occur. The trajectory of ducts shall be as per approved drawings.</p> <p>iv) All materials used in the prestressed concrete shall be got tested as per specifications.</p> <p>v) Prestressing operations shall be carried out only under the direction of an experienced and competent supervisor who shall be approved by the Employer's Representative. All personnel operating the stressing equipment shall have to be properly trained in its use. In addition to the normal precautions against accident which should be taken at all times for the whole of the works, special precautions shall be taken when working with and near tendons which have been tensioned or are in the process of being tensioned.</p>
6.2	Materials	
6.2.1	Concrete	<p>(i) Cement</p> <p>For prestressed concrete works, 53 grade cement conforming to IS: 12269-1987/IRS T 40 grade shall be used.</p> <p>(ii) Aggregates</p> <p>Only aggregates conforming to IS:383-1970 shall be used in plain, RCC or PSC concrete works. Marine aggregate shall not be used The provisions in IS:2386 (Part 2) shall prevail when dealing with suspicious aggregates. Where required by the Employer's</p>

		<p>Representative, aggregates shall be tested in accordance with IS:2386-1963 (Part I to VIII).</p> <p>(iii)Water</p> <p>Water free from impurities and as per clause 4.3 of IRS Concrete Bridge code shall only be permitted.</p> <p>(iv)Admixture</p> <p>Acceptable admixtures conforming to IS:9103 and clause 4.4 of IRS Concrete Bridge Code – 1997 may be used with the approval of the Employer's Representative, if tests have shown that their use improves the properties of concrete, i.e. increasing workability, entraining air or expanding the concrete. Admixture must not contain chlorides, nitrates, sulphides, sulphates, or any other products, which are likely to damage steel or concrete. When an expanding agent is used the total unrestrained expansion shall preferably be between 4 to 6%. Aluminum powder as an expanding agent is not permitted. The cost of use of such admixtures will be borne by the contractor with in his quoted rates.</p> <p>(v) Binding Wire</p> <p>Only soft GI wire of 16 gauge shall be used for binding reinforcement. The GI wire shall be treated by Anticorrosion Process, approved by the Employer's Representative.</p> <p>(vi)High Tensile Steel For Prestressing</p> <p>All prestressing strands shall be low relaxation steel of Class II conforming to IS: 14268-1995 (as amended upto date)</p> <p>The tenderer(s) will be required to furnish type of prestressing steel and the name of the firm from which the supply is intended to be procured and also the necessary test certificates regarding both chemical as well as physical properties of the prestressing steel proposed to be used in the prestressing cables. The tenderer(s) will have to make their own arrangements for procuring full quantity of prestressing cables of required design and quality.</p> <p>All prestressing steel shall be procured in coils not less than 2440 mm diameter and shall be straightened and degreased (if present) by an approved method before use.</p> <p>All prestressing steel shall be provided with protective coating immediately after procurement, during storage, after threading and ultimately in position. Such protective coatings shall not be deleterious and detrimental to the ultimate use of prestressing cables nor shall it interfere with the design qualities required during services.</p> <p>Prestressing steel shall not be contaminated with form release agents used on forms or beds.</p>
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6.3	Form Work	<p>i) Bridge Code 1997 for all PSC/RCC works. These specifications shall be read in conjunction with the IS specifications and MORTH Specifications.</p> <p>ii) The form work, false work, staging scheme etc. shall be designed by the Contractor and approved by the Employer's Representative before starting of work.</p>
6.4	Design Requirements	Schedule and sequence of tensioning tendons shall be as shown in the drawing.
6.4.1	Tensioning Equipment	<p>i) All tensioning equipment shall be procured from authorised manufacturers only and be approved by the Employer's Representative. Where hydraulic jacks are used, they shall be power-driven. The tensioning equipment shall satisfy the following requirements;</p> <ol style="list-style-type: none"> The means of attachments of the prestressing steel to the jack or any other tensioning apparatus shall be safe and secure; The tensioning equipment shall be such that it can apply controlled total force gradually on the concrete without inducing dangerous secondary stresses in steel, anchorage or concrete and Pressure gauges fitted in the hydraulic system to determine the pressure in the jacks shall be provided.

		<p>ii) The force in the tendons during the tensioning shall be measured by direct-reading load cells or obtained indirectly from gauges fitted in the hydraulic system to determine the pressure in the jacks. Facilities shall be provided for the measurement of the extension of the tendon and of any movement of the tendon in the gripping devices. The load measuring device shall be calibrated to an accuracy within $\pm 2\%$ and checked at intervals to the approval of the Employer's Representative. Elongation of tendon shall be measured to an accuracy within $\pm 2\%$ or 2 mm whichever is more accurate.</p> <p>iii) Calibration of Pressure Gauge shall be done before prestressing is done and at intervals as ordered by the Employer's Representative. The Contractor shall have a Master Gauge kept in Employer's Representative's custody separately for calibration purpose.</p> <p>iv) The alignment and position of ducts within the girder are critical. Short kinks and wobbles shall be avoided. The trajectory of ducts shall not depart from the curve or straight lines shown in the drawing by more than 1 in 240. The cable position shall not deviate by more than 5 mm from the designed trajectory vertically.</p> <p>(v) Anchorage devices for all post tensioning systems must be aligned with the direction of the axis of the tendons at the point of attachment. Concrete surfaces, against which the anchorage devices bear, must be normal to this line of direction. Accurate measurement of anchorage losses due to slippage or other causes shall be made and compared with the assumed losses and necessary adjustments or correction shall be made in the stressing operation</p> <p>vi) The clear cover shall be uniform and as per the drawings. Concrete cover blocks used, shall be of the same concrete mix as the member and shall contain the binding wire to secure it to the reinforcement. All ends of binding wire shall be carefully turned inside so that they do not project out of concrete cover. Reinforcement bars shall be adequately secured by chairs/ties/hangers so that it will maintain its position during casting and vibrating concrete. Ends of the wires used to tie bars shall be bent into the member.</p>
6.5	Method of Concreting	<p>i) Normally, concreting of Box girder shall be done in one single pour only. However, if the arrangements of casting of PSC box girder proposed by the contractor require two stage concreting, the scheme should be submitted by the contractor with details to the Employer's Representative for getting it proof checked from an independent consultant. All expenditure for such proof checking will be borne by the contractor. For concreting of Box girder, if use of approved quality of super-plasticizer cum retarders or any other additives is considered inevitable without sacrificing strength, specific prior approval of Employer's Representative shall be taken. The cost of such additives shall be borne by the Contractor within his quoted offer.</p>

		<p>ii) Mixing and production of concrete shall conform to clause 5.5,5.6 of IRS CBC 1997 and clause 9 of IS 456-2000.</p> <p>iii) Special care shall be taken for curing of concrete in order to ensure maximum durability and to minimise cracking. Concrete surface shall be kept continuously wet for a period of at least 15 days. Rapid lowering of concrete temperature which may induce thermal cracks shall be avoided. Any modern methods of curing including application of coats on the concrete surface can be adopted with the prior approval of the Employer's Representative.</p> <p>iv) Sampling, strength test of concrete and acceptance criteria shall be as per clause 8.7 of IRS-CBC 1997.</p> <p>v) Compaction of concrete shall be according to clause 13 of IS:456-2000. Sufficient number of shutter/form vibrators and needle vibrators, as directed by the Employer's Representative shall be used during concreting.</p> <p>vi) During concreting, care shall be taken to ensure that the sheathing is not damaged. Needle vibrators shall be used with extreme care by well experienced staff only, to ensure the above requirements.</p> <p>vii) The HTS strands shall be moved in both directions during the concreting operations, which can easily be done by light hammering the ends of the wires/strands during concreting. It is also advisable that 3 to 4 hours after concreting, the cable should be moved both ways through a distance of about 20 cms to reduce the chance of blockages due to any leakage of mortar. This operation can also be done by fixing prestressing jacks at one end, pulling the entire cable and then repeating the operation by fixing the jack at the other end.</p> <p>viii) The concreting should be stopped at the end of each shift at predetermined points as approved by the Employer's Representative.</p> <p>ix) All precast slabs/parapet blocks used in gang paths etc. are to be table vibrated.</p>
6.6	Additional Tests for Concrete	<p>i) As frequently as the Employer's Representative may require, additional testing shall be carried out for concrete in addition to mandatory test specified in IRS concrete Bridge Code, 1997, relevant IS Code/MORTH Specifications. Cost of all such additional testing shall be borne by the contractor.</p> <p>ii) The concrete shall be verified for permeability and the procedure shall confirm to Appendix G of IRS concrete bridge code- 1997. The</p>

		frequency of test shall depend on the change in design mix or change in source of material used in the work. However, the for examination at his discretion and any time during concreting Sampling shall generally be done at the point of discharge from the mixer and at placing point.
6.6.1	Permeability Test	After 24 hours of casting of specimen, central circular area of 100 mm dia meter shall be roughened with a wire brush on the side on which the water pressure is to be applied. The unroughened part of the side of the test specimen which is subjected to water pressure is to be sealed with two coats of cement water paste (W/C = 0.4).
6.6.2	Procedure for permeability test	<p>i) After 28 days curing, test specimen shall be fitted into a test apparatus where water pressure acts on the required face and remaining faces can be observed.</p> <p>ii) At first, a pressure of 1 bar shall be applied for 48 hours, then 3 bar for 24 hours and 7 bar for 24 hours.</p> <p>iii) After the test the specimen shall be split in the middle by compression applied on two round steel bars lying on opposite sides, above and below. The side after test specimen exposed to the water pressure should face downwards.</p> <p>iv) The greatest water penetration depth shall be taken as the average value of the greatest penetration depths on three test specimen.</p>
6.6.3	Acceptability Criteria	The concrete shall pass the permeability test if it is properly compacted and is not considered permeable when tested as per above procedure, and the water penetration in the broken core is less than 25 mm.
6.7	Batching Plants, Mixes and Vibrators	For all structural concreting work, the Contractor shall provide automatic or any other suitable weigh-batching plant of sufficient capacity. The plant used shall conform to IS: 4925.
6.8	Protection of Pre-stressing Steel	<p>i) All pre-stressing steel shall be free of deleterious materials such as grease, oil, wax, dirt, paint, loose rust or other similar contaminants that would reduce bond between steel and concrete. Pre-stressing steel shall not be contaminated with form release agents used on forms or beds.</p>

		<p>ii) The following points are recommended for pre-stressing steel to minimise corrosion :</p> <p>a) Proper packing should be made during shipment. The diameter of coils should not be too small to induce high bending stresses.</p> <p>b) Pre-stressing steel should always be stored in dry warehouses avoiding direct contact with the ground.</p> <p>iii) Dragging of pre-stressing steel on the ground is prohibited.</p> <p>iv) Possibility of 'stray currents' passing through the pre-stressing steel should be eliminated.</p> <p>v) Threading of cables should preferably be done as late as possible into the duct after hardening of the concrete. Only where unavoidable, the cables be threaded in advance of concreting.</p> <p>vi) High tensile steel is to be stored under cover to minimise corrosion. Prestressing steel with deeply etched or pitted surface will not be permitted for use in PSC work.</p> <p>vii) Strand surfaces shall always be inspected prior to placement in the duct and contamination shall be cleaned with an effective solvent.</p> <p>viii) Prestressing steel shall be protected by suitable coating of water soluble grease/oil during storage. Procurement of pre-stressing steel shall be so phased by the Contractor that the storage period before its actual use in works is limited to the bare minimum as approved by the Employer's Representative. The execution of works shall be so planned that threading of cables inducts is done just prior to stressing. All works preliminary to placing of cables shall be done in a covered shed to be erected at site at the Contractor's cost.</p>
6.9	Stressing of Pre-stressing Steel	<p>i) To avoid possibility of part of sheathing getting clogged by the overlying concrete, it shall be ensured that the cables move freely inside the sheath before, during and after concreting.</p> <p>ii) All precautions shall be taken to ensure that the sheathings do not get contaminated with deleterious chemicals, salts, etc. during manufacture, storage and installation.</p> <p>iii) Any slack in the pre-stressing tendon shall first be taken up by applying a small tension. For arriving at the extent of correction and the actual total elongation the procedure given in clause 7.2.6.5 of IRS Concrete Bridge Code – 1997 shall be followed. The rate of application of load shall be in accordance with the manufacture's</p>

		<p>recommended procedure for post tensioning. Slip/draw must be measured at ends and the extension measured for the total length.</p> <p>iv) Large tensioning forces, which are necessary for all pre-stressing operations make all such constructions very hazardous. The Contractor is, therefore, required to establish good safety devices and following instructions shall be complied with:</p> <ul style="list-style-type: none"> a) Care shall be taken during tensioning to ensure the safety of all persons in the vicinity. b) Jacks shall be secured in such a manner that they will be held in position, should they lose their grip on the tendons. c) No person shall be allowed to stand behind the jacks or close to the line of the tendons while tensioning is in progress. d) The operations of the jacks and the measurement of the elongation associated operations shall be carried out in such a manner and from such a position that the safety of all concerned is ensured. e) A safety barrier shall be provided at both ends to prevent any tendon, which might become loose from recoiling unchecked. f) During actual tensioning operation, warning sign shall be displayed at both ends of the tendon. g) After prestressing, concrete shall neither be drilled nor any portion cut nor chipped away nor disturbed, without express approval of the Employer's Representative. h) No welding shall be permitted on or near tendons nor shall any heat be applied to tendons. Any tendon, which has been affected by welding, weld spatter or heat, shall be rejected. <p>v) Stressing of high tension wire shall be done either from both side or from one side as prescribed above.</p> <p>vi) It shall be noted that the system of jacking the cable wholly (i.e. for pulling all the wires/strands of each cable together and anchoring) be adopted for the PSC girders and the quoted rates shall take care of this.</p>
6.10	Grouting of pre-stressing cable	

6.10.1	General	<p>i) The recommendations cover the cement grouting of post tensioned tendons of prestressed concrete members of bridges. This also covers some of the essential protective measures to be adopted for minimizing corrosion in PSC bridges.</p> <p>ii) The purpose of grouting is to provide permanent protection to the post tensioned steel against corrosion and to develop bond between the prestressing steel and the surrounding structural concrete. The grout ensures encasement of steel in an alkaline environment for corrosion protection and by filling the duct space, it prevents water collection and freezing.</p>
6.10.2	Materials	
6.10.2.1	Water	Water free from impurities and as per clause 4.3 of IRS Concrete Bridge code shall only be permitted.
6.10.2.2	Cement	<p>i) Ordinary Portland Cement should be used for preparation of the grout. It shall be as fresh as possible and free from any lumps. Pozzolana cement shall not be used.</p> <p>ii) It is not recommended to use sand for grouting of prestressing tendons. In case the internal diameter of the ducts exceed 150mm, use of sand may be considered. Sand, if used, shall conform to IS 383. The weight of sand in the grout shall not be more than 10% of weight of cement, unless proper workability can be ensured by addition of suitable plasticizers.</p>
6.10.2.3	Admixtures	Acceptable admixtures conforming to IS:9103 may be used with the approval of the Employer's Representative, if tests have shown that their use improves the properties of grout, i.e. increasing fluidity, reducing bleeding entraining air or expanding the grout. Admixtures must not contain chlorides, nitrates, sulphides, sulphates or any other products, which are likely to damage the steel or grout. When an expanding agent is used, the total unrestrained expansion shall preferably be between 4 -6%. Aluminium powder as an expanding agent is not permitted for grouting because its long term effects are not free from doubt.
6.10.2.4	Grout Openings or Vents	i) All ducts should have grout openings at both ends. For this purpose special openings shall be provided where such openings are not available at end anchorages. For draped (curved) cables crown points shall have a grout vent. For draped cables longer than 50m grout vents or drain holes may be provided at or near the lowest points. All grout openings or vents shall include provisions for preventing grout leakage.

		<p>ii) Standard details of fixing couplers, inlets, outlets and air vents to the duct anchorage shall be followed as recommended by the supplier of the system of prestressing.</p> <p>iii) Ducts shall be securely fastened at close intervals. All unintended holes or openings in the duct must be repaired prior to placement of concrete. The joints of the couplers and the sheathing shall be made water proof by use of tape or similar suitable system capable of giving leak proof joints. Grout openings and vents must be securely be anchored to the duct and to either the forms or to reinforcing steel to prevent displacement during concreting operations due to weight, buoyancy and vibrations.</p> <p>iv) Ducts require very careful handling as, being thin are susceptible to leakage due to corrosion/damage in transit or storage. Tearing/ripping in handling particularly when placed adjoining reinforcement steel by pulling apart of joints while inserting tendons, prior to concreting or by accidental puncturing while drilling for form, ties/inserts needs to be carefully prevented. Ducts are also liable to damage by rough use of internal vibrator and sparks from welding being done close by.</p>
6.10.3	Equipment	
6.10.3.1	Grout Agitator	It is essential that the grout is maintained in a homogenous state and of uniform consistency so that there is no separation of cement. It is therefore, necessary that the grout be continuously agitated by a suitable mixer with a minimum speed of 1000 RPM and travel of discharge not exceeding 15m per second.
6.10.3.2	Grout Pump	The pump shall be a positive displacement type and shall be capable of injecting the grout in a continuous operation and not by way of pulses. The grout pump must be fitted with pressure gauge to enable pressure of injection to be controlled. The minimum pressure at which the grout should be pumped shall be 0.3 MPa and the grout pump must have a relief arrangement for bypass of the grout in case of build-up of pressure beyond 1 MPa. The capacity of the grout pump should be such as to achieve a forward speed of grout of around 5 to 10 meters per minute. The slower rates are preferable as they reduce the possibility of occurrence of voids. If the capacity of the pump is large, it is usual to grout two or more cables simultaneously through a common manifold.

		Use of hand pumps for grouting is not recommended. Use of compressed air operated equipment for injection is prohibited, as it is likely that there will be some air entrapped in grout.
6.10.3.2	Water Pump	Before commencement of grouting, a standby direct feed high pressure water pump should be kept available at site for an emergency. In case of any problem in grouting the ducts, such pump shall immediately be connected to the duct and all grout flushed by use of high pressure flushing. It is therefore necessary to have adequate storage of clean potable water for operation of the water pump for such emergencies.
6.10.3.3	Grout Screen	The grouting equipment shall contain a screen having a mesh size of 100 micron. Prior to introduction into the grout pump the grout should be passed through such screen. This screen shall be easily accessible for inspection and cleaning.
6.10.3.4	Connections & Air Vents	Standard details of fixing inlets, and air vents to the sheathing and/or anchorage should be followed as specified by the supplier of the system of prestressing. In general, all connections shall be of the "Quick Couple" type and at change of diameters, suitable reducers shall be provided.
6.10.4	Properties of the Grout	<p>Water/cement ratio should be as low as possible, consistent with workability. This ratio shall not normally exceed 0.45. Before grouting, the properties of the grout mix should be tested in a laboratory depending on the facilities available. Tests shall be conducted for each job periodically. The recommended test is described below.</p> <p>i) Compressive Strength</p> <p>The compressive strength of 100 mm cubes of the grout shall not be less than 17 N/mm² at 7 days. Cubes shall be cured in a moist atmosphere for the first 24 hours and subsequently in water. These tests shall be conducted in advance to ascertain the suitability of the grout mix.</p> <p>ii) Cement</p> <p>Which shall normally be ordinary Portland cement and shall be less than one month old. The cement shall be stored in dry place. When used, its temperature shall not exceed 40 degree C unless special precautions are taken.</p>

6.10.5	Mixing of Grout	<p>i) Proportions of the materials shall be based on field trials made on the grout mix before commencement of grouting, but subject to the limits specified above. The materials should be measured by weight.</p> <p>ii) Water shall be added to the mixer first, followed by cement. Admixture if any may be added as approved by the Employer's Representative.</p> <p>iii) Mixing time depends upon the type of the mixer but will normally be between 2 and 3 minutes. However, mixing should be for such a duration as to obtain uniform and thoroughly blended grout without excessive temperature increase or loss of expansive properties of the admixtures. The grout should be continuously agitated until it is injected.</p> <p>iv) Once mixed, no water shall be added to the grout to increase its fluidity.</p> <p>v) Hand mixing is not permitted.</p>
6.10.6	Grouting Operations	
6.10.6.1	General	<p>i) Grouting shall be carried out as early as possible but not later than one week of stressing a tendon. Whenever this stipulation cannot be complied with for unavoidable reasons, adequate temporary protection of the steel against corrosion by methods or products which will not impair the ultimate adherence of the injected grout should be ensured till grouting. The sealing of the anchorage ends after concreting is considered to be a good practice to prevent ingress of water. For structures in aggressive environment, sealing of the anchorage ends is mandatory.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Application of some patented water soluble oils for coating of steel/VPI powder injections/sending in of hot, dry and oil free compressed air through the vents at frequent intervals have shown some good results. 2. Some of the methods recommended for sealing of anchorages are proof paper or by building a brick pedestal plastered on all faces enclosing the exposed wires outside the anchorages. <p>ii) Any traces of oil if applied to steel for preventing corrosion should be removed before grouting operation.</p> <p>ii) Dust shall be flushed with water for cleaning as well as for wetting the surfaces of the duct walls. Water used for flushing should be of the same quality as used for grouting. It may, however, contain about 1</p>

		<p>per cent of slaked lime or quick lime. All water should be drained through the lowest drain pipe or by blowing compressed air through the duct.</p> <p>iv) The water in the duct should be blown out with oil free compressed air. Blowing out water from duct for cables longer than 50m draped up at both ends by compressed air may not be effective Outlet/vent provided at or near the lowest point shall be used to drain out water from duct.</p> <p>v) The connection between the nozzle of the injection pipe and duct should be such that air cannot be sucked in.</p> <p>vi) All outlet points including vent openings should be kept open prior to the commencement of injection of grout.</p> <p>vii) Before grouting all air in the pump and hose should be expelled. The suction circuit of the pump should be airtight.</p>
6.10.6.2	Injection of Grout	<p>i) After mixing, the grout should be kept in continuous movement.</p> <p>ii) Injection of grout must be continuous and should not be interrupted.</p> <p>iii) The method of injection should ensure complete filling of the ducts. To verify this, it is advisable to compare the volume of the space to be filled by injected grout with the quantity to grout actually. Also, the bypass system indicated above is essential for further safety.</p> <p>iv) Grouting should be commenced initially with a low pressure of injection of upto 0.3 N/mm² increasing it until the grout comes out at the other end. The grout should be allowed to flow freely from the other end until consistency of the grout at this end is the same as that of the grout at the injection end. When the grout flows at the other end, it should be closed off and build up of pressure commenced. Full injection pressure at about 0.5 N/mm² shall be maintained for at least one minute before closing the injection pipe. It is a recommended practice to provide a stand pipe at the highest point of the tendon profile to hold all water displaced by sedimentation or bleeding. If there is a build up of pressure much in excess of 1 N/mm² without flow of grout coming at the other end, the grouting operation should be discontinued and the entire duct flushed with high water pressure.</p> <p>v) Grout not used within 30 minutes of mixing should be rejected.</p>

		vi) Disconnection is facilitated if a short length of flexible tube connects the duct and injection pipe. This can be squeezed and cut off after the grout has hardened.
6.10.6.3	Precautions and Recommendations for Effective Grouting	<p>i) When the ambient temperature during the day is likely to exceed 40 degree C, grouting should be done in the early morning or late evening hours.</p> <p>ii) When the cables are threaded after concreting, the duct must be temporarily protected during concreting by inserting a stiff rod or a rigid PVC pipe or any other suitable method.</p> <p>iii) During concreting, care shall be taken to ensure that the sheathing is not damaged. Needle vibrators shall be used with extreme care by well experienced staff only to ensure the above requirements.</p> <p>iv) It is a good practice to move the cables in both directions during the concreting operations. This can easily be done by light hammering the ends of the wires/strands during concreting. It is also advisable that 3 to 4 hours after concreting the cable should be moved both ways through a distance of about 20 cms. With such movement, any leakage of mortar which has taken place in spite of all precautions loses bond with the cables, thus reducing the chance of blockages. This operation can also be done by fixing prestressing jacks at one end, pulling the entire cable and then repeating the operation by fixing the jack at the other end. Compressed air should be also be pumped to clear leaked mortar plug.</p> <p>v) In case of stage prestressing, cables tensioned in the first stage should not remain ungrouted till all cables are stressed. It is a good practice while grouting any duct in stage prestressing to keep all the remaining ducts filled up with water containing 1 percent lime or by running water through such ducts till the grout has set. After grouting the particular cable the water in the other cables should be drained and removed with compressed air to prevent corrosion.</p> <p>vi) Care should be taken to avoid leaks from one duct to another at joints of precise members.</p> <p>vii) End faces where anchorages are located are vulnerable points of entry of water. They have to be necessarily protected with an effective barrier. Recesses should be packed with mortar/concrete and should preferably be painted with water proof paint.</p> <p>viii) After grouting is completed, the projecting portion of vents should be cut off and the face protected to prevent corrosion.</p> <p>ix) Before covering the anchorage zone with concreting, suitable epoxy coating shall be applied over the anchorage and bearing plates.</p>

		A proxy coating selected should be such that it is compatible with both metal and concrete so that proper bonding is also achieved between epoxy coating and concrete after filling the anchorage zone with concrete.
6.11	Inspection	<p>In general the scope of inspection to be performed in the prestressing work shall include the following:</p> <ul style="list-style-type: none"> i) Identification, examination, acceptance and laboratory testing of materials. ii) Inspection and recording tensioning. iii) Inspection of Bed and forms prior to concreting. iv) Checking of dimensions of members, positions of cables/ducts, reinforcing steel, air vents, other incorporated materials, anchorages, openings, blackouts, etc. v) Continual inspection of batching mixing, conveying, placing, compacting, finishing, curing, of concrete cubes, etc. vi) Preparation of concrete specimens for tests and performing of tests for slumps, air content, cube strength, etc. vii) General observation of casting, site, equipment, working conditions, weather and other conditions affecting product. viii) Final inspection of finished members. ix) Any other items required direction for ensuring quality, process, and smooth functioning of the work.
6.12	Record Keeping	<p>In order to establish evidence of proper manufacture and quality of the prestressed concrete members, a system of records as mentioned below shall be maintained by the contractor besides such records as may be directed by the Employer's Representative during the progress of the work. Two copies of such record shall be made and one copy duly signed by the contractor and the site Employer's Representative shall be submitted to the Employer's Representative.</p> <ul style="list-style-type: none"> i) Each prestressed member shall be identified by bed and date of cast and an identification number which shall refer to design calculation, drawing, tensioning records, concreting records, cube strength records. Maintaining of these records shall be the responsibility of the contractor.

		<p>ii) Certified test report of the materials such as prestressing steel, anchorages, sheathings, admixtures, expansion joints, aggregates, etc. brought by the contractor and used in the structure. These reports shall show that the materials conform to the relevant specifications. Keeping record of all these test reports including those of cement and reinforcing steel, shall be the responsibility of the contractor.</p> <p>iii) An accurate record of tensioning and grouting operations for each and every cable shall be kept. These shall include but not be limited to the following:</p> <ol style="list-style-type: none"> Date of tensioning/grouting Cast bed identification Description, identification and number of the girder Manufacture, size and class of tendon. Identification of all the tensioning equipment. Identification and number of the cable/duct being tensioned /grouted. Cube strength on the date of tensioning. Design elongation and gauge pressure for the particular cable under tension. Chart indicating actual gauge pressure and corresponding measured elongation at each end and at each stage of tensioning with graph showing actual gauge pressure vs measured elongation and correction value of elongation for initial tension before marking. Slip of anchorages at each end. The actual net elongation and shortfall or otherwise from the design value for each cable. All data on the date of grouting e.g. time of start and completion, initial and final pressure of grout injection, total cement consumption, etc. Any un-natural occurrences encountered during tensioning or grouting ; such as failure of equipment, snapping of tendons, excessive slippage, blockage of ducts resulting in heavy shortfall in elongation or excessive increase in pressure of grout injection, or any other problem that may have direct or indirect influence on the net stress or effective grouting. <p>iv) Records of concreting operations and tests shall be kept so that the following data be recorded for each member or each group of members cast on one bed.</p> <ol style="list-style-type: none"> Date, time and duration of concreting. Identification of batching plant (including its initial and final reading) and other important concreting equipment. Quality by weight for each ingredient of concrete and mixing time of each batch. Identification of casting bed and member.
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		<ul style="list-style-type: none"> c. Design Mix proportion. d. Adjustments in water content in the mix due to bulking of sand or absorbed water in coarse aggregate. e. Identification and numbering of work strength testing cubes. Various field tests conducted at site like workability test, determination of water content in sand and coarse aggregate, etc f. Weather condition, ambient temperature, concrete temperature. g. Method and duration of curing Strength of cubes at 7 days, 28 days and on the date of prestressing. h. Strength of cubes at 7 days, 28 days and on the date of prestressing. i. Failure of equipment and interruption in continuous concreting. j. Total cement consumption. k. Any un-natural occurrence that may have direct or indirect effect on the overall quality of the work. <p>v) All equipment used in the work shall be calibrated to the satisfaction of the Employer's Representative. The record for calibration done shall show the following: -</p> <ul style="list-style-type: none"> a. Date of calibration. b. Agency and laboratory performing the calibration. c. Method of calibration. d. A curve showing full range calibration with gauge readings plotted against actual load
6.13	Installation of Bearings	i) Care shall be taken during installation of the bearings to permit their correct functioning in accordance with the design scheme. It will be desirable that the representatives of the manufacturer be at the time of installation of bearings at least for first few girders or the work of installation be also included in the scope of the work of the manufacturers.
6.14	Installation of Expansion Joints	It shall be preferable to have stainless steel as expansion joint. Care shall be taken during installation of the expansion joints to permit their correct functioning in accordance with the design scheme. It will be desirable that the representatives of the manufacturer be present at the time of installation of expansion joints at least for first few joints or the work of installation be also included in the scope of work of the manufacturer.
6.15	Drainage Outlets	The drainage outlets shall be in conformity to the requirements and code of practice. The spacing of the drainage outlets shall be as per approved drawing or as directed by the Employer's Representative. The down spouts shall be adequately fixed to the deck and shall be of rigid corrosion resistant materials not less than 100 mm dia in the least dimension and shall be provided with suitable clean out fixtures. These outlets shall be so provided that the discharge of the rain water drained

		by them is not directed towards any part of the super-structure or sub-structure component.
6.16	Rates	The rates offered by the bidders are deemed to include direct / indirect cost of all the activities mentioned herein. Contractor will have no right to demand any extra cost for completion / compliance of above specifications / instructions.
7.0	BORED PILES	
7.1	Content	This section covers the technical requirement for installation of bored cast-in-situ reinforced concrete vertical piles & raker piles of specified load carrying capacity and diameter, including load tests on piles for all types of structures.
7.2	Pile Installation	<p>i) Installation of piles shall be carried out as per pile layout drawings, installation criteria and the instructions of the Employer's Representative</p> <p>ii) Safe load capacity of pile of various diameters in vertical compression, horizontal (lateral), for various pile diameters are to be clearly specified in the Drawing by the Contractor in the schedule of items.</p> <p>iii) The Contractor shall ensure and guarantee the "safe load" capacities both for initial test piles and working piles..</p> <p>iv) Before installing the initial test pile, Contractor shall finalise the pile testing arrangement and get the approval from the Employer's Representative.</p> <p>v) It is envisaged that the working piles shall be installed after the successful completion of the initial pile load test.</p> <p>vi) In case the Contractor desires to install the working piles, pending successful completion of initial pile load test, he may be permitted to do so, provided he gives undertaking to the Employer's Representative to bear all associated risks and costs involved to make up for the short falls in the pile capacity, in the event of the failure of the initial pile load tests to establish specified safe load carrying capacity of initial test pile.</p> <p>vii) The Employer's Representative reserves the right to reject any pile which in his opinion is defective on account of safe load carrying capacity, structural integrity, position, alignment, concrete quality etc. Piles that are defective shall be pulled out or left in place as</p>

		<p>judged convenient by the Employer's Representative, without affecting the performance of adjacent piles. The Contractor shall install additional piles to substitute the defective piles, as per the directions of the Employer's Representative, at no extra cost to the owner. Further, the cost of additional piles and increase in the pile cap size, if any, on account of additional piles shall be borne by the Contractor. If any bore hole is defective or is abandoned, it shall be filled up with lean concrete 1:4:8 at contractor's cost.</p> <p>viii) In case, the Contractor fails to establish the safe load carrying capacity based on initial pile load test, the owner shall have full rights to get the work of piling done by any other agency of repute, all at the risks and cost of the Contractor.</p> <p>ix) Each pile shall be identified with a reference number. The convenience of installation may be taken into account while scheduling the sequence of piling in a group.</p> <p>x) Level marks shall be accurately painted on each pile immediately after its installation. Subsequently, if any pile displays any tendency to heave up due to installation of other piles or due to any other reasons, the same shall be reinstalled firms as per the directions of the Employer's Representative without any extra cost.</p> <p>Xi) The Contractor shall record all the information during installation of piles. Typical data sheet for recording pile data shall be as shown at Annexure-1. On completion of each pile installation, pile record in triplicate shall be submitted to the Employer's Representative within two days of completion of concreting of the pile.</p> <p>xii) Approvals of termination depth by the Employer's Representative in no way absolve the Contractor of his responsibility to guarantee the 'safe load' capacities of the piles as indicated in this document.</p>
7.3	Control of Position and Alignment	Piles shall be installed as accurately vertical (for vertical piles) as well as to specified rake (for raker piles) as possible. The permissible limits for deviation with respect to position and (inclination) alignment shall confirm to IS: 2911.
7.4	Pile Installation	The equipment and accessories for installation of piles shall be selected giving due consideration to the sub soil conditions, ground water conditions, type of founding material etc. These shall be of standard type and shall have the approval of the Employer's Representative.

7.4.1	Bored Pile	<p>i) Boring / drilling operations shall be done with conventional rigs or by rotary hydraulic feed drilling rigs, and wherever considered necessary reverse mud circulation technique shall be adopted. The cutting tool shall have suitable ports for the bentonite slurry / Polymer circulation. The rotary drilling rigs shall have suitable and adequate accessories for boring / drilling through all type of strata expected at site.</p> <p>ii) Working level shall be above the cut-off-level. After the initial boring of about 1m, temporary guide casing of suitable length shall be lowered in the pile bore for vertical pile. The diameter of guide casing shall be such as to give the necessary finished diameter of the concrete pile. The centre line of guide casing shall be checked before continuing further boring. Guide casing shall be minimum of 1.0m length. Additional length of casing may be used depending on the condition of the strata, ground water level etc. For raker piles, permanent guide case shall be provided upto the founding level.</p> <p>iii)The temporary guide casing (if provided) shall be withdrawn cautiously, after concreting is done upto the required level. While withdrawing the casing, concrete shall not be disturbed.</p> <p>iv)The size of cutting tools shall not be less than the diameter of the pile by more than 75mm. However, the pile bore shall be of the specified size.</p> <p>v)Permanent MS Liners shall be provided for piles upto point of refusal or as directed by the Employer's Representative. The Contractor shall fabricate MS Liners from MS sheets to suit to the diameter of the pile. The required length of the Liners will be made up by welding each unite at site. The thickness of the Liners shall not be less than 6mm and for the bottom length of 1.2m or such increased length as decided by the Employer's Representative, the thickness can be increased suitably. The bottom end of the MS Liner shall be stiffened by welding additional plates to withstand the impact during driving.</p> <p>vi)In case hard rock is encountered, chiselling is essentially required for softening of the rock, the same may be adopted only on approval of the Employer's Representative, at no extra cost to the owner. Advancement of pile bore shall be done by drilling only, in case of use of rotary hydraulic drilling rig.</p> <p>vii)The piles shall be founded on hard or soft rock or other suitable strata as per the directions of the Employer's Representative. Where the pile is required to be founded in hard rock, a minimum embedment as follows shall be ensured</p>
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		<p>Minimum, Embedment</p> <p>i) Rock SBC > 100t/sq . m. 3x dia . of Pile.</p> <p>ii) Rock SBC > 200t/sq.m. 2x dia. Of Pile.</p> <p>viii) Drilling mud (bentonite slurry) shall be used for stabilizing the sides of the pile bore. Drilling mud to be used shall meet the requirements, as given below.</p> <ol style="list-style-type: none"> Liquid limit of bentonite when tested in accordance with IS:2720 (part v) shall be more than 300 percent and less than 450 percent. Sand content of the bentonite powder shall not be greater than 7 percent. Bentonite solution should be made by mixing it with fresh water using pump for circulation. The density of the freshly prepared bentonite suspension shall be between 1.034 and 1.10 gm / ml depending upon the pile dimensions and type of soil in which the pile is to be installed. However, the density of bentonite suspension after mixing with deleterious materials in the pile bore may be upto 1.25 gm / ml. The marsh viscosity when tested by a marsh cone shall be between 30 to 60 seconds. The differential free swell shall be more than 540 percent. The pH value of the bentonite suspension shall be between 9 and 11.5. <p>ix. Maintaining the bore hole: The bentonite slurry shall be maintained at 1.5m above the ground water level during boring operations and till the pile is concreted. The bentonite slurry shall be under constant circulation till start of concreting and shall meet the requirements stipulated in the subsequent clauses.</p> <p>x. Cleaning of Pile bore</p> <ol style="list-style-type: none"> After completion of the pile bore upto the required depth, the pile bore shall be cleaned by three stage flushing of slurry using airlift technique. The bottom of the pile bore shall be thoroughly cleaned by airlift technique. Cleaning shall ensure that the pile bore is completely free from sludge / bored material, debris of rock / boulder etc. Necessary checks shall be made so as to confirm the thorough cleaning of the pile bore Pile bore shall be cleaned by fresh drilling mud through tremie pipe before and after placing the reinforcement and just before the start of concreting Concreting operations shall not proceed if the contaminated drilling mud at the bottom of the pile bore possesses a density of more than 1.25 t / cu.m. The drilling mud sample shall be collected from the bottom of pile bore. For this a solid cone shall be lowered by a string to the bottom of pile bore. A
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7.4.2	Carriage & Disposal	Bored spoil material and contaminated mud shall be disposed off up to a lead of 2 kms as directed by Employer's Representative.
7.4.3	Concreting	<p>i. Technical specification for cast-in-situ concrete and allied works along with IS: 2911 shall be applicable to concrete works for piles.</p> <p>ii. Minimum grade of concrete shall be M25. Cement content shall be 425kg/cu.m. or 10% more than that determined from the mix design, whichever is higher.</p> <p>iii. The slump of concrete shall vary between 150 to 180 mm for bored piles</p> <p>iv. Concreting shall not be done until the Employer's Representative is satisfied that the termination level of pile, is as per the installation criteria mentioned else where in the specification.</p> <p>v. The time interval between the completion of boring and placing of concrete in pile bore shall not exceed 6 hrs. In case the time interval exceeds 6 hrs the pile bore shall be abandoned. However, the Employer's Representative may allow concreting provided the Contractor extends the pile bore by 0.5 m beyond the termination level and clean the pile bore. The entire cost of all operation and materials for this extra length shall be borne by the Contractor.</p> <p>vi. Concreting shall be done by tremie method. The operation of tremie concreting shall be governed by IS: 2911. Drilling mud shall be maintained sufficiently above the ground water level as specified elsewhere in the specification.</p>

		<p>vii. Concreting by tremie shall continue to allow the initial pours of concrete mixed with bentonite slurry, sludge and cut spoils from the bore over flows and the consistency and quality of the over flowing concrete is comparable to that of designed mix. The length of over flow will be decided by the Employer's Representative.</p> <p>viii. It shall be ensured that volume of concrete poured is atleast equal to the theoretically computed volume of the pile shaft being cast.</p>
7.5	Top of Concrete in Pile and Cut-off-level (COL)	<p>i) Cut-off-Level of piles shall be as indicated in drawings released for construction and / or as indicated by the Employer's Representative.</p> <p>ii) The top of concrete in pile as cast shall be above the cut-off-level by 1.0 metre (maximum) to remove all laitance and weak concrete and to ensure good concrete at cut-off-level, for proper embedment into the pile cap.</p> <p>iii) Cement being used for concreting this extra length of pile above the cut-off-level, as per the requirements of technical specification shall only be considered as the material being used for the work, for the purposes of reconciliation of cement consumption.</p> <p>iv) Preparation of Pile head: The area surrounding the piles shall be excavated upto the bottom of the pile caps. After seven days of concreting of pile, the exposed part of concrete above the COL shall be removed / chipped off and made rough at COL. The projected reinforcement above COL shall be properly cleaned and bent to the required shape and level to be anchored into the pile- cap. The pile top shall be embedded into the pile cap by 150 mm or clear cover to reinforcement, whichever is higher.</p> <p>v) All loose material on the top of pile head after chipping to the desired level shall be removed and disposed off upto a lead of 2Kms as directed by the Employer's Representative.</p>
7.6	Reinforcement	<p>i) Technical specification for cast-in-situ concrete and allied works along with IS:2911 shall be applicable for reinforcement for piles.</p> <p>ii) Longitudinal reinforcement in pile shall be high yield strength deformed steel (HYSD) bars conforming to IS:1786, unless specified otherwise. Lateral reinforcement in pile shall be of mild steel conforming to IS: 432 Part-1 or HYSD bars as per IS: 1786.</p>

		<p>iii) The longitudinal reinforcement shall project 50 times its diameter above cut-off-level unless otherwise indicated.</p> <p>iv) The minimum clear spacing between the two adjacent main reinforcement bars shall normally be 100 mm for the full depth of cage and they shall be held firmly in position by tack welding suitable stiffeners. For links, the spacing shall not be less than 150mm and in no case more than 250mm.</p> <p>v) Proper cover to reinforcement and central placement of the reinforcement cage in the pile bore shall be ensured by use of suitable concrete spacers or rollers, cast specifically for the purpose. Placement of reinforcement cage to its full length shall be ensured before concreting.</p> <p>vi) Minimum clear cover to the reinforcement shall be 75 mm, unless otherwise mentioned.</p>
7.7	Building Up of Piles	<p>If any pile, already cast as per construction drawing, requires any extra casting due to any change in cut-off-level, then the pile shall be built up by using at least one grade higher concrete than specified for piles, ensuring proper continuity with the existing concrete and to the satisfaction of the Employer's Representative. Necessary reinforcement, as per design requirement and suitable shuttering shall be provided, before casting the concrete. Surrounding soil shall also be built up to the required level by proper compaction, to ensure lateral capacity of the pile.</p>
7.8	Breaking Off of Piles	<p>If any pile already cast requires breaking, due to subsequent change of cut-off-level, then the same shall be carried out, not before seven days of casting without affecting the quality of existing pile, such as loosening, cracking etc., and to the satisfaction of the Employer's Representative.</p>
7.9	100mm Dia Bore Hole	<p>i) Bore hole shall be made as per IS: 1892 for determining (which is one of the criteria of establishing) start of socketing horizon and termination level of piles. Standard Penetration Test (SPT), as per IS: 2131, in a bore hole shall be conducted at 1.0 m interval in the overburden soil and rock portion having core recovery < 30%.</p> <p>ii) Number of bore holes for determining termination shall vary depending on the site condition and as decided by the Employer's Representative. In case of uniform strata, 1 borehole may be sufficient for 40-50 piles or in a pile group. In case of erratic strata, the number of boreholes may be 1 in 20 to 40 piles. However, at the</p>

		location of initial load test piles, one such borehole shall be done at each location.
7.10	Load Test on Piles	<p>i) This part of the specification covers the requirements for initial and routine load tests on reinforced concrete single vertical piles of specified diameter to assess their vertical, horizontal (lateral) and pull out load carrying capacities.</p> <p>ii) The work shall include mobilisation of all necessary equipment, kentledge, anchor piles / rock anchors, or combination of kentledge</p>
7.11	Test Pile Installation	<p>i) Piles shall be installed as specified elsewhere in this specification.</p> <p>ii) Pile installation data as applicable shall be furnished along with the load test results in triplicate, to the Employer's Representative.</p>
7.12	Type of Tests	<p>i. The Contractor shall carry out three categories of load tests i.e initial load test, routine load test and pile integrity test.</p> <p>ii. Initial load test shall be conducted to assess the safe load carrying capacity of pile before start of installation of working Piles. This shall include the following type of tests.</p> <p style="padding-left: 40px;">a. Vertical (compression) load test to assess safe vertical load capacity.</p> <p>iii. Routine load tests shall be conducted to verify the load capacity of working pile. This shall include the following types of tests:</p> <p style="padding-left: 40px;">a. Direct vertical (compression) load test for vertical load capacity</p> <p>iv. The minimum number of routine load test on working piles shall be as directed by Employer's Representative.</p> <p>v. Pile Integrity Test has to be conducted on 100% of the piles on each bridge.</p>
7.13	Test Pile for routine load	<p>i. The test piles for routine load test shall be identified by the Employer's Representative. For initial load test, test piles shall be installed as directed by the Employer's Representative.</p> <p>ii. A minimum time period of four weeks shall be allowed between the time of pile casting and testing. Test pile head shall be prepared for testing purposes only, one week after casting the pile.</p>

		iii. Test piles shall be cut off at the proper level and provided with a proper cap / head, so as to provide a plane bearing surface for the test plate and for proper arrangements for seating of the jack and dial gauges.
7.14	Vertical Load Test	
7.14.1	Equipment and Test Set Up	<p>i. A steel plate of sufficient thickness but not less than 50mm shall be centered on the pile head / cap to prevent it from crushing under applied load. The size of the circular test plate shall not be less than the pile size nor less than the area covered by the base of the hydraulic jack (s).</p> <p>ii. The datum bars shall be supported on immovable supports preferably of concrete pillars or steel sections placed sufficiently far away from the test pile. The distance shall not be less than 3 times the diameter of test pile and in no case less than 2 metres from the edge of test pile. These supports shall be placed at a sufficient depth below ground to be unaffected by ground movements.</p>
7.14.2	Loading System	<p>i. The test load on pile shall be applied in one of the following ways as approved by the Employer's Representative.</p> <ol style="list-style-type: none"> By means of hydraulic jack(s), which obtain reaction from kentledge heavier than the required test load. While using this method care shall be taken to ensure that the centre of gravity of kentledge is on the axis of the pile. The load applied by the jack(s) shall also be coaxial with the pile. The nearest edge of the crib supporting the kentledge stack shall not be closer than 1.5 metres to the edge of the test pile. By means of hydraulic jack(s), which obtain reaction from anchor piles (for initial pile load test) and / or suitable loading frame. While using this method all anchor piles shall be at a centre to centre distance of atleast three times the test pile shaft diameter from the test pile and in no case less than 2 metres. Care shall be exercised to ensure that the datum bar supports are not affected by heaving up of the soil. By means of hydraulic jack(s), which obtain reaction from suitable rock anchors (for initial pile load test). When this method is adopted, the anchor transferring the load to the ground shall not be closer than two times the test pile shaft diameter to the test pile and in no case less than 1.5m. By means of combination of kentledge, anchor pile / rock anchors.

		e. The measurement of strains for load monitoring may also be done by load cell connected to a digital read out unit.
7.14.3	Measuring System	<p>i. Settlement of the pile shall be recorded by four dial gauges placed at diametrically opposite locations and suspended from the datum bar around the pile. Settlement / movement of the pile top can also be made by three Linear Variable Differential Transducers (LVDTs) having at least 100mm of travel. The read out unit shall have a minimum display of 3½ digits, capable of monitoring output at least 10 DC/PC type LVDTs.</p> <p>ii. Additionally a graduated scale of at least 150mm long and divided in graduations of 500 □ shall be fixed to the pile and tungsten wire shall be fixed in opposite side. Measurement of the pile settlement shall also be done by a suitable total station digital theodolite. Typical set up for measuring system shall be submitted by the Contractor.</p>
7.14.4	Test Procedure	The test shall be carried out by the direct loading method in successive increments for initial and routine load test.
7.14.4.1	Direct Loading Method	<p>The test shall be carried out as per the procedure outlined below:-</p> <p>i. The load shall be applied to the pile top in increments (steps) of about 20% of the rated capacity of the pile or as directed by Employer's Representative. Each increment of load shall be applied as smoothly and expeditiously as possible. Settlement reading shall be taken before and immediately after the application of next increment and at 15, 30 minutes and thereafter at every 1/2 hour until application of the next load increment.</p> <p>ii. Each stage of loading shall be maintained till the rate of movement of the pile top is not more than 0.2mm / hr or until two hours have elapsed, whichever is earlier.</p> <p>iii. The rate of movement of pile shall not be permitted to be extrapolated from period of test less than one hour.</p> <p>iv. Loading on the pile shall be continued till one of the following takes place:</p> <ol style="list-style-type: none"> In case of initial load test <ol style="list-style-type: none"> Applied load reaches three times the safe vertical load carrying capacity. The maximum settlement of pile exceeds a value of 10 percent of pile diameter. In case of Routine Load Test

		<ol style="list-style-type: none"> 1. Applied load reaches one and half times the safe vertical load carrying capacity. 2. The maximum settlement of Test Loading in position attains 12mm. <p>v. Where yielding of the soil / rock does not occur, full test load shall be maintained on the pile head for a minimum period of 24 hrs, after the last increment of load has been applied. Settlement /values shall be recorded at every 6 hrs interval during this period.</p> <p>vi. Unloading shall be carried out in the same steps as loading. A minimum period of 30 minutes shall be allowed to elapse between two successive stages of load decrement. The final rebound shall be recorded 6 hours after the entire test load has been removed.</p>
7.14.5	Assessment of Safe Load	<p>The safe vertical load carrying capacity of single pile from the initial and routine vertical load tests shall be the least of the following values :</p> <ol style="list-style-type: none"> i. Two-third of the final load, at which the total settlement is 12mm. ii. 50 percent of the final load, at which the total settlement equals to 10 percent of the pile diameter.
7.15	Deleted	
7.16	PILE INTEGRITY TESTS	
7.16.1	Integrity Testing	<p>General</p> <p>Pile integrity testing shall be used as specified or required as a method of proof-testing a pile as work proceeds with the aim of indirectly assessing one or more of the following:-</p> <ol style="list-style-type: none"> i. The structural integrity of the pile. ii. The relative shape of the pile shaft and an estimate of the physical dimensions of the pile or both. iii. The continuity of the pile <p>Pile integrity testing shall be performed as specified in Employer's Requirements.</p>
7.16.2	Test Procedure	<p>Where integrity testing is required, the test to be adopted shall be one of the following :</p> <ol style="list-style-type: none"> i. Sonic impact test (SIT) ii. Sonic vibration test (SVT) iii. Alternative test as specified

		The testing, if done, the scheme shall be got approved by Employer's Representative.
7.16.3	Supervision & Recording of Results	Pile tests shall be carried out under the direction of a suitable person experienced in the supervision of pile integrity tests.
7.17	Sampling, Testing, Acceptance Criteria Including Construction Tolerances	Frequency of sampling, testing and quality assurance including the method of conducting the tests, acceptance criteria and construction tolerances shall be as per IS specification. 100% piles shall be tested with pile integrity test.

Annexure - I

Pile Data

1. Reference No. Location (Co-ordinates) _____ area.
2. Sequence of piling
3. Pile diameter & type
4. Working level (Platform level)
5. Cut off level (COL)
6. Actual length below COL
7. Pile termination level
 - a) Start of socket (Level):
 - b) Termination of pile (Level):
8. Top of finished concrete level
9. Date and time of start and completion of boring.
10. Type of soil/ rock at pile tip
11. Method of boring operation
12. Details of drilling mud as used :
 - i) Freshly supplied mud
 - Liquid limit
 - Sand content
 - Density
 - Marsh viscosity
 - Swelling index
 - PH value
13. Contaminated mud.
 - density
 - Sand content
- 14.1 Standard Penetration Test (SPT)
 - Penetration for 100 blows at
 - Socketing Level for reference pile:
- 14.2 Unconfined Compression Strength (UCS)
 - Value in rock (from the nearest bore hole):
 - Core recovery (from the nearest bore hole):

14.3 Rate of drilling in mm / hr.:

- a) At start of socketing horizon
- b) At termination level

16. Date and time of start and completion of concreting.

17. Method of placing concrete

18. Concrete quantity

Actual :

theoretical:

19. Ref. number of test cubes

20. Grade and slump of concrete

21. Results of test cubes

22. Reinforcement details:

Main reinforcement

No. _____

Dia _____

Depth _____

Stirrups: Type

No. _____

Dia _____]

Depth _____

23. Any other information regarding obstructions, delay and other interruption to the sequence of work.

24. Pile bore log details (in brief).

Annexure - II

PROJECT _____

PILE LOAD TEST: VERTICAL/ HORIZOTAL/UPLIFT

Pile No.:

Date of cast:

Method of boring:

Type of pile:

Diameter:

Capacity:

Type of test:

Loading method:

Direct / Cyclic details :

Commencement of test:

Completion of test :

Brief description of testing arrangement:

Tension or Compression piles:

Capacity of jack:

Jack constant:

Weight of kentledge

Reaction pile deload (if any)

DATE	TIME	PRESSURE	LOAD	DIAL	GAUGE	SETTLEMENT (mm)	REBOUND
		GAUGE	MT	READING	AVERAGE		NET

Submission of test results:

- i. Time Vs Settlement.
- ii. Load Vs. Settlement indicating the safe load.
Separation of skin friction & end bearing of pile, in case of cyclic initial vertical load tests.

8.	BEARINGS	
8.1	General	<p>A] Elastomeric bearings under PSC girder (Horizontal bearings) shall be as per UIC guidelines.</p> <ol style="list-style-type: none"> 1. The Elastomeric bearing shall be as per UIC 772 2R and shall have the following properties. <ol style="list-style-type: none"> a) Shore Hardness = 6 ± 5 b) Share Module = 8kg/cm c) Raw material chloroprene (CR) shall only be used in manufacture of bearing. <p>SEQUENCE OF INSTALLATION: -</p> <ol style="list-style-type: none"> 1. Provide minimum 15mm thick pre-packed high early strength non shrink levelling mortar over RCC pedestal. 2. Place bearing over pedestal after pre-packed high early strength non shrink levelling mortar gain strength. 3. Lower the superstructure over bearing. <p>Reference drawings No. No SURAT/DFC/D/WC-ST/MB-99/2011</p> <p>B] Vertical Bearings shall be as per UIC guidelines. There are two vertical bearings (Type A & Type B) – lateral and longitudinal direction.</p> <ol style="list-style-type: none"> 1. The vertical elastomeric bearings has been designed as per IRC: 83 (Part II) – 1987 2. Material: <ol style="list-style-type: none"> 2.1 Raw material chloroprene (CR) shall be used in manufacture of elastomeric bearing

		<p>2.2 Properties of elastomeric shall be as per CL: 915.1 & 915.2 as per IRC 83 (part ii) -1987.</p> <p>2.3 Laminates of mild steels confirming to is: 2062.</p> <p>2.4 Anchor bolts material as per grade 4.6 of is: 1367 & sleeve material as per is : 2062 & detail of thread as per is: 1367.</p> <p>2.5 Suitable nos. of washer are to be used as packing to tighten the anchor bolts with M.S. Plate.</p> <p>3. M.S. plate (backing plate) shall be vulcanised along with the elastomeric bearing at the time of manufacturing.</p> <p>4. M.S. Plate (backing plate) will be coated one coat of epoxy primer.</p> <p>5. Anchor sleeve & bolts will be hot dip galvanised coated after welding before dispatch.</p> <p>6. Manufacturing tolerances as per table 2 cl . 917.7 of IRC :83 (part ii) -1987.</p> <p>7. All material specifications, fabrication, testing and acceptance of bearing shall be in accordance with tender document and IRC: 83 (part ii) -1987 specification.</p> <p>Reference drawings No. No.PP/SOMA_DFCC/BOX/35 TON-TYPE-B, No.PP/SOMA_DFCC/BOX/40 TON-TYPE-A,</p>
9.0	Laying Boulder Aprons, Sausages	
9.1	General	<p>This work shall consist of laying boulders on the bed of rivers for protection against scour.</p> <p>Where the required sizes of boulders are not available, cement concrete boulders of equivalent weight shall be used. The grade of concrete shall be M15 nominal mix. Cement concrete blocks shall be preferred where practicable. The stones used in Apron shall be sound, hard, durable and fairly regular in shape. Stone subject to marked deterioration by water or weather shall not be used.</p> <p>Quarry stones are preferable to round boulders as the later roll off easily. Angular stones fit into each other better and have good interlocking characteristics.</p>
9.2	Boulder Apron	The size of stone should conform to clause 5.3.7.2 of IRC: 89.

		<p>The size of stone shall be as large as possible. In no case any fragment shall weigh not less than 35 kg. The specific gravity of stones shall be as high as possible and it shall be not be less than 2.65.</p> <p>To ensure regular and orderly disposition of the full intended quantity of stone in the apron, template cross walls in dry masonry shall be built about a metre thick and to the full height of the specified thickness of the apron at the intervals of 30 meters all along the length and width of the apron. Within these walls, the stones then shall be hand packed.</p> <p>The surface on which the apron is to be laid shall be levelled and prepared for the length and width as shown on the drawings. Incase the surface on which apron is to be laid is below the low water level, the ground level may be raised upto low water level by dumping earth and the apron laid thereon. The quantity of stone required in the apron shall be re-worked out by taking the toe of pitching at higher level.</p>
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10.0	Pitching / Revetment on slopes	
10.1	General	The work shall consist of covering the slopes of banks with stone, boulders, cement concrete blocks over a layer of granular material called filter.
10.1.1	Pitching	<p>The pitching shall be provided as indicated in the drawings. The thickness of the pitching shall be 230 mm and it shall be backed by a 75 mm Thick layer of filter material, the shape of stone pitching shall be as per the approved drawings.</p> <p>The stones shall be sound, hard, durable and fairly regular in shape. Quarry stones shall be used for this purpose. Round boulders shall not be allowed. Stone subject to marked deterioration by water or weather shall not be accepted.</p> <p>The boulders to be used shall not be than 35 kg each. Voids of pitching shall be filled with cement sand mortar 1:4.</p>
10.1.2	Filter Media	The material for the filter media shall consist of sand, gravel, stone or coarse sand (material shall be of GW, SP, SW groups as per IS 1498-1970). To prevent escape of the embankment material through the voids of the stone pitching / cement concrete blocks as well as to allow free movement of water without creating any uplift head on the pitching, one or more layers of graded materials, commonly known as a filter medium, shall be provided underneath the pitching.

PART – III

**ADDITIONAL TECHNICAL
SPECIFICATIONS**

1.0 Additional SPECIAL CONDITIONS OF CONTRACT GENERAL:

In these Special Conditions of Contract the following terms shall have the meaning hereby assigned to them except where the context otherwise requires:

"General Condition of Contract" shall mean General Conditions of Contract – as contained in this Tender/ Bid document vide chapter IV First Sheet.

Standard Specifications shall mean "Indian Railways Unified standard specifications (works and materials) Vol –I &II in Tender form (First sheet).

Standard Schedule Items/Rates shall mean the Items/Rates in the Unified standard schedule of rates (works & materials)-2011

All other terms shall have the same meaning as assigned to them in the General Conditions of Contract and Standard Specifications.

Where there is any conflict in conditions/Specifications contained in various parts, order of precedence will be as given below-

Any foot note given by the Railway in the schedule of quantities and rates.

Description of item in the Schedule of Quantities and rates.

Special Specifications.

Additional Special Conditions/of Contract.

Standard Specifications.

Special Conditions of Contract.

General Conditions of Contract.

Where there is any conflict in the description, Unit, rate etc. of items based on USSOR-2011, as included in the "Schedule of items, Quantities and rate " incorporated in the tender/Contract document on the one hand and the USSOR-2011 on the other hand, USSOR-2011 should prevail.

Every endeavour has been made to avoid any error which can materially affect the basis of the Tender and it is understood that the Contractor has taken upon himself and provided for the risk of any error which may be subsequently and shall make no subsequent claim on account thereof.

1.2 PRODUCTION OF TEST CERTIFICATES:

The contractor shall have to produce Test Certificates for any items of material procured by him for use in the work as may be called for by the Engineer or his representative to establish that the materials conform to the specification for the works. The Contractor shall produce Test Certificates issued by an authority acceptable to the Engineer in regard to the relevant properties of high tensile steel wires, reinforcement steel or structural steel (as supplied and used by the Contractor) including the country name of manufacturer).

1.3. PAYMENT OF ROYALTY CHARGES:

All taxes, royalty charges, etc. of whatever nature in connection with the work including extraction and supply of rubble stone/stone ballast/sand/moorum/earth or any other material used on the work shall have to be borne by the Contractor. The Contractor will be required to obtain a royalty clearance certificate from the concerned Revenue Authorities/Collector and produce the same to the Engineer after completion of the supply but before release of the final bill.

1.4. ROYALTIES AND PATENT RIGHTS:

The Contractor shall defray the cost of all royalties, fees and other payments in respect of patents, patent rights and licenses which may be payable to patentee, licensee or other person or corporation and shall obtain all necessary licenses.

The contractor shall indemnify, the Railway or any agent, servant or employee of the Railway against any action, claim or proceedings relating to infringement use of any patent or design any alleged patent or design rights and shall pay any royalties or other charges which may be payable in respect of any articles or materials or part thereof included in the contract. In the event of any claim being made or action being brought against the Railway or any agent, servant or employee of the Railway in respect of any such matters, as aforesaid, the contractor shall indemnify notified thereof. Provided that such indemnify shall not apply when such infringement has taken place in complying with the specific direction issued by the Railway but the contractor shall pay any royalties or other charges payable in respect of any such use.

1.5. INCOME TAX

Income Tax as per rates applicable/amended under the Income Tax Act of work shall be deducted at source unless the contractor is exempted by Income Tax Authorities.

1.6 GST

GST as applicable from time to time on taxable value of each running account bill shall be paid by DFCCIL.

1.7 PERMITS, FEES, TAXES & ROYALTIES

Unless otherwise provided in the contract documents, the contractor shall secure and pay for all permits, Government fees and licenses necessary for the execution and completion of the works. The contractor shall pay all taxes and duties **except GST tax, GST will be paid by DFCCIL as per prevailing rate.**

The DFCCIL authorities will not take any responsibility of refund of such taxes/fees. Any violation, in the legal provision of taxes, duties, permits and fees, carried out by the Contractor and detected subsequently shall be sole responsibility of the Contractor and his legal heirs.

1.8 STATUTORY INCREASE IN DUTIES, TAXES ETC

Tenderers will examine the various provisions of the Central Goods and Service Tax Act, 2017 (CGST)/Integrated Goods and service Tax Act, 2017(IGST)/ Union Territory Goods and service Tax Act, 2017(UTGST)/ respective state's State Goods and Service Tax Act (SGST) also, as notified by Central / State Govt. & as amended from time to time and applicable taxes before bidding. Tenderers will ensure that full benefit of input Tax Credit (ITC) likely to be availed by them is duly considered while quoting rates.

All the taxes and duties levied by the State and Central Govt. and by Local Bodies at the prevailing rates applicable on the date of receipt of tender shall be fully borne by the contractor and shall not be reimbursed to him on any account. The tender shall be inclusive of all taxes levies as mentioned in 1.7 above.

Further **DFCCIL** shall not honour any claim arising out of any increase in any of the prevailing statutory duties, taxes, levies, octroi, etc except GST. At the time of quoting/ bidding contractor should bear the above fact in mind.

The successful tenderer who is liable to be registered under CGST/IGST/UTGST/SGST Act shall submit GSTIN along with other details required under CGST/IGST/UTGST/SGST Act to DFCCIL immediately after the award of contract, without which no payment shall be released to the contractor. The contractor shall be responsible for deposition of applicable GST to the concerned authority.

1.9. EXCISE DUTY OR ANY OTHER TAXES/DUTIES:

The contractor shall bear full excise duty, sales tax and / or any other taxes/ duties levied by State Government and / or Central Government/Local bodies from time to time. This would be entirely a matter between the contractor and the State / Central Government /Local bodies. No claim, what so ever, on this account shall be entertained by DFCCIL.

1.10. ROAD TAX CHARGES:

Road Tax/Charges levied by Government for movement of vehicles of contractor, used in transportation, shall be borne by the contractor and no re-imbursement on this account will be made by the DFCCIL.

1.11. FOREIGN EXCHANGE REQUIREMENTS:

Any demand of foreign exchange for importing of equipment's and materials shall not be accepted.

1.12: EMERGENCY WORKS

In the event of any accident or failure occurring in the execution of work/ arising out of it which in the opinion of the Engineer requires immediate attention, the Railway may bring its own workmen or other agency/agencies to execute or partly execute the necessary work or carry out repairs if the Engineer-in-charge considers that the contractor(s) is/are not in a position to do so in time without giving any notice and charge the cost thereof, to be determined by the Engineer-in-charge, to the contractor.

1.13. CUTTING/UP ROOTING OF TREES:

No extra rate shall be paid for cutting or up-rooting trees but the contractor would be authorised to take away the tree observing the forest laws of the land.

1.14. OBSERVANCE OF BONDED LABOUR SYSTEM (ABOLITION ORDINANCE ACT, 1975):

The "Bonded Labour System (Abolition Ordinance, 1975)" would apply to the present contract. The contractors shall duly observe the provisions thereof.

1.15. JURISDICTION OF COURTS:

If any dispute arises between the parties with respect to this contract, any application or suit shall be instituted only in the court within the local limits of whose jurisdiction,

the CGM / NORTH / MUMBAI / DFCCIL Office is situated and both the parties shall be bound by this clause.

1.16 ANTI PROFITEERING CLAUSE:

The contractor should adhere to anti profiteering provisions as per section 171 of the CGST Act. Where due to change in the rates of GST / Change in law, the contractor gets any credits / benefits, the same shall be passed on to DFCCIL by way of reduction in prices.

2.0 EXTRA SAFETY PRECAUTIONS

2.1 SAFE METHODS:

The Contractor shall at all times, adopt such safe methods of working as will ensure safety of structures, equipment and labour. Safety rules that should be adhered to are given as guidelines in Annexure C. If at any time, the DFCCIL finds the safety arrangements inadequate or method of working unsafe, the Contractor shall take immediate corrective actions as directed by the Engineer's representative. Any directions in the matter shall in no way absolve the Contractor of his sole responsibility to adopt safe working methods. The Contractor is responsible for providing skilled personnel and adequate expert supervision so as to ensure complete safety.

It is the responsibility of the Contractor to ensure safe loading, transportation and unloading of materials and equipment etc. Any loss or damage caused to adjacent Railway property will have to be made good by the contractor at his/their own cost, failing which recoveries shall be effected from the running bill of the contractor as per the Clause No. 46(1) of the General Conditions of Contract.

The liability arising out of accidents, if any, to persons will be met by the contractors and the Railway will not be responsible for any damage or compensation thereof. The contractor shall follow the provisions laid down in Contract Labour Act, 1972.

The contractor shall be entirely responsible for ensuring safety of his labour, vehicles, plant or equipment while working along or near the track and highways and shall programme his working so as not to interfere with the movement of trains and road traffic. No extra payment shall be allowed to the contractor for all safety precautions to be observed during the execution of the work. The cost of all such precautions shall be deemed to be included in the rates for all items of the schedule.

2.2. PRECAUTIONS WHILE WORKING IN THE VICINITY OF TRACK:

2.2.1 The contractor shall not allow any road vehicle belonging to him or his suppliers etc., to ply in railway land next to the running line. If for execution of certain works viz. Earthwork for parallel railway line and supply of ballast for new or existing rail line gauge conversion etc. road vehicles are necessary to be used in railway land next to

the railway line, the contractor shall apply to the engineer incharge for permission giving the type and no. of individual vehicles, names and license particulars of the drivers, location, duration and timings for such work/movement. The engineer-in charge or his authorised representative will personally counsel examine & certify, the road vehicle drivers, contractor's flagmen and supervisor and will give written permission giving names of road vehicle drivers, contractor's flagmen and supervisor to be deployed on the work, location, period and timing of the work. This permission will be subject to the following obligatory conditions:

The road vehicles and drivers will ply only between sunrise and sunset.

Nominated vehicles and drivers will be utilized for work in the presence of at least one flagman and one supervisor certified for such work.

The vehicles shall ply 6m. Clear of track. Any movement/work at less than 6m and upto minimum 3.5 clear of track centre shall be done only in the presence of DFCIL / Railway employee authorised by the Engineer-incharge. No part of the road; vehicle will be allowed at less than 3.5m from track centre. Cost of such railway employee shall be borne by the railway.

The contractor shall remain fully responsible for ensuring safety & in case of any accident, shall bear cost of all damages to this equipment & men and also damages to railway and its passengers.

Semi-permanent fencing as approved by the Railway Engineer should be provided by the contractor at his own cost along the running line at a distance of 3.5 metres from the centreline of the nearest track at work sites where vehicles/machineries are likely to ply close to the track. This fencing should remain in position till the vehicles/machinery are required to work adjacent to running line.

Engineer-incharge may impose any other condition necessary for a particular work or site.

Suitable scaffolds should be provided for workmen for all works that cannot safely be done from the ground or from solid construction except for such short period work as can be done safely from ladders. when a ladder is used an extra labour shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable foot holds and hand-holds shall be provided on the ladder and the ladder shall be given an inclination not steeper than 1/4 to 1 (1/4 horizontal to one vertical).

2.2.3 Scaffolding or staging more than 3.5 meters above the ground or floor, swung or suspended from an overhead support or erected with stationary support shall have a

guard rail properly attached bolted, braced and otherwise secured at least 1 meter high above the floor or platform or staging and extending along the entire length thereof with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

2.2.4 Working platform gangways and stairways should be so constructed that they should not sag unduly or unequally, and where the height of the platform or the gangway or the stairway is more than 3.5 meters above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described in the para above.

2.2.5 Safe means of access shall be provided to all working platform and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 10 metres in length while the width between side rails in swung ladder shall in no case be less than 300 mm for ladders upto and including 3.5 metres in length. For longer ladders this width should be increased by at least 20 mm for each additional metre of length. Uniform steps spacing shall not exceed 300 mm. Adequate precautions shall be taken to prevent danger from electrical equipments. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any persons or the public. The contractor shall provide all necessary fencing and lights to protect the public from accident and shall be bound to bear the expenses of the defense. of every suit, action or other proceeding at Law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any suits, action or proceedings to any such persons or which may with the consent of the contractor be paid to compromise any claim by any such persons.

2.2.6 Demolition: Before any demolition is commenced and also during the process of the work:

All roads and open areas adjacent to the work site shall either be closed or suitably protected;

No electric cable or apparatus which is liable to be a source of danger over a cable or apparatus used by the operator shall remain electrically charged;

All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding;

No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.

All necessary personal safety equipment as considered adequate by the Engineer should be kept available for the use of the persons employed on the site and maintained in a condition suitable for immediate use, and the Contractor should take adequate steps to ensure proper use of equipment by those concerned. In addition, workers employed on mixing asphalted materials, cement and lime mortar shall be provided with protective goggles.

workers engaged in white-washing and mixing or stacking of cement bags or any materials which is injurious to the eyes shall be provided with protective goggles; workers engaged in welding works shall be provided with protective goggles; stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

2.2.7 The contractor shall submit the methodology proposed to be adopted for execution of works for approval of the Railway Engineer with a view to ensure safety of trains, passengers & workers and he shall also ensure the methods and arrangements are actually available at site before start of work and contractor's supervisors and workers have clearly understood the safety aspects and requirements to be adopted / followed while executing the work.

2.2.8 The contractor shall maintain an assurance register at each site, which shall be got signed by both DFCCIL supervisor as well as contractor's supervisor in token of their having understood the safety precautions to be observed at site.

2.2.9 JOINT PROCEDURE ORDER FOR UNDERTAKING DIGGING WORK IN THE VICINITY OF UNDERGROUND SIGNALLING, ELECTRICAL AND TELECOMMUNICATION CABLES.

A	A number of Engineering works in connection with gauge conversion / doubling / third line are in progress on various railways, which require extensive digging work near the running track, in close vicinity of the working S&T cables carrying vital safety circuits as well as electrical cables feeding the power supply to Cabins, ASM room, RRI Cabin, Intermediate Block Huts (IBH) etc. Similarly, S&T organization under open line on construction units under CAO/C are executing various signaling and telecommunication works requiring digging of earth for laying of cables or casting of foundations for the erection of signal posts etc. RailTel are also executing the work of laying of quad cable and OFC on various Railways as a part of sanctioned works for exclusive use of Railways for carrying voice and data i.e. administrative and control communication, PRS, FOIS etc. or shared by RailTel Corporation of India Ltd. On
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	certain sections digging is also required for laying of electrical cable and casting of foundation for the erection of OHE masts by Electrical Deptt. Generally, these works are executed by contractors employed by these organizations.
B	However, while carrying out these works in the vicinity of working signaling, telecommunication and electrical cables, at times, cable cuts take place due to JCB machines working along the track or during the digging work being done by Contractors carrying out the Civil Engineering Works. Similarly, such cable cuts are also resulting due to works undertaken by S&T or Electrical deptts. Such Cable faults results in the failure of vital signaling and telecommunication circuits.
C	Henceforth, the following joint procedure shall be followed by Engineering, Electrical and S&T (and RailTel organization, wherever such works are being done by them) Officers of the respective divisions and by the Construction Organization, while carrying out any digging work near to existing signaling& telecommunication and electrical cables, so that the instances of cable cut due to execution of works can be controlled and minimized.
1	S&T Department (and TailTel, where they have laid the cables) & Electrical Deptts. shall provide a detailed cable route plan showing exact location of cable at an interval of 200m or wherever there is change in alignment so that the same is located easily by the Engineering official/contractor. This cable route plans shall be made available to the DSE/DEN or Dy. CE/C as the case may be by Sr.DSTE/DSTE or Sr.DEE/DEE of the divisions or Dy. CSTE/C or Dy.CEE/C within a reasonable time in duplicate. DSE/DEN or Dy.CE/C or Dy.CEE/C within a reasonable time in duplicate. DSE/DEN or Dy.CE/C will send copies to their field unit i.e. AEN/SE/P.Way& Works.
2	Before taking up any digging activity on a particular work by any agency, Sr.DSTE / DSTE or Sr.DEE/DEE of the section shall be approached in writing by the concerned Engg. or S&T or Electrical officer for permitting to undertake the work. After ensuring that the concerned executing agencies, including the contractor have fully understood the S&T and Electrical cable route plan shall permit the work in writing.
3	After getting the permission from S&T or Electrical Deptt. as the case may be, the relevant portion of the cable route plan shall be attached to the letter through which permission is issued to the contractor by concerned Engg. official for commencement of work and ensuring that the contractors have fully understood the cable route plan and precautions to be taken to prevent damage to the underground cables. The contractor shall be asked to study the cable plan and follow it meticulously to ensure that the safety of the cable is not endangered. Such a provision, including any penalty for default, should form part of agreement also. It is advisable that a suitable post of SE (Sig) or SE (Tele) or SE (Elect) shall be created chargeable to the estimates of doubling / Gauge conversion, who can help engg. agencies in the execution of the work. However basic responsibility will be of the Department executing the work and the Contractor.

4	The SE (P.Way) or SE (Works) shall pass on the information to the concerned SE (Sig) or SE (Tele) or SE (Elect) about the works being taken up by the contractors in their sections at least 3 days in advance of the day of the work. In addition Engineering control shall also be informed by SE (P.Way) or SE (Works), which in turn shall pass on the information to the Test Room / Network Operation Centre of RailTel / TPC / Electrical Control.
5	On receiving the above information, SE (Sig) or SE (Tele) or SE (Elect) shall visit the site on or before the date of taking up the work and issue permission to the contractor to commence the work after checking that adequate precautions have been taken to avoid the damage to the cables. The permission shall be granted within 3 days of submission of such requests.
6	The name of the contractor, his contact telephone number, the nature of the work shall be notified in the Engineering Control as soon as the concerned Engg. official issued the letter authorizing commencement of work to the contractor. Test Room be given a copy and Test Room shall collect any further details from the Engineering Control and shall pass it on to S&T / RailTel& Elect. Officials regularly.
7	In case of works being taken up by the State Government, National Highway Authority etc., the details of the permission given i.e. the nature of work, kilometer etc. be given to the Engineering Control including the contract person's number so that the work can be done in a planned manner. The permission letter shall indicate the contact numbers of Test Room / Network Operations Centre of RailTel / TPC/ Elect. Control.
8	Where the nature of the work taken up by the Engineering department is such that the OFC or other S&T cables or Electrical cables is to be shifted and relocated, notice of minimum one week shall be given so that the Division / RailTel / Construction can plan the works properly for shifting. Such shifting works shall, in addition, for security and integrity of the cables, be supervised by S&T supervisors / TailTel supervisors / Electrical Supervisors.
9	The concerned SE(P.Way), SE(Works / SE(Sig) / SE (Tele) SE (Elect) or RailTel supervisors, supervising the work of the contractor shall ensure that the existing emergency sockets are not damaged in view of their importance in providing communication during accident / emergency.
10	In case of minor nature of works where shifting of cable is not required, in order to prevent damage to the cable, the Engineering Contractor shall take out the S&T or optical fibre cable or Electrical cable carefully from the trench and place it properly alongside at a safe location before starting the earthwork under the supervision of SE (Sig) or SE (Tele) or SE (Electrical). The cable shall be reburied soon after completion of excavation with proper care including placement of the brick over the cable by the concerned S&T supervisors or Electrical Supervisors. However, the work will be charged to the concerned engineering works.

11	In all the sections where major project are to be taken up / going on RailTel / S&T Deptt. shall deploy their official to take preventive / corrective action at site of work.
12	No new OFC/Quad cable shall be laid close to existing track. It shall be laid close to Railway boundary as per extant instructions i.e. 1.0 m from the Railway boundary to the extent possible to avoid any interference with future works (doubling etc). It shall be ensured in the new works of cable laying that the cable route is properly identified with electronic or Concrete markers. Henceforth, wherever cable laying is planned and before undertaking the laying work, the cable route plan of the same shall be got approved from the concerned Sr. DEN or Dy. CE / Constn. to avoid possible damages in future. Such approvals shall be granted within 07 days of submission of the requests.
13	The works of excavating the trench and laying of the cable should proceed in quick succession, leaving a minimum time between the two activities.
14	Any damage caused to OFC/Quad cable or Electrical cable during execution of the work, necessary debit shall be raised on Engineering Department who shall bear the cost of the corrective action.
15	All types of bonds i.e. rail bond, cross bond and structure bond shall be restored by the Contractor with a view to keep the rail voltage low to ensure safety of personnel.
16	Above joint circular shall be applicable for construction as well as open line organization of Engineering, S&T & Electrical.
17	The S&T cable and Electrical cable route plan should be got approved from the concerned Sr. DSTE / DSTE & Sr. DEE / DEE respectively, before undertaking the work and completion cable route plan should be finalized Block section by Block section as soon the work is completed.

2.2.10 FORM FOR ENGINEERING WORK PERMIT (EWP)

1. Name of the Railway Supervisor
2. Location of work
3. Nature of work
4. Agency
5. Machineries deployed
6. Working hours
7. I have personally checked the arrangements of rope barricading, fencing at turning locations, posting of staff by the railway by the Contractor, erection of display boards training of staff, issue of permits to drivers and I am satisfied that it shall be possible to adhere to the standard safety precautions at site as reproduced in the enclosed Annexure 'S' except those indicated in para 8 below. Further I have made all the departmental arrangement require for adherence of safety precautions.

8. In case of following it shall not be possible to adhere to Annexure 'S' provisions as mentioned below.
9. However, in view of Para 8 following extra safety provisions will be taken at site to ensure safety.

Executive/ DFCCIL

Remarks of APM/DFCCIL

Remarks of Dy. CPM/DFCCIL

Based on the above certificate, I hereby permit the above work for a period of _____ days i.e. upto _____.

Dy. CPM/Engg/DFCCIL

Date:

C/- Sr. DSO-BCT, Sr. DEN (N) BCT, AEN concerned Sr. Sectional Engineer (P. Way)
Sectional Engineer, PWM Concerned (with 5 spare copies).

APM/DFCCIL In-Charge

PWI © Safety

CPM/North/DFCCIL

Notes

1. A copy of this permit on issue shall be pasted on the site order book.
2. Each work location shall require separate EWP

ANNEXURE 'C'

1.0 Safety precautions: General

Safe working of contractors: A large number of men and machinery are deployed by the contractors for track renewals, gauge conversions, doublings bridge rebuilding etc. it is therefore essential that adequate safety measures are taken for safety of the trains as well as the work force. The following measures should invariably be adopted.

- i) The contractor shall not start any work without the presence of DFCCIL / Railway supervisor or his representative and contractors supervisor at site.
- ii) Where ever the road vehicles and/or machinery are required to work in the close vicinity of railway line, the work shall be so carried out that there is no infringement to the railway's schedule of dimensions. For this purpose the area where road vehicles and/or machinery are required to ply, shall be demarcated and acknowledged by the Contractor. Special care shall be taken for turning/reversal of road

vehicles/machinery without infringing the running track. Barricading shall be provided wherever justified and feasible as per site conditions.

- iii) The look out and whistle caution orders shall be issued to the trains and speed restrictions imposed where considered necessary. Suitable flagmen/detonators shall be provided where necessary for protection of trains.
- iv) The supervisor/workmen should be counselled about safety measures. A competent certificate to the contractor's supervisor as per proforma annexed shall be issued by APM which will be valid only for the work for which it has been issued.
- v) The unloaded ballast/rails/sleepers/other P. Way materials after unloading along track should be kept clear off moving dimensions and stacked as per the specified heights and distance from the running track.
- vi) Supplementary site specific instructions, wherever considered necessary, shall be issued by the Engineer-in-charge.
- (vii) The Engineer-in-charge shall approve the methodology proposed to be adopted by the contractor, with a view to ensure safety of trains, passengers and workers and he shall also ensure that the methods and arrangements are actually available at site before start of the work and the contractor's supervisors and the workers have clearly understood the safety aspects and requirements to be adopted/followed while executing the work.

There shall be an assurance register kept at each site, which will have to be signed by both, i.e. DFCCIL Supervisor or his representative as well as the contractor's supervisor as a token of their having understood the safety precautions to be observed at site."

2.2.11 Supplementary Precautions for working at site.

- i) A rope having luminous red strip wrapped around it, must be stretched by tying to the OHE masts to indicate the area not to be infringed under any circumstances. The entire area of work should be demarcated by providing rope barricades and sign boards which will enable the workman posted at site and also the lorry drivers to have clear guidelines on movement of vehicles.
- ii) At every 500 mts, locations having adequate space & level for proper turning of vehicles shall be earmarked and a modular, portable 1 Mt. High steel fencing at a distance of 3.5m shall be erected in a length of 20 mts. for turning of vehicles.

- iii) At places of turning of vehicles planned out a safety guard/flagman in special orange colour luminous/reflective uniform shall be posted during execution of the work who shall supervise the turning of vehicles after seeing the movement of trains and shall ensure that under no circumstances the vehicle touches the fencing erected. These safety guards shall also carry Binoculars so as to watch the vehicles/trains from a distance as well for any necessary action by him if need be. Executive/DFCCIL in charge of the work shall ensure that slopes of the nominated places are kept away from the running lines so as to avoid the possibility of any rolling down of vehicles.
- iv) These nominated places shall have the status as of a Station for a run through train and the safety guard/flagman shall stand attentively facing the track and should hold green and red hand signal flags furled up on separate sticks, the green flag in the left hand and red flag in the right hand during day time and a lighted hand signal lamp with white light pointing towards passing trains during night time. If any unsafe condition is noticed on the train he shall attract the attention of Train crew by blowing whistle as well as showing danger or other signal as warranted. At the nominated turning place of each location, a board with text "Vehicle Turning station/W" shall be erected by the safety guard. 'W' indicates the need for whistling by incoming train motorman / driver on the nearest track. In the event of any untoward incident like say a vehicle infringing the track safety guard/flagman shall arrange to stop the train by planting short circuit operating clip and putting detonators, showing red hand signal as in case of obstruction on a track.
- v) At such nominated places temporary "whistle boards" shall be erected so as to invite the attention of Motorman/drivers to whistle when passing such locations.
- vi) At each site where construction vehicles of the contractor are required to ply along the track a patrolman by the Contractor shall be deployed to see that the driver do not have any tendency to come closer to the track and infringe.
- vii) The Drivers/Motormen of trains plying on the nearest track shall be served with caution orders to look out for any obstruction at the places of work that infringes the train movements.
- viii) All the authorized Drivers of the road vehicles/machines shall be given a red flag/ red lamp so that in the event of any obstruction they atleast stop the incoming trains.
- ix) The Executive/DFCCIL incharge shall inspect every site every alternate working day and record his observations in Site order Book clearly indicating if the safety

precautions are being adhered to or not /in case of violation or inadequacy, he shall suspend the work and report to APM / DPM or his Superiors.

- x) APM incharge shall carry out safety inspection once in a week and record his observations in the site order book pointing out deficiencies if any. In case he finds that safety precautions being taken are not as per the Standing procedure order he shall suspend the work and report to Dy. CPM/Engg/DFCCIL and all others as listed in the permit to work.
- xi) Sectional Engineer as well as APM I/C while taking measurements & recording the bill shall certify that all safety precautions stipulated in General/Special conditions of Contract have been followed by the Contractor.
- xii) Dy. CPM/Engg/DFCCIL incharge shall carry out detailed safety inspection once in a month of each site and shall scrutinize site order book in respect of adherence to safety precaution once in a fortnight. It shall be the responsibility of each APM to bring his site order books per bearer once in a fortnight to his Dy. CPM/Engg/DFCCIL incharge & put up to him. Dy. CPM/Engg/DFCCIL I/C must return the site order book the same day so as not to keep the site without site order book for more than a working day.
- xiii) All the contractors shall be given copy of the procedure order so that they in turn drill/train their staff.
- xiv) The Contractor shall not allow any road vehicle (even belonging to him or his suppliers etc.) to ply in railway land next to the running line. If for execution of certain works viz. Earthwork for parallel railway line and supply of ballast for new or existing rail line gauge conversion etc. road vehicles are necessary to be used in railway land next to the railway line, the contractor shall apply to the engineer-in-charge for permission giving the type & no. of individual vehicles, names & licence particulars of the drivers, location, duration & timings for such work/movement. The engineer-in-charge or his authorized representative shall personally check the validity of road vehicles, driving license and counsel, examine & certify, the road vehicle Drivers, contractor's flagmen & supervisor and will give written permission giving names or road vehicle drivers, contractor's flagmen and supervisor to be deployed on the work, stating location, period and timing of the work. This permission will be subject to the following obligatory conditions.
 - a) The road vehicles shall NOT ply between sunset and sunrise and when visibility is impaired due to dust storm/for etc. during day hours.

- b) Nominated vehicles & drivers will be utilized for work in the presence of at least one flagman & one supervisor certified for such work.
 - c) The vehicles shall ply 6 m clear of track. Any movement/work at less than 6 m upto minimum 3.5m clear of track centre, shall be done only in the presence of DFCCIL employee authorized by the Engineer-in-charge. No part of the road vehicle will be allowed at less than 3.5m from track centre.
- XVII) The movement of lorries near the track shall be prohibited during night as well as during day when visibility & adequate protective measures including lighting shall be ensured & specific approval of Dy. Chief Engineer obtained for each such occasion.
- XVIII) Machines and vehicles which are required to move at less than 8 mts. away from the track, it shall be in the presence of railway employee authorized by Engineer-in-charge.
- XIX) The contractor's representative shall be issued a certificate by DPM/APM to the effect that they have acquired sufficient knowledge about the Safety precautions that are needed to be followed while working near the track.

2.2.12 On receiving the application for permit to work through APM/DPM, Dy.CPM/Engg/DFCCIL© shall issue permit to work to the Sectional Engineer.

2.2.13 A copy of the permit to work shall be endorsed to Sr. DSO-BCT Sr.DEN(N), AEN under SR DEN(N) BCT o, Chief Sectional engineer (P. Way) concerned, Sectional Engineer (P. Way) concerned with 5 spare copies.

3.0 Site Lab

3.1 A Field Laboratory shall be set up by the contractor at site. This lab shall have equipment which are required for daily field tastings. All other tests (like material source approval, concrete mix design, Steel Cement etc.) can be carried out at NABL approved lab. The NABL approved Lab as far as possible shall be near to the work location. However, approval of Employer/Employer's Representatives shall be obtained before engaging the NABL lab for testing purpose. The contractor shall be set up a site lab with minimum equipment listed below;

1. IS sieve sets for sieve analysis.
2. 15 X 15 X15 cms cubes minimum 15 nos.

3. Cubes for cement test of 7.09 X 7.09 X cm
4. Vicate apparatus.
5. Cube testing machine of minimum 100 T capacities.
6. Measuring cylinder.
7. Equipement required for field soil testing, sieve analysis etc.

4.0 Disaster management

1.7.7.1 "All the available vehicles and equipment of the contractor can be drafted by the DFC/Railway Administration in case of accidents/natural calamities involving human lives. The payment for such drafting shall be made according to the rates as shall be fixed by the Engineer. However, if the contractor is not satisfied with the decision of the Engineer in this respect he may appeal to the CPM-DFCCIL/Chief Engineer within 30 Days of getting the decision of the Engineer, supported by analysis of the rates claimed. The CPM-DFCCIL/Chief Engineer's decision after hearing both the parties in the matter would be final and binding on the contractor and the Railway."

5.0 Submission of Photographs and Videos:

5.1 The contractor shall arrange to submit three sets of minimum 200 Nos. of photographs of size 5"x7" showing various operations and stages of different activities of the project. The photograph shall be taken for every important activity during execution of work as decided by the Engineer for display and record purpose. In addition, the contractor will submit 3 sets of 2 laminated photographs of size 20"x30". If the photograph as listed above are not submitted then recovery of Rs.75,000/- shall be made from the contractor's bill.

5.2 The successful tenderer will be required to prepare video film (on CDROM) recording of entire construction and edit the same with proper commentary. The same shall cover the whole work in duration of about 2 hours. This film shall pictorially represent the entire work of Linking, Various Execution Stages, CRS Inspection and final completion stages. Two copies of video films (On CDROM) shall be handed over to be Railway along with necessary details, instructions, literature etc. The rate includes cost of such filming. Nothing shall be paid on this account. If the contractor fails to submit the Video Film on CDROM then Rs. 1,00,000/- shall be recovered from bill.

6.0 Special Conditions for working of Road Cranes:

6.1 No machine shall be selected to do any lifting on a specific job until its size and characteristics are considered against the weights, dimensions and lift radii of the heaviest and largest loads.

6.2 The contractor shall ensure that a valid Certificate of Fitness is available before use of Road Cranes.

6.3 Contractor can utilise the services of any competent person as defined in Factories Act, 1948 and approve by Chief Inspector of Factories.

6.4 The laminated photocopies of fitness certificate issued by competent person, the operator's photo, manufacturer's load chart and competency certificate shall always be either kept in the operator cabin or pasted on the visible surface of the lifting appliances.

6.5 All lifting appliances including all parts and gears thereof, whether fixed or movable shall be thoroughly tested and examined by a competent person once at least in every six months or after it has undergone any alterations or repairs liable to affect its strength or stability.

6.6 In addition, it is also advised that for all the works being executed by the Road Cranes, the above stipulations should be checked. These instructions should be strictly observed.

PART- IV

TENDER FORMS (INCLUDING SCHEDULE OF PRICES)

PART- IV

TENDER FORMS

FORM No.	SUBJECT
Form No. 1	Offer Letter
Form No. 2	Tenderer's Credentials
Form No. 2A	Technical Eligibility Criteria Details
Form No. 2B	Financial Eligibility Criteria Details
Form No. 2C	Applicant's Party Information Form
Form No. 3	Summary of Prices
Form No. 4	Schedule of Prices and Total Prices
Form No. 5	Contract Agreement
Form No. 6	Performance Guarantee Bond
Form No. 7	Standing indemnity bond for on account payment.
Form No. 8	ECS / NEFT / RTGS
Form No. 9	Draft MOU for Joint Venture Participation
Form No.10	Draft Agreement for JV
Form No.11	Pro-forma of Participation from each partner of JV
Form No.12	Power of Attorney for authorized signatory of JV Partners
Form No.13	Power of Attorney to lead partner of JV
Form No. 14	Proforma for Time Extension
Form No. 15	Certificate of Fitness
Form No. 16	Proforma of 7 days' Notice
Form No. 17	Proforma of 48 Hours' Notice
Form No. 18	Proforma of Termination Notice
Form No. 19	Format of Bank Guarantee for Mobilisation Advance
Form No. 20	Anti-Profiteering Declaration

FORM No. 1

OFFER LETTER

Tender No. MUM/N/EN/Major/Important Bridges/Package-V, dated 23.04.2019

Name of work - Construction of Major / Important Bridge No. 115, 144, 163, 166, 169, 173, 182 & 192 (Balance Work) between Vaitarna - Bhilad Railway station of Virar – Surat Section of Mumbai Division of Western Railway in connection with Western Dedicated Freight Corridor.

To,
The Managing Director,
DFCCIL,
New Delhi

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda.
- (b) We offer to execute the Works in conformity with the Bidding Documents;
- (c) Our bid shall be valid for a period of 90 days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (d) We have not been blacklisted/banned in accordance with para.1.3.13 (ii)(v)(a) of Preamble and General Instructions to tenderers.
- (e) We are neither Bankrupt/Insolvent nor in the process of winding-up nor there is a case pending before any Court on deadline of submission of the Bid in accordance with para. 1.3.13 (ii) (v) (b) of Preamble and General Instructions to tenderers.
- (f) If our bid is accepted, we commit to obtain a Performance Guarantee in accordance with the Bidding Documents;
- (g) If our bid is accepted, we commit to deploy key equipment and key personnel consistent with the requirements of the work.
- (h) We understand that this bid, together with your written acceptance thereof

included in your notification of award/Letter of Acceptance (LOA), shall constitute a binding contract between us, until a formal contract is prepared and executed; and

- (i) All information, statements and description in this bid are in all respect true, correct and complete to the best of our knowledge and belief and we have not made any tampering or changes in the bidding documents on which the bid is being submitted and if any tampering or changes/incorrect information are detected at any stage, we understand the bid will invite summarily rejection and forfeiture of bid security, the contract will be liable to be terminated along with forfeiture of performance security, even if LOA has been issued.
- (j) We understand that you are not bound to accept the lowest bid or any other bid that you may receive.

Name

In the capacity of

Signed

Duly authorized to sign the Bid for and on behalf of

Date

FORM No. 2

TENDERER'S CREDENTIALS

S. No	Description
1.	For technical experience/competence, give details of similar completed works during the last three financial years (i.e. current Financial year and three previous Financial Years) in the proforma given in Form-2A
2.	For financial capacity and organizational resources, give details of contractual payments received for the last three financial years (i.e current Financial year and three previous financial years) as per audited balance sheet certified by Chartered Accountant in the proforma given in Form-2B
3.	Give constitution of your firm. Attach certified copies of legal documents in support thereof. Form-2C

FORM No. 2A**TECHNICAL ELIGIBILITY CRITERIA DETAILS****Details of the similar works completed (as per Para 1.3.13 (i) of Preamble and General Instructions to Tenderers)**

Similar Contract No.		
Contract Identification		
Award date		
Completion date		
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>
Total Contract Amount (Rs.)		
If member in a JV , specify participation in total Contract amount	<i>[insert a percentage amount]</i>	<i>Total contract amount in Rs.</i>
Employer's Name: Address: Telephone/fax number E-mail:		
Description of the similarity in accordance with Criteria 1.3.13(i)(A)		

The bidder shall attach Certified completion certificates issued by the client duly attested by Notary as per Eligibility Criteria of the tender documents.

Signature of the
Tenderer with Seal

FORM No. 2B**FINANCIAL ELIGIBILITY CRITERIA DETAILS**

Each Bidder or each member of JV must fill in this form separately.

Name of Bidder/JV Partner

Details of contractual payments (Construction only) received during the last three financial years and current financial year

Contractual payments received (Construction only)	
Year	Value of payment received in Rs. (Contract Receipts)
Current Year (2019-2020)	
2018 - 2019	
2017 - 2018	
2016 – 2017	
Total Contractual Payment	

Note: The details should be extracted from the audited balance sheet Certified by the Chartered Accountant or form 16-A issued by the Employer as per clause 1.3.13 of Preamble and General Instructions to Tenderers.

The bidder shall attach necessary documents in support of the above.

Signature of the
Tenderer with Seal

FORM No. 2C

APPLICANT'S PARTY INFORMATION FORM

Applicant name: [insert full name]
Applicant's Party name: [insert full name of Applicant's Party]
Applicant's Party country of registration: [indicate country of registration]
Applicant Party's year of constitution: [indicate year of constitution]
Applicant Party's legal address in country of constitution: [insert street/ number/ town or city/ country]
Applicant Party's authorized representative information Name: [insert full name] Address: [insert street/ number/ town or city/ country] Telephone/Fax numbers: [insert telephone/fax numbers, including country and city codes] E-mail address: [indicate e-mail address]
1. Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above. <input type="checkbox"/> In case of a Government-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and absence of dependent status. 2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Signature of the
Tenderer with Seal

FORM No. 3

SUMMARY OF PRICES

(Summary of Prices has been separately attached in Financial Packet "B")

FORM No. 4

**SCHEDULE -1
SCHEDULE OF PRICES & TOTAL PRICES**

**(Schedule of Prices & Total Prices have been separately attached in
Financial Packet "B").**

**FORM No. 5
SAMPLE**

AGREEMENT

CONTRACT AGREEMENT

THIS AGREEMENT ("Agreement") is made at New Delhi on the ____ day of ____
BETWEEN

(1) Dedicated Freight Corridor Corporation of India Limited, incorporated under the laws of India and having its principal place of business at, Pragati Maidan Metro Station Building Complex, New Delhi, India – 110001 (hereinafter called **'the Employer'**), and ---
-----, a company / corporation / JV incorporated under the laws of -----having its principal place of business at -----
(hereinafter called **"the Contractor"**).

WHEREAS in reference to a call for Tender for Construction of Construction of ____ nos ROBs (excluding/including approaches) in lieu of level crossings for LC No. _____ as per Tender paper _____ at Annexure "A" here to, the Contractor has submitted a Tender hereto and whereas the said Tender of the contractor has been accepted for Construction of ____ nos ROBs (excluding/including approaches) in lieu of level crossings for LC No. _____.

as per copy of the Letter of Acceptance of Tender No----- dated ----_complete with enclosure at the accepted rates and at an estimated contract value of Rs._____(Rupees _only). Now the agreement with witnesseth to that in consideration of the premises and the payment to be made by the Employer to the Contractor provided for herein below the Contractor shall supply all equipments and materials and execute and perform all works for which the said Tender of the Contractor has been accepted, strictly according to the various provisions in Annexure 'A' and 'B' hereto and upon such supply, execution and performance to the satisfaction of the Purchaser, the Purchaser shall pay to the contractor at the several rates accepted as per the said Annexure 'B' and in terms of the provisions therein.

IN WITNESS WHEREOF the parties hereto have caused their respective Common Seals to be hereunto affixed/ (or have hereunto set their respective hands and seals) the day and year first above written.

For and on behalf of the Contractor

For and on behalf of the Employer

Signature of the authorized official

Signature of the authorized official

Name of the official

Name of the official

Stamp/seal of the Contractor

Stamp/Seal of the Employer

SIGNED, SEALED AND DELIVERED

By the said

By the said

_____ Name

_____ Name

on behalf of the Contractor in the
presence of: _____

on behalf of the Employer in the
presence of: _____

Witness _____

Witness _____

Name _____

Name _____

Address _____

Address _____

Enclosures:-

1. Annexure 'A' - Tender Papers No.
2. Annexure 'B' - Letter of Acceptance of Tender No. _____ Dated _____
along with Summary of Prices

FORM No. 6

SAMPLE

Name of the Bank _____

Managing Director/ DFCCIL Bank Guarantee Bond No. _____

Acting through _____ (Designation Dated _____ and address of contract signing authority)

PERFORMANCE GUARANTEE BOND

In consideration of the Managing Director/ DFCCIL acting through _____ (Designation & Address of Contract Signing Authority), Dedicated Freight Corridor Corporation of India Limited, New Delhi hereinafter called "DFCCIL") having agreed under the ~~terms~~ and conditions of agreement/Contract Acceptance letter No. _____ dated made between _____ (Designation & address of contract signing Authority) and _____ (hereinafter called "the said contractor(s)" for the work _____ (hereinafter called "the said agreement") having agreed for submission of a irrevocable Bank Guarantee Bond for Rs. _____ (Rs. ____ only) as a performance security Guarantee Bond from the contractor(s) for compliance of his obligations in accordance with the terms & conditions in the said agreement.

1. We _ (indicate the name of the Bank) hereinafter referred to as the Bank, undertake to pay to the Government an amount not exceeding Rs. ____ (Rs. ____ only) on demand by the Government.
2. We _____ (indicate the name of the bank, further agree that (and promise) to pay the amounts due and payable under this guarantee without any demur merely on a demand from the Government through the GROUP GENERAL MANAGER/ FINANCE Dedicated Freight Corridor Corporation of India Limited, New Delhi or ____ (Designation & Address of contract signing authority) DFCCIL, stating that the amount claimed is due by way of loss or damage caused to or would be caused or suffered by the Government by reason of any breach by the said contractor of any of the terms or conditions contained in the said agreement or by reason of the contractor failure to perform the said agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____ (Rs. _____ only)
- 3 (a) We, _____ (indicate the name of Bank) further undertake to pay to the Government any money so demanded notwithstanding any dispute or dispute raised by the contractor (s) in any suit or proceeding pending before any court or

- Tribunal relating to liability under this present being absolute and unequivocal.
- (b) The payment so made by us under this bond shall be valid discharge of our liability for payment there under and the contractor(s) shall have no claim against us for making such payment.
4. We, _____ (indicate the name of bank) to further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged by _____(Designation & Address of contract signing authority) on behalf of the Government, certify that the terms and conditions of the said agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee.
5. (a) Notwithstanding any thing to the contrary contained herein the liability of the bank under this guarantee will remain in force and effect until such time as this guarantee is discharged in writing by the Government or until (date of validity/extended validity) whichever is earlier and no claim shall be valid under this guarantee unless notice in writing thereof is given by the Government within validity / extended period of validity of guarantee from the date aforesaid.
- (b) Provided always that we _____(indicate the name of the Bank) unconditionally undertakes to renew this guarantee to extend the period of guarantee form year to year before the expiry of the period or the extended period of the guarantee, as the case may be on being called upon to do so by the Government. If the guarantee is not renewed or the period extended on demand, we _____(indicate the name of the Bank) shall pay the Government the full amount guarantee on demand and without demur.
6. We, _____ (indicate the name of Bank) further agree with the Government that the Government shall have the fullest liberty without our consent and without effecting in any manner out of obligations hereunder to vary any of the terms and conditions of the said contract from time to time or to postpone for any time or from time to time any to the powers exercisable by the Government against the said contractor (s) and to forbear or enforce any of the terms and conditions of the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said contractor (s) or for any bearance act or omission on the part of the Government or any indulgence by the Government to the said contractor (s) or by any such matter or thing whatsoever which under the

law relating to sureties for the said reservation would relive us from the liability.

7. This guarantee will not be discharged by any change in the constitution of the Bank or the Contractor (s).
8. We, _____(indicate the name of the Bank) lastly undertake not to revoke this guarantee except with the previous consent of the Government in writing.
9. This guarantee shall be valid upto _____(Date of completion plus 60 days beyond that). Unless extended on demand by Government. Notwithstanding anything to the contrary contained herein before, our liability under this guarantee is restricted to Rs. _____ (Rs.

_____only) unless a demand under this guarantee is made on us in writing on or before _____ we, shall be discharged from our liabilities under this guarantee thereafter.

Dated _____ the day of _____ for
_____(indicate the name of bank)

Signature of Bank Authorize official
(Name):
Designation:
Full Address.

Witness:

1. _____

2. _____

FORM No. 7

**SAMPLE
STANDING INDEMNITY BOND FOR “ON ACCOUNT” PAYMENTS**

(On paper of requisite stamp value)

We, M/s _____ hereby undertake that we hold at our stores Depot/s at _____ for and on behalf of the Managing Director/ DFCCIL acting in the premises through the Chief Project Manager /North/Mumbai/ DFCCIL or his successor (hereinafter referred to as “The Employer”) all materials for which “On Account” payments have been made to us against the Contract for (_____) on the section _____ DFCCIL also referred to as Group/s _____ vide letter of Acceptance of Tender _____ dated _____ and _____ material handed over to us by the employer for the purpose of execution of the said contract, until such time the materials are duly erected or otherwise handed over to him.

We shall be entirely responsible for the safe custody and protection of the said materials against all risk till they are duly delivered as erected equipment to the employer or as he may direct otherwise and shall indemnify the employer against any loss /damage or deterioration whatsoever in respect of the said material while in our possession and against disposal of surplus materials. The said materials shall at all times be open to inspection by any officer authorized by the Chief Project Manager/North/Mumbai/DFCCIL in charge of Dedicated Freight Corridor Corporation of India Limited (Whose address will be intimated in due course).

Should any loss, damage or deterioration of materials occur or surplus material disposed off and refund becomes due, the Employer shall be entitled to recover from us the 85% of supply portion of Part IV, Chapter – II (Form - 4) to the Contract (as applicable) and also compensation for such loss or damage if any long with the amount to be refunded without prejudice to any other remedies available to him by deduction from any sum due or any sum which at any time hereafter becomes due to us under the said or any other Contract.

Dated this day ____ day of _____ 2016
for and on behalf of
M/s _____ (Contractor)
Signature of witness
Name of witness in Block letter.

Address.

FORM No. 8**ECS / NEFT / RTGS
MANDATE FORM**

Date :-

To,

GM (F) / GGM (F)

DFCCIL, New Delhi.

Sub : ECS / NEFT / RTGS payments

We refer to the ECS / NEFT / RTGS set up by DFCCIL for remittance of our payments using RBI's NEFT / RTGS scheme, our payments may be made through the above scheme to our under noted account.

Name of Bank	
Name of City	
Bank Code No	
Name of Bank Branch	
Branch Code No	
Address of Bank Branch	
Telephone Number of Bank Branch	
Fax No of Bank Branch	
Name of customer / Tenderer as per account	
Account Number of Tenderer appearing on cheque book	
Type of Account (S. B. / Current / Cash credit)	
IFSC code for NEFT	
IFSC code for RTGS	
9-Digit-code number of the bank and branch appearing on the MICR cheque issued by the bank.	
Details of Cancelled Cheque leaf	
Telephone no of tenderer	
Cell Phone Number of the tenderer to whom details with regard to the status of bill submitted to Accounts Office i.e Co6 & Co7 & Cheque Purchase Orders particulars can be intimated through SMS	
Tenderer's E - mail ID	

Confirmed by Bank signature of tenderer With stamp and address
Enclose a copy of crossed cheque

FORM No. 9

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

M/s having its registered office at (hereinafter referred to as) acting as the Lead Partner of the first part,

and

M/s having its registered office at (hereinafter referred to as `.....') in the capacity of a Joint Partner of the other part.

and

M/s having its registered office at (hereinafter referred to as `.....') in the capacity of a Joint Partner of the other part.

The expressions of and shall wherever the context admits, mean and include their respective legal representatives, successors-in-interest and assigns and shall collectively be referred to as "the Parties" and individually as " the Party"

WHEREAS:

Dedicated Freight Corridor Corporation of India Limited (DFCCIL) [hereinafter referred to as "Client"] has invited bids for ... "[Insert name of work]....."

NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. The following documents shall be deemed to form and be read and construed as an integral part of this MOU.
 - (i) Notice for Bid, and
 - (ii) Bidding document
 - (iii) Any Addendum/Corrigendum issued by Dedicated Freight Corridor Corporation of India Limited
 - (iv) The bid submitted on our behalf jointly by the Lead Partner.
2. The `Parties' have studied the documents and have agreed to participate in submitting a `bid' jointly.
3. M/s shall be the lead member of the JV for all intents and purpose and shall represent the Joint Venture in its dealing with the Client. For the purpose of submission of bid proposals, the parties agree to nominate as the leader duly authorized to sign and submit all documents and subsequent clarifications, if any, to the Client. However M/s shall not submit any such proposals, clarifications or commitments before securing the written clearance of the other partner which shall be expeditiously given by M/s.....to M/s.....
4. The `Parties' have resolved that the distribution of responsibilities and their proportionate share in the Joint Venture is as under:
 - (a) Lead Partner;
 - (i)

(ii)

(iii)

(b) Joint Venture Partner

(i)

(ii)

(iii)

[Similar details to be given for each partner]

5. JOINT AND SEVERAL RESPONSIBILITY

The Parties undertake that they shall be jointly and severally liable to the Client in the discharge of all the obligations and liabilities as per the contract with the Client and for the performance of contract awarded to their JV.

6. ASSIGNMENT AND THIRD PARTIES

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

7. EXECUTIVE AUTHORITY

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

8. BID SECURITIES

Till the award of the work, JV firm/Lead Partner of JV firm shall furnish Bid Security to the Client on behalf of the joint venture which shall be legally binding on all the members of the Joint Venture.

9. BID SUBMISSION

Each Party shall bear its own cost and expenses for preparation and submission of the bid and all costs until conclusion of a contract with the Client for the Project. Common expenses shall be shared by all the parties in the ratio of their actual participation.

10. INDEMNITY

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

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

12. DOCUMENTS & CONFIDENTIALITY

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

13. ARBITRATION

Any dispute, controversy or claim arising out of or relating to this agreement shall be settled in the first instance amicably between the parties. If an amicable settlement cannot be reached as above, it will be settled by arbitration in accordance with the Indian Arbitration and Conciliation Act 1996 or any amendments thereof. The venue of the arbitration shall be Delhi.

14. VALIDITY

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

- a. The bid submitted by the Joint Venture is declared unsuccessful, or
- b. Cancellation/ shelving of the Project by the client for any reasons prior to award of work
- c. Execution of detailed JV agreement by the parties, setting out detailed terms after award of work by the Client.

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

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

17. NOTICES

Notices shall be given in writing by fax confirmed by registered mail or commercial courier to the following fax numbers and addresses:

Lead Partner

Other Partner(s)

.....
(Name & Address)

.....
(Name & Address)

IN WITNESS WHEREOF THE PARTIES, have executed this MOU the day, month and year first before written.

M/s.....

M/s.....

.....
(Seal)

.....
(Seal)

Witness

1.....(Name & Address)

2..... (Name & Address)

Notes: (1) In case of existing joint venture, the certified copy of JV Agreement may be furnished.

FORM No. 10

DRAFT FORMAT OF JOINT VENTURE AGREEMENT

To be executed on non-judicial stamp paper of appropriate value in accordance with relevant Stamp Act and to be registered with appropriate authority under Registration Act.

The JV agreement shall be structured generally as per contents list given below:

A. CONDITIONS AND TERMS OF JV AGREEMENT

1. Definitions and Interpretation
2. Joint Venture – Include Equity of members, transferability of shareholding of equity of a partner leaving during the subsistence of the contract.
3. Proposal Submission
4. Performance – To indicate scope of responsibility of each member
5. Language and Law
6. Exclusively
7. Executive Authority
8. Documents
9. Personnel
10. Assignment and Third Parties
11. Severability
12. Member in Default
13. Duration of the Agreement
14. Liability and sharing of risks
15. Insurance
16. Sharing of Promotion and Project Costs, Profits, Losses and Remuneration
17. Financial Administration and Accounting
18. Guarantees and Bonds
19. Arbitration
20. Notices
21. Sole Agreement and Variation

B. SCHEDULES

1. Project and Agreement Particulars
2. Financial Administration Services
3. Allocation of the obligations
4. Financial Policy and Remuneration

FORM No. 11

PRO-FORMA LETTER OF PARTICIPATION FROM EACH PARTNER OF JOINT VENTURE (JV)

(To be executed on non-judicial stamp paper of appropriate value in accordance with relevant Stamp Act and to be registered with appropriate authority under Registration Act.)

No....

Dated

From:

.....
.....

To,
The Managing Director,
Dedicated Freight Corridor Corporation of India Limited
Pragati Maidan Metro Stn. Building Complex.,
New Delhi 110001.

Gentlemen,

Re: ...*"[Insert name of work]....."*

Ref: Your notice for Invitation for Bid No. _____
dated

1. We wish to confirm that our company/firm has formed a Joint Venture with(i)..... & ii)..... for the purposes associated with IFB referred to above.

(Members who are not the lead partner of the JV should add the following paragraph).*

2. 'The JV is led by ... whom we hereby authorise to act on our behalf for the purposes of submission of Bid for and authorise to incur liabilities and receive instructions for and on behalf of any and all the partners or constituents of the Joint Venture.'

OR

*(Member(s) being the lead member of the group should add the following paragraph)**

2. 'In this group we act as leader and, for the purposes of applying for Bid, represent the Joint Venture:
3. In the event of our JV being awarded the contract, we agree to be jointly with i)

& ii) (names of other members of our JV) and severally liable to the Dedicated Freight Corridor Corporation of India Limited, its successors and assigns for all obligations, duties and responsibilities arising from or imposed by the contract subsequently entered into between Dedicated Freight Corridor Corporation of India Limited and our JV.

4. ***I/We, further agree that entire execution of the contract shall be carried out exclusively through the lead partner.**

Yours faithfully,

(Signature)

(Name of Signatory).....

(Capacity of Signatory).....

Company Seal * Delete as applicable

Note : In case of existing joint venture, the certified copy of JV Agreement may be furnished.

FORM No. 12

**FORMAT FOR POWER OF ATTORNEY FOR AUTHORISED SIGNATORY OF
JOINT VENTURE (JV) PARTNERS**

POWER OF ATTORNEY*

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

Know all men by these presents, we ... do hereby constitute, appoint and
authorise Mr/Ms. who is presently employed with us and holding the position ofas
our attorney, to do in our name and on our behalf, all such acts, deeds and things
necessary in connection with or incidental to our bid for the work of
... Including signing and submission of all documents and providing information /
responses to Dedicated Freight Corridor Corporation of India Limited , representing us in
all matters, dealing with Dedicated Freight Corridor Corporation of India Limited in all
matters in connection with our bid for the said project.

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

Dated this the day of 2017.

(Signature of authorised Signatory)

Signature of Lead Partner

Signature of JV Partner(s)

.....
(Signature and Name in Block letters of Signatory)
Seal of Company

Witness

Witness 1:

Name:

Address:

Occupation:

Witness 2:

Name:

Address:

Occupation:

***Notes:**

- i) To be executed by all the partners jointly, in case of a Joint Venture.

FORM No. 13

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

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

POWER OF ATTORNEY*

Whereas Dedicated Freight Corridor Corporation of India Limited has invited Bids for the work of "Construction of Major / Important Bridge No. 115, 144, 163, 166, 169, 173, 182 & 192 (Balance Work) between Vaitarna - Bhilad Railway station of Virar – Surat Section of Mumbai Division of Western Railway in connection with Western Dedicated Freight Corridor."

Whereas, the members of the Joint Venture comprising of M/s. ..., M/s. ..., M/s., and M/s. are interested in submission of bid for the work of ...*[Insert name of work]*... in accordance with the terms and conditions contained in the bidding documents.

Whereas, it is necessary for the members of the Joint Venture to designate one of them as the Lead Partner, with all necessary power and authority to do, for and on behalf of the Joint Venture, all acts, deeds and things as may be necessary in connection with the Joint Venture's bid for the project, as may be necessary in connection the Joint Venture's bid for the project.

NOW THIS POWER OF ATTORNEY WITNESSETH THAT:

We, M/s., hereby designate M/s., being one of the partners of the Joint Venture, as the lead partner of the Joint Venture, to do on behalf of the Joint Venture, all or any of the acts, deeds or things necessary or incidental to the Joint Venture's bid for the contract, including submission of bid, participating in conferences, responding to queries, submission of information/ documents and generally to represent the Joint Venture in all its dealings with the DFCCIL or any other Government Agency or any person, in connection with the Bid/contract for the said work until culmination of the process of bidding till the contract agreement if successful, is entered into with the Dedicated Freight Corridor Corporation of India Limited and thereafter till the expiry of the contract agreement.

*To be executed by all the members of the JV except the lead member.

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

We hereby agree to ratify all acts, deeds and things lawfully done by lead member, our said attorney, pursuant to this power of attorney and that all acts deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us/ Joint Venture.

Dated this the Day of 2017

.....
(Signature)

.....
(Name in Block letters of Executants)
Seal of Company

Witness 1	
Name:	
Address:	
Occupation:	
Witness 2	
Name:	
Address:	
Occupation:	

FORM No. 14

Registered Acknowledgement Due

PROFORMA FOR TIME EXTENSION

No. _____ Dated : _____

Sub : (i) _____ (name of work).

(ii) Acceptance letter no. _____

(iii) Understanding/Agreement no. _____

Ref: _____ (Quote specific application of Contractor for extension to the date received) _____

Dear Sir,

1. The stipulated date for completion of the work mentioned above is _____. From the progress made so far and the present rate of progress, it is unlikely that the work will be completed by the above date (or 'However, the work was not completed on this date').
2. Expecting that you may be able to complete the work, if some more time is given, the competent authority, although not bound to do so, hereby extends the time for completion from _____ to _____.
3. Please note that an amount equal to the liquidated damages for delay in the completion of the work after the expiry of _____ (give here the stipulated date for completion with/without any penalty fixed earlier) will be recovered from you as mentioned in Clause, 17-B of the Standard General Conditions of Contract for the extended period, notwithstanding the grant of this extension. You may proceed with the work accordingly.
4. The above extension of the completion date will also be subject to the further condition that no increase in rates on any account will be payable to you.
5. Please intimate within a week of the receipt of this letter your acceptance of the extension of the conditions stated above.

6. Please note that in the event of your declining to accept the extension on the above said conditions or in the event of your failure after accepting or acting upto this extension to complete the work by _____ (here mention the extended date), further action will be taken in terms of Clause 62 of the Standard General Conditions of Contract.

Yours faithfully

For and on behalf of the Employer

Name of the Official:-

Stamp/Seal of the Employer

FORM No. 15

CERTIFICATE OF FITNESS

1. (a) Serial Number _____
(b) Date _____
2. Name of person examined _____
I certify that I have personally examined (*name*) _____
3. Father's Name: son/daughter of _____ ,
residing at _____
4. Sex _____
5. Residence: _____
6. Date of birth, if available, and/or certified age _____
7. Physical fitness _____
8. Identification marks _____
9. Reasons for:
(a) refusal to grant certificate, or _____
(b) revoking the Certificate _____

Who is desirous of being employed in a factory or on a work requiring manual labour and that his / her age as nearly as can be ascertained from my examination, is _____ years and that he/she is fit for employment in a factory or on a work requiring manual labour as an adult/child.

Signature or Left Hand
Thumb Impression of the
person Examined

Signature of Certifying Surgeon

Note : In case of physical disability, the exact details of the cause of the physical disability should be clearly stated

FORM No. 16
Registered Acknowledgement Due

PROFORMA OF 7 DAYS NOTICE
DFCCIL
(Without Prejudice)

To
M/s _____

Dear Sir,

Contract Agreement No. _____
In connection with _____

1. In spite of repeated instructions to you by the subordinate offices as well as by this office in various letters of even no. _____, dated _____; you have failed to start work/show adequate progress and/or submit detailed programme for completing the work.
2. Your attention is invited to this office/Chief Engineer's office letter no. _____, dated _____ in reference to your representation, dated _____.
3. As you have failed to abide by the instructions issued to commence the work/to show adequate progress of work you are hereby given 7 days' notice in accordance with Clause 62 of Standard General Conditions of Contract to commence works / to make good the progress, failing which further action as provided in Clause 62 of the Standard General Conditions of Contract viz. to terminate your Contract and complete the balance work without your participation will be taken.

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the Employer
Name of the Official:-
Stamp/Seal of the Employer

FORM No. 17

Registered Acknowledgement Due

PROFORMA OF 48 HRS. NOTICE
DFCCIL
(Without Prejudice)

To

M/s _____

Dear Sir,

Contract Agreement No. _____
In connection with _____

1. Seven days' notice under Clause 62 of Standard General Conditions of Contract was given to you under this office letter of even no., dated _____; but you have taken no action to commence the work/show adequate progress of the work.
2. You are hereby given 48 hours' notice in terms of Clause 62 of Standard General Conditions of Contract to commence works / to make good the progress of works, failing which and on expiry of this period your above contract will stand rescinded and the work under this contract will be carried out independently without your participation and your Security Deposit shall be forfeited and Performance Guarantee shall also be encashed and consequences which may please be noted.

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the
Employer

Name of the Official:-
Stamp/Seal of the Employer

FORM No. 18
Registered Acknowledgement Due

PROFORMA OF TERMINATION NOTICE
DFCCIL
(Without Prejudice)

No. _____ Dated _____

To
M/s _____

Dear Sir,

Contract Agreement No. _____
In connection with _____

Forty eight hours (48 hrs.) notice was given to you under this office letter of even no., dated _____; but you have taken no action to commence the work/show adequate progress of the work.

Since the period of 48 hours' notice has already expired, the above contract stands rescinded in terms of Clause 62 of Standard General Conditions of Contract and the balance work under this contract will be carried out independently without your participation. Your participation as well as participation of every member/partner in any manner as an individual or a partnership firm/JV is hereby debarred from participation in the tender for executing the balance work and your Security Deposit shall be forfeited and Performance Guarantee shall also be encashed.

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the Employer
Name of the Official:-
Stamp/Seal of the Employer

FORM No. 19

**SAMPLE
FORMAT OF BANK GUARANTEE FOR MOBILISATION ADVANCE**

(Clause 1.5.20, Part - I, Chapter - V)

Bank guarantee made on this Between (hereinafter called "**the Bank**") of the One Part and Dedicated Freight Corridor Corporation of India Limited. (hereinafter called "**the Employer**") of the other Part.

WHEREAS Dedicated Freight Corridor Corporation of India Limited has awarded the Contract no..... for "....." (hereinafter called "**the Contractor**"), having its registered office at

AND WHEREAS vide Clause 1.5.20 of Part - I, Chapter V, Special Conditions of Contract, Mobilization Advance up to ____% (____ percent) of the original contract value of Rs..... is payable to the contractor against Bank Guarantees, the contractor hereby applies for Mobilization Advance of ____% (____ percent) amounting to Rs...../- (Rupees.....) of the Contract Price,

Now, we the undersigned, Bank of, being fully authorized to sign and to incur obligations for and on behalf of and in the name of Bank ofhereby declare that the said Bank will guarantee the Employer the full amount of Rs.-/- (Rupees.....) as stated above.

We, Bank of, do hereby unconditionally, irrevocably and without demur guarantee and undertake to pay the Employer immediately on demand any or all money payable by the contractor to the extent of Rs.-/- (Rupees.....) without any demur, reservation, context, recourse or protest and/or without any reference to the contractor. Any such demand made by the Employer on the Bank shall be conclusive and binding notwithstanding any difference between the Employer and the contractor on any dispute pending before any court, Tribunal, Arbitrator or any other authority. We agree that the guarantee herein contained shall be irrevocable and shall continue to be enforceable till the Employer discharges this guarantee.

This guarantee is valid till
.....

At any time during the period in which this guarantee still valid of the contractor fails to fulfil its obligation under the Contract, it is understood that the Bank will extend this guarantee under the same condition for the required time on demand by the Employer at the cost of the contractor.

The Guarantee hereinbefore contained shall not be affected by any change in the constitution of the Bank or of the contractor.

The neglect or forbearance of the Employer in enforcement of payment of any money, the payment whereof is intended to be hereby secured or the giving of time by the Employer for the payment hereof shall in no way relieve the Bank of their liability under this Deed.

The expressions "the Employer", "the Bank" and "the contractor" hereinbefore used shall include their respective successors and assigns.

Notwithstanding anything contained herein:

Our liability under this Bank Guarantee shall not exceed Rs...../-
(Rupees.....)

this bank Guarantee shall be valid up to.....

We are liable to pay the guaranteed 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(date of expiry of Guarantee).

In witness whereof we of the Bank have signed and sealed this Guarantee on theday of being herewith duly authorized.

For and on behalf of the Bank of

Signature of Authorized Bank Official

Name
Designation
Stamp/Seal of the bank
Signed, sealed and delivered for and on
Behalf of the bank by the above named

..... in the presence of

Witness 1
Signature
Name
Address
Witness 2
Signature
Name
Address

FORM No. 20

SAMPLE
ANTI-PROFITEERING DECLARATION TO WHOMSOEVER IT MAY CONCERN

TO WHOMSOEVER IT MAY CONCERN

I, resident of solemnly affirm and state as under:

- 1) That I am the Authorised Signatory of and I/we am/are duly authorized to furnish this undertaking/declaration on behalf of (Name of the company).
- 2) That (Name of the company) has been awarded the work (Name of Work) vide Letter of Award number by M/s Dedicated Freight Corridor Corporation of India Limited.
- 3) That the Company is fully aware of the anti-profiteering provision under the Goods & Services Tax ("GST") Law(s),
- 4) That the Company has passed the benefit of input tax credit available on the Goods/Services (good/services) having HSN supplied to M/s Dedicated Freight Corridor Corporation of India Limited which it is getting on account of reduced tax liability and input tax credit because of enactment of GST Laws after introduction of Goods and Service Tax w.e.f. 1st July, 2017. The details and amounts being passed on to DFCCIL are provided in Annexure "A" of this document and are as per applicable GST Laws. These are true and correct to the best of my knowledge, information and belief.
- 5) Further, it is to confirm also that in case (name of the organization) will receive any further benefit in future after 1st July, 2017 by way of availment of input tax credits which were not allowed to be availed before 1st July, 2017 or reduction in tax rates or in any other manner which results in reduction of cost of the goods/services supplied to M/s Dedicated Freight Corridor Corporation of India Limited, then Company will pass that benefit to M/s Dedicated Freight Corridor Corporation of India Limited also
- 6) That I declare that the foregoing is true and correct and the same is a legal obligation and failure to fulfil it could result in penalties under the law.
- 7) I confirm that I am aware of the implication of the above undertaking and our liability on account of incorrect/misleading declaration under the GST Laws.

Signature of the Authorised signatory/ person
Name and Designation of the Auth. Sign/person of the person
Name of the Organization and Seal

PART V

DRAWINGS

5.0 General Arrangement Drawings with Key Plan:

5.1 Bridge No. 115 (6.665 + 6.640 + 6.665 m RCC Box) at KM 82/6-8

Sr. no.	Drawing Title	Drawing No.
1	GAD of Br. No. 115 (6.665 + 6.640 + 6.665 m RCC Box) at KM 82/6-8 on Taki River.	SOMA-DFCC-115-C-1001
2	Dimension Details of Box Culvert	SOMA-DFCC-115-C-1201
3	Dimension Details of Wing Wall and Return Wall for Abutment 'A1' (Sheet 1 of 2)	SOMA-DFCC-115-C-1251
4	Dimension Details of Wing Wall and Return Wall for Abutment 'A1' (Sheet 2 of 2)	SOMA-DFCC-115-C-1252
5	Dimension Details of Return Wall for Abutment 'A2' (Sheet 1 of 2)	SOMA-DFCC-115-C-1253
6	Dimension Details of Return Wall for Abutment 'A1' (Sheet 2 of 2)	SOMA-DFCC-115-C-1254
7	Reinforcement Details of Wing Wall & Return Wall	SOMA-DFCC-115-C-1271
8	Reinforcement Details of Return Wall – Abutment 'A2'	SOMA-DFCC-115-C-1272
9	Reinforcement Details of Box Culvert (Sheet 1 of 2)	SOMA-DFCC-115-C-1401
10	Reinforcement Details of Box Culvert (Sheet 2 of 2)	SOMA-DFCC-115-C-1402

5.2 Bridge No. 144 (3x14.14 m PSC I-Girder) at KM 99/24-26

Sr. no.	Drawing Title	Drawing No.
1	GAD of Br. No. 144 (3x14.14 m PSC I-Girder) at KM 99/24-26 on Juhi River	SOMA-DFCC-144-C-1001

5.3 Bridge No. 163 (3x19.0 m PSC Girder) at KM 113/22-26

Sr. no.	Drawing Title	Drawing No.
1	GAD of Br. No. 163 (3x19.0 m PSC Girder) at KM 113/22-26 on Kapsee River.	SOMA-DFCC-163-C-1001
2	Pile Layout and Pile Reinforcement for Piers P1 to P2	SOMA-DFCC-163-C-1101
3	Pile Layout and Pile Reinforcement for Abutment 'A1' and Abutment 'A2'	SOMA-DFCC-163-C-1102
4	Reinforcement Detail of Pile Cap for Pier P1 and P2	SOMA-DFCC-163-C-1106

5	Reinforcement Detail of Pier P1 and P2	SOMA-DFCC-163-C-1111
6	Dimension Detail of Abutment 'A1' & 'A2'	SOMA-DFCC-163-C-1201
7	Reinforcement Detail of Abutment 'A1' & 'A2' (Sheet 1 of 2)	SOMA-DFCC-163-C-1206
8	Reinforcement Detail of Abutment 'A1' & 'A2' (Sheet 2 of 2)	SOMA-DFCC-163-C-1207
9	Toe Wall towards W.R. Side for Abutment 'A1' & 'A2'	SOMA-DFCC-163-C-1291
10	Reinforcement for End Bearing Test Pile & Bore Data	SOMA-DFCC-163-C-1751

5.4 Bridge No. 166 (3x19.0 m PSC Box Girder) at KM 118/2-4

Sr. no.	Drawing Title	Drawing No.
1	GAD of Br. No. 166 (3x19.0 m PSC Box Girder) at KM 118/2-4 on Dandi River.	SOMA-DFCC-166-C-1001
2	Pile Layout and Pile Reinforcement for Abutment 'A1' and Abutment 'A2'	SOMA-DFCC-166-C-1101
3	Pile Layout and Pile Reinforcement for Piers P1 to P2	SOMA-DFCC-166-C-1102
4	Reinforcement Detail of Pile Cap for Pier P1 and P2	SOMA-DFCC-166-C-1106
5	Reinforcement Detail of Pier P1 and P2	SOMA-DFCC-166-C-1111
6	Dimension Detail of Abutment 'A1' & 'A2'	SOMA-DFCC-166-C-1201
7	Reinforcement Detail of Abutment 'A1' & 'A2' (Sheet 1 of 2)	SOMA-DFCC-166-C-1206
8	Reinforcement Detail of Abutment 'A1' & 'A2' (Sheet 2 of 2)	SOMA-DFCC-166-C-1207
9	Toe Wall towards W.R. Side for Abutment 'A1' & 'A2'	SOMA-DFCC-166-C-1291
10	Reinforcement for End Bearing Test Pile & Bore Data	SOMA-DFCC-166-C-1751
11	Details of Test Pile for Abutment 'A2'	SOMA-DFCC-166-C-1752

5.5 Bridge No. 169 (4x19.8 m PSC Box Girder)

Sr. no.	Drawing Title	Drawing No.
1	GAD of Br. No. 169 (4x19.8 m PSC Box Girder) on Diversion on River	SOMA-DFCC-169-C-1001
2	Embankment Section for Bridge no. 169	SOMA-DFCC-169-E-01
3	Dimension Details of Open Foundation for Pier P1, P2 & P3	SOMA-DFCC-169-C-1101

4	Reinforcement Details of Open Foundation for Pier P1, P2 & P3	SOMA-DFCC-169-C-1102
5	Reinforcement Detail of Pier for Pier P1, P2 & P3	SOMA-DFCC-169-C-1111
6	Dimension Detail of Abutment 'A2'	SOMA-DFCC-169-C-1201
7	Dimension Detail of Abutment 'A1'	SOMA-DFCC-169-C-1202
8	Reinforcement Detail of Abutment 'A1' & 'A2' (Sheet 1 of 2)	SOMA-DFCC-169-C-1208
9	Reinforcement Detail of Abutment 'A1' & 'A2' (Sheet 2 of 2)	SOMA-DFCC-169-C-1209
10	Dimension Detail of Wing Wall towards Abutment 'A1' & 'A2'	SOMA-DFCC-169-C-1251
11	Reinforcement Detail of Wing Wall towards Abutment 'A1' & 'A2'	SOMA-DFCC-169-C-1271

5.6 Bridge No. 173 (5x14.20 m PSC I-Girder)

Sr. no.	Drawing Title	Drawing No.
1	GAD of Br. No. 173 (5x14.20 m PSC I-Girder) on Diversion on Ban Khadi River	SOMA-DFCC-173-C-1001
2	Dimension Details of Open Foundation for Pier P1 to P4	SOMA-DFCC-173-C-1101
3	Reinforcement Details of Open Foundation for Pier P1 to P4	SOMA-DFCC-173-C-1106
4	Reinforcement Detail of Pier P1 to P4	SOMA-DFCC-173-C-1111
5	Dimension Detail of Abutment 'A1'	SOMA-DFCC-173-C-1201
6	Dimension Detail of Abutment 'A2'	SOMA-DFCC-173-C-1202
7	Reinforcement Detail of Abutment 'A1' & 'A2' (Sheet 1 of 2)	SOMA-DFCC-173-C-1206
8	Reinforcement Detail of Abutment 'A1' & 'A2' (Sheet 2 of 2)	SOMA-DFCC-173-C-1207
9	Dimension Detail of Wing Wall for Abutment 'A1' & 'A2'	SOMA-DFCC-173-C-1251
10	Reinforcement Detail of Wing Wall towards Abutment 'A1' & 'A2'	SOMA-DFCC-173-C-1271

5.7 Bridge No. 182 (1x19.8 m PSC Box Girder) at KM 127/24-26

Sr. no.	Drawing Title	Drawing No.
1	GAD of Br. No. 182 (1x19.8 m PSC Box Girder) at KM 127/24-26 on Dhobi Khadi	SOMA-DFCC-182-C-1001
2	Embankment Section for Br. No. 182	SOMA-DFCC-182-E-01

3	Dimension Detail of Abutment 'A1'	SOMA-DFCC-182-C-1201
4	Dimension Detail of Abutment 'A2'	SOMA-DFCC-182-C-1202
5	Reinforcement Detail of Abutment 'A1' & 'A2' (Sheet 1 of 2)	SOMA-DFCC-182-C-1206
6	Reinforcement Detail of Abutment 'A1' & 'A2' (Sheet 2 of 2)	SOMA-DFCC-182-C-1207
7	Dimension Detail of Wing Wall towards Abutment 'A1' & 'A2'	SOMA-DFCC-182-C-1251
8	Reinforcement Detail of Wing Wall towards Abutment 'A1' & 'A2'	SOMA-DFCC-182-C-1271

5.8 Bridge No. 192 (2x19.8 m PSC Box Girder) at KM 113/18-20

Sr. no.	Drawing Title	Drawing No.
1	GAD of Br. No. 192 (2x19.8 m PSC Box Girder) at KM 113/18-20 on Gholvad River	SOMA-DFCC-192-C-1001
2	Embankment section for Br. No. 192	SOMA-DFCC-192-E-01
3	Dimension Details of Open Foundation for Pier P1	SOMA-DFCC-192-C-1102
4	Reinforcement Details of Open Foundation for Pier P1	SOMA-DFCC-192-C-1106
5	Reinforcement Detail of Pier P1	SOMA-DFCC-192-C-1111
6	Dimension Detail of Abutment 'A1'	SOMA-DFCC-192-C-1201
7	Dimension Detail of Abutment 'A2'	SOMA-DFCC-192-C-1202
8	Reinforcement Detail of Abutment 'A1' & 'A2' (Sheet 1 of 2)	SOMA-DFCC-192-C-1206
9	Reinforcement Detail of Abutment 'A1' & 'A2' (Sheet 2 of 2)	SOMA-DFCC-192-C-1207
10	Dimension Detail of Splay Type Wing Wall for Abutment 'A1' & 'A2'	SOMA-DFCC-192-C-1251
11	Dimension Details of Wing Wall Towards W.R. for Abutment 'A1' & 'A2'	SOMA-DFCC-192-C-1252
12	Reinforcement Details of Wing Wall for Abutment 'A1' & 'A2'	SOMA-DFCC-192-C-1271

5.9 Common Drawings:

SN	Drawing Title	Drawing No.
01	Details of Handrail, Ballast Retainer wall, foot path, slab & drainage spout for PSC box girder	DFCC DRG No : SURAT/DFC /D/WC-ST/MB-330/2012
02	Details of Transition system & back filling behind Abutment	DFCC DRG No : SURAT/DFC /D/WC-ST/MB-188/2011
03	Reinforcement detail of Pedestals & stoppers	DFCC DRG No : SURAT/DFC /D/WC-ST/MB-03/2011

04	Details of Elastomeric bearing for PSC box girder	DFCC DRG No : SURAT/DFC /D/WC-ST/MB-99/2011
05	Detail of 35 Ton Vertical Elastomeric Bearing Type B (for Transverse Stopper)	PP-SOMA-DFCC-BOX 35 TON Type_B_R2
06	Detail of 40 Ton Vertical Elastomeric Bearing Type A (for Longitudinal Stopper)	PP-SOMA-DFCC-BOX 40 TON Type_A_R2
07	Dimension Details of PSC Box Girder for span 19.00m (c/c of pier) (Sheet 1 of 2)	SOMA-DFCC-CD-C-2103
08	Dimension Details of PSC Box Girder for span 19.00m (c/c of pier) (Sheet 2 of 2)	SOMA-DFCC-CD-C-2104
09	Reinforcement details of Box Girder Diaphragm for span 19.00m (c/c of pier) (Sheet 1 of 2)	SOMA-DFCC-CD-C-2115
10	Reinforcement details of Box Girder Diaphragm for span 19.00m (c/c of pier) (Sheet 2 of 2)	SOMA-DFCC-CD-C-2116
11	Reinforcement details of Box Girder for span 19.00 m (c/c of pier)	SOMA-DFCC-CD-C-2114
12	Prestressing detail of PSC Box (Span 19.00m) (Sheet 1 of 2)	SOMA-DFCC-CD-C-1503
13	Prestressing detail of PSC Box (Span 19.00m) (Sheet 2 of 2)	SOMA-DFCC-CD-C-1504

Notes:

1. General Arrangement Drawings of Major / Important Bridges are attached as a part of tender document.
2. These GADs are indicative and for reference only.
3. The work shall be done as per final / detailed drawings.

END OF TENDER DOCUMENTS
