

**SOUTH EAST CENTRAL RAILWAY
(CONSTRUCTION ORGANISATION)**

TENDER DOCUMENT

Name of the work:-“Execution of Boring, Casting of RCC Piles and Lateral Load Testing of Piles in Major Br. No. 06, 54, 59 and 66 and other miscellaneous allied works in BSP-SKT section in connection with BSP-JSG 4th line.”

TENDER NOTICE NO. : [CAO-C-BSP-26-27-10 Dated: 12.06.2026]

[Open Tender with Single Packet System]

DATE AND TIME OF CLOSING OF TENDER BID :[07.07.2026, 15:00]

TOP SHEET

TENDER NOTICE NO: CAO-C-BSP-26-27-10**Dated: 12.06.2026****(Open e-Tender with Single Packet System)**

Name of the work:- “Execution of Boring, Casting of RCC Piles and Lateral Load Testing of Piles in Major Br. No. 06, 54, 59 and 66 and other miscellaneous allied works in BSP-SKT section in connection with BSP-JSG 4th line.”

Approx Tender Value	Rs. 85,44,635.99
Earnest Money/Bid Security	Rs. 1,70,900.00
Cost of Tender Document	NIL
Period of completion	[03 months]
Tender closing date and time	At 15.00 Hrs on [07.07.2026]
Tender Opening Date	At 15.30 Hrs on [07.07.2026]

Note:

- 1.0.E-Tender forms are non-transferable and the same is to be submitted with digital signature by the tenderer already registered with the site.
- 2.0 The submitted e-tender will be considered as digitally signed by the tenderer as a confirmation from the tenderer that the tenderer has read, agreed and accepted all the conditions under laid down documents as well as Schedule of Tender, General and Special Conditions.
- 3.0 *Inclusion of “Letter of Credit” as Mode of Payment in Works Tenders or Service Tenders, is applicable to this tender and copy of the same is uploaded in IREPS Portal. (Ref to Rly Boards Lr.No.- 2018/CE-I/CT/9 dated 04.06.2018).*

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TENDER NOTICE No.CAO-C-BSP-26-27-10,Dated:12.06.2026

Open e-Tenders are invited on behalf of the President of India, for execution of the following works from the intending contractors who fulfils the following eligibility criteria for the works as detailed below.

Name of work	Approximate value (Rs.)	Earnest money (Rs.)	Tender closing date& time	Completion period
“Execution of Boring, Casting of RCC Piles and Lateral Load Testing of Piles in Major Br. No. 06, 54, 59 and 66 and other miscellaneous allied works in BSP-SKT section in connection with BSP-JSG 4th line.”	Rs. 85,44,635.99	Rs. 1,70,900.00	At 15.00 Hrs on 07.07.2026	03months

1.0 Eligibility Criteria:**1.1 Technical Eligibility Criteria:**

Technical criterion: The tenderer must have successfully completed or substantially completed any one of the following categories of work(s) during last 07 (seven) years, ending last day of month previous to the one in which tender is invited:

- Three similar works each costing not less than the amount equal to 30% of advertised value of the tender.
- OR
- Two similar works each costing not less than the amount equal to 40% of advertised value of the tender,
- OR
- One similar work costing not less than the amount equal to 60% of advertised value of the tender,

*Similar work for the purpose of eligibility criteria under 1.1 above shall mean: "**Any Civil Engineering Work**"*

Note for item-1.1:

(i) Substantially completed work means an ongoing work in which payment equal to or more than 90% of the present contract value (excluding the payment made for adjustment of Price Variation (PVC), if any) has been made to the contractor in that ongoing contract and no proceedings of termination of contract on Contractor's default has been initiated. The credential certificate in this regard should have been issued not prior to 60 days of date of invitation of present tender.

(ii) Work experience certificate from private individual shall not be considered. However, in addition to work experience certificates issued by any Government Organisation, work

experience certificate issued by Public Listed Company having average annual turnover of Rs.500 Crore and above in last three financial years excluding the current financial year, listed on National Stock Exchange or Bombay Stock Exchange, incorporated/ registered at least 5 years prior to the date of closing of tender, shall also be considered provided the work experience certificate has been issued by a person authorized by the Public listed Company to issue such certificates.

In case tenderer submits work experience certificate issued by public listed company, the tenderer shall also submit along with work experience certificate, the relevant copy of work order, bill of quantities, bill wise details of payment received duly certified by Chartered Accountant, TDS certificates for all payments received and copy of final/last bill paid by company in support of above work experience certificate.

(iii) The responsibility of proving the eligibility for the work as per tender conditions lies with the bidders along with providing unambiguous documents/certificates in confirmation to eligibility criteria with bid. Only Experience given by Tenderer in Annexure-A will be evaluated for Technical Eligibility. No other document will be taken cognizance.

Offers submitted by Joint Venture are NOT permitted.

1.2 Financial Eligibility Criterion: The tenderer must have minimum average annual contractual turnover of 'V/N' or 'V' whichever is less; where

V=Advertised value of the tender in Crores of Rupees.

N=Number of years prescribed for completion of work for which bids have been invited.

The average annual contractual turnover shall be calculated as an average of "total contractual payments" in the previous three financial years, as per the audited balance sheet. However, in case balance sheet of the previous year is yet to be prepared/audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover.

The tenderer shall submit requisite information as per Annexure-IV, along with copies of Audited Balance Sheets duly certified by the Chartered Accountant/Certificate from Chartered Accountant duly supported by Audited Balance Sheet.

1.3. Bid Capacity [NOT APPLICABLE]:

NOTE:- Date of inviting tender shall be the date of publishing tender notice on IREPS website.

1.4 Credentials if submitted in foreign currency shall be converted into Indian currency i.e., Indian Rupee as under:

The conversion rate of US Dollars into Rupees shall be the daily representative exchange rates published by the Reserve Bank of India or entity authorized by RBI to do so for the relevant date or immediately previous date for which rates have been published. Where, relevant date shall be as on the last day of month previous to the one in which tender is invited. In case of any other currency, the same shall first be converted to US Dollars as on the last day of month previous to the one in which tender is invited, and the amount so derived in US Dollars shall be converted into Rupees at the aforesaid rate. The conversion rate of such currencies shall be the daily representative exchange rates published by the

International Monetary Fund for the relevant date or immediately previous date for which rates have been published.

Explanation for clause 1 including clause-1.1 to 1.4 - Eligibility Criteria:

1. Substantially completed work means an ongoing work in which payment equal to or more than 90% of the present contract value {excluding the payment made for adjustment of Price Variation (PVC), if any} has been made to the contractor in that ongoing contract and no proceedings of termination of contract on Contractor's default has been initiated. The credential certificate in this regard should have been issued not prior to 60 days of date of invitation of present tender.
2. *In case a work is started prior to 07 (seven) years, ending last day of month previous to the one in which tender is invited, but completed in last 07 (seven) years, ending last day of month previous to the one in which tender is invited, the completed work shall be considered for fulfillment of credentials.*
3. *If a work is physically completed and completion certificate to this extent is issued by the concerned organization but final bill is pending, such work shall be considered for fulfillment of credentials.*
4. *In case of completed work, the value of final bill (gross amount) including the PVC amount (if paid) shall be considered as the completion cost of work. In case final bill is pending, only the total gross amount already paid including the PVC amount (if paid) shall be considered as the completion cost of work.
In case of substantially completed work, the total gross amount already paid including the PVC amount (if paid), as mentioned in the certificate, shall be considered as the cost of substantially completed work.*
5. *If a bidder has successfully completed a work as subcontractor and the work experience certificate has been issued for such work to the subcontractor by a Govt. Organization or Public listed company as defined in Note for item-1.1 above, the same shall be considered for the purpose of fulfillment of credentials.*
6. *In case a work is considered similar in nature for fulfillment of technical credentials, the overall cost including the PVC amount (if paid) of that completed work or substantially completed work, shall be considered and no separate evaluation for each component of that work shall be made to decide eligibility.*
7. *In case of newly formed partnership firm, the credentials of individual partners from previous propriety firm(s) or dissolved previous partnership firm(s) or split previous partnership firm(s), shall be considered only to the extent of their share in previous entity on the date of dissolution / split and their share in newly formed partnership firm. For example, a partner A had 30% share in previous entity and his share in present partnership firm is 20%. In the present tender under consideration, the credentials of partner A will be considered to the extent of $0.3 \times 0.2 \times \text{value of the work done in the previous entity}$. For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No.(s) in case of dissolution of partnership firm(s) etc.*
8. *In case of existing partnership firm, if any one or more partners quit the partnership firm, the credentials of remaining partnership firm shall be re-worked out i.e., the quitting partner(s) shall take away his credentials to the extent of his share on the date of quitting the partnership firm (e.g. in a partnership firm of partners A, B & C having*

share 30%, 30% & 40% respectively and credentials of Rs.10 crore; in case partner C quits the firm, the credentials of this partnership firm shall remain as Rs.6 crore). For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No.(s) in case of dissolution of partnership firm(s) etc.

- 9. In case of existing partnership firm if any new partner(s) joins the firm, without any modification in the name and PAN/TAN No of the firm, the credentials of partnership firm shall get enhanced to the extent of credentials of newly added partner(s) on the same principles as mentioned in item-6 above. For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deeds, dissolution/splitting deeds and proof of surrender of PAN No.(s) in case of dissolution of partnership firm etc.*
- 10. Any partner in a partnership firm cannot use or claim his credentials in any other firm without leaving the partnership firm i.e., In a partnership firm of A&B partners, A or B partner cannot use credentials of partnership firm of A&B partners in any other partnership firm or propriety firm without leaving partnership firm of A&B partners.*
- 11. In case a partner in a partnership firm is replaced due to succession as per succession law, the proportion of credentials of the previous partner will be passed on to the successor.*
- 12. If the percentage share among partners of a partnership firm is changed, but the partners remain the same, the credentials of the firm before such modification in the share will continue to be considered for the firm as it is without any change in their value. Further, in case a partner of partnership firm retires without taking away any credentials from the firm, the credentials of partnership firm shall remain the same as it is without any change in their value.*
- 13. In a partnership firm "AB" of A&B partners, in case A also works as propriety firm "P" or partner in some other partnership firm "AX", credentials of A in propriety firm "P" or in other partnership firm "AX" earned after the date of becoming a partner of the firm AB shall not be added in partnership firm "AB".*
- 14. In case a tenderer is LLP, the credentials of tenderer shall be worked out on above lines similar to a partnership firm.*
- 15. In case company 'A' is merged with company 'B', then company 'B' would get the credentials of company 'A' also.*

2. Tenderer Credentials:

Documents testifying tenderer previous experience and financial status should be produced along with the tender.

Tenderer(s) who is / are not borne on the approved list of the Contractors of South East Central Railway (Construction organization) shall submit along with his / their tender:

- (i)** Certificates and testimonials regarding contracting experience for the type of job for which tender is invited with list of works carried out in the past.
- (ii)** Audited Balance Sheet duly certified by the Chartered Accountant regarding contractual payments received in the past.
- (iii)** The list of personnel / organization on hand and proposed to be engaged for the tendered work. Similarly list of Plant & Machinery available on hand and proposed to be inducted and hired for the tendered work.

- (iv) A copy of certificate stating that they are not liable to be disqualified and all their statements/documents submitted along with deed are true and factual. Standard format of the certificate to be submitted by the bidder is enclosed as **Annexure-V and V(A)**. Non submission of a certificate by the bidder shall result in **Summarily Rejection** of his/their bid. It shall be mandatorily incumbent upon the tenderer to identify, state and submit the supporting documents duly self-attested/digitally signed by which they/he are/is qualifying the Qualifying Criteria mentioned in the Tender Document.
- (v) The Railway reserves the right to verify all statements, information and documents submitted by the bidder in his tender offer, and the bidder shall, when so required by the Railway, make available all such information, evidence and documents as may be necessary for such verification. Any such verification or lack of such verification, by the Railway shall not relieve the bidder of its obligations or liabilities hereunder nor will it affect any rights of the Railway there under.
- (vi) (a) In case of any information submitted by tenderer is found to be false forged or incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the tender Bid Security besides banning of business for a period of upto two years.
- (b) In case of any information submitted by tenderer is found to be false forged or incorrect after the award of contract, the contract shall be terminated. Bid Security, Performance Guarantee and Security Deposit available with the railway shall be forfeited. In addition, other dues of the contractor, if any, under this contract shall be forfeited and agency shall be banned for doing business for a period of upto two years.
- (vii) Declaration or An undertaking from the tenderer(s) that he is not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India from participation in tender on the date of opening of bids, either in individual capacity or as a member of the partnership firm or JV in which he or JV in which HUF was / is a partner/member. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause-62 of the General Conditions of Contract.
- (viii) PAN Card details- copy of PAN Card to be submitted.
- (ix) Bank A/c details of the tenderer(s):- Any payment to the contractor/tenderer including releasing of the EMD of un-successful tenderer(s) will be done through electronic transfer for which the tenderer/contractor must furnish the following details-

Sl. No.	Items	Details to be Furnished
1.	Name of the Account Holder	
2.	Name of the Bank	
3.	Branch of Bank and full address	
4.	Account Number as appearing in the Cheque Book	
5.	RTGS/IFSC Code	
6.	Account Type (i.e. Current or Saving)	

3.Bid Security: Tender must be accompanied with Bid Security of requisite amount as mentioned in NIT deposited through Internet Banking or e-payment gateway only or

submitted as Bank Guarantee bond (Format enclosed) from a Scheduled commercial bank of India. The Bank Guarantee shall be valid for a period of 90 days beyond the bid validity period. The scanned copies of the instruments are to be uploaded with tender document. Tenders not accompanied by requisite amount of Bid Security in acceptable form, will be '**Summarily Rejected**' and no correspondence what-so-ever will be entertained on this account. In case, submission of Bid Security in the form of Bank Guarantee, following shall be ensured:

- (i) **A scanned copy of the Bank Guarantee shall be uploaded on e-Procurement Portal (IREPS) while applying to the tender.**
- (ii) **The original Bank Guarantee should be delivered in person to Dispatch & Receipt section of the office of Chief Administrative Officer/Con/Bilaspur, Nirman Bhawan, Railway Settlement, Bilaspur before closing date for submission of bids i.e. upto 18.00 Hrs on 06.07.2026 (i.e. excluding the last date of submission of bids) [One working day before date of submission of bids].**
- (iii) **Non submission of scanned copy of Bank Guarantee with the bid on e-tendering portal (IREPS) and/or non submission of original Bank Guarantee within the specified period shall lead to 'Summarily Rejection' of bid.**
- (iv) **The Tender Security shall remain valid for a period of 90 days beyond the validity period for the tender.**
- (v) **The details of the BG physically submitted should match with the details available in the scanned copy and the data entered during bid submission time, failing which the bid will be rejected.**
- (vi) **The Bank Guarantee shall be placed in an envelope, which shall be sealed. The envelope shall clearly bear the identification "Bid For the.....[Name of work]" and shall clearly indicate the name and address of the bidder. In addition, the bid due date should be indicated on the Right Hand Top Corner of the envelope.**
- (vii) **The envelope shall be addressed to the officer and address as mentioned in the tender document [Dy. CE/Con-I/SECR/Bilaspur, Office of the Chief Administrative Officer(Con)/SECR/Bilaspur, Nirman Bhawan, In front of Little Bunny School, Railway Settlement, Bilaspur, Chhattisgarh-495004 Phone: 9752440218 E mail: dycecon1secrbasp@gmail.com].**
- (viii) **If the envelope is not sealed and marked as instructed above, the Railway assumes no responsibility for the misplacement or pre mature opening of the contents of the bid submitted and consequent losses, if any, suffered by the bidders.**

NOTE:-

- (i) **The Bid Security shall be rounded-off to the nearest ₹100. This Bid Security shall be applicable for all modes of tendering.**
- (ii) **Any firm recognized by Department of Industrial Policy and Promotion (DIPP) as 'Startups' shall be exempted from payment of Bid Security, as detailed above, on submission of Registration Certificate issued by appropriate authority.**
- (iii) **Labour Cooperative Societies shall submit only 50% of above Bid Security detailed above.**

- (iv) **Any other firms including MSME/NSIC registered firms, Government owned PSU (Public Sector Undertakings) shall have to deposit the requisite amount of Bid Security for this instant tender.**

4.0 Documents mentioned & as required to be submitted with the offer which have been detailed in Chapter-I of the tender document.

5.0The last date and time of submission tender: Upto 15:00 hours on 07.07.2026.

6.0Date and time of opening of technical bid: At 15:30 hrs on 07.07.2026.

7.0Price variation clause : Price variation clause (PVC) will **NOT** be applicable under this contract. (*As per Cl. 46A of Part-II of GCC April 2022*)

CHAPTER-I
DETAILS OF DOCUMENTS TO BE SUBMITTED ALONG WITH OFFER
(Tenderers are requested to read the following carefully)

For documents to be uploaded with tender offer, the tenderer(s) must read the NIT and instructions to tenderers in detail. For ready reference a concise listing of documents to be submitted along with offer are as under. However, these are not exhaustive and all document/certificate as detailed in the Tender Document and Indian Railway Standard General Conditions of Contracts, April-2022 should be submitted along with the offer duly mentioning the Annexure No. vide which it has been submitted.

Sl. No.	Item	To be mentioned by the tenderer as his Annexure No. (Annexure numbering by the tenderer as annexures attached with the offer to be same for that Annexures mentioned in this tender document).
1.0	Documents in support of eligibility criteria:	
(a)	Document in support of Technical Criteria: Completion/substantially completion certificate/certificates of similar nature of works (similar nature as defined in the NIT) completed in last seven years (ending last day of month previous to the one in which tender is invited). The certificate should be issued by the competent authority authorised by the concerned Organization, which will in general includes (i) Scope of works in details, (ii) date of award, (iii) completion period as per original agreement, (iv) actual date of completion, (v) value of work as per original agreement/revised sanctioned value if any, (vi) value of completed works etc. (vii) Final bill prepared or not; final bill paid or not and if paid then what was the amount etc. (viii) Work experience certificate for similar nature of work is also to be submitted with/supported by the Letter of Acceptance (LOA)/Contract Agreement duly enclosing the tender schedules for the said work claiming as similar nature of work in view of work experience certificate.	Annexure
(a). (i)	In case of Partnership firm, for evaluation of technical eligibility following legal documents are to be submitted in terms of <i>Explanation note for</i>	Annexure

	<i>clause-10 including clause 10.1 to 10.5 - Eligibility Criteria of GCC-2022: “The tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No.(s) in case of dissolution of partnership firm(s) etc. (Refer sub-clause-6 to 14 of clause-10 of GCC-2022).</i>	
(b)	The tenderer(s) having work experience certificate issued by Public listed company following documents must have been enclosed along with offer, otherwise the particular work experience certificate issued by Public listed company will not be considered as valid and no further correspondence will be made in this regard:	
(i)	Proof of having average annual turnover of Rs.500 crore and above in the last three financial years excluding the current financial year by Public listed company who have issued the work done certificate.	Annexure
(ii)	Proof regarding listing of the Public listed company on National Stock Exchange or Bombay Stock Exchange, incorporated/registered at least 5 years prior to the date of opening of tender.	Annexure
(iii)	Authorization of the person authorized by the Public listed company to issue such certificates.	Annexure
(iv)	Along with the work experience certificate, the tenderer must have submit, the relevant copy of work order, bill of quantities, bill wise details of payment received duly certified by Chartered Accountant, TDS Certificates for all payments received and copy of final/last bill paid by company in support of above work experience certificate.	Annexure
(c)	Document in support of Financial Eligibility Criteria: The tenderers shall submit requisite information as per Annexure-IV , along with copies of Audited Balance Sheet duly certified by the Chartered Accountant/Certificate from Chartered Accountant duly supported by Audited Balance sheet.	Annexure
(d)	Document in support of Bid Capacity as per format given in Annexure-III& ANNEXURE VI of tender document duly verified by Chartered Accountant.	Annexure
2.0	Bid Security / Earnest Money Deposit (EMD):	
3.0	Certificate as per Annexure-V and V(A) of Tender Document.	Annexure
4.0	Documents to be enclosed by Joint Venture firm along with tender in terms of clause-14 of Chapter-IX of this tender document.	Annexure

5.0	Documents as prescribed vide clause-14 and 15 of Indian Railway Standard General Conditions of Contracts, April-2022– Part-I. Clause-14 & 15 of GCC-2022 are reproduced below:	
6.1	Documents to be submitted along with Tender (Clause-14 of GCC-2022):	
(i)	The tenderer shall clearly specify whether the tender is submitted on his own (Proprietary Firm) or on behalf of a Partnership Firm / Company / Joint Venture (JV) /Registered Society / Registered Trust/Hindu Undivided Family (HUF) / Limited Liability Partnership (LLP) etc. The tenderer(s) shall enclose the attested copies of the constitution of their concern and copy of PAN Card along with their tender. Tender Documents in such cases are to be signed by such persons as may be legally competent to sign them on behalf of the firm, company, association, trust or society, as the case may be.	
(ii)	Following documents shall be submitted by the tenderer:	
(a)	Sole Proprietorship Firm: (i) All documents in terms of Para-10 of the Tender Form (Second Sheet) of GCC-2022.	Annexure
(b)	HUF: (i) A copy of notarized affidavit on Stamp Paper declaring that he who is submitting the tender on behalf of HUF is in the position of ‘Karta’ of Hindu Undivided Family (HUF) and he has the authority, power and consent given by other members to act on behalf of HUF. (ii) All documents in terms of para-10 of the Tender Form (Second Sheet) of GCC-2022.	Annexure Annexure
(c)	Partnership Firm: The tenderer shall submit documents as mentioned in clause-18 of the Tender Form (Second Sheet) of GCC-2022. (i) The Partnership Firms participating in the tender should be legally valid under the provisions of the Indian Partnership Act. (ii) The partnership firm should have been in existence or should have been formed prior to submission of tender. Partnership firm should have either been registered with the Registrar or the Partnership deed should have been notarized prior to date of tender opening as per the Indian Partnership Act. (iii) The tenderer shall submit all documents as mentioned in para-18 of the Tender Form (Second Sheet) of GCC-2022. (v) A notarized copy of partnership deed or a copy of	Annexure Annexure Annexure Annexure Annexure

	the Partnership deed registered with the Registrar. (vi) A notarized or registered copy of Power of Attorney in favour of the individual to tender for the work, sign the agreement etc and create liability against the firm (if not covered in the Partnership deed).	
(d)	<p>(i) Joint Venture (JV): The tenderer shall submit documents as mentioned in para-17 of the Tender Form (Second Sheet) of GCC-2022.</p> <p>(ii) An undertaking that all the Members of JV are not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India from participation in tender/contract on the date of opening of bids, either in individual capacity or in any firm/LLP in which they were/are partners/members, as a member of the JV in which they were/are members. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause-62 of the General Conditions of Contract.</p>	<p>Annexure</p> <p>Annexure</p>
(e)	<p>Company registered under Companies Act'2013:</p> <p>(i) The copies of MOA (Memorandum of Association) / AOA (Articles of Association) of the company.</p> <p>(ii) A copy of Certificate of Incorporation</p> <p>(iii) A copy of Authorization/Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favour of the individual to sign the tender on behalf of the company and create liability against the company.</p> <p>(iv) All other documents in terms of explanatory notes in clause-10 of the Tender Form (Second Sheet) of GCC-2022.</p>	<p>Annexure</p> <p>Annexure</p> <p>Annexure</p> <p>Annexure</p>
(f)	<p>LLP (Limited Liability Partnership):</p> <p>If the tender is submitted on behalf of a LLP registered under LLP Act-2008, the tenderer shall submit along with the tender:</p> <p>(i) A copy of LLP Agreement.</p> <p>(ii) A copy of Certificate of Incorporation.</p> <p>(iii) A copy of Power of Attorney/Authorization issued by the LLP in favour of the individual to sign the tender on behalf of the LLP and create liability against the LLP.</p> <p>(iv) An undertaking by all partners of the LLP that they are not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India from participation in tenders/contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP or in JV in which they were/are partners/ members. Concealment / wrong information in regard to</p>	<p>Annexure</p> <p>Annexure</p> <p>Annexure</p> <p>Annexure</p>

	<p>above shall make the contract liable for determination under Clause-62 of the Standard General Conditions of Contract.</p> <p>(v) All other documents in terms of explanatory notes in para-10 of the Tender Form (Second Sheet) of GCC-2022.</p>	Annexure
(g)	<p>Registered Society & Registered Trust: The tenderer shall submit:</p> <p>(i) A copy of the Certificate of Registration.</p> <p>(ii) A copy of Memorandum of Association of Society/Trust Deed.</p> <p>(iii) A copy of Power of Attorney in favour of the individual to sign the tender documents and create liability against the Society/Trust.</p> <p>(iv) A copy of Rules & Regulations of the Society.</p> <p>(v) All other documents in terms of explanatory notes in para-10 of the Tender Form (Second Sheet) of GCC-2022.</p>	<p>Annexure</p> <p>Annexure</p> <p>Annexure</p> <p>Annexure</p> <p>Annexure</p>
	<p>Note:</p> <p>(i) If it is NOT mentioned in the submitted tender that tender is being submitted on behalf of 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.</p> <p>(ii) After opening of the tender, any document pertaining to the constitution of Sole Proprietorship Firm / Partnership Firm / Registered Company/ Registered Trust / Registered Society / HUF/LLP etc. shall be neither asked nor considered, if submitted. Further, no suo-moto cognizance of any document available in public domain (i.e., on internet etc.) or in Railway's record/office files etc. will be taken for consideration of the tender, if no such mention is available in tender offer submitted.</p> <p>(iii) A tender from JV / Partnership firm etc. shall be considered only where permissible as per the tender conditions.</p> <p>(iv) The Railway will not be bound by any change of power of attorney or in the composition of the firm made subsequent to the submission of tender. Railway may, however, recognize such power of attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the Contractor.</p>	
6.2	<p>Clause-15 of Tender Form(Second Sheet) of Part-I of GCC-2022</p> <p>The tenderer whether sole proprietor / a company or a partnership firm /registered society/registered trust/ joint venture (JV) / HUF/LLP etc. if they want to act through agent or individual partner(s), should submit</p>	Annexure

	<p>along with the tender, a copy of power of attorney duly stamped and authenticated by a Notary Public or by Magistrate in favour of the specific person whether he/they be partner(s) of the firm or any other person specifically authorizing him/them to sign the tender, submit the tender and further to deal with the tender/contract upto the stage of signing the agreement except in case where such specific person is authorised for above purposes through a provision made in the Partnership deed/ Memorandum of Understanding/Article of Association/Board Resolution, failing which tender shall be Summarily Rejected.</p> <p>A separate Power of Attorney duly stamped and authenticated by a Notary Public or by Magistrate in favour of the specific person whether he/they be partner(s) of the firm or any other person, shall be submitted after award of work, specifically authorizing him/them to deal with all other contractual activities subsequent to signing of agreement, if required.</p> <p>Note: A power of attorney executed and issued overseas, the document will also have to be legalized by the Indian Embassy and notarized in the jurisdiction whether the power of attorney is being issued. However, the power of attorney provided by bidder's from countries that have signed the Hague Legislation Convention'1961 are not required to be legalized by the Indian Embassy if it carries a conforming Apostille Certificate.</p>	
7.0	<p>Employment/Partnership etc. of Retired Railway Employees: Please refer clause-16 of Indian Railway Standard General Conditions of Contracts–April'2022–Part-I regarding employment of Retired Railway Employees and submit the information in this regard or submit statement to this effect that no such retired Engineer or retired gazetted officer is so associated with the tenderer, as the case may be. If information as required as per 16(a), 16(b) or 16(c) of GCC-2022 has not been furnished, contract is liable to be dealt in accordance with provision of clause-62 of the Standard General Condition of Contract-2022.</p>	Annexure
8.0	Certificate of Familiarization.	Annexure
9.0	Declaration or an undertaking from the tenderer(s) that he is not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India from participation in tender on the date of opening of bids, either in individual capacity or as a member of the partnership firm or JV in which he or JV in	Annexure

	which HUF was / is a partner/member. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause-62 of the General Conditions of Contract.	
10.0	PAN Card details- copy of PAN Card to be submitted.	Annexure

CHAPTER – II
INSTRUCTION TO TENDERERS

1. General

- 1.1** E-tender has been invited for and on behalf of the President of India through website www.ireps.gov.in for the work mentioned against the tender notice number available in the website. Tenderers are to bid online only in the above mentioned website. No Manual offer is acceptable against this tender. No Tender document in hard copy will be sold against this tender. Please read the Instructions to Tenderers for e-tendering, Indian Railway Standard General Conditions of Contract, April-2022 with Correction Slips, Special Conditions of Contract before filling the e-tender through online.
- 1.2** E-Tender forms are not transferable and the same is to be submitted with digital signature by the Tenderer already registered with the site.
- 1.3** The submitted e-tender forms will be considered as digitally signed by the tenderer as a confirmation from the tenderer that the tenderer has read, agreed and accepted all the conditions and laid down documents, as well as Schedule of Tender, General and Special Conditions.
- 1.4** The tender offer complete in all respect and with all documents is to be submitted online by e-tendering process through the website www.ireps.gov.in before the closing time/date of this tender as mentioned in the NIT (Notice Inviting Tender). Tenderer can revise the bids any number of times till the closing time/date of the tender. No manual offers shall be accepted.
- 1.5** The Railway may, of its own or in response to any clarification requested/suggested by any person including that from the tenderer, may modify this tender document at its sole discretion at least 15 days before the due date of closing of the tender as corrigendum.
- 1.6** Corrigendum as required may be issued at least 15 days prior to the closing of the tender. These corrigenda of this tender, if any, as issued time to time will be available on website at least 15 days in advance of closing of tender. The tenderers are requested to check the website before submitting their offer whether any such corrigendum to the tender has been issued or not and revise the offer if required accordingly. Failure on the part of tenderer on this aspect will be solely tenderer's responsibility.
- 1.7** This document is the Standard Tender Document which consists of the Instruction to the Tenderers, NIT (Notice Inviting Tender), General Conditions of the Tender, Special conditions of the tender, Tender schedules, Specifications of the works & various Annexures, drawings etc. All the above mentioned documents taken together shall constitute the complete tender document hereafter referred to as "Tender Document" and have to be read together and acted upon accordingly. No part of the tender document can be relied upon or acted upon in isolation.
- 1.8** The Railway and the website will have no responsibility for incorrect evaluation of cost and thereby incorrect cost of work and ranking of tenderers, if the schedule is not filled incorrectly and unambiguously for each item. No claim or clarification of a tenderer regarding applicability, inclusion or exclusion of any element of tax or duty or any other change in the offer subsequently (after closing of the tender) will be entertained. For this the

tenderers are advised to read the Instructions, General Conditions, Special Conditions and other Instructions carefully before submission of tender.

- 1.9 In case of any problem with the portal is faced while filling the e-tender, Tenderers are advised to contact with the Helpdesk of IREPS portal who will render all help and assistance related with the website and portal except that related with the details of the tender. Railway will not take any responsibility for non-participation in the e-tender online for the reasons related to the website and portal or server etc beyond the control of railways.
 - 1.10 Railway and the IREPS website will not take the responsibility for any online payment made by the tenderer and debited from his/their account towards the tender cost or Earnest Money due to wrong or manipulation of the menus or any reasons related with the IT or found unsuitable for the tender etc. Railway and IREPS website will not entertain any claim in this regard or refund the paid amount.
 - 1.11 The tenderer shall submit a copy of certificate stating that all their statements/documents submitted along with bid are true and factual. Standard format of Certificate to be submitted by the bidder is enclosed as **Annexure-V&V(A)**. **In addition to Annexure – V**, in case of other than Company/Proprietorship Firm, Annexure V(A) shall also be submitted by the each member of a Partnership Firm/Joint Venture (JV)/ Hindu Undivided Family (HUF)/Limited Liability Partnership (LLP) etc as the case may be. Non submission of above certificate by the bidder shall result in **Summarily Rejection** of his/their bids. It shall be mandatorily incumbent upon the tenderer to identify, state and submit the supporting documents duly self-attested/digitally signed by which they/he is qualifying the Qualifying Criteria mentioned in the Tender document.
 - 1.12 With the submission of the certificate as mentioned above, the practice of verification of tenderer's documents by the Railway may be dispensed with. However, the Railway reserves the right to verify all statements, information and documents submitted by the bidder in his tender offer, and the bidder shall, when so required by the Railway, make available all such information, evidence and documents as may be necessary for such verification. Any such verification or lack of such verification, by the railway shall not relieve the bidder of its obligations or liabilities hereunder nor will it affect any rights of the railway thereunder.
2. **Inspection of drawings**
 Drawings for the work can be seen in the office inviting this tender on any working day during working hours. The drawings are only for the guidance of tenderers. Detailed working drawings, if required based on the drawings mentioned above, will be given by the Engineer or his representative from time to time as the work will be planned for starting the execution at sites and deployment of adequate required resources will be done by the contractor at sites.
 3. **Omissions and Discrepancies**
 Should a tenderer find discrepancies in or omissions from the drawings or any of the Tender Forms or should he be in doubt as to their meaning, he should at once notify the authority inviting tenders. The tender inviting authority may, if deemed necessary, clarify the same to all tenderers. It shall be understood that every endeavour has been made to avoid any error which can materially affect the basis of tender and successful tenderer shall take upon himself

and provide for the risk of any error which may subsequently be discovered and shall make no subsequent claim on account thereof.

4. Opening of E-tender:-

- 4.1** The e-tenders will be opened online using the IREPS portal. No representative is required to be present for opening of tender and details of rates quoted and ranking of all the bidders etc. shall be available to the bidders in the website after the opening of the tender.
- 4.2** In case the date of closing mentioned in the Notice Inviting Tender is declared a holiday/bandh/strike etc. on any account, the date of closing tender online will not be changed as the application in the website of IREPS does not permit submission of any offer after closing date and time of the tender. However, opening of tenders online will be on any convenient day after the closing date/time of tenders.
- 4.3** Tender with any special conditions may not be considered.
- 4.4** The tenderer(s) shall quote single percentage rate for each schedule on IREPS Portal indicating above or below or at Par and same shall be uniformly applicable on all individual items of tender schedule.

5. Validity of Offer

The Tenderer(s) shall keep the offer open for a minimum period of **60 days** from the date of opening of the Tender. It is understood that the tender documents have been issued to the Tenderer(s) and the Tenderer(s), is / are permitted to tender in consideration of the stipulation on his / their part that after submitting his / their tender subject to the period being extended further, if required by mutual agreement from time to time, he will not resile from his offer or modify the terms and conditions thereof in a manner not acceptable to the Chief Engineer/Dy. Chief Engineer/Divisional Engineer of South East Central Railway. If the tenderer fail to observe or comply with the foregoing stipulation, the amount deposited as Earnest Money for the due performance of the above stipulation, shall be forfeited to the Railway.

6. Acknowledgement by Tenderers

It shall be deemed that by submitting the tender, the Tenderer has:

- (a) made a complete and careful examination of the tender Document;
- (b) received all relevant information requested from the Railway;
- (c) acknowledged and accepted the risk of inadequacy, error or mistake in the information provided in the tender document or furnished by or on behalf of the Railway;
- (d) acknowledged and agreed that inadequacy, lack of completeness or incorrectness of information provided in the tender document, hereinabove shall not form a basis for any claim for compensation, damages, extension of time for performance of its obligations, loss of profits etc. from the Railway, or a ground for termination of the Contract;
- (e) agreed to be bound by the undertaking provided by it under and in terms hereof.

7. Care in Submission of Tenders:

- (a) (i) 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 rates he enters in the tender forms are adequate and all inclusive to accord with the provisions in Clause-37 of

the Standard General Conditions of Contract for the completion of works to the entire satisfaction of the Engineer.

- (a)(ii) Tenderers will examine the various provisions of The Central Goods and Services Tax Act'2017(CGST)/ Integrated Goods and Services Tax Act'2017(IGST)/ Union Territory Goods and Services Tax Act'2017(UTGST)/ respective state's State Goods and Services 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.
- (a)(iii) 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 railway 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.
- (a)(iv) In case the successful tenderer is not liable to be registered under CGST/IGST/UTGST/SGST Act, the railway shall deduct the applicable GST from his/their bills under reverse charge mechanism (RCM) and deposit the same to the concerned authority.
- (a)(v) Contractor shall be liable to pay/refund the amount collected as GST to the Indian Railways along with interest and penalties, if any imposed by the authorities, in case GST input tax credit of Indian Railways is denied/rejected by the tax authorities due to reasons mentioned below but not limited to:

Wrong/incorrect invoice s is sued by Contractor ;

No-filing of GST returns;

Non-payment of GST collected from Indian Railways to the authorities;

Any other non-compliance done by Contractor;

General Indemnity: Contractor hereby agrees to indemnify and hold harmless the Indian Railways from and against any and all losses, including loss on account of Input Tax Credit and all losses incurred by the Indian Railways relating to or arising out of or in connection with any actual or threatened claim, legal action, proceedings, prosecution or inquiry by or against the Indian Railways arising out, directly or indirectly, offailure by the contractor to comply with the provisions of GST and related laws, or based upon or arising from any failure by the Contractor.

Retention Money: Any payment liable to be paid by Indian Railways to contractor against the goods or services or both supplied by such contractor to Indian Railways shall be kept on hold in case supplier makes any non-compliance of any of the GST law provisions including non-reporting of invoices in GST returns. Such payment shall be released after proper verification of records and availability of ITC to Indian Railways as per provisions of GST Law.

- (b) When work is tendered for by a firm or company, the tender shall be signed by the individual legally authorized to enter into commitments on their behalf.
- (c) The Railway 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 execution of the contract. It may, however, recognize such power of attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the Contractor.

8. Clarification on Bid

- 8.1 To assist in the examination, evaluation & comparison and pre-qualification of the Tender, the Railway may, at its discretion, ask any Bidder for a clarification of its Bid. Any clarification submitted by a Bidder that is not in response to a request by the Railway shall not be entertained or considered. The Railway request for clarification and the response of the bidder in this regard shall be in writing.
- 8.2 However, if a Bidder does not provide clarification of its bid by the date and time communicated in the Railway request for clarification, the bid shall be evaluated as per the documents submitted along with the bid.

9.0 Award of work

After selection, a Letter of Acceptance (the “LOA”) shall be issued, in duplicate, by the Railway to the selected tenderer and the selected tenderer shall, within 10 (ten) days of the issue of the LOA, sign and return the duplicate copy of the LOA in acknowledgement thereof. In case the duplicate copy of the LOA duly signed by the selected tenderer is not received by the stipulated date, the Railway may, unless it consents to extension of time for submission thereof, forfeit and appropriate the EMD of such tenderer in full on account of failure of the selected tenderer to acknowledge the LOA, and cancel the LOA.

10. Execution of Contract Document-

The tenderer whose tender is accepted shall be required to appear in person at the office of Chief Administrative Officer (Construction)/SECR or concerned Engineer, as the case may be, or if tenderer is firm or corporation, a duly authorised representative shall appear (there would be no need for appear in person if agreement is signed digitally) and execute the contract agreement within seven days of notice from Railway that the Contract Agreement is ready. Failure to do so shall constitute a breach of the agreement affected by the acceptance of the tender. The Contract Agreement shall be entered into by Railway only after submission of valid Performance Guarantee by the Contractor. In such cases the Railway may determine that such tenderer has abandoned the contract and thereupon his tender and acceptance thereof shall be treated as cancelled and the Railway shall be entitled to forfeit the full amount of the Bid Security and other dues payable to the Contractor under this contract. The failed Contractor shall be debarred from participating in the re-tender for that work.

- 11. Novation Agreement-** The contractor(s) has to sign the Novation Agreement in addition to the contract agreement signed vide clause 11 above. This novation agreement is applicable to the works chargeable to EBR-IF fund. This novation agreement will be signed by (i) the Railway (ii) the Contractor and (iii) Indian Railway Finance Corporation Limited. As per Novation Agreement, the invoices shall be issued by capturing GSTIN of contractor (as the supplier) and GSTIN of IRFC (as the bill-to party). Also the contractor shall submit the invoice (2 copies), issued in the name of IRFC, to Railway for processing payment by Railway to contractor subject to applicable TDS under Income Tax, GST or any other applicable laws. IRFC shall be responsible to comply with Income Tax and GST laws in relation to filling of returns.

- 12. Right of the Railway to deal with Tender:** The Railway reserves the right of not to invite tenders for any of Railway works or to invite open or limited tenders and when tenders are called to accept a tender in whole or in part or reject any tender or all tenders without

assigning reasons for any such action. In case if tender is accepted in part by Railway Administration, Letter of Acceptance shall be issued as counter offer to the Tenderer, which shall be subject to acceptance by the Tenderer.

12.a. Make in India Policy: Provisions of Make in India Policy'2017 issued by Govt. of India, as amended from time to time, shall be followed for consideration of tenders.

12.b. Permission to Bid for a bidder from a country which shares Land boundary with India:

Any bidders from the countries sharing a land border with India will be eligible to bid in any procurement of works (including turnkey projects) only if the bidder is registered with the Competent Authority. The Competent Authority for registration will be the Registration Committee constituted by the Department of Promotion of Industry and Internal Trade (DPIIT), Government of India. For interpretation of this para, Department of Expenditure, Ministry of Finance, Government of India letter F.No.6/18/2019-PPD dated 23.07.2020 shall be referred.

13. Fraud and Corrupt Practices

The Tenderers and their respective employees shall observe the highest standard of ethics during the selection process. Notwithstanding anything to the contrary contained in this tender document, the Railway shall reject a tender without being liable in any manner whatsoever to the tenderer, if it determines that the tenderer has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice in the selection process. In such an event, the Railway shall, without prejudice to its any other rights or remedies, forfeit and appropriate the EMD or Security Deposit, as the case may be. For the purposes of this clause, the following terms shall have the meaning hereinafter respectively assigned to them:

- (a) "corrupt practice" means (i) the offering, giving, receiving, or soliciting, directly or indirectly of anything of value to influence the action of any person connected with the selection process (for avoidance of doubt, offering of employment to or employing or engaging in any manner whatsoever, directly or indirectly, any official of the Railway who is or has been associated in any manner, directly or indirectly with the selection process or the LOA or has dealt with matters concerning the contract or arising there from, before or after the execution thereof, at any time prior to the expiry of one year from the date such official resigns or retires from or otherwise ceases to be in the service of the Railway, shall be deemed to constitute influencing the actions of a person connected with the Selection Process; or (ii) engaging in any manner whatsoever, whether during the selection process or after the issue of the LOA or after the execution of the contract, as the case may be, any person in respect of any matter relating to the Project(s) or the LOA or the Contract, who at any time has been or is a contractor of the Railway in relation to any matter concerning the Project(s);
- (b) "fraudulent practice" means a misrepresentation or omission of facts or disclosure of incomplete facts, in order to influence the selection process;
- (c) "coercive practice" means impairing or harming or threatening to impair or harm, directly or indirectly, any persons or property to influence any person's participation or action in the selection process;
- (d) "undesirable practice" means (i) establishing contact with any person connected with or employed or engaged by the Railway with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Selection Process; or (ii) having a Conflict of Interest; and

- (e) “restrictive practice” means forming a cartel or arriving at any understanding or arrangement among tenderers with the objective of restricting or manipulating a full and fair competition in the selection process.

14. Other Instructions:

- i) The instructions to the Tenderer(s) shall be deemed to form a part of the tender document.
- ii) It is desirable that Tenderer(s) should have a copy of SECR USSOR-2021, Indian Railway Standard General Conditions of Contracts–April-2022 and tenderer have gone through all the conditions of contract and specifications etc. embodied therein. The copy of SECR USSOR-2021 and Indian Railway Standard General Conditions of Contracts–April-2022 can be obtained on payment of an amount specified for copy of each Volume on any working day during office hours, subject to availability, in the office of General Manager (Engineering), S.E.C.Railway, Bilaspur. Further, the copy of Indian Railway Standard General Conditions of Contracts –April-2022 and the correction slips can be downloaded from web site www.indianrailways.gov.in.
- iii) South East Central Railway does not bind itself to accept the lowest or any other tender nor does it undertake to assign reason for declining to consider the Tender.
- iv) The Railways reserve the right to accept the tender either for the full quantity of work or part thereof or divide the works amongst more than one tenderer(s) without assigning any reasons for any such actions.
- v) Tender documents in which tenderer(s) submits offer on On-Line mode shall become the property of the Railway and the Railway shall have no obligation to return the same to the Tenderer(s).
- vi) In case of non-acceptance of a tender by the Railway Administration for any reason whatsoever, the tenderer(s) cannot claim for the expenses incurred by him in submitting the tender offer for the work or for any other account.
- vii) **If the tenderer(s) deliberately gives / give the wrong information in his / their tender or creates / create circumstances for the acceptance of his / their tender, the Railway reserves the right to reject such tender at any stage.**
- viii) **If any partner(s) of a partnership firm expires after the submission of its tender or after the acceptance of its tender, the Railway shall deem such tender as cancelled/contract as terminated under Clause-61 of the Standard General condition of Contract, unless the firm retains its character as per partnership agreement. If a sole proprietor expires after the submission of tender or after the acceptance of tender, the Railway shall deem such tender as cancelled / contract as terminated under clause-61 of the Standard General Conditions of Contract.**

15. Procedure for conduct and reporting of Reverse Auction.[Not Applicable]

CHAPTER-III**(DECLARATION FROM TENDERERS)****Tender Notice No. CAO-C-BSP-26-27-10, Dated:12.06.2026****(Open Tender with Single Packet System)****To****The President of India,
Acting through the Dy.CE/Con-I/BSP
S.E.C.Railway.****Sir,****Sir,**

1. I/we _____ have read the various conditions to tender attached hereto and agree to abide by the said conditions. I/we also agree to keep this offer open for acceptance for a period of **60 days** from the date fixed for closing of the tender and in default thereof, I/we will be liable for forfeiture of my/our "Bid Security". I/We offer to do the work for South East Central Railway, at the rates quoted in the attached bill(s) of quantities and hereby bind myself/ourselves to complete the work in all respects within **months including monsoon** from the date of issue of letter of acceptance of the tender.
2. I/We also hereby agree to abide by the Indian Railways Standard General Conditions of Contract, with all correction slips up-to-date and to carry out the work according to the Special Conditions of Contract and Specifications of materials and works as laid down by Railway in the annexed Special Conditions/Specifications, Schedule of Rates with all correction slips up-to-date for the present contract.
3. A sum of **₹1,70,900.00/-** has already been deposited online/submitted as Bank Guarantee Bond. Full value of the Bid Security shall stand forfeited without prejudice to any other right or remedies in case my/our Tender is accepted and if:
 - (a) I/We do not submit the Performance Guarantee within the time specified in the Tender document;
 - (b) I/We do not execute the contract documents within seven days after receipt of notice issued by the Railway that such documents are ready; and
 - (c) I/We do not commence the work within fifteen days after receipt of orders to that effect.
4. (a) I/We am/are a Startup firm registered by Department of Industrial Policy and Promotion (DIPP) and my registration number is valid upto (Copy enclosed) and hence exempted from submission of Bid Security.
5. We are a Labour Cooperative Society and our Registration No. is with and hence required to deposit only 50% of Bid Security.
6. Until a formal agreement is prepared and executed, acceptance of this tender shall constitute a binding contract between us subject to modifications, as may be mutually agreed to between us and indicated in the letter of acceptance of my/our offer for this work.

7.I/We have read and understood Special Conditions of Contracts, Instructions to tenderer(s) and the stipulations made in the scope of work & Schedules of quantities and rates governing the works under this contract, in addition to and/or in part sub-cession of the SOUTH EAST CENTRAL RAILWAY-USSOR-2021 and Indian Railways Standard General Condition of Contract April-2022(with upto date correction slips) and Indian Railways Unified Standard Specification 2021 (with latest amendment) and agree to carry out the work.

Signature of Tenderer(s)

Date _____

Address of the Tenderer(s)

CHAPTER – IV
(CERTIFICATE OF FAMILIARISATION)

Name of the work:- Execution of Boring, Casting of RCC Piles and Lateral Load Testing of Piles in Major Br. No. 06, 54, 59 and 66 and other miscellaneous allied works in BSP-SKT section in connection with BSP-JSG 4th line.

I/We hereby solemnly declare that I/We have visited the site of above work and have familiarised myself/ourselves of the working conditions there in all respects and in particular the following:-

- (a) The area and the constraints therein.
- (b) Availability of Service/approach passage.
- (c) Soil Conditions at Site of the Work.
- (d) Sources and Availability of construction materials like good earth, blanketing materials sand, aggregate etc .
- (e) Rates & availability for Construction Materials.
- (f) Availability of Local Labour Skilled/Unskilled and the Prevailing Labour Rates.
- (g) Availability of Water & Electricity.
- (h) Availability of Space for Putting Up Labour Camps, Offices, Store Go down, Engineering Yard Etc.
- (i) Likely site constraints in collecting materials and the working constraints etc.
- (j) Existing Road Network (Highways or Other Type) and Availability of Service Roads.

CHAPTER - V**(SCOPE OF WORK AND DEPLOYMENT OF MEN/MACHINERY)**

Name of the Work:- Execution of Boring, Casting of RCC Piles and Lateral Load Testing of Piles in Major Br. No. 06, 54, 59 and 66 and other miscellaneous allied works in BSP-SKT section in connection with BSP-JSG 4th line.

(1)Scope of work: Brief scope of major works

- Boring, Casting in Pile and Pile testing
- Provision of weep hole
- Construction of Bridge Plaques

NOTE: The above are for general guidance of tenderer at the time of tendering. If there is change as per subsequent planning, then execution of work shall be done as per actual requirement and as decided and offered by Engineer in charge for change in scope of work, the decision of Engineer-in-charge will be final.

2.Deployment of Engineers&Staff:The contractor shall provide and keep on the works, during the execution of the works, efficient and competent Engineers to ensure that the work is executed strictly as per provisions of the contract. It shall be the obligation on the part of the contractor to provide the following minimum engineering staff at site: -

Sr. No.	Position/Qualification/Experience	Minimum nos. to be deployed
1.	Construction Manager – Degree holder with minimum experience of 4 years/Diploma holders with minimum experience of 6 years in the field.	0
2.	Engineer (Quality Control) – Degree holder with minimum experience of 3 years/Diploma holders with minimum experience of 5 years experience in the field.	0
3.	Site Engineer (Civil) – Degree holder with minimum experience of 3 years/Diploma holders with minimum experience of 5 years in the field.	[1]
4.	Survey Engineer - Degree holder with minimum experience of 3 years/Diploma holders with minimum experience of 5 years in the field.	0
5.	Technical staff for assisting Engineer with project management software with minimum 5 years experience in the field.	0

In addition to the above, requisite number of staff for laboratory and other supervisory staff shall be deployed by the contractor. The technical staff shall be got approved in writing from the Engineer (whose approval may be withdrawn any time) for supervision of works and to receive direction from the Engineer or his representative of the work on behalf of the contractor. The supervisory staff of the contractor will not be changed without the approval of the Engineer. In case of failure to employ the qualified Engineers, as above, a penalty for an amount of

Rs. 40,000/- for each month or part thereof for the default period, respectively shall be levied on the contractor.

The decision of the Engineer as to the period for which the required technical staff was not employed by the contractor and as to reasonableness of the amount to be deducted on this account shall be final and binding on the contractor.

The details of skilled manpower/workers trade wise i.e. skilled, semiskilled workers, labour, arrangement of boarding/lodging along with the details of permanent staff shall be submitted by the contractor within 15 days after the award of work to him. This shall be submitted along with the program of works.

2.1 The contractor has to deploy the Project Manager, Construction Manager, Engineer (Quality Control) and Survey Engineer within one month of issue of the letter of acceptance. The site engineers shall be deployed by the contractor as per the deployment program/method statement approved by the Engineer. In case, the contractor fails to deploy sufficient Engineers as described above, the Engineer shall be entitled to recover the following amount from the dues of the contractor:-

1	Non Deployment of Construction Manager	Rs. 50,000/- per month or part thereof
2	Non Deployment of Site Engineer/Engineer (Quality Control), Survey Engineer, Technical Assistant/Staff.	Rs. 40,000/- per month or part thereof

The decision of the Engineer as to the period for which the required technical staff was not employed by the contractor and as to reasonableness of the amount to be deducted on this account shall be final and binding on the contractor.

2.1.1 The details of skilled manpower/workers trade wise i.e. skilled, semiskilled workers, labour, arrangement of boarding/lodging along with the details of permanent staff shall be submitted by the contractor within 15 days after the award of work to him. This shall be submitted along with the program of works.

3.0 Inspection Vehicles: NA

4.0 Site Office: NA

5.0 LABORATORY

All laboratory testing required under this Agreement shall be carried out at the Contractor's cost and expense. Nothing extra shall be paid on this account, and the Contractor shall ensure that such testing is performed in accordance with applicable standards.

Others:

- (i) The maintenance period of the work will be for a period of Six **months from the date of completion of work or passage of one full monsoon** (15th June to 15th Sept) whichever is later.

CHAPTER - VI**SPECIAL CONDITIONS OF CONTRACT**

<p>1.</p>	<p>General:</p> <p>The following documents (including addendum slips, correction slips, Corrigendum slips issued upto date of opening of the tender) shall govern the works under this contract, in addition to and /or in part suppression of the USSOR – 2021 of South East Central Railway & Indian Railways Standard General Conditions of Contract published in April-2022 updated with correction slip issued upto ACS-11(issued on 13.03.2026). In a tender/contract, in case of any difference, contradiction, discrepancy, with regard to Conditions of tender/contract, Specifications, Drawings, Bill of quantities etc., forming part of the tender/contract, following shall be the order of precedence:</p> <ul style="list-style-type: none"> (i) Letter of Award/Acceptance (LOA). (ii) Bill(s) of Quantities. (iii) Special conditions of contract. (iv) Technical Specifications as given in tender documents. (v) Drawings. (vi) Indian Railways Standard General Conditions of Contract-April-2022 updated with correction slip issued upto ACS-11. (vii) Indian Railways Unified Standard Schedule of Rates (USSOR-2021) & Indian Railways Unified Standard Specifications (IRUSS)-Formation Works, Bridge Works, P.Way Works 2021, updated with correction slips issued upto date of inviting tender, or as otherwise specified in the Tender Document, if applicable in the contract. (viii) CPWD Delhi Schedules of Rates {DSR 2023 (DSR – Vol I, DSR Vol II, DSR-Horticulture & Landscaping-2020)} and applicable CPWD Specifications for execution of all Civil Engineering works related to Building work, Road works and Horticulture works (except Formation works, Bridge works and P.Way works) if applicable in the tender. (ix) IR Specifications/Guidelines updated with correction slips issued upto date of inviting tender or as otherwise specified in the Tender Documents. (x) Relevant B.I.S. Codes updated with correction slips issued upto date of inviting tender or as otherwise specified in the Tender Documents. <p>In case of conflict between provisions of IRS/IRC/IS specifications the precedence will be in the same order.</p> <p>Any specifications/conditions stated by the Tenderer(s) in the covering letter submitted by him along with the tender shall be deemed to be a part of the contract only to such an extent as has been expressly accepted by the Railway.</p> <p>In case of any ambiguity, the decision of Chief Administrative Officer (Construction)/South East Central Railway/Bilaspur shall be final & binding.</p>
<p>2.</p>	<p>All measurements, methods of measurements, meaning and item of specifications and interpretation of Special Conditions of Contract made by the Engineer on behalf of the Railway shall be final and binding and shall be considered as “Excepted matters” in terms of Clause-63 of Indian Railways Standard General Conditions of Contract published in April-2022.</p>
<p>3.</p>	<p>Change of address: Any change in the address of the Contractor, shall be forthwith</p>

	intimated in writing to Engineer. The Railway will not be responsible for any loss or inconvenience suffered by the Contractor on account of his failure to comply with this.
4.	Office communication: The contractor shall maintain Mobile number, a FAX machine, e-mail on registered email ID and a telephone connection in his office in working condition throughout the currency of the contract through which the Railways may be able to pass on any instructions to him. In case of any change, the same shall be advised to the Railway. As a measure to improve quality and progress of work, mobile communication should be available with the contractor's site engineer so that he can be contacted by railway.
5.	Deployment of plant and machinery: The deployment of plant and machinery including moving machines shall be such as not to infringe or cause damage to Railway track or any other Government or private properties. Operation of such equipment involving infringement to moving dimensions prescribed in the Schedule of Dimensions of the Railway shall not be undertaken without the prior approval of the Engineer. Contractor/s shall be wholly responsible for any loss or damage resulting from violation of this clause.
6.	Damages By Accidents/Rain/Flood/Cyclones/Earthquake etc.:
6.1.	The contractor(s) shall take all precautions against damages from accidents, rain, floods, cyclone, earthquake or tides etc. No compensation shall be allowed to the contractor for his tools, Plants, materials, machines other equipment lost or damaged by any cause whatsoever. The contractor(s) shall make good the damages to any structure, plant or materials of every description belonging to the Railway Administration, lost or damaged by any cause during the course of construction work. Contractors are solely responsible for safety and security of his all resources and have to arrange the same in case any loss or damage so as to adhere to the program of completion of the work. Neither party shall by reason of such event be entitled to terminate the contract.
6.2.	The Railway Administration will not be liable to pay the contractor any charges for rectification or repairs that may have occurred from any cause whatsoever, to any part of the new structures during currency of contract. No claims in this regard will be arbitrable.
7.	The contractor has to take all precautions required to be taken for working in the electrified territories. Railways will not be responsible for any loss to life of Contractor's workmen. In case of any mishap, the decision of the Railway will be final & the agency has to bear the cost of the damages for which it is held responsible by the Railways.
8.	The contractor's have to make their own arrangement for barricading/protection arrangements required for safety of their labour, tools, plants and machineries, as well as the train/road traffic from any mishap due to any reason.
9.	In case of emergency , such as in the event of any accident or failure of contractor for completion or maintenance of the works which is in the opinion of the Engineer requires immediate attention, the Railway may bring its own workmen or other agency to execute such work or part of the necessary work or carry out repairs, if the Engineer considers that the Contractor/s is/are not in a position to do so in time and charge the cost thereof to the contractor(s), as shall be determined by the Engineer-in-charge to the Contractor.
10.	Night work: The Contractor shall not carry out any work between sun-set and sun-rise without the previous permission of the Engineer. However, if the Engineer is satisfied

	<p>that the work is not likely to be completed in time except by resorting to night work, he may order the same without confirming any right on the Contractor for claiming any extra payment for the same.</p> <p>The Contractor at his own cost shall make all arrangements including adequate lighting in this connection. He will be responsible for safety and security of the labour and equipments and take all precautions for the same.</p>
11.	<p>Service Roads: The Contractor(s) will be permitted to make use of the service roads already existing in the possession of the Railway. All service roads required by the contractor within or outside Railway boundary shall be constructed by the Contractor at his own risk and cost and all these roads shall be maintained by the Contractor at his own cost. The Railway reserves the right to make use of the service roads as and when necessary without any additional payment to the Contractor. All approaches to take the tools and plants to the site of work/river bed shall be made by the Contractor(s) and no extra payment will be made for this.</p>
12.	<p>Recovery of water charges: The contractor shall be responsible for the arrangements to obtain supply of water necessary for the work. In case the Railway arrange supply of water, the cost will be recovered at the rate of Rs.2/-(Rupees Two only) per 4546 liters (1000 gallons) subject to the conditions stipulated in Clause –31 of the Indian Railway Standard General Conditions of the Contract, April-2022. In the event of water being used from Railway well/other source either in use or abandoned recovery at the rate of Rs.2/- per 4546 liters (1000 gallons) will be made.</p>
13.	<p>Electricity:</p> <p>(a) Any electric supply required at site for whatsoever purpose, shall be arranged by the Contractor/s. The Contractor/s shall be responsible for the arrangements for obtaining electric supply at his own cost, and rates quoted shall include the cost of providing electric supply arrangements required for the work.</p> <p>If required by Contractor/s, the Railway Administration may give required assistance in recommending to State Electricity Board for giving necessary electric connection to the Contractor for execution of works.</p> <p>(b) Electric Supply from the Railway System: The Railway may supply to the Contractor part or whole of the electric power wherever available and possible, required for execution of works from the Railway's existing electric supply systems at or near the site of works on specified terms and conditions and such charges as shall be determined by the Railway and payable by the Contractor provided the cost of arranging necessary connections to the Railway's Electric Supply systems and laying of underground/overhead conductor, circuit protection, electric power meters, transmission structure, shall be borne by the Contractor and that the Contractor shall not be entitled to any compensation for interruption or failure of the Electric supply system.</p>
14.	<p>Loss of Work Orders: If the original work order issued to the contractor is lost by him for any reason whatsoever and the Contractor demands for supply of a duplicate of the same, a penal levy of Rs.100/- (Hundred only) for each work order shall be imposed on him for the issue of a duplicate copy.</p>
15 (a).	<p>Income Tax Deduction: In respect of works, the contract value of, which is more than Rs.10,000/- each, a deduction of 2% and cess if any at the extant rate on the gross payment from each of the Contractor's bills shall be made in terms of section 194(e) of the Income Tax Act of 1961 & 1991.</p>

15 (b).	GST: The contractor shall get himself registered with appropriate Authority for the purpose of Goods & Service Tax as the case may be and submit the proof of such registration for the information of Railway. The Tax at the prescribed percentages will be deducted from contractor's bills as per the respective State Government acts.
16.	Provision of Efficient and Competent staff at Work Sites by the Contractor:
16.1.	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 & proper manner and shall employ only such supervisors, workmen & labourers in or about the execution of any of these works as are careful and skilled in the various trades.
16.2.	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.
16.3.	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 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 as 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 Railway to rescind the contract under Clause-62 Indian Railway Standard General Conditions of Contract published in April-2022.
16.4	The contractor will deploy the artisan having undergone trade training (Mason, Smithy, shuttering, Brickwork etc) by Skill Development institutes/ITIs.
16.5	Dedicated safety staff to be deployed at worksites by the contractor as per direction of Railway representative.
16.6	IT expert having the sufficient knowledge of the work to be deployed for submission of bills, preparation of variation etc.
16.7	Qualification/experience of key officials to be mentioned.
17.	Hire of Railway's Plant & Machinery: It would be clearly understood that it is entirely the Contractor's responsibility and liability to procure all the machinery, tools and plants, and their spare parts that are required for the efficient and methodical execution of the work. Delay in procurement of such items due to their non-availability or due to difficulty in importing or any other causes whatsoever, will not be taken as an excuse for slow or nonperformance of work. The Railway may at their discretion give on hire to the Contractor any plant as considered necessary by the engineer, if available with Railway. However it does not guarantee hiring any machinery and it shall not entertain any claim or compensation due to Railway's inability to supply any plant/machinery or the condition of the railway's plant/machinery supplied on hire shall not be taken as an excuse for slow progress or for non-performance of the work.
18.	Hire charges of Plant & Machinery: The railway administration shall charge the contractor for the hire of machinery and plant supplied to him. The rate of hire charge for the plant and machinery given by the railway will be evaluated by the Railway Administration and intimated to the contractor in advance.
19.	Running expenses:- Running expenses including fuel, lubricant and other stores and labour if any supplied by the Railway will also be paid for by the contractor at rates to be determined by the Railway. The contractor should make his own arrangement for taking delivery of fuel, lubricant and other stores, transporting the same to site of work

	and storing or use as per prescribed rules. In case of such supply of fuel, lubricant and other stores the actual cost plus 7% (for storing etc.) increased by 12% for supervision charges and for the labour supplied, the actual pay and allowances granted to the Railway servant with additional percentage charges laid down in Para-258 of the Indian Railway Establishment code volume- II plus 12% supervision charges shall be charged. Recoveries on this account will be made from the contractor's running bills. It must be noted that no claims will lie with the Railway for its liability to supply fuel, lubricant and other stores aforesaid for late supply.
20.	Right to Recall:- The Railway shall reserve to itself the right to recall any plant/machinery without assigning any reasons by giving one month's notice or at any time without notice in the event of its being required by the Railway for an unforeseen emergency. In either case, the Railway shall not be liable to pay any compensation to hirer for the loss that may be caused by the withdrawal of the plant.
21.	Statutory Certificate Etc.: While the machine(s) is/are in the possession of the contractor(s), he/they shall be responsible for seeing that any inspection certificate or license required under any Government Act is obtained in due time. The contractor shall also be responsible for seeing that all required precautions are observed in using the plant as well, and he shall be responsible for any accident that may occur from the use of the plant.
22.	Storage of Railway Materials: The Contractor shall make his own arrangements at the site of work for the safe storage and custody of Railway material issued to him. Such Railway materials issued to the Contractor and stored at the site of work shall be open for inspection by the Engineer or his representative at all times.
23.	Released materials such as boulders from existing pitching, if dismantled, trees if cut, etc will be Railways property. The materials have to deposited at the nearest Railway store depot/Railway station or as desired by the Engineer-in-Charge and payment for leading/transportation will be made as per USSOR-2021. No extra rates for cutting trees or jungle clearance will be paid. Weighment arrangements will have to be made by the contractor and the cost of such weighment is deemed to have been included in the rates.
24.	Maintenance Period: The maintenance period subject to the conditions stipulated in Clause-47 of the Indian Railway Standard General Conditions of the Contract-April-2022 shall be 06 (Six) months from the date of completion of work or passage of one full monsoon (15th June to 15th Sept) whichever is later.
25.	Extension of time of Contract- Extension of time in contract will be governed by the Clause No.17, 17-A & 17-B of Indian Railway Standard General Condition of Contract, April-2022.
26.	IS/IRS Specifications: Wherever any reference to Code, specification etc. is made in this document, it shall be taken as a reference to the version issued upto the date of publication of Tender Notice. If any other version of the code or specification is to be made applicable for any item(s), the rates for that item(s) shall be mutually negotiated.
27.	Tree Cutting: If the section passes through forest land, the contractor or his labour is prohibited to cut the trees for the purpose of firewood or for any other purpose. Cutting of trees as required under the items of works indicated in the tender schedules may be carried out strictly as directed by the Engineer or his representative of the work. Unauthorised felling of trees will result in prosecution and imprisonment. It is the contractor's responsibility to cause no damage to the forest growth and any fuel required by the Contractor for his own use or for the use by his labourers, or for the work shall be

	arranged by the Contractor at his own cost. The Contractor shall take this aspect into consideration while quoting the rates against the tender.
28.	Approval of Samples of Material: All materials to be used in the work by the Contractor shall be subject to the prior approval of the Engineer. Contractor shall submit samples of materials to be used in the work.
29.	Mode of payment for running/final bills: All the payments will be made through Electronic Fund Transfer /DD/Remote pay out by State Bank of India or as decided by the Railway Administration.
30.	<u>Royalty clearance certificate</u> Procedure for deduction of royalty amount from agencies is as below: i.Total approx. amount of Royalty for quantities of earthwork, ballast etc of contract shall be assessed with prevailing rates of Royalty. ii.In absence of Royalty paid certificate/Royalty clearance certificate, a uniform deduction of 10% will be made from running bill amount. The deduction will start from third bill and onwards, every on-account bill. iii.The recovery will be made up to the total amount of royalty calculated vide para (i) above, duly deducting the amount for which Royalty paid certificate/Royalty clearance certificate is submitted by the agencies. iv.On submission of Royalty paid certificate/Royalty clearance certificate for any amount the following will be calculated; total royalty calculated as (i) above–Royalty paid certificate/Royalty clearance certificate amount – Royalty deducted @ 10% per RA Bill at any stage, the positive amount will be continued to be deducted and if the amount is in negative, the same will be refunded to the agency. v.However, the full amount as calculated vide (iv) above will be deducted/recovered before passing the last bill or refund of PG/SD etc. vi.Railway will refund all deducted amount without any interest after submission of Royalty paid certificate/Royalty clearance certificate for the total executed quantities of earthwork, ballast etc. issued from State Government". vii. In addition to the above recovery, the recovery for DMF (District Mineral Foundation) charges, which are also part of Royalty clearance certificate, shall be made from the bills of Contractor executing work related to mineral. The recovery shall be according to the rate fixed by respective authority of concerned state government under jurisdiction of which the work being executed.
31.1.	Security Deposit: The Security Deposit shall be 5% of the contract value. The Bid Security submitted by the contractor with his tender will be retained/encashed by the Railways as part of Security for the due and faithful fulfilment of the contract by the contractor. Provided further that, if contractor submits the cash or Term Deposit Receipt issued from a Scheduled Commercial Bank of India or irrevocable Bank Guarantee bond from a Scheduled Commercial Bank of India, either towards the Full Security Deposit or the Part Security Deposit equal to or more than Bid Security, the Railway shall return the Bid Security, to the contractor.

	<p>Balance of Security Deposit may be deposited by the Contractor in cash or Term Deposit Receipt issued from Scheduled Commercial Bank of India or irrevocable Bank Guarantee bond issued from Scheduled Commercial Bank of India or may be recovered at the rate of 6% of the bill amount till the full Security Deposit is recovered. Provided also that in case of defaulting Contractor, the Railway may retain any amount due for payment to the Contractor on the pending "on account bills" so that the amounts so retained (including amount guaranteed through Performance Guarantee) may not exceed 10% of the total value of the contract.</p> <p>The irrevocable Bank Guarantee submitted towards security deposit shall be initially valid upto the stipulated date of maintenance period plus 60 days and shall be extended from time to time, depending upon extension of contract granted in terms of Clause-17, 17A & 17B of the Standard General Conditions of Contract.</p> <p>Note: Security Deposit deposited in cash by the contractor to recover from the running bills of a contractor or submitted by contractor as Term Deposit Receipt(s) can be refunded/returned to the contractor, in lieu of irrevocable Bank Guarantee bond issued from Scheduled Commercial Bank of India, to be submitted by him, for an amount equal to or more than the already available Security Deposit, provided however that, in a contract of value less than Rs.50 Crores, such refund/return of the already available Security Deposit is permitted upto two times and in a contract of value equal to or more than Rs.50 Crores, such refund/return of the already available Security Deposit is permitted upto 3 times.</p>
31.2.	<p>Refund of Security deposit:</p> <p>(i) Security Deposit mentioned in para-31.1 above shall be returned to the Contractor along with or after the following:</p> <p>(a) Final Payment of the Contract as per clause-51(1) of Indian Railways Standard General Conditions of Contract, April-2022 and</p> <p>(b) Execution of Final Supplementary Agreement or Certification by Engineer that Railway has No Claim on Contractor and</p> <p>(c) Maintenance Certificate issued, on expiry of the maintenance period as per clause-50(1) of Indian Railways Standard General Conditions of Contract, April-2022, in case applicable.</p> <p>(ii) Forfeiture of Security Deposit: Whenever the contract is rescinded as a whole under clause-62(1) of these conditions as per GCC-2022, the Security Deposit already with railways under the contract shall be forfeited. However, in case the contract is rescinded in part or parts under clause-62(1) of these conditions as per GCC-2022, the Security Deposit shall not be forfeited.</p> <p>(iii) No interest shall be payable upon the Bid Security and Security Deposit or amounts payable to the Contractor under the Contract, but Government Securities deposited in terms of Sub-Clause-16.(4)(b) of Indian Railways Standard General Conditions of Contract, April-2022 will be payable with interest accrued thereon.</p>
32.	<p>Performance Guarantee:</p> <p>The procedure for obtaining Performance Guarantee is outlined below:</p> <p>(a) The successful bidder shall have to submit a Performance Guarantee (PG) within 21 (Twenty one) days from the date of issue of Letter of Acceptance (LOA). Extension of time for submission of PG beyond 21 (Twenty one) 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 12% per annum shall be charged for the delay beyond 21 (Twenty one) days, i.e. from 22nd day after the date of issue of LOA. Further, if the 60th day happens to be a declared holiday in the concerned office of the</p>

	<p>Railway, submission of PG can be accepted on the next working day.</p> <p>In all other cases, if the Contractor fails to submit the requisite PG even after 60 days from the date of issue of LOA, the contract is liable to be terminated. In case contract is terminated railway shall be entitled to forfeit Bid Security and other dues payable to the contractor against that particular contract, subject to maximum PG amount. In case a tenderer has not submitted Bid Security on the strength of their registration as a Startup recognized by Department of Industrial Policy and Promotion (DIPP) under Ministry of Commerce and Industry, DIPP shall be informed to this effect.</p> <p>The failed Contractor shall be debarred from participating in re-tender for that work.</p> <p>(b) The successful bidder shall submit the Performance Guarantee (PG) in any of the following forms, amounting to 5% of the original contract value and additional Performance Guarantee as per clause 16(4)h in any of the following forms:</p> <p>(i) A deposit of Cash;</p> <p>(ii) Irrevocable Bank Guarantee;</p> <p>(iii) Insurance Surety Bond as per Annexure-XVII given in ACS-9 to IRSGCC-April-2022</p> <p>Note: In case of extension of Date of Completion, selected bidder needs to submit extended Insurance Surety Bond/Fresh Insurance Surety Bond/fresh Performance Security, in any form as given above, before expiry of existing Insurance Surety Bond.</p> <p>(iv) Government Securities including State Loan Bonds at 5% below the market value;</p> <p>(v) Pay Orders and Demand Drafts tendered by any Scheduled Commercial Bank of India;</p> <p>(vi) Guarantee Bonds executed or Deposits Receipts tendered by any Scheduled Commercial Bank of India;</p> <p>(vii) Deposit in the Post Office Saving Bank;</p> <p>(viii) Deposit in the National Savings Certificates;</p> <p>(ix) Twelve years National Defence Certificates;</p> <p>(x) Ten years Defence Deposits;</p> <p>(x) National Defence Bonds and</p> <p>(xii) Unit Trust Certificates at 5% below market value or at the face value whichever is less. Also, FDR in favour of FA&CAO/SECR/BSP (free from any encumbrance) may be accepted.</p> <p>(c) The Performance Guarantee shall be submitted by the successful bidder after the Letter of Acceptance (LOA) has been issued, but before signing of the contract agreement. This P.G. shall be initially valid upto the stipulated date of completion plus 60 days beyond that. In case, the time for completion of work gets extended, the Contractor shall get the validity of P.G. extended to cover such extended time for completion of work plus 60 days.</p> <p>(d) The value of PG to be submitted by the Contractor is based on original contract value and shall not change due to subsequent variation(s) in the original contract value.</p> <p>(e) The Performance Guarantee (PG) shall be released after physical completion of the</p>
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	<p>work based on 'Completion Certificate' issued by the competent authority stating that the Contractor has completed the work in all respects satisfactorily.</p> <p>(f) Whenever the contract is rescinded, the Performance Guarantee already submitted for the contract shall be encashed.</p> <p>(g) The Engineer shall not make a claim under the Performance Guarantee except for amounts to which the President of India is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:</p> <p>(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.</p> <p>(ii) Failure by the Contractor to pay President of India 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 notice to this effect by Engineer.</p> <p>(iii) The Contract being determined or rescinded under clause 62 of Part-II of IRSGCC-April-2022.f</p> <p>(h) If a tender is accepted on the quoted rates of bidder which is below the advertised tender value, an additional performance security shall be submitted by the bidder as below:</p> <table border="1"> <tr> <th>Bid Quoted in % of Advertised Cost</th><th>Additional Performance Guarantee(%)</th></tr> <tr> <td>Below 0-5%(inclusive)</td><td>Nil</td></tr> <tr> <td>Below 5%</td><td>5%</td></tr> </table>	Bid Quoted in % of Advertised Cost	Additional Performance Guarantee(%)	Below 0-5%(inclusive)	Nil	Below 5%	5%
Bid Quoted in % of Advertised Cost	Additional Performance Guarantee(%)						
Below 0-5%(inclusive)	Nil						
Below 5%	5%						
33.	If contractor fails to apply for extension of time on valid and reasonable grounds as acceptable to the railway after expiry of the date of completion/extended date of completion, in such situation, Railway reserves the right to terminate the contract agreement without issuing 'Seven Days' and 'Forty EightHours'. It may be noted that for non-fulfilment of the contract the railways reserve the right to claim the damages under clause-62 of GCC in addition to any other rights available to it under law.						
34. 34.1	<p>Variations in Extent of Contract:-</p> <p>Modification to Contract to be in Writing: In the event of any of the provisions of the contract required to be modified after the contract documents have been signed, the modifications shall be made in writing and signed by the Railway 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 Railway unless and until the same is incorporated in a formal instrument and signed by the Railway and the Contractor, and till then the Railway shall have the right to repudiate such arrangements.</p>						
34.2	<p>Powers of Modification to Contract:The Engineer on behalf of the Railway 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</p>						

	approved materials supplied against a specific order.
	(i) Unless otherwise specified in the special conditions of the contract, the accepted variation in quantity of each individual item of the contract would be upto 25% of the quantity originally contracted, except in case of foundation work (in which no variation limit shall apply). However, the rates for the increased quantities shall be as per sub – para (iii) below:
	(ii) 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 upto the limit of 25% variation in quantity of individual item of works.
	(iii) In case an increase in quantity of an individual item by more than 25% of the agreement quantity is considered unavoidable, then same shall be executed at following rates-
	(a) Quantities operated in excess of 125% but upto 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;
	(b) Quantities operated in excess of 140% but upto 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;
	(c) Variation in quantities of individual items beyond 150% will be avoided and would be permitted only in exceptional unavoidable circumstances and shall be paid at 96% of the rate awarded for that item in that particular tender.
	(d) Variation to quantities of Minor Value Item: 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. (d)(i) Quantities operated upto and including 100% of the agreement quantity of the concerned minor value item, shall be paid at the rate awarded for that item in that particular tender; (d)(ii) Quantities operated in excess of 100% but upto 200% of the agreement quantity of the concerned minor value item, shall be paid at 98% of the rate awarded for that item in that particular tender; (d)(iii) Variation in quantities of individual minor value item beyond 200% will be avoided and would be permitted only in exceptional unavoidable circumstances and shall be paid at 96% of the rate awarded for that item in that particular tender.
	(iv) In case of earthwork, the variation limit of 25% shall apply to the gross quantity of earthwork items and variation in the quantities of individual classifications of soil shall not be subject to this limit.
	(v) As far as Standard Schedule of Rates (SSOR) items are concerned, the variation limit of 25% would apply to the value of SSOR schedule as a whole and not on individual SSOR items. However, in case of Non Standard Schedule of Rates (SSOR) 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).
34.3.	Valuation of Variations: The enlargements, extensions, diminution, reduction, alterations or additions referred to in para-34.2 above 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 therefor shall be calculated in accordance with the

	accepted Bill(s) of Quantities. Any extra items/quantities of work falling outside the purview of the provisions of para-34.2 above shall be paid for at the rates determined under Clause-39 of Indian Railways Standard General Conditions of Contract, April-2022.	
35.	Vitiation during variation in Contract Quantities: As a result of variations, a contract shall be considered “vitiated” only when, the following percentage variation in contract value between tenderers are noticed to have been exceeded.	
	Sl. No.	Value of Contract
		Percentage difference between present Contractor and new L-1 as a result of variation (percentage shall be calculated with base as the revised contract quantities multiplied by the rates of the present contractor).
	1.	Small value contracts (Tender value less than Rs. 50 lakh)
		10
	2.	Other than small value contracts (Tender value equal to or more than Rs. 50 lakh)
		5
	When the percentage difference between present Contractor and new L-1 is noticed as becoming beyond the values specified above, Railway may take decision at its’ discretion whether fresh tender shall be invited for the extra quantities or to negotiate the rates with the existing contractor and decision of Railway Administration in this regard shall be final and binding to the contractor. The case shall be decided by the tender accepting authority (competent for the revised quantity) and shall not be treated as a case of single tender. However, the Executives while executing the work shall make all efforts to ensure that no vitiation takes place in normal circumstances. Vitiation should be an exception rather than a routine affair. Vitiation should always be computed with respect to the items, rates, quantities and conditions as available at the time of tender opening and subsequent changes/additions by way of new items will not be counted for computing vitiation.	
36.	<p>(A) MOBILISATION ADVANCE & INCENTIVE CLAUSE: Mobilization advance and incentive clause will <u>NOT</u> be applicable under this contract.</p> <p>(B) Measurement of works: Measurement of the work done shall be done as per Rly Bd letter no. <u>2017/CE-I/CT/9 dated 31.05.2023&2018/CE-I/CT/30 dated 03.11.2023.</u></p> <p>The main content of above mentioned letter is reiterated below:</p> <p><i>“For all contracts costing more than Rs. 5 Crore, Contractor’s e-MB is mandatory and Contractor’s e-MB should be part of Tender Document. In exceptional cases, approval of DRM/PHOD/CHOD with finance concurrence may be taken, as the case may be.”</i></p>	
37.	<p>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”:</p> <p>The tenderers for carrying out any construction work must get themselves registered from 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</p>	

	Govt. (Labour Deptt.). The cess shall be deducted from contractor's bills as per provisions of the Act.
38.	<p>Employees' Pension Scheme'1995 :</p> <p>Para 3(1) : From and out of the contributions payable by the employer in each month under Section-6 of the "Act" or under the rules of the Provident Fund of the establishment which is exempted either under clauses (a) and (b) of sub-section (1) of Section-17 of the Act or whose employees are exempted under either paragraph-27 or paragraph:27-A of the Employees' Provident Fund Scheme'1952, a part of contribution representing 8.33 per cent of the Employee's pay shall be remitted by the employer to the Employees' Pension Fund within 15 days of the close of every month by a separate Bank Draft or Cheque on account of the Employees' Pension Fund contribution in such manner as may be specified in this behalf by the Commissioner. The cost of the remittance, if any, shall be borne by the employer.</p> <p>Para 3(2) : The Central Government shall also contribute at the rate of 1.16 per cent of the pay of the members of the Employees' Pension Scheme and Credit the contribution to the Employees' Pension Fund:</p> <p>Provided that where the pay of the member exceeds Rs.6,500/- (Rs Six thousand and five hundred) per month, the contribution payable by the employer and the Central Government be limited to the amount payable on his pay of Rs.6,500/- (Rs. Six thousand and five hundred) only.</p> <p>Para 4 : Payment of Contribution:</p> <p>The employer shall pay the contribution payable to the Employees' Pension Fund in respect of each member employed by him directly or by or through a contractor.</p> <p>It shall be the responsibility of the principal employer to pay the contributions payable to the Employees' Pension Fund by himself in respect of the employees directly employed by him also in respect of the employees employed by or through a contractor.</p>
39.	<p>Employees' Deposit Linked Insurance Scheme'1976:</p> <p>Para 7: Contribution:</p> <p>(1) The contribution payable by the employer and the Central Government under sub-section (2) and sub-section (3) of Section 6-C of the Act, shall be calculated on the basis of the basic wages, dearness allowance (including the cash value of any food concession) and retaining allowance, if any, actually drawn during the whole month whether paid on daily, weekly, forthrightly or monthly basis.</p> <p>Provided that where the monthly pay of an employee exceeds six thousand five hundred rupees, the contribution payable in respect of him by the employer and the Central Government shall be limited to the amounts payable on a monthly pay of six thousand five hundred rupees including dearness allowance, retaining allowance (if any) and cash value of food concession.</p> <p>Para 8: Mode of Payment of Contribution:</p> <p>The contribution by the employer shall be remitted by him together with administrative charges at such rate as the Central Government may fix from time to time under sub-section-4 of Section 6-C of the Act, to the Insurance Fund within fifteen days of the close of every month by a separate Bank Draft or cheque or by remittance in cash in such manner as may be specified in this behalf by the Commissioner. The cost of</p>

	<p>remittance, if any, shall be borne by the employer.</p> <p>It shall be the responsibility of the employer to pay the contribution payable by himself in respect to the employees directly employed by him and also in respect of the employees employed by or through a contractor.</p>
40.	<p>Following should be complied under this contract:</p> <p>(i) Payment to the contract labourers should be made through bank/cheque.</p> <p>(ii) Identity Card should be issued to all contract workers.</p> <p>(iii) Necessary step should be taken to deduct Provident Fund from the payment made to the contract labour and ensure that the same is credited to their Provident Fund Account.</p> <p>(iv) Medical facilities from ESI, if applicable.</p>
41.	<p>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 employed by him either directly or through petty Contractors or sub-contractors in the works. If in compliance with the terms of the contract, the Contractor directly or through petty Contractors or 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 nevertheless 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 or behalf of the Contractor and the Engineer may on failure of the Contractor to repay such money to the Railways deduct the same from any moneys due to the Contractor in terms of the contract. The Railway shall be entitled to recover the same from Contractor's bills/ Security Deposit or any other dues of Contractor with the Government of India all moneys paid or payable by the Railway by 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.</p>
41.1.	<p>Provisions of Contract Labour (Regulation and Abolition) Act, 1970:</p>
41.1.1	<p>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 Railway from and against any claims under the aforesaid Act and the Rules.</p>
41.1.2	<p>The Contractor shall obtain a valid license under the aforesaid Act as modified from time to time before the commencement of the work and continue to have a valid license until the completion of the work. Any failure to fulfill the requirement shall attract the penal provision of the Act.</p>
41.1.3	<p>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.</p>
41.1.4	<p>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</p>

	complied with the provisions of the aforesaid Act and Rules wherever applicable.
41.1.5	In every case in which, by virtue of the provisions of the aforesaid Act or the rules, the Railway 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 Railway due to the Contractor's failure to fulfil his statutory obligations under the aforesaid Act or the rules, the Railway 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 Railway under the Section 20, Sub-Section (2) and Section 2, Sub-Section (4) of the aforesaid Act, the Railway shall be at liberty to recover such amount or part thereof from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India. The Railway 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 Railway full security for all costs for which the Railway might become liable in contesting such claim. The decision of the Chief Engineer regarding the amount actually recoverable from the Contractor as stated above shall be final and binding on the Contractor.
41.2.1	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 Railway from and against any claims under the aforesaid Act and the Rules.
41.2.2	<p>Contractor is to abide by the provisions of various labour laws in terms of above clause 54, 55, 55-A and 55-B of Indian Railways Standard General Conditions 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:</p> <p>(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 in the portal within 7 days of receipt of such request.</p> <p>(b) Contractor once approved by any Engineer, can create password with login ID (PAN No.) for subsequent use of portal for all Letter of Acceptances (LoAs) issued in his favour.</p> <p>(c) The contractor once registered on the portal, shall provide details of his Letter of Acceptances (LoAs) / Contract Agreements 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.</p> <p>(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.</p>
	(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.
41.2.3	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 correct 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."
42.	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, Railway is obliged to pay compensation to a workman directly or through petty Contractor or subcontractor employed by the Contractor in executing the work, Railway will recover from the Contractor the amount of the compensation so paid, and, without prejudice to the rights of Railway under Section 12 Sub-section (2) of the said Act, Railway shall be at liberty to recover such amount or any part thereof from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India. Railway 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 Railway full security for all costs for which Railway might become liable in consequence of contesting such claim.
43.	Reporting of Accidents: 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 make every arrangements to render all possible assistance.
44.	The contractor shall provide and keep on the works, during the execution of the works, efficient and competent Engineers to ensure that the work is executed strictly as per provisions of the contract. It shall be the obligation on the part of the contractor to provide the following minimum engineering staff at site: - As mentioned in Chapter 'V' i.e. SCOPE OF WORK AND DEPLOYMENT OF MEN/MACHINERY.
45.	The contractor shall start the work within 15 days as per GCC and will have to submit within 30 days from the issue of LOA as per GCC, the bar chart/mile stone, preferably in M.S.Project for the various activities showing the completion of the work within the stipulated completion period for the approval of the Engineer.
46.	LABORATORY All laboratory testing required under this Agreement shall be carried out at the Contractor's cost and expense. Nothing extra shall be paid on this account, and the Contractor shall ensure that such testing is performed in accordance with applicable standards.
47.	Video recording/Ortho-photogrammetry : NOT APPLICABLE

48.	<p>(a). For protection of track during construction at sites adjacent to the existing running railway tracks, sufficient nos. banner flags, red hand flags, tri-color torches for night time to be kept at all such sites.</p> <p>(b). Also for protection of existing track & formation, proper protection to be ensured by providing sheet piles, concrete piles etc.</p>
49.	<p>Certificate of completion of Works: As soon as in the opinion of the Engineer, the work 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 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 against the contract concerned.</p> <p>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 Railway. 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.</p>
50.1	<p>Rates for Extra Items of Works:</p> <p>(a) Standard Schedule of Rate (SSOR) Items:- Any item of work carried out by the Contractor on the instructions of the Engineer which is not included in the accepted Bill(s) of Quantities but figures in the Standard Schedule of Rates (SSOR), shall be executed at the rates set forth in the “ Standard Schedule of Rates (SSOR) of Railway” modified by the tender percentage as accepted in the contract for that chapter of Standard Schedule of Rates (SSOR).</p> <p>For item(s) not covered under this sub-clause, the rate shall be decided as agreed upon between the Engineer and the Contractor before execution of such items of work as sub-clause-(b) below.</p> <p>(b) Other Items:-For any item of work to be carried out by the Contractor but not included in the accepted Bill(s) of Quantities and also not covered under sub-clause-(a) above, the Contractor 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 Bill(s) of Quantities does not include rate or rates for such 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 Railway 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.</p> <p>The assessment of rates for extra items shall be arrived at based on the prevailing market rates of labour, machinery & materials and by taking guidance from the following documents in order of priority:</p> <ul style="list-style-type: none"> (i) Analysis of Rates for “Unified Standard Schedule of Rates of Indian Railways (USSOR)”. (ii) Analysis of Rates for “Delhi Schedule of Rates issued by CPWD (DSR)”.

	(iii) Market Analysis.
50.2.	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 as case the Contractor shall be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of determination of the 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 Chief Engineer within 30 days of getting the decision of the Engineer, supported by analysis of the rates claimed. The Chief Engineer's decision after hearing both the parties in the matter would be final and binding on the Contractor and the Railway.
52.	Display Board: The Contractor shall be responsible for displaying the details of works i.e. name of work, approximate cost, expected date of completion, name and address of the Contractor and address of Engineer on a proper steel Board of size not less than 1m x 1m.
53.	<p>Offloading of Part(s) of Work:-</p> <p>At the final stage of completion / commissioning of work, in case the contractor fails to complete the final part(s) of the work and the value of such part(s) of the work is limited to 5% of the original contract value, the Engineer may allow/decide for offloading of such part(s) of works, either after the Contractor's request in writing to do so or after serving a 14 (Fourteen) days suo-moto notice (as per annexure- VIIA in GCC-2022), if the Engineer is of the opinion that:-</p> <p>(i) Such Offloading of works (up to 5% of original contract value) would enable successful completion of contract/work,</p> <p>(ii) Termination/ Part termination of the contract at this stage is not be in the interest of the Railway/work; and</p> <p>(iii) The anticipated additional cost for execution of such works through other mode would not be substantial and can be recovered from the pending dues of the contractor;</p> <p>The Contractor shall be informed, in due course, by the Engineer of the mode and cost of execution of such offloaded work through other agency(ies) (as per Annexure-VIIB in GCC-2022). The extra expenditure so incurred in execution of the offloaded work, shall be recovered from subsequent Bill(s) or any other dues of the Contractor, but not exceeding the value of Performance Guarantee available in the contract. There shall be no other repercussion of such offloading on execution of the balance contract. The Contractor shall have no claim on account of above mentioned offloading of works.</p>
54.	Providing live feed of worksite through IP based video cameras- The contractor shall provide IP based video cameras at the various locations as decided by Engineer-in-charge, to provide live feed on the mobile phones of concerned Railway officials and on screen in the office of the CPM/Con, and maintain the same during entire period of contract, including extended period, if any. The cost of this shall be deemed to be inclusive in the quoted rates. If required, the location of these IP based cameras, may be changed/shifted, as per subsequent progress of works/subsequent site requirements and cost of such shifting shall also be deemed to be inclusive in the quoted rates.
55.	Conservancy charges if applicable as per the extant policy guidelines shall be recovered for this contract.

56.	During execution if railway feels to amend the issued approved drawings by way of increasing or decreasing no.of bridges, formation length, construction of residential and service buildings, non schedule items, USSOR-2021 and DSR- 2023 (Vol-I&II) items, etc., the contractor shall be ready for such a situation and shall have no claim over it.
57.	On completion of the work, a completion drawing to be submitted in soft copy and in 5 hard copies duly signed by the Incharge Supervisors involved and AXEN/XEN concerned, as directed by Engineer-in-Charge.

CHAPTER-VII**Annexure-I****BANK GUARANTEE FORMAT (For Performance Guarantee).**

(For the purpose of submission of Performance Guarantee after award of work and before execution of contract agreement by the successful tender)

In consideration of the President of India (hereinafter called "the Government") having agreed to exempt _____ (hereinafter called "the said Contractor/s") from the demand, under the terms and conditions of this Agreement dated _____ made between _____ and XEN/Con/RIG (Beneficiary FA&CAO/SECR/BSP) for _____ (hereinafter called " the said Agreement"), of performance guarantee for the due fulfilment by the said Contractor(s) of the terms and conditions contained in the said Agreement, on production of a Bank Guarantee for Rs. _____ (Rupees _____) we, _____ (hereinafter referred to as (indicate the name of the bank)" the Bank") at the request of _____ (Contractor's) do hereby undertake to pay to the Government an amount not exceeding Rs. _____ against any loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement.

2. We, _____ (indicate the name of bank) do hereby undertake to pay the to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Government (Railways) stating that the amount/claimed is due by way of loss or damage caused to or would be caused to or suffered by the Government (Railway) by reason of breach by the said contractor(s) of any of the terms or conditions contained in the said Agreement or by reason of the contractor(s) 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. _____.

3. We under take to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor(s)/supplier(s) in any suite or proceeding pending before any court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the contractor(s)/supplier(s) shall have no claim against us for making such payment.

4. We, _____ (indicate the name of the bank) 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 or till _____ office/ Department) Ministry of _____ certifies 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. Unless a demand or claim under this guarantee is made on us in writing on or before the _____ we shall be discharged from all liability under this guarantee thereafter. .

5. We _____ (indicate the name of bank) further agree with the Government that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to 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 forbearance, act or omission on the part of the Government or any indulgence by the Government to the said Contractor(s), or any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s)/Supplier(s).

7. We, _____ (indicate the name of the bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Government/Railway in writing.

Dated the _____ day of _____ 19

For _____

(Indicate the name of the bank)

NOTES:

(1) If the tenderer submit Performance Guarantee in the shape of Bank Guarantee, then it will be accepted only if the same matches verbatim with the given format.

(2) The Bank Guarantee/extension of the B.G. if any in future to be submitted by the supplier(s)/contractor(s) should be sent directly to the concerned authorities by the issuing Bank under Registered Post A/D

Format for Bid Security (Annexure-II)

Bank Guarantee bond from any scheduled commercial bank of India
(On non-judicial stamp paper, which should be in the name of the Executing Bank)

Name of the Bank: -----

President of India,

Acting through XEN/Con/RIG,

Beneficiary: FA&CAO/SECR/BSP

Date:

Bank Guarantee Bond No.:

Date: -----

In consideration of the President of India acting through *(Designation & address of Contract Signing Authority)*, Railway,*(hereinafter called “The Railway”)* having invited the bid for _____ through Notice inviting tender (NIT) No. _____, We have been informed that*[Insert name of the Bidder]*.....*(hereinafter called “ the Bidder”)* intends to submit its bid (hereinafter called “the Bid”).

WHEREAS, the Bidder is required to furnish Bid Security for the sum of [Insert required Value of Bid Security], in the form of Bank Guarantee, according to conditions of Bid.

AND

WHEREAS, *[Insert Name of the Bank]*, with its Branch*[Insert Address]* having its Headquarters office at*[Insert Address]*, hereinafter called the Bank, acting through*[Insert Name and Designation of the authorised persons of the Bank]*, have, at the request of the Bidder, agreed to give guarantee for Bid Security as hereinafter contained, in favour of the Railway:

1. KNOW ALL MEN that by these present that I/We the undersigned *[Insert name (s) of authorized of the Bank]*, being fully authorized to sign and incur obligations for and on behalf of the Bank, confirm that the Bank, hereby, unconditionally and irrevocably guarantee to pay to the Railway full amount in the sum of *[Insert required Value of Bid Security]* as above stated.
2. The bank undertakes to immediately pay on presentation of demand by the Railway any amount upto and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Railway on the Bank shall be final, conclusive and binding, absolute and unequivocal on the Bank notwithstanding any disputes raised/ pending before any Court, Tribunal, Arbitration or any Authority or any threatened litigation by the Bidder or Bank.
3. The Bank shall pay the amount as demanded immediately on presentation of the demand by Railway without any reference to the Bidder and without the Railway being required to show grounds or give reasons for its demand of the amount so demanded.
4. The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank or in the constitution of the Bidder.
5. The bank agrees that no change, addition, modifications to the terms of the Bid document or to any documents, which have been or may be made between the Railway and the Bidder, will in any way absolve the Bank from the liability under this guarantee, and the Bank, hereby, waives any requirement for notice of any such change, addition or modification made by Railway at any time.
6. This guarantee will remain valid and effective from*[Insert date of issue]* till *[insert date which should be minimum 90 days beyond the expiry of validity of Bid]*. Any demand in respect of this Guarantee should reach the bank within the validity period of Bid security.
7. The Bank Guarantee is unconditional and irrevocable.
8. The expressions Bank and Railway herein before used shall include their respective successors and assigns.

9. The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the Railway. This guarantee is subject to the Uniform Rules for demand Guarantees, ICC Publication No.758.
10. The Bank hereby confirms that it is on the SFMS (Structured Financial Messaging System) and shall invariably send the advice of this Bank Guarantee to the following band details-

IFSC CODE	SBIN00RAIL
IFSC TYPE	BRACH
BANK NAME	STATE BAND OF INDIA
BRANCH NAME	RAIL
CITY NAME	NAVI MUMBAI
ADDRESS	SECTOR-11, CBD BELAPUR, NAVI MUMBAI
DISTRICT	NAVI MUMBAI
STATE	MAHARASHTRA
BG ENABLED	YES

11. THE Guarantee shall be valid in addition to and without prejudice to any other security Guarantee(s) of Bidder in favour of the Railway. The Bank, under this Guarantee, shall be deemed as Principal Debtor of the Railway.

Date

Place.....

.....

Bank Seal and authorized signature(s)

[Name in Block letters]

[Designation with Code No.]

[P/Attorney] No.

Witness:

1. Signature, Name & Address & Seal

2. Signature, Name & Address & Seal

Bank Seal

[P/Attorney] No.

Note: All italicized text is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.

ANNEXURE – III**Performa for Bid Capacity**

Bid Capacity: The Bid Capacity of the tenderer may be submitted in the following format duly enclosing documents mentioned in this regard in the NIT.

Sl. No	Name of work and contract agreement no. with date	Name and address of employee	Contractual Agreemental value in Cr	Revised value if any in Cr	Completion time as per original agreement and any extension granted.	Payment received upto date of Invitation of this tender in Cr	Balance Amount of ongoing work to be completed in next 'N' years. in Cr
1	2	3	4	5	6	7	8

Note-

1. The tenderer has to furnish the above details of ongoing works and also the works which are awarded but not yet started. In case of no works in hand a NIL statement should be furnished. This statement should be submitted duly verified by Chartered Accountant.

2. In case of JV the arithmetic sum of individual "Bid Capacity" of all the members shall be taken as JV's Bid Capacity. For this purpose, each member of JV will submit separate statement duly verified by Chartered Accountant.

Annexure-IV

Each Bidder must fill in this from separately:

NAME OF BIDDER:

Annual Contractual Turnover Data for the Previous 3 Years (Contractual Payment only)			
Year	Amount Currency	Exchange Rate	Indian Rupees National Equivalent
Average Annual Contractual Turnover for last 3 years			

- 1.** The average annual contractual turnover shall be calculated as an average of "total contractual payments" in the previous three financial years. However, in case balance sheet of the previous year is yet to be prepared/audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover.
- 2.** The information supplied shall be substantiated by data in the audited balance sheets and profit and loss accounts for the relevant years in respect of the bidder or all members constituting the bidder.
- 3.** Contents of this form should be certified by a Chartered Accountant duly supported by Audited Balance Sheet duly certified by the Chartered Accountant.

SEAL AND SIGNATURE OF THE BIDDER

Certified that all figures and facts submitted in this form have been furnished after full consideration of all observations/notes in Auditor's reports. _____

(Signature of Chartered Accountant)

Name of CA: _____

Registration No: _____

(Seal)

ANNEXURE – V**FORMAT FOR CERTIFICATE TO BE SUBMITTED / UPLOADED BY TENDERER ALONGWITH THE TENDER DOCUMENTS**

I..... (Name and designation)** Appointed as the attorney/authorized signatory of the tenderer,

M/s _____ (hereinafter called the tenderer) for the purpose of _____ the Tender documents for the work of _____ as per the tender

No. _____ of South East Central Railway, do hereby solemnly affirm and state on the behalf of the tenderer including its constituents as under:

1. I/we the tenderer(s) am/are signing this document after carefully reading the contents.
2. I/We the tenderer(s) also accept all the conditions of the tender and have signed all the pages in confirmation thereof.
3. I/we hereby declare that I/we have downloaded the tender documents from Indian Railway website www.ireps.gov.in . I/we have verified the content of the document from the website and there is no addition, no deletion or no alteration to the content of the tender document. In case of any discrepancy noticed at any stage i.e. evaluation of tenders, execution of work or final payment of the contract, the master copy available with the railway Administration shall be final and binding upon me/us.
4. I/we declare and certify that I/we have not made any misleading or false representation in the forms, statements, and attachments in proof of the qualification requirements.
5. **I/We also understand that my/our offer will be evaluated based on the documents/credentials submitted along with the offer and same shall be binding upon me/us.**
6. **I/We declare that the information and documents submitted along with the tender by me/us are correct and I/we are fully responsible for the correctness of the information and documents, submitted by us.**
7. I/we certify that I/we the tenderer(s) is/are not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India from participation in tender on the date of submission of bids, either in individual capacity or as a HUF/ member of the partnership firm/LLP/JV/Society/Trust.
8. I/we understand that if the contents of the **certificate** submitted by us are found to be forged/false at any time during process for evaluation of tenders, it shall lead to forfeiture of the Bid Security and may also lead to any other action provided in the contract including banning of business for a period of upto two year. Further, I/we (insert name of the tenderer)** _____ and all my/our constituents understand that my/our offer shall be summarily rejected.
9. I/we also understand that if the contents of the certificate submitted by us are found to be false/forged at any time after the award of the contract, it will lead to termination of the contract, along with forfeiture of Bid Security/Security Deposit and Performance guarantee and may also lead to any other action provided in the contract including banning of business for a period of upto two year.
10. I/We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India and certify that am/We are not from

such a country or, if from such a country, have been registered with the competent Authority. I/We hereby certify that I/we fulfil all the requirements in this regard and am/are eligible to be considered (evidence of valid registration by the competent authority is enclosed)

SEAL AND SIGNATURE
OF THE TENDERER

Place:

Dated:

** The contents in Italics are only for guidance purpose. Details as appropriate are to be filled in suitably by tenderer.

ANNEXURE-V(A)

(This certificate is to be given by attorney/authorized signatory/each member of Partnership firm/Joint Venture (JV)/Hindu Undivided Family (HUF)/Limited Liability Partnership (LLP) etc.)

I/We.....(Name), attorney/authorized signatory of the.....(constituent firm/constituent partner) and member/partner of the.....(tendering firm) hereby solemnly affirm and state as under:

1. I/we certify that.....(constituent firm/constituent partner) is/are not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India from participation in tender on the date of submission of bids, either in individual capacity or as a HUF/ member of the partnership firm/LLP/JV/Society/Trust.
2. I/We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India and certify that I am/We are not from such a country or, if from such a country, have been registered with the competent Authority. I/We hereby certify that I/we fulfil all the requirements in this regard and am/are eligible to be considered (evidence of valid registration by the competent authority is enclosed),

SEAL AND SIGNATURE

OF THE CONSTITUENT FIRM/CONSTITUENT PARTNER

Place:

Dated:

ANNEXURE VI (TENDERER'S CREDENTIALS (BID CAPACITY)).

For tenders having advertised value more than Rs 10 Crore wherein eligibility criteria includes bid capacity also, the tenderer will be qualified only if its available bid capacity is equal to or more than the total value of the present tender. The available Bid Capacity shall be calculated as under:

Available Bid Capacity = $[A \times N \times 2] - 0.33 \times N \times B$

Where,

A = Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender), taking into account the completed as well as works in progress.

N = Number of years prescribed for completion of work for which bids has been invited.

B = Existing commitments and balance amount of ongoing works with tenderer as per the prescribed proforma of Railway for statement of all works in progress and also the works which are awarded to tenderer but yet not started up to the date of inviting tender.

Note:

(a) The Tenderer(s) shall furnish the details of -

(i) Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender) for calculating A, and

(ii) Existing commitments and balance amount of ongoing works with tenderer as per the prescribed proforma of Railway for statement of all works in progress and also the works which are awarded to tenderer but yet not started upto the date of inviting of tender for calculating B. In case of no works in hand, a 'NIL' statement should be furnished.

The submitted details for (i) and (ii) above should be duly verified by Chartered Accountant.

(b) In case if a bidder is JV, the tenderer(s) must furnish the details of

(i) Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender) by each member of JV for calculating A, and

(ii) Existing commitments and balance amount of ongoing works with each member of JV either in individual capacity or as a member of another JV as per the prescribed proforma of Railway for statement of all works in progress and also the works which are awarded to each member of JV either in individual capacity or as a member of other JV but yet not started upto the date of inviting of tender for calculating B. In case of no works in hand, a 'NIL' statement should be furnished.

The submitted details for (i) and (ii) above should be duly verified by Chartered Accountant.

(c) Value of completed work/work in progress/work awarded but yet not started for a Member in an earlier JV shall be reckoned only to the extent of the concerned member's share in that JV for the purpose of satisfying his/her compliance to the above mentioned bid capacity in the tender under consideration.

(d) The arithmetic sum of individual "bid capacity" of all the members shall be taken as JV's "bid capacity".

(e) In case, the tenderer/s failed to submit the above statement along with offer, their/his offer shall be considered as incomplete and will be rejected **summarily**.

(f) The available bid capacity of tenderer shall be assessed based on the details submitted by the tenderer. In case, the available bid capacity is lesser than estimated cost of the put to tender, his offer shall not be considered even if he has been found eligible in other eligibility criteria/tender requirement.

ANNEXURE-VII**Insurance Surety Bond for Performance Security**

Name of the issuer of surety bond:

President of India,
Acting
through.....,
.....

Railway.

Date:.....
.....

Surety Bond No:.....

Issue Date:.....

Amount of Bond:..... .ExpiryDate:.....

WHEREAS, In consideration of the President of India acting through..... (Designation & address of contract signing authority),.....Railway,....., (hereinafter called "The Railway") having accepted the bid of M/S XXXXX hereinafter called the contractor, for the work of XXX" under invitation for bids No XXXX Dated XXXXX, Vide Letter of Acceptance No.....

AND

WHEREAS, the contractor is required to furnish Performance Security for the sum of Rs.XXXX (**Rupees XXXX Only**), in the form of Surety Bond, being a condition precedent to the signing of the Contract Agreement.

WHEREAS, we,__, (Name of insurance company) hereinafter called the Surety, acting through [*Designation(s) of the authorised person of the Surety*], have, at the request of the **M/s.XXXX** contractor, agreed to give Bond for performance security/additional performance security as hereinafter contained:

1. KNOW ALL MEN by these present that I/We, the undersigned [*Insert name(s) of authorized representatives of the Surety*], being fully authorized to sign and incur obligations for and on behalf of the Surety, confirm that the Surety, hereby, unconditionally and irrevocably Bond to pay the Railway the full amount in the sum of XXXX (**Rupees XXXX Only**) as above stated.

2. The Surety undertakes to immediately pay on presentation of demand by the Railway any amount up to and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Railway on the Surety shall be final, conclusive and binding, absolute and unequivocal notwithstanding any disputes raised/pending before any Court, tribunal, arbitration or any authority or any threatened litigation by the Bidder or Bank.

3. On payment of any amount less than aforementioned full amount, as per demand of the Railway, the Bond shall remain valid for the balance amount i.e. the aforementioned full amount less the payment made to the Railway.
4. The Surety shall pay the amount as demanded immediately on presentation of the demand by Railway without any reference to the contractor and without the Railway being required to show grounds or give reasons for its demand or the amount demanded.
5. The Surety Bond shall be unconditional and irrevocable.
6. The Bond hereinbefore shall not be affected by any change in the constitution of the Surety or in the constitution of the Contractor.
7. The Surety agrees that no change, addition, modifications to the terms of the Contract Agreement or to any documents, which have been or may be made between the Railway and the Contractor, will in any way release us from the liability under this Bond; and the Surety, hereby, waives any requirement for notice of any such change, addition or modification to the Surety.
8. This Bond is valid and effective from the date of its issue, which is [*insert date of issue*]. The Bond and our obligations under it will expire on **XXXX** (*Expiry Date*). All demands for I payment under the Bond must be received by us on or before that date.
9. The Surety agrees that the Railways right to demand payment of aforementioned full amount in one instance or demand payments in parts totalling up to the aforementioned full amount in several instances will be valid until either the aforementioned full amount is paid to the Railway or the Bond is released by Railway before the Expiry date.
10. The Surety agrees that its obligation to pay any amount demanded by the Railway before the expiry of this Bond will continue until the amount demanded has been paid in full.
11. The expressions Surety and Railway hereinbefore used shall include their respective successors, administrators and assigns.
12. The Surety hereby undertakes not to revoke the Bond during its currency, except with the previous consent in writing of the Railway. This Bond is subject to the Uniform Rules for Demand Bonds, ICC Publication No. 758.
13. We, the Surety Insurer, further agree that the Authority shall be the sole judge to decide as to whether the Bidder is in default of due and faithful fulfilment and compliance with the terms and conditions contained in the Bidding Documents including, inter alia, the failure of the Bidder to keep its Bid open during the Bid validity period set forth in the said Documents, and the decision of the Authority that the Bidder is in default as aforesaid shall be final and binding on us, notwithstanding any differences between the Authority and the Bidder or any dispute pending before any Court, tribunal, arbitrator or any other authority.
14. The Bond shall be in addition to and without prejudice to any other security Bond (s) of the contractor in favour of the Railway available with the Railway. The Surety, under this Bond, shall be deemed as Principal Debtor of the Railway.

Notwithstanding anything to the contrary contained in these presents,

- a. Our liability under this Surety Bond shall not exceed **XXXX (Rupees XXXXX Only)**.
- b. This Surety Bond shall be valid up to *XXXX (being the date of expiry)*;
- c. Unless the bank is served a written claim or demand on or before *XXXX [date of expiry]* all rights under this Bond shall be forfeited and the Surety shall be relieved and discharged from all liabilities under this Bond irrespective of whether or not the original Surety bond is returned to the Surety.

Dated the day of 2025

15. The Insurance Surety Bond shall be verified by sending mail to [customer.care@sbigeneral.in].

Place.....

Bank's Seal and authorized signature(s)

[Name in Block Letters].....

[Designation with Code No.].....

[P/Attorney] No.

Witness

1.

2.

[Note: All italicized texts are for guidance on how to prepare this Insurance Surety Bond and shall be deleted from the final document.]

Annexure-A

Technical Eligibility of the Bidder

Name of Work/Project	Name of firm/Partner	Project code	% Share	Present Contract value	Contractual Amount received	Claimed Value from Technical Eligibility
1	2	3	4	5	6	7
		a				
		b				
		c				
		d				
		e				
		f				
Aggregate Claimed Technical Eligibility =						
(Only Completed/Substantially Completed Works)						

Note: The responsibility of proving the eligibility for the work as per tender conditions lies with the bidders along with providing unambiguous documents/certificates in confirmation to eligibility criteria with bid. Only Experience given by Tenderer in Annexure-A will be evaluated for technical Eligibility. No other document will be taken cognizance.

[Seal and Signature of the Bidder]

CHAPTER - VIII
SPECIAL CONDITIONS OF CONTRACT
(SAFETY PRECAUTIONS)

PRECAUTION WHILE PLYING VEHICLES ADJACENT TO RUNNING TRACK

1. General

The Contractor shall execute all works in proximity of running lines and on running lines after duly conforming to all safety precautions as detailed in PCE Circular No.16 (Revised), Dated:16.02.2023 issued by the Office of Principal Chief Engineer/S.E.C.Railway/Bilaspur and further revisions of the circular if any. The Contractor shall not allow any road vehicle belonging to his 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 and License particulars of the drivers, location, duration & timings for such work/movement. The engineer in charge or his authorized representative will personally counsel, examine & certify, the road vehicle drivers, Contractor's flagmen & 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.

- 1.1 The road vehicles will ply in between sunrise & sunset.
- 1.2 Nominated vehicles & drivers will be utilized for work in the presence of at least one flagman & one supervisor certified for such work.
- 1.3 The vehicles shall ply 6 m clear of track. If any movement/work is required to be carried out at distance less than 6 m and up to 3.5 m clear of track centre, it shall be done only in the presence of railway employee authorized by the Engineer-in-Charge. No part of the road vehicle will be allowed at less than 3.5 m from track centre. Cost of such railway employee shall be borne by the railway.
- 1.4 The Contractor shall remain fully responsible for ensuring safety & in case of any accident, shall bear cost of all damages to his equipment and also damages to Railway & its passengers.
- 1.5 The Contractor shall also be bound by the provisions of this agreement to ply the road Vehicles only with adequate margin of safety, well clear of the fixed structure profile of infringements, as stipulated in the rules made under the Indian Railways Act and to seek and be guided by the Signals and other directions of any look-out men or other personnel retained for the purpose of ensuring safety, and to ensure extra care and vigilance while turning, reversing or moving the road Vehicles Track or the siding, as the case may be. The Contractor shall employ necessary lookout men also at his own cost, irrespective of any other arrangement that Railway may make in this regard.

Any breach of these conditions by the Contractor and/or his agents affecting the safety of movement of Trains, engines, or other rolling stock of the railway shall constitute a breach of Contract by the Contractor entailing liability for termination of contract for default on the part of the Contractor.

2. PROVISION OF FENCING: If desired by the Engineer-in-charge, the work site is to be protected by providing and maintaining fencing cost of which will be made separately as per provision in the schedule of work. Sturdy fencing shall be provided as per CE/C/BSP's Drg. No.5808/2018 and the payment will be made separately.
3. **“JOINT PROCEDURE ORDER FOR UNDERTAKING DIGGING WORK IN THE VICINITY OF UNDERGROUND SIGNALING, ELECTRICAL AND TELECOMMUNICATION CABLES”**
 - 3.1. Number of Engineering works in connection with third/fourth line are in progress, 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 organisation under open line or construction units under CAO/C, are executing various Signalling and Telecom works requiring digging of earth for laying of cables or casting of foundations for the erection of signal posts etc. On certain sections digging is also required for laying of electrical cable and casting of foundation for the erection of OHE masts. Generally, these works are executed by Contractors.
 - 3.2. However, while carrying out these works in the vicinity of working signalling, 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 Contractors. Such cable faults result in the failure of vital signalling and telecommunication circuits & electrical installations.
 - 3.3. Following joint procedure shall be followed by Engineering, Electrical and S&T Contractors, while carrying out any digging work near to existing signalling & telecommunication and electrical cables, so that the instances of cable cut due to execution of works can be controlled and minimized.
 - 3.4. S&T Department and Electrical Department shall provide a detailed cable route plan showing exact location of cable at an interval of 200 m or wherever there is change in alignment so that the same is located easily by the Engineering official/Contractor. In addition, S&T Department and Electrical Department shall also provide cable markers along the alignment of the cable.
 - 3.5. Before taking up any digging activity for a particular work by any agency, the concerned Engineering, S&T, or Electrical officer shall approach the Sr. DSTE/DSTE or Sr. DEE/DEE of the section in writing to obtain permission to undertake the work. The Sr. DSTE/DSTE or Sr. DEE/DEE, after ensuring that the concerned executing agencies, including the contractor, have fully understood the S&T and Electrical cable route plan, shall grant permission in writing within 7 days of receiving the request from the concerned department.
 - 3.6. After obtaining permission from the S&T or Electrical Department, as applicable, the relevant portion of the cable route plan shall be attached to the letter issued by the concerned Engineering Official to the Contractor for commencement of work. It must be ensured that the Contractor has fully understood the cable route plan and the precautions to be taken to prevent damage to underground cables. The Contractor shall be required to carefully study the cable plan and follow it meticulously to ensure that the safety of the cables is not compromised. Such a provision, including any penalty for default, should also form part of the agreement.

- 3.7. The SE/P.Way or SE/Works shall pass on the information to the concerned SE/Sig and SE/Tele regarding the works being undertaken by the contractors in their respective sections at least **three days in advance** of the scheduled date of work. In addition, Engineering Control shall also be informed by the SE/P.Way or SE/Works. They shall, in turn, communicate the information to the **Test Room / Network Operation Centre (TPC/Elect. Control)**.
- 3.8. On receiving the above information, the SE/Sig or SE/Telecom 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 damage to the cables. The permission shall be granted within 3 days of submission of such requests.
- 3.9. The name of the contractor, their contact telephone number, and the nature of the work shall be notified to Engineering Control as soon as the concerned engineering officials issue the letter authorizing the commencement of work to the contractor. The Test Room shall be provided with copies of this information. It shall also collect any further details from Engineering Control and regularly pass them on to S&T and Electrical officials. In case the supervisors of the concerned departments do not turn up on the scheduled day as advised under Paras 3.5 to 3.8 above, the contractor's work should not be stopped on this account.
- 3.10. In case works are undertaken by the State Government, National Highway Authority, or any other agency, the details of the permission granted—such as the nature of the work, location (kilometre), etc.—should be provided to the Engineering Control along with the contact numbers of the concerned person. This will help ensure that the work is carried out in a planned and coordinated manner. The permission letter must also include the contact numbers of the Test Room / Network Operating Centre of TPC / Electrical Control.
- 3.11. Where the nature of the work taken up by the Engineering Department is such that OFC or other S&T cables or electrical cables are to be shifted and relocated, a notice of a minimum of one week shall be given so that the Division/Construction team can plan the works properly for shifting. Such shifting works shall, in addition, for the security and integrity of the cables, be supervised by S&T Supervisors/Electrical Supervisors.
- 3.12. The concerned SE/P.Way/SE/Works/SE/Sig/SE/Tele 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 accidents or emergencies.
- 3.13. In case of minor works where shifting of cables is not required, the Engineering Contractor shall carefully take out the S&T, optical fibre, or electrical cables from the trench and place them safely alongside at a secure location before starting earthwork, under the supervision of SE/Signal or SE/Tele. After completion of excavation, the cable shall be reburied with due care, including proper placement of bricks over the cable, under the supervision of S&T or Electrical supervisors. The cost of such work shall be charged to the concerned Engineering department. The responsibility for ensuring the availability of SE (Signal), as per Paras 3.5 to 3.9 above, lies with the respective department. The Contractor shall proceed with the shifting of cables as per the decided program and shall not be held responsible for any cable cuts.

- 3.14. In all sections where major project are to be taken up / going on S & T department shall deploy their official to take preventive / corrective action at site of work. As regards Electrical Department, the official may be deputed on need basis.
- 3.15. No new OFC or quad cable shall be laid close to existing track. It shall be laid close to the Railway boundary on one side of the Railway track to the extent possible to avoid any interference with the future works. It shall be ensured in the new works of cable laying that the cable route is properly identified with electronic or concrete markers. Wherever multiple cables are laid in a trench, RFID markers may be provided for easy identification of the cable. Henceforth, wherever cable laying is planned, before undertaking the cable laying work, the cable route plan of the same shall be prepared by the Dy.CSTE/A or Dy.CEE/C and shall be got approved from the concerned Sr. DSTE/DSTE or Sr.DEE/DEE and also from the concerned Dy.CE/C for new lines and from the concerned Sr.DEN for all other projects including GC etc., to avoid possible damages in future. Such approvals shall be granted within 15 days of the submission of the request.
- 3.16. The works of excavating the trench and laying of the cable should proceed in quick succession, leaving a minimum time between the two activities.
- 3.17. In case damage caused to OFC/Quad cable or Electrical cable during execution of the work, the Contractor is liable to pay a penalty for damaging the cable. Penalty shall not be levied in case of the following:-
- Detailed cable route plan as per clause C-1 not provided by concerned department or cable is not protected as per laid down procedures.
 - The alignment of the cable does not tally with the information provided to the Contractor.
 - The cable depth is found to be less than 800 mm from normal ground level.
 - No representative of S&T department was available at site guarding the cables on the fixed pre-determined date and time.

3.18. Penalty to be imposed for damages to cable shall be as under:-

Cable damaged	Penalty per location
Only Quad cable or signaling cable	Rs 1.0 lakh
Only OFC	Rs 1.25 lakh
Both OFC and Quad	Rs 1.5 lakh
Electrical Cable	Rs 1.0 lakh

Necessary debit in this regard shall be raised on the department undertaking the work, who shall in turn levy the penalty on the defaulting Contractor. S&T department shall raise the debits in case of damage to OFC or Quad or Signalling cable, and Electrical department shall raise the debits in case of damage to Electrical cable.

- 3.19. Railways will not lodge FIR with RPF in case of works being executed by authorized Contractors of Railways who have been duly permitted to execute the works in accordance with this JPO. Joint note by the supervisors of the concerned department shall be prepared, and the responsibility of the cable cut should be decided without involving RPF. The joint note deciding the fact whether the contractor should be penalized shall be completed in a day's time from the occurrence of the cable cut. In all other cases, when the cable is cut by an agency that was not permitted to execute any work, FIR should be lodged with RPF.

- 3.20. While giving permission for taking up the works, concerned departments may note that earthwork by engineering Contractors will normally be done by machines, except in a few isolated locations where the quantity of earthwork is very less.
- 3.21. Railways shall make necessary correction in their future contracts so that this JPO can also be enforced contractually.
- 3.22. All types of signalling & OHE bonds, i.e., rail bond, cross bond, and structure bond, shall be restored by the Contractor with a view to keep rail voltage low to ensure safety of personnel.
- 3.23. Above joint circular shall be applicable for construction as well as open line organization of Engineering, S&T, and Electrical.
- 3.24. S&T cable and electrical cable route plan should be prepared by the concerned S&T and Electrical officers respectively and got approved as stipulated before undertaking the work. The completion cable route plans should be finalized block section by block section as soon as the work is completed.
- 3.25. All cable laying works shall be executed as per laid down technical specifications, such as protection measures/protective cover, compaction of refilled material, etc.

CHAPTER – IX

SPECIAL CONDITIONS OF CONTRACT (QUALITY ASSURANCE, MONITORING AND SUPERVISION)

1.1. Quality of Materials and workmanship

1.1.1 The Contractor shall ensure that the Construction, Materials and workmanship are in accordance with the requirements specified in this Agreement, Specifications and Standards and Good Industry Practice.

1.1.2 The Contractor warrants that all Materials shall be new, unused, not reconditioned and in conformity with Specification and Standards, Applicable Laws and Good Industry Practice, and that the Contractor shall not use any materials which are generally recognized as being deleterious under Good Industry Practice.

1.2 Quality control system

1.2.1 The Contractor shall establish a quality control mechanism to ensure compliance with the provisions of this Agreement as **Quality Assurance Plan or QAP**.

1.2.2 The Contractor shall, within 15 (fifteen) days of the issue of letter of Acceptance of this tender, submit to the Engineer its Quality Assurance Plan which shall include the following:

- (a) organization, duties and responsibilities, procedures, inspections and documentation;
- (b) quality control mechanism including sampling and testing of Materials, test frequencies, standards, acceptance criteria, testing facilities, reporting, recording and interpretation of test results, approvals, check list for site activities, and proforma for testing and calibration in accordance with the Specifications and Standards and Good Industry Practice; and
- (c) internal quality audit system.

The Engineer shall convey its comments to the Contractor within a period of 21 (twenty-one) days of receipt of the QAP stating the modifications, if any, required, and the Contractor shall incorporate those in the QAP to the extent required for conforming with the provisions of this Clause 1.2.

1.2.3 The Contractor shall procure all documents, apparatus and instruments, fuel, consumables, water, electricity, labour, Materials, samples, and qualified personnel as are necessary for examining and testing the Project Assets, Materials and workmanship in accordance with the Quality Assurance Plan.

1.2.4 The cost of testing of Construction, Materials and workmanship shall be borne by the Contractor.

1.3 Methodology

The Contractor shall, at least 07 (seven) days prior to the commencement of any construction activity, submit to the Engineer for review the method statement proposed to be adopted for executing the Work, giving details of inspection checklist, quality parameters, engineers/staff/labour/equipment to be deployed, traffic management and measures for ensuring safety. The Engineer shall complete the review and convey its comments, if any, to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed method statement from the Contractor. The Contractor shall revise the method statements by incorporating these comments or else will advise the Engineer reasons for not/partially including the same.

1.4 Inspection and technical audit by the Railway

The Engineer or his representative may inspect and review the progress and quality of the construction of Works and issue appropriate directions to the Contractor for taking remedial action in the event the Works are not in accordance with the provisions of this Agreement.

1.5 Inspection of construction records

The Engineer shall have the right to inspect the records of the Contractor relating to the Works.

1.6 Monthly progress reports

During the Construction Period, the Contractor shall, no later than 10 (ten) days after the close of each month, furnish to the Engineer a monthly report on the progress of Works and shall promptly give such other relevant information as may be required by the Engineer.

1.7 Inspection

1.7.1 The Engineer and Engineer's Representative shall at all times:

- (a) have full access to all parts of the Site and to all places from which natural Materials are being obtained for use in the Works; and
 - during production, manufacture and construction at the Site and at the place of production, be entitled to examine, inspect, measure and test the Materials and workmanship, and to check the progress of manufacture of Materials.

1.7.2 The Contractor shall give the Engineer and his representatives access, facilities and safety equipment for carrying out their obligations under this Agreement.

1.7.3 The Engineer shall submit a monthly inspection report to the Contractor bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. For the avoidance of doubt, such inspection or submission of Inspection Report by the Engineer shall not relieve or absolve the Contractor of its obligations and liabilities under this Agreement in any manner whatsoever.

1.8 Samples

The Contractor shall submit the following samples of Materials and relevant information to the Engineer for review:

1.8.1 Manufacturer's test reports and standard samples of manufactured Materials; and

1.8.2 Samples of such other Materials as the Engineer may require.

1.9 Tests

1.9.1 For determining that the Works conform to the Specifications and Standards, the Engineer shall require the Contractor to carry out or cause to be carried out tests, at such time and frequency and in such manner as specified in this Agreement, and in accordance with Good Industry Practice for quality assurance. The Contractor shall, with due diligence, carry out all the tests in accordance with the Agreement and furnish the results thereof to the Engineer. Of the total tests for each category or type to be undertaken by the Contractor under the provisions of this Agreement and Good Industry Practice, the Engineer shall (a) carry out or cause to be carried out, test checks equal to about 10% (ten per cent) of the number of the tests required to be undertaken by the Contractor; and (b) witness or participate in at least 10% (ten per cent) of the number of such tests conducted or caused to be conducted by the Contractor.

1.9.2 In the event that results of any tests conducted under this Clause 1.10 establish any Defects or deficiencies in the Works, the Contractor shall carry out remedial measures and furnish a

report to the Engineer in this behalf. The Engineer shall require the Contractor to carry out or cause to be carried out tests to determine that such remedial measures have brought the Works into compliance with the Specifications and Standards, and the procedure shall be repeated until such Works conform to the Specifications and Standards. For the avoidance of doubt, the cost of such tests and the remedial measures in pursuance thereof shall be solely borne by the Contractor.

1.10 Rejection

- 1.10.1 If, as a result of an examination, inspection, measurement or testing, any Plant, Material, design or workmanship is found to be defective or otherwise not in accordance with the provisions of this Agreement, the Engineer may reject such Plant, Material, design or workmanship by giving notice to the Contractor, with reasons. The Contractor shall then promptly make good the Defect and ensure that the rejected item complies with the requirements of this Agreement.
- 1.10.2 If the Engineer requires the Plant, Material, design or workmanship to be retested, the tests shall be repeated on the same terms and conditions, as applicable in each case. If the rejection and retesting cause the Railway to incur any additional costs, such costs shall be recoverable by the Railway from the Contractor and may be deducted by the Railway from any money due to be paid to the Contractor.
- 1.10.3 The Contractor shall not be entitled to any extension of time on account of rectifying any Defect or retesting as specified above.
- 1.10.4 No examination, inspection, measurement or testing of any Plant, Material, design or workmanship by the Engineer or its failure to convey its observations or to examine, inspect, measure or test shall relieve the Contractor of its obligations and liabilities under this Agreement in any manner nor shall the Railway be liable for the same in any manner.

1.11 Remedial work

- 1.11.1 Notwithstanding any previous test or certification, the Engineer may instruct the Contractor to:
 - (a) remove from the Site and replace any Plant or Materials which are not in accordance with the provisions of this Agreement;
 - (b) remove and re-execute any work which is not in accordance with the provisions of this Agreement and the Specification and Standards; and
 - (c) execute any work which is urgently required for the safety of the Railway Project, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work which is required on account of a Force Majeure Event, the provisions of Clause 17 of Part II of GCC shall apply.
- 1.11.2 If the Contractor fails to comply with the instructions issued by the Engineer under Clause-1.12 within the time specified in the Engineer's notice or as mutually agreed, the Engineer may decide to have the work executed by another agency. The cost so incurred by the Railway for undertaking such work shall be recoverable from the Contractor and may be deducted by the Railway from any monies due to be paid to the Contractor.

1.12 Quality control records and Documents

The Contractor shall hand over to the Engineer a copy of all its quality control records and documents after completion of the work.

CHAPTER - X
SPECIAL CONDITIONS OF CONTRACT
(SPECIFICATION FOR STEEL REINFORCEMENT)

“Supply of TMT reinforcement bars should have conformity to the SCHEDULE OF TECHNICAL REQUIREMENTS for SUPPLY OF TMT REINFORCEMENT BARS to Indian Railway. All reinforcement steel (TMT Bar) and structural steel as per IS: 1786 and IS: 2062 with latest amendment should be procured from the primary producers of steel i.e.

- a. SAIL
- b .TISCO
- c. RINL

d. Any other Primary Steel Producer having Integrated Steel Plant (ISP) and using iron ore as the basic raw material and having in-house iron rolling facilities, followed by production of steel through the process of DRI-EAF, BF-BOF and Corex-BOF only.

Note:- (i). The contractor shall produce the certificate in advance before supply start issued by plant manufacturer/Plant consultant (with documentary proof of process) establishing process being used at plant is either of DRI- EAF, BF-BOF and Corex-BOF route only, for manufacturing TMT reinforcement bar using iron ore as basic raw materials.

(ii). All Reinforcement Steel (TMT Bars) shall be procured as per specifications mentioned in BIS's document - IS:1786. Independent tests shall be conducted, where ever required, to ensure that the materials procured conforms to the specifications and cost of testing to be borne by the Contractor and no extra payment will be given to the contractor. The particular type/grade/brand of reinforcement steel/bars only to be used from the manufacturing companies/plant.

(iii) The contractor shall disclose the source from where supplies of Steel is received by him and maintain a detailed record of receipt of steel from different sources and shall keep the challan, Railway receipts, lorry number, etc. and store balance in a register as directed by the Engineer-in-charge and produce the same to the Engineer as and when demanded. A copy of purchase document shall have to be submitted along the bill for claiming payment against these Items. Railway reserves the right to inspect contractor store godown/material yard and documents pertaining to procurement of steel.

(iv) Payment towards Steel will be made on the basis of actual consumption (payment of overlaps and chairs will also be made) and no wastage on any of the materials supplied and used in the work by the contractor is payable by the Railway.

(v) In case of any doubts regarding quality of Steel, the Railway may order to get it tested. Acceptance of the supplied steel shall be subject to such test results and cost of testing will have to be borne by the contractor and no extra payment will be made by the Railway.

(vi). The quantity will be calculated using standard weight per running metre or actual weight whichever is less and minimum required over laps will be provided as per IS:456 (Latest revision). The quantity of chairs shall be payable as per drawing showing layout of chair locations duly approved in advance by the Engineer.

(vii). Manufacturer's Test certificate for steel used should be produced and the same should conform to IS:1786.

(viii). All reinforcement used should be free from loose Mill scale, loose rust, paints and oil coating etc.

(ix). Contractor has to use galvanized wire not less than 1mm diameter for binding of reinforcement steel. No extra payment shall be applicable for binding wire.

(x). Dy CE(Con)/Authority Engineer is the authority to approve steel as per above specification.”

CHAPTER-XI

SPECIAL CONDITION OF CONTRACT

(EARTHWORK)

The work shall be executed according to the RDSO guideline RDSO/2020/GE:IRS-0004 “Comprehensive guidelines and specifications for Railway formation” and also any revised guidelines issued by Railway Board from time to time. **Guidelines to be used (for some or other block sections) for earthwork and blanketing etc. will be decided by Engineer – in – Charge as per site conditions and final binding to the contractor for the same.**

1. Soil Exploration for formation design:

1.1 As formation design will primarily depend upon the type of soil being used in construction, it is essential the soil exploration is done properly for soil classification and assessment of bearing capacity as laid down in RDSO Guidelines GE:G-1, para-3.0& as per the RDSO guideline RDSO/2020/GE:IRS-0004. The results of soil exploration shall be reviewed and finally approved as this will be the basis of further design.

1.2 Following initial activities were required to be done by the contractor-

- (i). Geo-technical investigation/testing of Natural ground/sub-soil and submission of their report.
- (ii). Submission of sample & Geo-technical testing of proposed embankment fill soil and submission of their report.
- (iii). Sub-soil testing along the alignment, for buildings & for bridge locations etc. as per the guidelines/provisions.
- (iv). Submission of sample of fill soil & testing of such sample and testing of sub-soil sample for formation design.
- (v). Recording of initial ground levels for joint signing of cross-sections before commencement of earthwork.
- (vi). Finalization of longitudinal levels, cross-levels & L-section as per the proposed final level and finalization of cross-sections before start of earthwork.

1.3 The soil classification shall be done as per RDSO guideline RDSO/2020/GE:IRS-0004 “Comprehensive guidelines and specifications for Railway formation”.

Table Description of soil quality class	
Description w.r.t. %age Fines (size < 75 micron)	Soil Quality Class,
Soil containing fines > 50%	SQ1
Soil containing fines from 12% to 50%	SQ2
Soil containing fines < 12%	SQ3

2. Requirement of Blanket Layer:

2.1 The provision of blanket layer shall not be needed when formation/ earth fill embankment have:

- (i) Rocky beds except those, which are very susceptible to weathering e.g. rocks consisting of shale's and other soft rocks, which become muddy after coming into contact with water.

- (ii) Soil GW, SW, GW-GM, SW-SM type.
- (iii) Soils conforming to specification given in para 4 below.

The provision of separate Blanket layer shall not be necessary when Coarse granular, well graded ($C_u > 7$, C_c between 1 and 3) soil/quarry dust/crushed stones material of 300 mm thickness is laid as top layer.

- 2.2 For other conditions, the system of layered construction of embankment consisting of prepared subgrade shall normally be followed. The prepared sub-grade should normally consist of good quality soils with fines less than 12% (A or B1).

2.3 Thickness of Prepared subgrade and Blanket Layer(as per letter no.RS/G/108/Heavy Axle Load, dated:19.10.2015):

Embankment Fill/Soil Group	Prepared Subgrade		Thickness of Blanket Layer (mm)
	Type of Soil group	Thickness (mm)	
A	Not Required	NIL	NIL
B(B1/B2)	A	500	NIL
	B1 (Fines < 12 %)	350	150
C	A	500	NIL
	B1 (Fines < 12 %)	500	150

of compaction of various layers of formation shall be ensured as defined in guidelines issued by RDSO.

- a) In case good quality soils with fines less than 12% (A or B1), are not available for preparation of subgrade economically, soils having fines between 12% to 50% (B2) can be used over embankment fill of soil group-C. In such cases, the thickness of blanket layer over prepared subgrade of 500 mm thickness shall be kept as 250mm. The thickness of blanket layer can be reduced to 150mm by use of Geotextile in consultation with RDSO.
 - b) In case, the prepared subgrade is not considered on economic consideration and use of other types of soil not covered by above clauses is required, Railways may approach RDSO for getting guidance on deciding blanket thickness depth.
 - c) Use of Geosynthetics (Geo textile/Geo grids) shall be considered at places where it is economical to use it in combination with blanket as it reduces the requirement of thickness of blanket. Use and selection of Geosynthetics should be done in consultation with RDSO.
- 2.4 The Railway Formation may be constructed with Single Layer System or Two LayerSystem as per RDSO guideline RDSO/2020/GE:IRS-0004 “Comprehensive guidelines and specifications for Railway formation”, based on availability of local soils/materials and on economic considerations. The thickness of the prepared sub-grade and blanket layer has been rationalized based on UIC-719R calculation for ballast cushion of 350 mm. The specifications and thickness of Blanket layer, Prepared subgrade, Subgrade (Top Layer & Lower layer) and Sub-Soil are tabulated for Single layer system and Two-layer system for 25T.

For 25 T Axle Load

Sl. No.	Soil type Category in Sub-grade	Prepared Sub-grade		Recommended Blanket Thickness (mm)	Remark
		Soil Type	Thickness (mm)		
1.	SQ1	SQ1*	--	550	Single layer
2.	SQ1	SQ2	500	400	Two Layer
3.	SQ1	SQ3	500	300	Two Layer
4.	SQ2	SQ2*	--	400	Single layer
5.	SQ2	SQ3	350	300	Two Layer
6.	SQ3	SQ3*	--	300	Single layer

* Subgrade soil is continued upto blanket layer.

2.5 Selection of top layers for design of formation as well as for blanket material as given in above paras and further deviations from these provisions can be finally decided on techno-economic considerations by CAO (Con.) after recording the reasons.

3. Specification of Blanket Material:

3.1. The material for blanket layer over prepared sub-grade should be well graded granular material. The following specifications shall be ensured at the time of laying.

(i) $C_u > 7$ and C_c between 1 and 3.

(ii) Fines (passing 75 microns) 3% to 10%.

(iii) Minimum required Soaked CBR value 25 of the blanket material compacted at 100% of MDD.

3.2 These values can generally be obtained by following the gradation as given in GE:G-0014.

3.3 **Specification and Thickness of Formation Layers for 25T axle load: Single layer system as per RDSO guideline RDSO/2020/GE:IRS-0004 "Comprehensive guidelines and specifications for Railway formation".**

Layers	Specification	Thickness
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<u>Blanket</u>	i) $C_u > 7$ and C_c between 1 and 3. ii) Fines (passing 75 microns): 3% to 10% iii) Minimum soaked CBR value ≥ 25 , (Soil compacted at 100% of MDD * in Lab) iv) Los Angeles Abrasion value $< 40\%$ v) Field Compaction : Min. 100% of MDD * in field trial vi) Minimum $E_{v2}^{**} = 100 \text{ MPa}$ vii) Size gradation – within specified range or should lie more or less within enveloping curves. viii) Filter criteria (***) Optional should be satisfied with sub-grade layers as given below: Criteria-1: $D_{15}(\text{blanket}) < 5 \times D_{85}(\text{sub-grade})$ Criteria-2: $D_{15}(\text{blanket}) > 4 \times D_{15}(\text{sub-grade})$ Criteria-3: $D_{50}(\text{blanket}) < 25 \times D_{50}(\text{sub-grade})$	30cm over SQ3 sub-grade 40cm over SQ2 sub-grade 55cm over SQ1 sub-grade
<u>Sub-grade</u> Top Layer	SQ1/SQ2/SQ3 soil SQ1 soils (To be used only with dispensation of PCE/CAO) i) For SQ2/SQ3 soil, $\text{CBR} \geq 6$ (soil compacted at 98% of MDD *) ii) For SQ1 soil, $\text{CBR} \geq 4$ soil compacted at 98% of MDD *	100cm
<u>Lower layer (fill)</u>	iii) Field Compaction : Min. 98% of MDD * iv) Minimum $E_{v2} = 45 \text{ MPa}$ (for SQ1) 60 MPa (for SQ2/SQ3) SQ1/SQ2/SQ3 soil (+) (a) $\text{CBR} \geq 3$ (soil compacted at 97% of MDD *) (b) Field Compaction : Min. 97% of MDD *	As per Embankment height
<u>Ground Soil/Sub-soil Strata</u>	i) Undrained cohesion of soil (C_u) $\geq 25 \text{ KPa}$ (only for soils having particles finer than 75 micron exceeding 12%) ii) E_{v2} (determined from PLT) $\geq 50 \text{ MPa}$ iii) N (determined from SPT) ≥ 5 Ground Improvement is required, if any of the above parameters not complied with	--

* MDD mentioned in the above table.

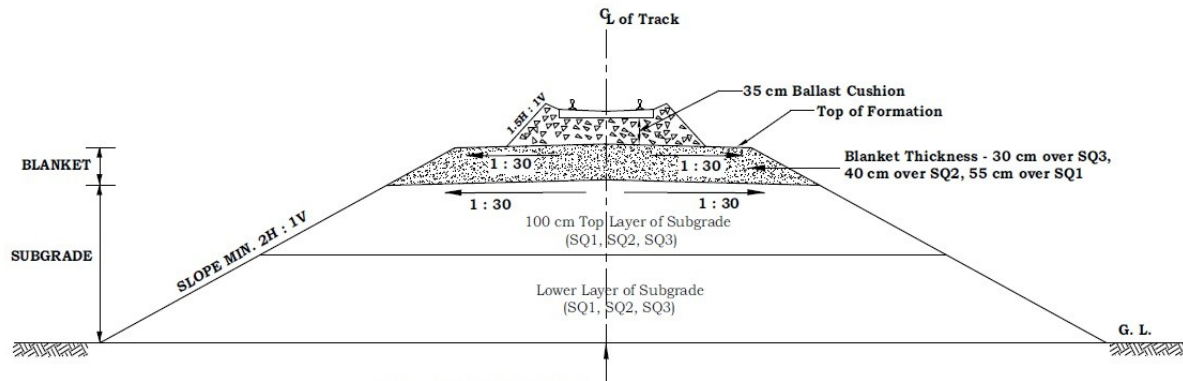
(a) For determination of CBR - MDD achieved in Lab

(b) For field compaction - MDD achieved in field compaction trials which should not be less than 98% of MDD in lab.

** E_{v2} is Modulus of deformation. E_{v2} testing at field is mandatory.

*** With the application of Non-woven Geotextile as a separator layer below the blanket, filter criteria will not be required or mandatory.

+ No dispensation of PCE/CAO required for use of SQ1 soil in Lower layer (fill) of Subgrade.



Track Formation for 25 T Axle Load (Single layer system)

3.4 Specification and Thickness of Formation Layers for 25T axle load: Two layer system as per RDSO guideline RDSO/2020/GE:IRS-0004 “Comprehensive guidelines and specifications for Railway formation”.

Layers	Specification	Thickness
<u>Blanket</u>	i) $C_u > 7$ and C_c between 1 and 3. ii) Fines (passing 75 microns): 3% to 10% iii) Los Angeles Abrasion value $< 40\%$ iv) Minimum soaked CBR value ≥ 25 , (Soil compacted at 100% of MDD * in Lab) v) Field compaction: 100% of MDD * in field trial vi) Minimum $E_{v2}^{**} = 100 \text{ MPa}$ vii) Size gradation – within specified range or should lie more or less within enveloping curves. viii) Filter criteria (***) Optional should be satisfied with prepared sub-grade layer as given below: Criteria-1: $D_{15}(\text{blanket}) < 5 \times D_{85}(\text{prepared sub-grade})$ Criteria-2: $D_{15}(\text{blanket}) > 4 \text{ to } 5 \times D_{15}(\text{prepared sub-grade})$ Criteria-3: $D_{50}(\text{blanket}) < 25 \times D_{50}(\text{prepared sub-grade})$	30 cm over SQ3 Prepared Sub-grade 40 cm over SQ2 Prepared Sub-grade
<u>Prepared Subgrade</u>	SQ2/SQ3 i) $\text{CBR} \geq 8$ (soil compacted upto 98% of MDD *) ii) Plasticity Index ≤ 12 iii) Field Compaction : Min. 98% of MDD * iv) Minimum $E_{v2} = 60 \text{ MPa}$	50 cm over SQ1 fill 35 cm over SQ2 fill

Subgrade Top Layer	SQ1/SQ2/SQ3 (SQ1 soils (To be used only with dispensation of PCE/CAO) i) CBR ≥ 5 (soil compacted at 97% of MDD *) for SQ2/SQ3 soils ii) For SQ1 soil, CBR ≥ 4 (soil compacted at 97% of MDD *) iii) Field Compaction: Min. 97% of MDD * iv) Minimum E_{v2} = 30 MPa (for SQ1) 45 MPa (for SQ2/SQ3)	50 cm
Lower layer (fill)	SQ1/SQ2/SQ3 soil (+) i) CBR ≥ 3 (soil compacted at 97% of MDD *) ii) Field Compaction: Min. 97% of MDD *	As per Embankment height
Ground Soil/Sub-soil Strata	i) Undrained Cohesion of soil (C_u) ≥ 25 KPa (only for soils having particles finer than 75 micron exceeding 12%) ii) E_{v2} (determined from PLT) ≥ 20 MPa iii) N (determined from SPT) ≥ 5 Ground Improvement is required, if any of the above parameters not complied with	--

* MDD mentioned in above table

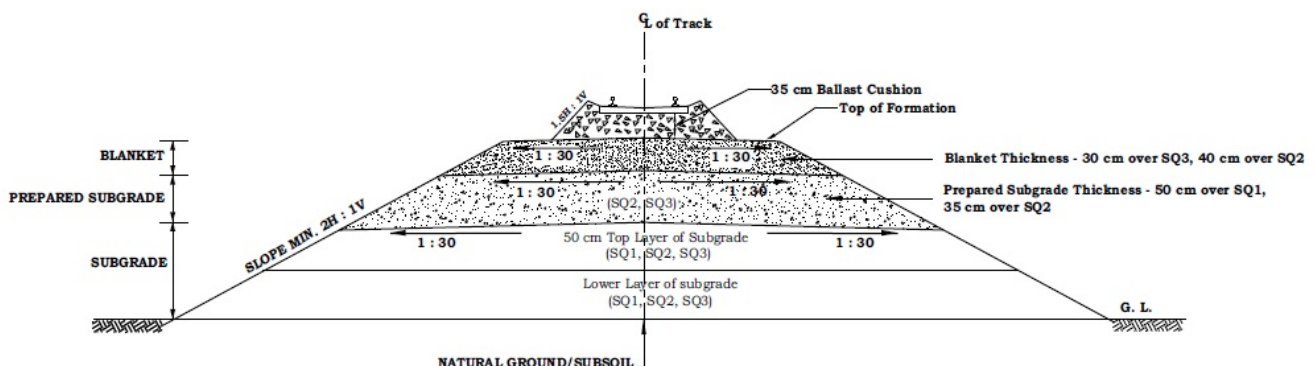
a) For determination of CBR - MDD achieved in Lab,

b) For field compaction - MDD achieved in field compaction trials which should not be less than 98% of MDD in lab.

** E_{v2} is Modulus of deformation. E_{v2} testing at field is mandatory.

*** With the application of Non-woven Geotextile as a separator layer below the blanket, filter criteria will not be required or mandatory.

+ No dispensation of PCE/CAO required for use of SQ1 soil in Lower layer (fill) of Subgrade.

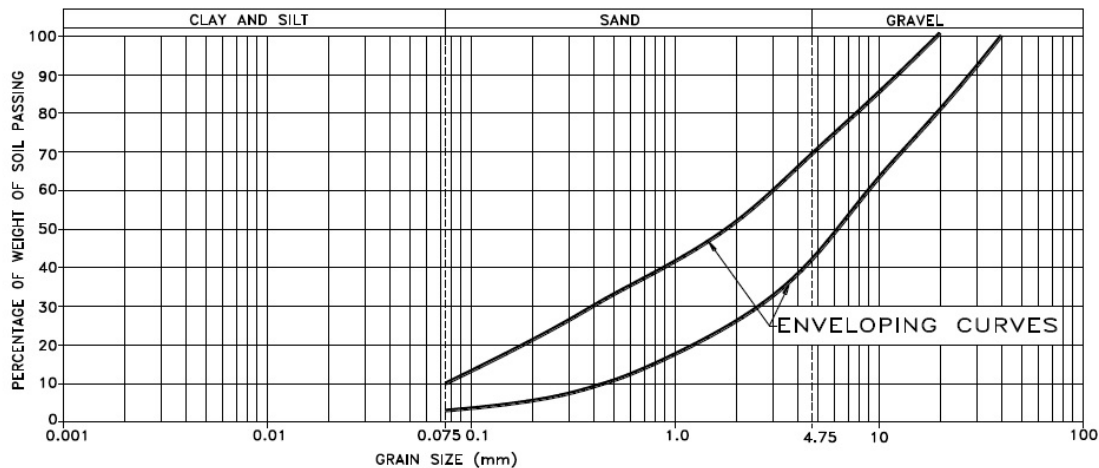


Track Formation for Two layer system (for 25 T Axle load)

3.5 Gradation Percentage of Blanket Material (as per RDSO guideline RDSO/2020/GE:IRS-0004 "Comprehensive guidelines and specifications for Railway formation"):

SL	ISSieveSize	PercentPassing (by weight)
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1.	40mm	100
2.	20mm	80 –100
3.	10mm	63–85
4.	4.75mm	42–68
5.	2 mm	27–52
6.	600micron	13–35
7.	425micron	10–32
8.	212micron	6–22
9.	75micron	3–10



Enveloping Curves for Blanket Material

- 3.6 When the subgrade/prepared subgrade is of SQ1 or SQ2 category soil, a suitable non-woven geo-textile layer may be used as “separator layer” on the top of subgrade to prevent upward migration of the fines from subgrade/prepared subgrade causing contamination of blanket layer on top of it and also to prevent penetration of coarse particles of layer on top of subgrade into soft/fine grained particles of sub-grade below.
- 3.7 Design of formation, including adoption of single layer or two layer system, and use of SQ1 soil (in top layer of subgrade) as given in above paras shall be decided by PCE/CAO (Con) on the basis of soil investigation. In case of the projects being executed by PSUs, the powers of PCE/CAO shall be exercised at appropriate level of authority as nominated by CMD/MD of the PSU.
- 3.8 In case of cutting also, blanketing shall be provided as required & as specified above, based on the type of soil just below the blanket.
4. **Quantity payable under this item shall be arrived at by cross sectional area of standard finished profile. In case of Mechanically compacted bank 5% of the gross quantity shall be deducted to arrive at payable quantity. And in case manual compaction is done then 10% of the gross quantity shall be deducted to arrive at payable quantity.**
5. Following stipulations shall further apply for earthwork.

- (i) Organic clay, organic silt, peat, chalks, dispersive soils, poorly graded gravel and sand with uniformity co-efficient less than 2, shall not be used in embankment. Clay and silt having WL more than 50%(CH & MH) are prohibited in top 3 m of embankment. Cutting in these types of soils, shale's and soft rocks which become muddy after coming in contact with water, should be avoided. If this is not possible, special investigation and measures will be necessary according to final decision by Engineer in Charge. The minimum dry density of the soil shall not be less than 1.70 gm/cc. In case soil having minimum dry density of 1.70 gm/cc is not locally available, then with permission of tender accepting authority soil having minimum dry density of 1.65gm/cc can may be allowed with condition that the rate reduction of 10% will be done.
 - (ii) Water content as desired, and densities should be specified as obtained in the field trials as per I.S. 10379 –1982. For guidance during field trials to determine the thickness of layers, dry density to achieve and optimum moisture content, Laboratory test for heavy compaction as per I.S.2720 (Pt. VIII)-1983 should be carried out for obtaining these.
 - (iii) The soil proposed to be brought from out-side Railway land will have to be initially tested either at railway lab or some other reputed lab and further testing may be done at the Contractor's site laboratory established prior to commencement of work. Frequency of conducting such tests should be at the discretion of the Authority's Engineer.
 - (iv) Only approved quality of earth after test and certification is to be used. Such test should invariably be conducted as and when quarry/ colour & texture of soil changes.
 - (v) The embankment should be progressed in layers and completed as per the standard profiles including dressing of slopes to final shapes.
 - (vi) Quantity payable under this item shall be arrived at by cross sectional area of standard finished profile. In case of Mechanically compacted bank 5% of the gross quantity shall be deducted to arrive at payable quantity. And in case manual compaction is done then 10% of the gross quantity shall be deducted to arrive at payable quantity.
6. The rate quoted in the schedule include picking up and setting out alignments, drawing of cross sections based on levels recorded by Railway's representative in presence of Contractor on Railway level book, all bushes clearance, crossing one or more Railway lines, making service dog bells and reference pillars bailing out water or pumping out water with Contractor's pump, removal of slush where encountered, dressing of spoil heaps, bank and cuttings to final dimensions, carting out the cutting spoils, benching side slopes of existing bank etc. as directed by the Engineer etc.
- The classification of the soil met with in cuttings shall be determined by the Engineer and rates shall be paid based on the type of soil classified, i.e. all classifications of soils, rock not required blasting and rock requiring blasting.
- 1. If soil from cutting is of good quality it can be used in embankment. Cutting spoils not used for formation of bank shall be led to form a spoil bank or filling in low-lying areas at site nominated by the Engineer or his representative within the section.
 - 2. Rate for earthwork in cutting shall also include proper stacking of moorum, boulders and other useful materials met with during excavation at places as directed by the Authority's Engineer at site.

3. Mechanical Compaction of Earthwork and Blanketing Material.

- i) After site clearance all pockets and depressions left in the soil, if any, shall be made good and compacted. The entire area shall be rolled and compacted with suitable roller before the first layer of earth is spread and the Contractor shall obtain clearance from the Engineer in writing before spreading the first layer of the earth.
- ii) Earth work shall be done in layers not exceeding 300 mm thick in the loose state and compacted with suitable rollers to obtain the density specified as per IS: 10379-1982. The number of passes of the rollers and the optimum thickness of earth layer shall be fixed after carrying out field trials with roller proposed to be used, from time to time and from location, to location the main criteria being to obtain maximum density achievable uniformly.
- iii) An additional width of 500 mm will be provided and rolled on cess side or either side wherever the track center is more, which shall be removed after compaction of the core and slop dressed after achieving full height of the embankment so that compaction is achieved to the desired value till the edge of formation width. The extra width of 500 mm is to be provided confining pressure to enable compaction of soil. No payment of this extra width shall be made.
- iv) Smooth wheel self-propelled vibratory roller of three wheels of operating weight exceeding 10 T and 22.6 T Dynamic force in high amplitude having 30 (THIRTY) Hz vibrating frequency shall have to be used for compaction. Each layer shall continue to be rolled until no further compaction results. The layers will be free from ruts.
- v) Cohesion less soils shall be compacted to get a minimum density Index (relative density) of 70 percent as obtained in accordance with IS: 2720 (Part –XIV) 1983. All other types of soil when compacted shall attain at least 98% of the maximum dry-density as determined using heavy compaction in accordance with IS 2720(Pt. VIII- 1983) followed by field trials as Per IS: 10379-1982.
- vi) The density of each layer of compacted soil shall be ascertained by taking adequate number of soil samples collected mostly on both sides of the centre line at intervals of 10 meter or so, with a view taken at random using Sand replacement (as per 2720 Pt. XXVIII- 1974) or core cutter method (as per IS: 2720Pt. XXIX 1975). The number of tests will of course depend on the width of the formation.
- vii) Where the moisture content of the earth in any layer is above OMC, it shall be left for drying for a suitable period to bring down the moisture content very near to OMC, before rolling is commenced. If the soil is dry, water shall be sprinkled either in the borrow pit or over the spread layer, as convenient, in order to obtain a workable moisture content before rolling is commenced. Where the natural moisture contents of borrow soil is high, compaction on higher moisture contents can be allowed by the permission of the Engineer.
- viii) Each layer shall be compacted to the specified density over its entire width commencing from the two sides before another layer is started. After completion of compaction of each layer, the nature of soil used, moisture content, densities, type of rollers used and compaction, achieved should be recorded under signature of the Authority's Engineer or his representative and Contractor's representative before commencing work on next layers.

- ix) While compacting it shall be ensured that there is a minimum overlap of 200 mm between each run of the roller.
- x) Care should be taken during the compaction operation to slope the surface of the bank to facilitate the shedding and to minimize the absorption of rainwater, particular attention being given the prevention of pounding.
- xi) The quality of work shall be determined by considering the mean density of the samples in each layer. The mean dry density shall be equal to or exceed the minimum, specified density. In no individual case shall the density be less than the minimum value specified by more than 2% otherwise further rolling should be done at the appropriate location.
- xii) The Contractor shall be allowed to lay further layer of soil, only after the compaction of a particular layer has been found satisfactory and certified to be so by the Engineer's representative in writing.
- xiii) The top of the formation shall be finished to cross slope of 1 in 30 from one end to other towards cess/drain in multiple lines and from center of formation to both sides in single line with tolerance of 0.5%. The finished top level of soil formation should be within +/- 25 mm. The finished top of blanket layer shall be permitted from design level by +25mm.
- xiv) In parts of embankment, inaccessible to the specified rolling equipment, e.g. edges and side slopes around and in contact with culverts, abutments or in proximity to structures, where it will not be possible to operate rolling equipment, compaction shall be accomplished by hand tamping with hand or mechanical tampers of approved type. Roller shall not be permitted to operate within 1500mm of masonry/concrete structure and all fill within this distance shall be hand tamped. All materials to be hand tamped shall be spread in layers not over 100mm thick. The moisture content at the time of tamping shall be such as to produce a degree of compaction equal to that specified for rolled fill. Final rolling of the top layer of the fill shall be completed with a self-propelled smooth wheel power driven roller or multiple pneumatic type wheels roller or hand tamped to the required profile.
- xv) The filling over arches and pipe culverts shall be made up simultaneously from both sides.
- xvi) In back filling, above or against or in filling over masonry or other structures, the materials, shall be deposited not more than 100mm thick, sloping away from the structure with each layer carefully tamped. Only the selected materials shall be used for this purpose. Highly cohesive, wet, impervious materials shall not be employed.
- xvii) Adequate arrangements for control of compaction must be ensured during the construction so that the required degree of density is obtained in each layer of earthwork.
- xviii) All works including the surfaces of the fill shall be finished to smooth and compact profile in conformity with plans and the Contractor must not leave any depressions or irregularities that will hold water or prevent drainage. Slopes shall be finished by hand shoveling. The inside slopes of embankment shall be neatly dressed to line as the placing of the fill progresses.
- xix) In making earthwork in embankment or due to movement of compaction equipment, if there is natural subsidence or sinking of the natural ground under the embankment due to

any reason, the Contractor shall make up the deficiency in the quantity of earthwork due to natural sinking at his own cost.

- xx) The Contractor shall purchase the soil testing equipment at his own cost and as per the list given below and keep it ready at site before work commences.
- (a) Rapid determination of moisture content kit, liquid limit, plastic limit, Density & OMC.
 - (b) Balance to weight up to 1 gm accuracy
 - (c) Hand balance to weigh up to 0.1 gm accuracy.
 - (d) Weights ranging from 3 Kg to 0.1 gm
 - (e) Core cutters bearing I.S.I mark.
 - (f) Porcelain dishes 100mm dia.
 - (g) Steel scale
 - (h) Grafting tool
 - (i) Spatula
 - (j) Spirit as required
 - (k) Rammer (standard) bearing IS1 mark.
 - (l) Kit for testing of soils by sand replacement method.

The number of above equipment to be arranged by the Contractor will be decided by the Engineer depending upon the actual site conditions and the rate at which the work progressed. The decision of the Engineer shall be final and binding on the Contractor in this regard.

4. The work may have to be carried out very close and over the running railway lines and electrical traction wires and the Contractors shall make all measures and precautions to protect the railway lines and structures, Contractor's labours, public properties at his own cost. Necessary barriers made by ropes and flags signals etc. at work site will have to be provided by the Contractors.

5. Quality Assurance of Earthwork.

- 11.1 Quality check on earthwork- Quality of execution of formation earthwork shall be controlled through exercise of checks on the borrow material, blanket material, compaction process, drainage system, longitudinal and cross sectional profiles of the embankment.

11.2 Frequency of Quality Assurance Tests- (As per the extant guidelines for the earthwork following for execution):-

CBR test for selection of blanketing material and other tests required for ensuring conformation of the materials for formation (blanket, subgrade, embankment fill) as per specifications e.g. size gradation, Cu, Cc, OMC/MDD etc. shall be conducted at the following frequency:

- (a) Embankment fill: One set of tests for every 5000 cum and at every change of soil strata.
- (b) Prepared subgrade: One set of tests for every 2000 Cum
- (c) Blanket material: one set of tests for every 500 cum.
- (d) Compacted earth/Blanket layers: Atleast one density check for every 200 Sqm for each blanket layer and top one meter of sub-grade and at least one density check for every 500 sqm for other than the blanket and one meter of sub-grade.

6. Payment for earthwork/blanketing:

- 12.1 12%(Twelve percentage) deduction will be made for the quantities of earth work executed (5% for each side slope & 2% for top level of formation) at the "On account" bill stage.

These quantities will be released progressively as per the following percentage as and when the following enabling works are completed.

12.2 Embankment:

- i) Dressing of side slopes including turfing/pitching = 10% (5% for each side slope)
- ii) Dressing of top level of formation = 2%.

12.3 Excavation

- i) Dressing of side slopes including turfing/pitching =10% (5% for each side slope).
- ii) Dressing of the formation after construction of side drains inside the cuttings = 2%

Note:-*Above conditions are for guidelines and not exhaustive. Work will be executed as per the latest or extant specifications/guidelines issued by RDSO and as directed by Engineer-in-charge which will be binding to the contractor.*

CHAPTER – XII**SPECIAL CONDITION OF CONTRACT****(SPECIFICATIONS FOR CONCRETE WORK/ BRIDGE WORK / PROTECTION WORK)****1.1. Codes & References.**

1.1.1. Production, sampling, testing and quality control of concrete shall be governed by provisions of IRS Concrete bridge code-1997 with upto date correction slip. Acceptance criteria for concrete work shall be as given in IRS Concrete Bridge Code. For this tender IRS Concrete Bridge Code-1997 with upto date correction slip is Part & Parcel of this tender document. This code is available in the Office of the Chief Engineer (Con) SEC Railway, Bilaspur and may be seen or purchased. The works of this contract shall be executed as per standard specifications. For execution, quality control and testing relevant IS Codes and Railway Codes shall be followed.

1.1.2 For specifications on material to be used in structures 'Indian Railways Unified Standard Specification 2021 with latest amendment should be referred.

1.2. General:

1.2.1. Prior to start of construction, the contractor shall design the mix as per IS 10262 and submit to Engineer for review, the proportions of materials, including admixtures to be used. For mix design purposes, the exposure condition for all the proposed bridges is considered as moderate. All codal provisions corresponding to moderate exposure condition would be applicable in this contract.

1.3. Cement

1.3.1. The cement used shall be any of the following. However the prior approval of the Engineer shall be taken for use of any of the cement.

- 43 Grade Ordinary Portland Cement conforming to IS: 8112.
- 53 Grade Ordinary Portland Cement conforming to IS: 12269.
- Portland slag cement conforming to IS: 455 (See Notes below).
- Portland Pozzolana cement confirming to IS 1489,

1.3.2. In aggressive environment, where SO_3 and Cl ion are present in abundance, preferably ordinary Portland cement with moderate sulphate resisting properties conforming to specifications as given in Table 1 may be used.

1.3.3. NOTE:

- i) Mixing of 50% blast furnace slag with OPC cement at site shall not normally be permitted. However, in exceptional cases for bridges requiring higher levels of durability using blended cement which is not available from manufacturers blending at site may be permitted subject to ensuring dedicated facilities and complete mechanized process control to achieve specified quality with the special permission of Chief Engineer/Chief Bridge Engineer”.
- ii) Portland Pozzolana cement shall not be used for PSC works. When Portland Pozzolana cement is used in plain and reinforced concrete, it is to be ensured that proper damp curing of concrete at least for 14 days and supporting form work shall not be removed till concrete attains at least 75% of the design strength.
- iii) 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 sulphate attack both.

- iv) The rate of development of strength is slow in case of blended cement i.e. Portland Pozzolana cement and Portland slag cement, as compared to ordinary Portland cement. This aspect should be taken care while planning to use blended cement. Accordingly stage of prestressing, period of removal of formwork and period of curing etc. should be suitably increased.
- v) Compatibility of chemical admixtures and super plasticizers with Portland Pozzolana cement and Portland blast furnace slag cement shall be ensured by trials before use.
- vi) Some other properties of concrete such as modulus of elasticity, tensile strength, creep and shrinkage are not likely to be significantly different. For design purposes, it will be sufficiently accurate to take the same value as those used for concrete made with OPC.

Table 1:
Specification for Ordinary Portland Cement
 (With Moderate Sulphate Resisting Properties)

Sl No	Characteristics	Limits	
		Not less than	Not more than
1	Ratio of Percentage Of Lime To Percentage Of Silica, Alumina And Iron Oxide, When Calculated By The Formula Given In IS 269.	0.80	1.02
2	Ratio of percentage of Alumina to that of Iron Oxide.	0.86	--
3	Magnesia, (% by Wt.)	--	5.0
4	Loss on ignition (% by Wt.)	--	4.0
5	Tricalcium aluminate content (C ₃ A) (%)	6.0	10.0
6	Tricalcium silicate contents (C ₃ S) (%)	40.0	--
7	Physical properties fineness (cm ² /g)	2800	3200
8	Soundness 'Le Chatalier' method (mm)	--	5
9	Setting Time		
(a)	Initial (in minutes)	60	--
(b)	Final (in minutes)	--	600

The method of testing to determine the above characteristics and ascertaining the results, shall conform to the procedure prescribed in IS: 269, 4031 & IS: 4032.

1.4. Prestressing Steel

- 1.4.1. The prestressing steel shall be 12.7mm dia class-II uncoated stress relieved low relaxation seven-ply strand conforming to IS:14268-1995.
- 1.4.2. All prestressing steel shall be free from splits, harmful scratches, surface flaws, rough, jagged and imperfect edges and other defects likely to impair its use in Prestressed Concrete.

1.5. Coarse Aggregates

- 1.5.1. For plain and reinforced cement concrete or Prestressed concrete works, coarse aggregate shall consist of clean, hard, strong, dense, non-porous and durable pieces of crushed stone, crushed gravel, natural gravel or a suitable combination thereof or other approved inert material. They shall not contain pieces of disintegrated stones, soft, flaky elongated particles, salt, alkali, vegetable matter or other deleterious materials in such quantities as to reduce the strength or durability of the concrete, or to attack the steel reinforcement. All coarse aggregates shall be tested to conform to IS: 383. Coarse aggregate having positive alkali – silica reaction shall not be used.
- 1.5.2. For reinforced cement concrete works, the maximum size of the coarse aggregate can be in the limits of 4.75 to 40 mm **but in no case should be greater than one quarter of the minimum thickness of the member**, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form work.
- 1.5.3. The preferred nominal size of aggregate is 20mm for reinforced cement concrete works. Larger sizes up to 31.5mm may be permitted in special cases where there is no restriction to flow of concrete in a section. If smaller sizes are necessary for any element, 10mm and 12.5mm may be used.
- 1.5.4. For plain cement concrete works, preferred nominal sizes shall be 20 and 40 mm. Larger sizes may be permitted only in special cases, subject to supplemental specifications and precautions.
- 1.5.5. For prestressed concrete works, the nominal maximum size of aggregate shall usually be restricted to 10mm less than the minimum clear distance between individual cables or individual untensioned steel reinforcement or 10mm less than the minimum clear distance between individual cables or individual untensioned steel reinforcement or 10mm less than the minimum cover to untensioned steel reinforcement whichever is smaller. A nominal size of 20mm coarse aggregate shall generally be considered satisfactory for prestressed concrete works. Primary or Secondary stone crusher should be employed for getting proper size and grading of coarse aggregates.

1.6. Sand/Fine Aggregates

1.6.1. For masonry work, sand shall conform to the requirement of IS: 2116. For plain and reinforced cement concrete or prestressed concrete works, fine aggregates shall consist of hard, strong, durable, clean particles of natural sand, crushed stone or crushed gravel or suitable combination of natural sand and crushed stone or gravel. They shall not contain dust, lumps, soft or flaky materials, mica and other deleterious materials in such quantities as would reduce the strength or durability of concrete or attack the embedded steel. Motorised sand washing machines should be used for removing impurities from sand, if required. All fine aggregates shall be tested to conform to IS: 383.

1.7. Water

1.7.1. Water used for mixing and curing 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. Potable water is generally considered satisfactory for mixing concrete. As a guide, the following concentrations represent the maximum permissible values.

1.7.2. To neutralise 200 ml sample of water, using phenolphthalein as an indicator, it should not require more than 2 ml on 0.1 normal NaOH.

1.7.3. To neutralise 200 ml sample of water using methyl orange as an indicator, it should not require more than 10 ml of 0.1 normal HCL.

1.7.4. The permissible limits for solids shall be as follows:

Item	Permissible limits (Maximum)
Organic	200 mg/lit
Inorganic	3000 mg/lit
Sulphates (SO ₄)	500 mg/lit
Chlorides (Cl)	2000 mg/lit (for PCC) or 500 mg/lit (for RCC)
Suspended matter	2000 mg/lit

1.7.5. In case of structures of length 30 m and below, the permissible limit of chlorides may be 1000 mg/lit.

1.7.6. All samples of water (including potable water) shall be tested and suitable measures taken where necessary.

1.7.7. The PH value shall generally be not less than 6. Whenever necessary tests should be done as per IS: 3025. Mixing and curing with seawater shall not be permitted.

2. **Sampling, Strength, Tests and Acceptance Criteria: Shall be done as per clause 8.7 of IRS Code of Practice for Plain, Reinforced & Pre-stressed Concrete for General Bridge Construction (Concrete Bridge Code-Reprint 2014).**

Minimum frequency of samples of concrete and criteria for acceptance shall be as per IS: 456.

3. **Testing of Concrete**

(i) The rate for concrete works shall be deemed to include all charge for testing of aggregates and the concrete as required to be in accordance with specification including the cost of labour, material, equipment, moulds, transport, curing etc. for this purpose the contractor shall set up a testing laboratory at his work site at the location to be decided by the Engineer. He/they shall also make adequate arrangements for curing of test cubes, so prepared as per the direction of the Engineer. The contractor shall prepare at his own cost standard cubes of concrete according to the directions of the Engineer-in-charge both for (1) preliminary test and (2) the works test. All such tests shall be carried out by the contractor in the present of the engineer or his representative and a proper record duly signed by the contractor or his/their representative and Engineer or his representative shall be maintained by the contractor as per the direction of the Engineer.

(ii) The contractor shall provide without any extra charge all materials, tools, labour and assistance of every kind which Engineer may demand from him for any test and examination,

other than special or independent test, which he shall require to make on the contractor's premises and the contractors shall bear and pay all costs attendants thereon. If the contractor fails to comply with the condition as aforesaid, the Engineer shall at his own judgment be entitled to remove for test and examination of any of the material to any premises other than Contractor's and in all such cases, the contractor shall bear the of transportation and/ or carrying out such test elsewhere. A certificate in writing of the Engineer that the contractor has failed to proved facilities and the means for the tests and the examination, shall be final.

- (iii) The contractor shall also provide and deliver for tests, free of charge at such places other than his premises as the engineer may specify, such materials or cubes as he may require.
- (iv) The engineer, at his discretion may decide to perform some of the test on aggregate or concrete at his own laboratory or any other agency he may consider necessary. In all such cases, the contractor shall provide and deliver for tests for such materials or concrete cubes duly cured, free of charge at the premises as may be specified by the Engineer. Any further cost incurred for such tests, shall be recovered from the contractor's bills.
- (v) The contractor shall set up a field laboratory as per the details given in this tender document.
- (vi) Calibration of compression testing machine should be done at specified intervals (Not more than 6 months) as per the direction of the Engineer-in-charge in approved laboratory/IIT/any University.
- (vii) Contractor should quote the rate considering the cost of above equipment and cost of calibration charges. The rate for the above testing and equipments have been already included in the respective items of works, for which separate payment will not be made.
- (viii) Immediately after receipt of formal acceptance letter, the Tenderer/Contractor has to arrange the sample in bags of specified quantity of fine, coarse aggregate and cement (Details such as name of quarry from which coarse aggregate and fine aggregate procured, cement brand name etc, should be furnished to railway

4. Workability of Concrete

- 4.1. The concrete mix proportions chosen should be such that the concrete is of adequate workability for the placing conditions of the concrete and can be properly compacted with the means available.
- 4.2. Suggested ranges of workability of concrete for some placing conditions are given in Clause 5.3.1 of IRS Code of Practice for Plain, Reinforced & Prestressed Concrete for general bridge construction.

5. Durability

- 5.1. The durability of concrete depends on its resistance to deterioration and the environment in which it is placed. The resistance of concrete to weathering, chemical attack, abrasion, frost and fire depends largely upon its quality and constituents materials. Susceptibility to corrosion of the steel is governed by the cover provided and the permeability of concrete. The cube crushing strength along 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. The general environment to which the concrete will be exposed during its working life is classified and will be governed by Indian Railway Code of Practice for Plain, Reinforced and Prestressed concrete for General Bridge construction.

5.2. Permeability

- 5.2.1. 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 in clause 5.2.2 with strong dense aggregates, a suitability low permeability is achieved by having a sufficiently low water cement ratio, by ensuring as through compaction of the concrete as possible and by 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. The depth of penetration of moisture shall not exceed 25 mm.

5.2.2. Permeability test:

- i. Permeability test shall be mandatory for all RCC/PCC bridges under severe, very severe and extreme environment.
- ii. Under mild and moderate environment, permeability test is desirable to the extent possible.
- iii. Permeability test is required for RCC/PCC structural element only.
- iv. All tests required for permeability of concrete to be done from outside in any approved laboratory with contractor's cost only. No extra payment will be given by the Railway.

5.2.3. **Maximum Water-Cement Ratio:** The limits for maximum water cement ratio for design mix shall be based on environmental conditions as defined in Clause 5.1 or clause 5.4.1 of IRS Code For Plain, Reinforced & Prestressed Concrete for General Bridge Construction (Concrete Bridge Code-Reprint 2014).

The limits for maximum water-cement ratio for different environments shall be governed by the Indian railway Code of Practice for Plain, Reinforced and Prestressed Concrete for General bridge construction.

5.2.4. **Cementitious material content:** Depending upon the environment to which the structure is likely to be exposed during its service life, minimum cementitious material content and Maximum cementitious material content in concrete shall be governed by the Indian railway Code of Practice for Plain, Reinforced and Prestressed Concrete for General bridge construction -1997.

5.2.5. **Total chloride contents:** The total chloride content by weight of cement shall not exceed the following values:

- (a) For prestressed concrete works: -
 - i) Under extreme environment 0.06%
 - ii) Under severe and moderate environment 0.10%
- (b) For RCC works 0.15%

5.2.6. **Coating for concrete (As per IRS Concrete Bridge Code):**

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. The recommended coating is as under:

Aggressive Environment (Severe & Extreme)		Non aggressive environment (Moderate)
Super structure of bridges	Substructure of bridges (in affected part only)	All structures
Epoxy – Phenolic IPN – coating CECRI Integrated four coat System	Coal tar epoxy coating	No coating is necessary.

In this area no coating is required, however in case of requirement of coating, the payment for the same will be made separately.

5.3. **Concrete Mix Proportions.**

5.3.1. **Mix Proportion:** The mix proportions shall be selected to ensure that the workability of the fresh concrete is suitable for the conditions of handling and placing, so that after compaction its surrounds all reinforcements and completely fills the formwork. When concrete gets hardened, it shall have the required strength, durability and surface finish.

5.3.2. The determination of the proportions of cement, aggregates and water to attain the required strengths shall be made as follows: -

5.3.3. By designing the concrete mix; such concrete shall be called 'Design mix concrete'; or

5.3.4. By adopting nominal concrete mix; such concrete shall be called 'Nominal mix concrete'

5.3.5. Design mix concrete is preferred to nominal mix. Nominal mixes when used are likely to involve higher cement content. Concrete of grades richer than M 20 shall only be design mix concrete.

5.4. Design Mix Concrete:

- 5.4.1. The mix shall be designed to produce the grade or concrete having the required workability, durability and a characteristic strength. The procedure given in IS: 10262 may be followed for mix design.
- 5.4.2. Nominal Mix Concrete: Nominal Mix Concrete may be used for concrete of grade M 20 or lower. The proportions of materials for nominal mix concrete shall be in accordance with Concrete Bridge Code.

5.5. Mix Design

- 5.5.1. Concrete mix shall be designed on the basis of preliminary tests. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work in question and can be properly compacted with the means available.
- 5.5.2. The mixing plant and the methods of transporting and depositing the concrete to be employed in the work shall be used to simulate working conditions with the trial mixes.
- 5.5.3. All these preliminary tests, approval etc. shall be got done will in advance by the contractor before any concreting is contemplated. Failure on the part of the Contractor to do so and the consequent delay in the completion of the works will not entitle him for any compensation whatsoever, either financially, or by way of extension of time

5.6. Design Mix proposals:

- 5.6.1. Based upon the successful preliminary crushing and workability tests, the Contractor shall submit design mix proposals to the engineer, who will have the right to reject any trial mix not deemed satisfactory. Selection of the trial mix to the complete satisfaction of the Engineer shall be the ultimate responsibility of the contractor.
- 5.6.2. Except where it can be shown to the satisfaction of the Engineer that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate should be controlled by obtaining the coarse aggregate in different sizes and blending them in the right proportions as required. Different sizes, however, shall be stocked in separate stock Wells, Required quantity of materials shall be stock-Well several hours, preferably a day, before use. Grading of coarse and fine aggregate shall be checked as frequently as possible, frequency for a given job being determined by the engineer to ensure that the suppliers are maintaining uniform grading as approved for samples used in the preliminary tests.
- 5.6.3. In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags shall be weighed separately to check the net weight. Where cement is weighed from bulk stocks at site and not by bags, it shall be weighed separately from the aggregates. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in a clean and serviceable condition. Their accuracy shall be periodically checked.
- 5.6.4. It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined as frequently as possible, frequency for a given job being determined by the Engineer according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the aggregates, IS: 2386 (Part III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates to allow for the variation in weight of aggregates due to variation in their moisture content.

5.7. Mixing concrete

- 5.7.1. Batching and mixing of the concrete shall be done with weigh batching system as per the design mix.

5.8. Proportioning of materials

- 5.8.1. In case weekly quantity of concrete to be done is more than 200 CUM or daily concreting is more than 40 CUM, or bulk structures are to be cast, proportioning of materials shall be done on the batching plant by weight, each type of material being weighed separately. Water shall be measured by volume. High capacity mixer like RM-800 or equivalent are to be used as batching plants.
- 5.8.2. The capacity of batching and mixing plant shall be at least 25 percent higher than the capacity for transportation and laying of concrete.

5.8.3. All drums that have been out of use for more than 30 minutes shall be thoroughly cleaned before any fresh concrete is mixed in them.

5.9.1. Transporting, placing and compaction of concrete.

5.9.1. Tremie shall be used in concreting of piles, high piers/ abutments will have combination of chutes and hoists for transportation of concrete. If there is specific schedule item, specifying use of concrete pump, then the same shall be deployed for transportation of concrete.

5.9.2. The Engineer shall approve the method of transporting and placing concrete. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent materials takes place. All formwork cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete.

5.9.3. No concrete shall be placed in any part of the structure until the approval of the Engineer has been obtained.

5.9.4. If concreting is not started within 24 hours of the approval being given, it shall have to be obtained again from the Engineer. Concreting then shall proceed continuously over the area between construction joints. Fresh concrete shall not be placed against concrete that has been in position for more than 30 minutes unless a proper construction joints is formed.

5.10. Concreting under Water

5.10.1. When it is necessary to deposit concrete under water, the methods, equipment, materials and proportions of the mix to be used shall be got approved from the Engineer before any work is started.

5.10.2. Concrete shall not be placed in water having temperature below 5°C. The temperature of the concrete, when deposited, shall be not less than 16°C & not more than 40°C.

5.10.3. The material shall be so proportioned as to produce a concrete having a slump of not less than 150 mm, and not more than 180 mm. The slump shall be tested as per IS: 516.

5.10.4. Cofferdams or forms 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 or forms in still water shall be sufficiently tight to prevent loss of mortar through the joints in the walls. Pumping shall not be done while concrete is being placed, or until 24 hours thereafter.

5.10.5. All under water concreting should be carried out by tremie method only, with tremie of appropriate diameter. The number and spacing of the tremie should be worked out to ensure proper concreting. The tremie concreting when started should be continued 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.

5.10.6. The top section of the tremie shall be a hopper large enough to hold one full batch of the mix or the entire contents of the transporting bucket if any. The tremie pipe shall not be less than 200 mm in diameter, and shall be large enough to allow 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 in uniform flow of concrete, but it shall not be emptied so that water enters above the concrete in the pipe. At all times after the 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.

- 5.10.7. 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.

5.11. Protection and Water curing

- 5.11.1. Curing is the process for preventing the loss of moisture from the concrete. The prevention of moisture loss from the concrete is particularly important if the water-cement ratio is low.
- 5.11.2. Curing and protection shall start immediately after the compaction of the concrete to protect it from
- 5.11.3. Premature drying out, particularly by solar radiation and wind.
- 5.11.4. High internal thermal gradients.
- 5.11.5. Leaching out by rain and flowing water.
- 5.11.6. Rapid cooling during the first few days after placing.
- 5.11.7. Low temperature or frost.
- 5.11.8. Vibration and impact, which may disrupt the concrete and interfere with its bond to the reinforcement.
- 5.11.9. Where members are of considerable size and length, with high cement content, accelerated curing methods are to be applied, as approved in detail by the Engineer.
- 5.11.10. Exposed surfaces of concrete shall be kept continuously in a damp or wet condition by ponding or by covering with a layer of sacks, canvas, hessian, or similar materials and shall be kept constantly wet for a period of not less than fourteen days from the date of placing of concrete.
- 5.11.11. Special attention should be paid to curing of concrete in order to ensure maximum durability and to minimize cracking.
- 5.11.12. Seawater shall not be used for curing. Seawater shall not come into contact with concrete members unless it has attained the desired strength.
- 5.11.13. Masonry work over the foundation concrete may be started after 48 hours of it's laying but the curing of concrete shall be continued for a minimum period of 14 days.
- 5.11.14. Wherever possible, use of water sprinklers or perforated pipes should be encouraged for curing of concrete. Such arrangements must be maintained for a minimum period of 14 days after concreting.
- 5.11.15. Approved concrete curing compounds should be preferred where water curing cannot be done reliably.

5.12. Working in Extreme Weather

- 5.12.1. Where concrete is to be deposited at or near freezing temperatures, precautions shall be taken to ensure that at the time of placing it has a temperature of not less than 5° C and that the temperature of the concrete shall be maintained above 4° C until it has thoroughly hardened. When necessary, concrete ingredients shall be heated before mixing. Cement shall however not be heated other than by the heat transmitted to it from other ingredients of the concrete. In general, heating the mixing water along to about 66° C may suffice for this purpose. Dependence shall not be placed on salt or other chemicals for the prevention of freezing. Calcium chloride up to one and a half per cent by weight of the cement can be used to accelerate the rate of hardening provided it does not accelerate corrosion. Use of calcium chloride in excess of this percentage is considered harmful. No frozen material or materials containing ice shall be used. All concrete damaged by frost shall be removed. It is recommended that concrete exposed to freezing weather shall have entrained air and the water content of the mix shall not exceed 30 litres per 50 Kg of cement.
- 5.12.2. When depositing concrete in very hot weather, precautions shall be taken so that the temperature of wet concrete does not exceed 40° C while placing. This shall be achieved by stacking aggregate under the shade and keeping them moist, using cold water, reducing the time between mixing and placing to the minimum, cooling formwork by sprinkling water, starting curing before concrete dries out and restricting concreting, as far as possible, to mornings and evenings.

6. Storage, testing and acceptance of Materials

General

- 6.1. All materials may be stored in 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 storage of the materials. All such materials even though stored in approved godowns/places, must be subjected to acceptance test prior to their immediate use.

7. Cement

- 7.1. 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 the ground level in perfectly dry and watertight 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 to 4 months.
- 7.2. 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 that has deteriorated in any way, during storage, shall not be used in the works and shall be removed from the site by the contractor without any extra cost to Railways.

8. Bending of Reinforcement

- 8.1. Reinforcing steel shall conform accurately to the dimensions given in the Bar Bending Schedules shown on relevant drawings.
- 8.2. Bars shall be bent cold to the specified shape and dimensions or as directed the Engineer using a proper bar bender, operated by hand or power to attain proper radii of bends.
- 8.3. Bars shall not be bent or strengthened in a manner that will injure the material.
- 8.4. Bars bent during transport or handling shall be straightened before being used on work, they shall not be heated to facilitate bending.
- 8.5. Unless otherwise specified the type of hook to be provided at the end of each bar shall be indicated in the bar bending schedule. The hook shall be suitably encased to prevent any splitting of concrete.

9. Placing of reinforcement

General

- 9.1. All reinforcement shall be free from rust, loose mill scale or coats of oil, paints etc. and chloride contamination, which may destroy bond. This may be ensured either by using reinforcement fresh from the factories or thoroughly cleaning all reinforcement to remove all the rust using any effective method such as sand blasting.
- 9.2. The reinforcement cage should generally be fabricated in the yard at ground level and then shifted and placed in position. The reinforcement shall be provided strictly in accordance with the drawings and shall be assembled in position only when the structure is otherwise ready for placing of concrete. Prolonged time gap between the assembling of reinforcements and placing of concrete that may result in rust formation of the surface shall not be permitted.
- 9.3. Reinforcement bars shall be placed accurately in position as shown in the drawings. The bars, crossing one another shall be tied together at every intersection with galvanized wire of not less than 1 mm in dia and conforming to IS: 280 to make the skeleton of the steel work rigid so that the reinforcement does not get displaced during the deposition of concrete, or any other operation of the work.
- 9.4. The bars shall be kept in position by the following paragraphs maintaining cover.
- 9.5. Cover blocks of specified thickness should be cast in advance with same design mix of structure for ensuring specified cover to all RCC and PSC works for which separate payment will not be made as the rate of all RCC and PSC works are inclusive of this element.
- 9.6. In case of dowels for columns and walls, the vertical reinforcement shall be kept in position by means of timer templates with slots accurately cut in them; or with cover blocks tied to the reinforcement. Timber templates shall be removed after the concrete has progressed up to a level just below them

- 9.7. Spacer bars shall separate layers or reinforcements at approximately 1000 mm intervals. The minimum diameter of spacer bars shall be 12 mm or equal to maximum size of main reinforcement or maximum size of coarse aggregate whichever is greater.
- 9.8. Necessary stays, blocks, metal chairs spacers, metal hangers, supporting wires etc., or other subsidiary reinforcement shall be provided to fix the reinforcements firmly in its correct position.

10 Precautions:

- 10.1. Main reinforcement shall not be allowed to sag between supports.
- 10.2. Projecting reinforcement
- 10.3. Reinforcements projecting from surface of newly placed concrete shall be supported in such a way that there is no sag or risk or damage to the newly placed concrete. In severe environment, such projecting reinforcements that are likely to remain exposed for a long time shall be protected by cement grout/anti-corrosive treatment. In case of cement grout the same shall be thoroughly cleaned and wire brushed before depositing fresh concrete.

11. Admixtures

- 11.1. Use of admixtures and superplasticisers for concrete shall be done in conformity of mix design to improve workability, quality and reliability.
- 11.2. The plasticizer/retarder/admixture shall conform to IS: 6925 & IS 9103. They should be chloride free and low in sulphate content. The contractor at his cost shall test each lot of admixture. The use of admixture shall be made as per the manufacturer's guidelines. Prior approval of engineer is necessary for its uses.

12. Formwork:

- 12.1. **Description:** Formwork shall include all temporary or permanent forms required for forming the concrete in the shape, dimension and surface finish as shown on the drawing or as directed by the Engineer, together with all props, staging, centering, scaffolding and temporary construction required for their support.
- 12.2. **Materials:** For major bridges only steel shuttering is to be used, for building works and minor bridges 12mm thick marine ply wood or equivalent type shuttering can also be allowed. All materials shall comply with the drawings/ instructions of the Engineer. Materials and components used for formwork shall be examined for damage or excessive deterioration before use and shall be used only if found suitable after necessary repairs. In case of marine ply wood formwork, the inspection shall not only cover physical damages but also signs of attack by decay, rot or insect attack or development of splits. In case of steel shuttering, the metal used for forms shall be of 3.15 to 4mm thickness that the forms remain true to shape. In case 2mm plates are used the same shall be stiffened by flats of 50mm x 6mm and angles of 50mm x 50mm x 6mm. All bolts should be countersunk. The use of approved internal steel ties or steel or plastic spacers shall be permitted. **Structural steel tubes used as supports for forms shall have a minimum wall thickness of 4mm.**

12.3 Workmanship:

- (i) The formwork shall be robust and strong and the **joints shall be leak proof.**
- (ii) **Bally should not be used either as staging or as support for fixing of formworks. Only tubular shafts of adequate diameter with proper coupling system should be used for fixing of formworks as well as for staging. Staging must have cross bracing and diagonal bracing in both directions.**
- (iii) If proprietary system of formwork is used, detailed information shall be furnished to the Engineer for approval.
- (iv) The contractor shall be entirely responsible for the adequacy and safety for formwork notwithstanding any approval or review by the Engineer of his drawing and design.
- (v) **The number of joints in the formwork shall be kept to a minimum by using large size panels. The design shall provide for proper 'soldiers' to facilitate alignment. All joints shall be leak proof and must be properly sealed. Use of PVC JOINT sealing tapes, foam rubber or PVC T-section is essential to prevent leakage of grout.**

- (vi) As far as practicable, clamps shall be used to hold the forms together. Where use of nails is unavoidable, minimum number of nails shall be used and these shall be left projecting so that they can be withdrawn easily. Use of double headed nails shall be preferred.
- (vii) Unless otherwise specified, or directed, chamfers or fillets of sizes 25mm x 25mm shall be provided at all angles of the formwork to avoid sharp corners. The chamfers, bevelled edges and moulding shall be made in the formwork itself. Opening for fixtures and other fittings shall be provided in the shuttering as directed by the Engineer.
- (viii) If centering trusses or launching trusses or floating cranes are adopted for erection of superstructure, the joints of the erection system, whether welded, riveted or bolted, should be thoroughly checked periodically. Also, various members of the erection system should be periodically examined for proper alignment and unintended deformation before proceeding with the concreting. They shall also be periodically checked for any deterioration in quality due to steel corrosion.
- (ix) For distribution of load and load transfer to the ground through staging, an appropriately designed base plate must be provided which shall rest on firm sub-stratum. Water used for curing should not be allowed to stagnate near the base plates supporting the staging and should be properly drained
- (x) The formwork shall be made so as to produce a finished concrete true to shape, line levels, plumb and dimensions as shown on the drawing, subject to the following tolerance, unless otherwise specified in these documents or drawings or as directed by the Engineer

Tolerances in Concrete elements

- a) Variation in cross-sectional dimensions : + 10mm, -5mm
 - b) Misplacement from specified position in plan : 10mm
 - c) Variation of levels at the top : + 10mm
 - d) Variations of reduced levels of bearing areas: + 5mm
 - e) Variations from plumb over full height : + 10mm
 - f) Surface irregularities measured with 3m straight edge
 - i) All surfaces except bearing areas : 5mm
 - ii) Bearing areas: 3 mm
- (xi) Tolerance given above are specified for local aberration in the finished concrete surface and structure taken as a whole or for the setting and alignment of formwork, which should be as accurate as possible to the entire satisfaction of the Engineer.
 - (xii) Where metal forms are used, all bolts and rivets shall be countersunk and well ground to provide a smooth, plane surface.
 - (xiii) Forms shall be made sufficiently rigid by the use of ties and bracings to prevent any displacement or sagging between supports. They shall be strong enough to withstand all pressure, ramming and vibration during and after placing the concrete. Skew jacks or hard wood wedges, where required, shall be provided to make up any settlement in the formwork either before or during the placing of concrete.
 - (xiv) The formwork shall be coated with an approved release agent that will efficiently prevent sticking and will not stain the concrete surface. Lubricating (machine oils) shall be prohibited for use as coating.

12.4 Form surface & finish:

- (i) 20mm x 5mm wide rubber flats should be placed between the shutters for proper joining to arrest leakage of cement slurry during concreting and compaction. Before laying the concrete all the gaps of shutters are to be packed with jute/ cotton waste and should be applied with grease and cement slurry to arrest leakage of cement-water through joints and other holes. Synthetic adhesive packing tape should be used for covering the joints in ply wood / iron shuttering for slabs after packing the joint with jute. Cost for the above should be included while quoting the rate by Contractor.

- (ii) The Contractor shall submit shuttering drawings and details of pattern and the method of forming joints in the exposed (form-finish) concrete to the Engineer for his approval and all changes and modification by the former and final approval thereof obtained, from the Engineer.
- (iii) The repetitive usage's of the same formwork to cast form finished exposed concrete shall be as decided by the Engineer and in no case the formwork not guaranteed to produce the required form finish to the satisfaction of the Engineer shall be used.

12.5 Precautions:

- i. Provision shall be made for safe access to and about the formwork at the levels as required.
- ii. Close watch shall be maintained to check for settlement of formwork during concreting. Any settlement of formwork during concreting shall be promptly rectified.
- iii. Water used for curing should not be allowed to stagnate near the base plates supporting the staging and should be properly drained.

12.6 Preparation of formwork before concreting:

The inside surfaces of forms shall, except in the case of permanent form work or where otherwise agreed to by the Engineer, be coated with a release agent supplied by approved manufacturer or of an approved material to prevent adhesion of concrete to the formwork. The release agent shall be applied strictly in accordance with the manufacturer's instructions and shall not be allowed to come into contact with any reinforcement or prestressing tendons and anchorages. Different release agents shall not be used in formwork of exposed concrete.

Before reuse of forms, the following action shall be taken:

- (a) The contact surface of the forms shall be cleaned carefully and dried before applying a release agent.
- (b) It should be ensured that the release agent is appropriate to the surface to be coated. The same type and make of release agent shall be used throughout on similar formwork materials and different types should not be mixed.
- (c) The form surface shall be evenly and thinly coated with release agent. The vertical surface shall be treated before the horizontal surface and any excess wiped out.
- (d) The release agent shall not come in contact with reinforcement or the hardened concrete.

12.7 Removal of formwork:

- (i) The scheme for removal of formwork (i.e., de-shuttering and De-centering), shall be planned in advance and furnished to the Engineer for scrutiny and approval. No formwork or any part thereof shall be removed without prior approval of the Engineer.

The formwork shall be so removed as not to cause any damage to the concrete. Centering 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.

Where there are re-entrant angles in the concrete sections, the formwork shall be removed at these sections as soon as possible after the concrete has set, in order to avoid cracking due to shrinkage of concrete.

- (ii) The following guidelines for OPC may be followed to determine the time of removal of formwork:

a)	Walls, piers and abutment columns and vertical faces of structural members	48 hrs
b)	Soffits of slabs	14 days
c)	Soffits of beams	21 days

For other than OPC, the removal of formwork shall be done as per direction of Engineer in charge

12.8 Finishing:

- (i) Immediately after removal of forms, exposed bars or bolts, if any, shall be cut inside the concrete member to a depth of at least 50mm below the surface of the concrete and the resulting holes filled with cement mortar of dry pack consistency.

All construction and expansion joints in the complete work shall be left carefully tooled and free from any mortar and concrete. Expansion joint filler shall be left exposed for its full length with clean and true edges.

The finished surface of concrete after removal of formwork should be such that no touching up is required. All fines caused by form joints, if any, shall be ground using electric surface grinder.

Immediately on removal of form, the concrete work shall be examined by the Engineer before any defects are made good.

- (a) The work that has sagged or contains honey combing to an extent detrimental to structural safety or of architectural appearance shall be rejected.

- (b) Surface defect of a minor nature may be accepted. On acceptance of such work by the engineer, the same shall be rectified as directed by the Engineer.

12.9. All construction and expansion joints in the completed work shall be left carefully tooled and free from any mortar and concrete. Expansion joint filler shall be left exposed for its full length with clean and true edges.

13. Temporary Structures

13.1. Before start of work contractor should submit a detailed layout plan of Camp/Structure being created to facilitate completion of work to Engineer. The plan should be elaborate and along with design. This should include camp, casting yard, batching plant, temporary sheds and temporary bridges etc.

14. Setting out of Bridge

14.1. Set out for the bridge would be given by the contractor based upon reference points that would be established by them. Detailed Scheme of set out, establishment of reference points etc would however be submitted to Engineer for their approval.

14.2. Permanent pillars would be established which should facilitate easy checking of alignment/centre point/Level at each stage of work.

14.3. Maintaining correct line and level of all the Bridge would be responsibility of contractor not withstanding alignment/centreline/level is checked by Engineer at regular intervals.

14.4. Contractor should make available all necessary facilities namely instruments, labour etc to Engineer/his representative to enable them check of alignment/Center point/Level at every stage.

15. The necessary field registers will be supplied by the contractor free of cost which shall be maintained for this work by Railway. Contractor/authorised representative has to sign with his remarks if any in each register as a token of acceptance of details/instructions entered by Engineer or Railway representative (DY.CE/ XEN/ AXEN/SSE/ JE(Con)).

- (a) **Site order book-** For recording the instructions issued to the contractor with replies on opposite side. Site Order Books are being maintained for giving the instructions 'as and when required' in writing by the Railway officials/authorities to the contractor's authorized engineer/supervisors at the site related with the execution of works/rectification of the works etc., duly to be replied by the contractor on opposite side of it and being maintained according to the contract/GCC provisions. Site Order Book is being/to be remains under the custody of concern railway supervisor only.

Contractor's engineer/representative should give his remarks in the Site Order Book on the day in which Railway Officials is giving the instructions in it.

Site Order Book is being remains in the custody of concern railway supervisor only and contractor's representative should take note & sign in the same date/time when railway authorities are giving instructions in it. Each Site Order Book is having its own sanctity & no separate/duplicate copy is to be/being maintained for keeping with agency.

- (b) **Daily progress, labour& machinery register** – For recording the daily progress of each work executed on every day, details of labour engaged (skilled/unskilled) and machinery mobilised on each and every day along with description of works and approximate quantity of work done and condition of weather.
- (c) **Cement consumption register** – For recording the details of receipts, consumption towards the work, and balance of cement in store godown on every day for different works along with clear description of work and approximate quantity of work done for different mix proportions etc.
- (d) **Reinforcement register** – For recording the reinforcement consumed in RCC/PSC and other works.
- (e) **Quality control register** – For recording the details of field test conducted on concrete cubes, and aggregate etc., are to be recorded in the register. Field tests are (a) checking the compressive strength of concrete cubes for 7 days & 28 days, (b) sieve analysis for fine and coarse aggregate (c) silt content in sand, (d) determination of moisture content in sand for calculating the actual quantity of sand to be used in design mix at site, (e) slump test (f) compaction factor test, (g) concrete permeability test, (h) specific gravity tests and other tests if any.
- (f) **For PSC Girders:**
- (i) **Stressing Register** : For recording the elongation of strands and load etc.
- (ii) **Load testing Register:** For recording the details of loads applied, and deflections noticed under particular load etc.
- (g) In addition to the above, any new register (s) if required, the same will have to be maintained as per the direction of the Engineer-in-charge.
- (h) The pages of each and every register should be machine numbered and top initialled on the first page of the register by the Engineer-in-charge /field officer. Entries in the each page should be signed jointly by authorized representative of Engineer in Charge of work and contractor/his authorized representative.

16. Ready Mixed Concrete

16.1. Ready mixed concrete may be used subject to prior review of the Engineer. It shall conform to the specifications of concrete as specified in IS:4926.

16.2. The quality of admixtures like water reducing agent, retarders, superplasticizers-cum retarders etc should meet the requirement of the material specification as given in IRUSS (Formation Works, Bridge Works and P. Way Works)2021 (with latest amendment) and its suitability should be tested as per IS: 9103 at the time of finalizing the mix design.

CHAPTER – XIII**SPECIAL CONDITION OF CONTRACT FOR STRUCTURAL STEEL WORK & OTHER STRUCTURE CEMENT & REINFORCEMENT BARS etc. (PART-A)**

1	Railway will exercise absolute discretion for operating all or some of the items of the schedule. The quantities indicated for different items under SCHEDULES are indicative and approximate and may vary from nil to actual requirements at the time of execution.
2	Indian Railway Unified Standard Specifications (Formation Works, Bridge Works and P. Way Works) 2021 is applicable.
3	Materials/Products used in the work shall be of approved make/brand, out of the list of manufactures/brands/makes given in the tender documents.
4	In case, no make or brand is specified in the tender documents the materials supplied should be an ISI mark & manufactures name should figure in the list of approved licenses of BIS.
5	In the case of items for which neither brands are specified nor ISI marked items are available, the sample shall be got approved from Engineer-in-charge.
6	In all the above cases i.e. (3) to (5) samples/fixture shall be approved by Engineer-in-charge before using the same in the work.
7	Engineer-in-charge has discretion to check the quality of materials & equipments to be incorporated in the work at the source of supply or site of works even if the materials have been marked as ISI mark or from the approved make list. In case it is required to test the materials, the testing charges are to be borne by contractor.
8	Even after approval of sample, if it is found at any point of time during execution that materials actually used is differing from the approved sample, the contractor shall remove the defective materials and the entire cost of redoing the work will be borne by the contractor.
9	Special condition of Cement for providing, consumption & payment:-
9.1	Contractor should procure cement from ISI approved Firms or from their authorized distributors only. Proof of procurement i.e. vouchers etc. will be submitted by the contractor.
9.2	Payment towards cement will be made on the basis of actual consumption according to design mix and for nominal mix it should be the actual consumption or as per Indian Railway Unified Standard Specification Works & Materials (Formation Works, Bridge Works and P. Way Works) 2021 with SEC Railway-USSOR 2021 whichever is less and no wastage on any of the materials supplied and used in the work by the contractor including cement is payable by the Railway. The contractor shall make his own arrangements for storing cement.
9.3	The manufacture's test certificate containing the batch, date of manufacturing etc. must be submitted by the Contractor at the time of supply.
9.4	Test Certificate for Cement used should be produced which should conform to IS: 1489 for PPC and IS:12226 for OPC-53 grade, IS:8112 for OPC -43 grade, IS :455 for PSC as the case may be.
10	Special condition of TMT Bars for providing, consumption & payment:-
10.1	The steel to be procured for the work shall be as per Special Condition of Contract XII (Specification Of Steel Reinforcement).
10.2	These steel shall be procured as per the extant policy guidelines.

10.3	The contractor shall disclose the source from where supplies of Steel is received by him and maintain a detailed record of receipt of steel from different sources and shall keep the challan, Railway receipts, lorry number, etc. and store balance in a register as directed by the Engineer-in-charge and produce the same to the Engineer as and when demanded. A copy of purchase document shall have to be submitted along the bill for claiming payment against these items. Railway reserves the right to inspect contractor.
10.4	Payment towards Steel will be made on the basis of actual consumption (including overlaps, chairs) and no wastage on any of the materials supplied and used in the work by the contractor including steel is payable by the Railway. The contractor shall make his own arrangement for storing Steel.
10.5	In case of any doubts regarding quality of Steel, the Railway may order it to be tested and acceptance of the supplied steel shall be subject to such test results and cost of testing will have to be borne by the contractor.
10.6	For the purpose of calculating weight of reinforcement steel consumed for the work, standard weight of reinforcement bar or the actual weight whichever is less will be multiplied by the total length of the bar used for the work. It shall be noted that for the purpose of payment, only authorized overlaps will be accounted for (As per IS:456 - latest revision), unauthorized overlaps, wastage, excess consumption etc. will not be paid for to the contractor. The quantity of chairs shall be payable as per drawing showing layout of chair locations duly approved in advance by the Engineer-in-charge. The payment for reinforcement steel consumed for the work will be made to the contractor for the work successfully executed and certified by the Engineer-in-charge for payment and the same will be calculated as mentioned above.
10.7	Manufacturer's Test certificate for steel used should be produced and the same should conform to IS-1786/2008. Railway may order testing of supplied steel periodically and cost of testing will have to be borne by the Contractor.
10.8	All reinforcement used should be free from loose Mill scale, loose rust, paints and oil coating etc.
10.9	No. payment is to be done for SWG binding wire used for reinforcement.
11	It is sole responsibility of the contractor for safety of his labors, tools and plants materials while executing the work.
12	The execution of all non-SOR items are including of all lead, lift, crossing of any No. of lines, ascent, descent, loading, unloading, transporting, labors, tools, plants, taxes, royalty etc., complete.
13	All the works covered under the contract shall be executed with contractor's own materials of approved quality unless otherwise specified.
14	No extra lead, lift or any other charges will be paid to the contractors, unless otherwise specified. The rate for all items is inclusive of all taxes.
15	Wooden centering will not be permitted, shuttering made of steel plates and or of ply boards only shall be allowed.
16	Mode of payment of structural steel work as follow : As per Schedule.
17	Conditions for Steel Girders/components fabrication and Metalizing/painting etc.:-
17.1	Fabrication of steel girders/components and Metalizing & painting etc.- QAP preparation & approval and work execution etc. to be done as per the concerned codes/guidelines- i.e. RDSO guidelines "Indian Railway Standard Specification for Fabrication and erection of Steel Girder bridges and locomotive turn-tables: IRS-B1-2001 (with latest

	Correction/Revision)", Indian Railway Standard Code of Practices for Metal-Arc welding for structural steel bridges carrying rail-cum-road or pedestrian traffic (Adopted 1972 Revised 2001) with latest corrections, guide book published by RETS-IRICEN "Steel Structure Fabrication for Railways", BS-110(R), BS-111, BS-115 (Rev), IRS Welded Bridge code, Indian Railway Bridge Manual (IRBM), IRS Steel Br. Code & other concern IS codes as required etc.
17.2	Metalizing process which involves the steps/procedure & to be followed-
17.3	Sand blasting- surface preparation, Abrasives to be used for blasting, blasting methods, spraying procedure etc. As per the code IS:6586-1989 & clause-3 of it and in accordance with IS:5905-1989 & Annexure 'A' of it for method of surface preparation of reference surface. As per IS:6586-1989, sand to be used as of washed River sand which should pass through 1700µm or 1.7mm (As per US classification sieve/mesh size No.12) sieve and to be retain on 600µm or 0.600mm (As per US classification sieve/mesh size No.30) sieve and minimum 40% should be retain on 850µm or 0.850mm (As per US classification sieve/mesh size No.20) sieve, sieves to confirm IS:460(Part-1)-1985. Pictorial surface preparation standards for painting of steel surfaces as per IS:9954-1981- for rust grades, preparation of grades and prepared surfaces. The designation of prepared surface grade to be 'Sa 2½' and will be of either rust grade A or B or C or D according to the surface rust as occurred at the surface of girders steel before surface preparation by sand blasting. That prepared surface after rust removal from steel surface by sand blasting to be compared with matching prints of that particular prepared surface grade of Sa 2½ with the concern particular rust grade A or B or C or D & to match with/confirm as given in Swedish Standard SiS SS 05 5900-1967 & as in Indian version ISO 8501-1:1988- 'Standard Comparator or Preparation of steel Sub grade Surface before application of paints-and related products- visual assessment of surface cleanliness- PART.1'.
17.4	Application of spray painting of Aluminium wire to be used confirming the IS:2590-1987 (with latest amendments)- Specification for primary Aluminium Ingots for re-melting for general Engineering purposes. Aluminium wire supplied to be of make from BALCO, NALCO or HINDALCO and purity of wire should be at least 99.5%. The Dry Film Thickness (DFT) at any isolated location should not be less than 110µ (microns) and average DFT should not be less than 150µ (microns). After sandblasting, dust from blasted steel surface to be removed by blower and within 4 Hrs one coat of Aluminium wire spray painting to be done in blasted steel surface and complete coating of required specified thickness of metalizing by Aluminium wire spray painting to be done within 8 Hrs after sand blasting.
17.5	Application of One Coat of Etch primer confirming to IS:5666-1970 (with latest amendments).
17.6	Application of One Coat of Zinc chrome primer confirming to IS:104-1979 (with latest amendments) with additional provision that Zinc chrometo be used in the manufacturing of primer shall confirm to Type 2 of IS:51-1998 shall be applicable. Minimum Dry Film Thickness (DFT) of Zinc chrome primer should be 20µ (microns).
17.7	Application of One Coat of Aluminium paint confirming to IS:2339-1963 (with latest amendments). Minimum Dry Film Thickness (DFT) should be 20µ (microns). Another coat of Aluminium paint of minimum DFT of 20µ (microns) will/to be applied after the erection of FOB girder at site/location or as per the direction of Engineer-in-charge.
17.8	DFT to be measured by Digital Elcometer (with valid calibration certificate) which is to be purchased by contractor's own cost and readings to be taken & recorded at least one reading for every 1.0 Sqm. All the paints used for the painting of girders to be taken of the RDSO approved brands only with valid certificates.

17.9	Steel to be used for the girder/components fabrication of FOB girders to confirm IS:2062-2011, Grade: E-250 Quality-'A'.
17.10	Paints/primers etc. to be procured from RDSO approved brands only having valid certificates/approval. "Aluminum wire" to be used as manufactured by BALCO, NALCO, HINDALCO.
17.11	Proper Registers/files to be prepared for supply of materials, steel, paints, primers, Aluminum wires etc. in which clearly to be mentioned the quantity, Heat no., shipping no., challan, bills, manufacture test certificate (MTC), 3rd party test certificates that to be tested as per the guidelines & requirement and according to the concern IS codes. All other consumables which are going to be used/consumed, is to be duly satisfy the requirement/quantity, quality etc. as per the concern IS codes or other relevant codes etc.
17.12	Work of fabrication of girders/components, metalizing/painting etc. to be done by the trade/Agency in the RDSO approved workshop only having valid certificate or in other fabrication workshops complying the STR as per the RDSO guidelines & as decided by competent Railway authority. And for this QAP to be prepared by the trade/Agency concern before the start of the work duly signed by the all concern competent authorities of fabricator workshop & contractor and to submit to the Railway for approval of the same from officials of construction department & competent authority.
17.13	During fabrication, metalizing/painting etc. work at the said workshop, concern Railway officials can/will inspect the work, workshop etc. and for the same trade & workshop authorities will have to facilitate the inspection enduring all support etc. and to show all the documents/ certificates/registers/challans/bills, codes, manuals, guidelines, provisions etc. as required for the work and as demanded by inspecting officials and and to be complied for the same if any discrepancy & for compliance of inspections in this regard.
17.14	Girder/components fabricated at workshop duly metalized/painted etc. to be transported at work/execution/final laying location/site of Railway/Railway premises/location as per the direction of Engineer-in-charge or his authorized representative and agency will have to bear the full cost for the same including all type of taxes, octroi, state boundary crossing taxes & all other taxes etc. and nothing extra will be paid from Railwayside to the contractor/agency in this regard.
17.15	Transported materials, girders/components etc. will require to be stacked properly in level ground and plumb line over the support with proper dunnage in safe & secure locations by the contractor/agency bearing full cost by him & nothing extra will be paid to him by the Railway for the same.
17.16	For erection of FOB girders/ lattice girders, suitable capacity crane will be arranged by Railway free of cost in railway running track area only and all labors, tools & plants materials and any other items referred for erection to be arranged by the contractor.
17.17	The erection of all steel structures should be carried out in accordance with the specifications, approved drawings and conditions supplied and subject to alteration and amendment as may be ordered from time to time during the progress of the work. Any departure from plans, specifications etc. should be reported to the Engineer.
18	Concreting without mixture and vibrator will not be permitted. For unimportant work hand mixing of concrete and/or compaction/consolidation by manual means can be permitted with the prior written approval of the Dy.CE/CON.
19	If required some of the essential works are to be executed in night time with the permission of Engineer-in-charge as requested by the contractor in written for speeding-up the execution of works at sites, for the stipulated period with proper safety precautions for which no extra payment will be made.

20	Contractor will be required to dispose of the resultant debris part or full load by own transport and labour within the Rly's land at nominated locations in the colonies as directed by the Engineer-in-charge. If the contractor fails to dispose off the debris as directed by the Engineer-in-charge, the concern- executed item, where the debris is released will not be paid.
21	The railway will at its discretion and for the duration of contract, make available land with taking the charges as per the policy guidelines for the construction of contractor's site office, stores etc. required for the execution of contract. Cleaning and leveling of the ground, construction of the temporary roads, stores, offices, etc. as required shall be done by the contractor at his cost to the satisfaction of the Engineer. No land for the accommodation for his staff and labors shall be made available by the Railway. In regard to the land made available to the contractor for the office, stores, the site shall on completion of work, be restored to reasonably the same condition as they were originally handed over to the contractor.
22	The quantities shown in schedule are approximate and are as a guide to give the tenderer(s) an idea of quantum of work involved. The Railway reserves the right to increase/decrease and/or delete or includes any of the quantities given above and no extra rate will be allowed on this account.
23	The railway will not arrange to supply electric energy. The contractor shall make his own arrangements for electric energy necessary for the works. The system shall conform to Indian Electricity Act and shall be approved by the railway.
24	The items for various section of SECR USSOR-2021 mentioned are tentative and for guidance of tenderers. Any item of any section of SECR USSOR-2021 can be executed as per site conditions and the contractor has to execute it at the same rates as applicable for that particular section in which the item exist. The contractor will not have any claim over it.
25	Contractor will have to make his own arrangement for water for concreting & other works while in execution. The water may be provided by Railways, if available. For using Railway's water, contractor will have to make his own pipe line arrangement along with water meter from location decided by Railway Administration. The rate chargeable will be as per rate given by Railways for purchase of water prevailing at that time. Supply of water from Railway's will depend upon availability and feasibility & contractor will have no claim for non supply of water by Railways.
26	Foundation work: The quantity payable for earthwork shall be for the contents based on the length, breadth of the bottom most footing and vertical depth from ground level and no extra for site slopes, slips etc. will be taken.
27	Fabrication, assembly and erection of steel work:
27.1	The steel that will be supplied by the contractor should IS:2062-2006 (latest version) Grade A or B for bridge girders and other steel structures and M.S. bolts & nuts confirming to IS:1363.
27.2	All fabrication and erection shall be done in accordance with IS:800-62 as per approved design.
27.3	The contractor shall afford to the Engineer or his representative all reasonable facilities as may be necessary for satisfying the Engineer that the structural steel is being and or has been fabricated in accordance with the specification and drawings.
27.4	The fabrication shall be by riveting and/or welding. The contractor has to submit cash receipt after purchase of raw steel and should bear the IS Specification to which steel is rolled.

27.5	Riveting/welding shall not be started until such time the Engineer has personally satisfied himself that the alignment of the structure is correct.
27.6	(a) The weldings shall be uniform and shall not contain any slag or below holes. There should be no undercutting of parent metal or over lapping. Electrodes used for welding shall be approved by the Engineer before use. Welding shall conform to IS:816. (b) All riveting shall be done by the pneumatic or hydraulic riveters. (c) Rivets, when driven, shall fill the holes completely have full dimension heads, and concentric with the shank of the rivet and shall be in full contact with the surface or be counter-sunk when so required.
27.7	The contractor shall arrange for service bolts and nuts, drifts, compressed air, oxygen and acetylene gases required for the fabrication and erection and also trailers/tractors with necessary tools and plants for loading, unloading, handling and transport to erection site from stores.
27.8	Where only bolting is specified in the drawing, it should be tightened to the maximum limit. The bolts used should be long enough so that at least 3 threads protrude when the nut is fully tightened and no gap should be allowed to clean the members to be joined. On permanent built, one washer should be provided for the bolt head and one for the nut.
27.9	Particular care should be taken to ensure free expansion and contraction wherever provided.
27.10	Wooden rammer mallet shall be used in forging members into position, in order to protect the metal from injury shock.
27.11	While assembling and erecting, the contractor shall arrange to straighten any bends, twists etc., if any in the fabrication. The contractor shall at his own cost rectify any defect minor in the opinion of Engineer in fabrication and also carry out any alterations as considered by Engineer that may be found necessary. Such minor works shall include cutting of rivets, drilling of holes, reaming and jointing structural members by riveting, bolting, welding.
27.12	Instrumental checking for correctness of setting up of structures as also the final adjustment of leveling and aligning should be carried out immediately after completion of assembling in the sequence determined by the design.
27.13	The erection of steel structure shall be carried out in correct sequence ensuring the stability of structures at all stages of erection. All structures placed in position must have strong supports until they are properly joined with the allied structures, so that they may not fall down or be blown off. The contractor failing to take such precaution shall make good the damages sustained to these structures and other properties of the railways or replace such structures and properties of the railways found damaged causing from such incidence as considered necessary by the Engineer.
27.14	The erection of all steel structures should be carried out in accordance with the specifications, approved drawings and conditions supplied and subject to alteration and amendment as may be ordered from time to time during the progress of the work. Any departure from plans, specifications etc. should be reported to the Engineer.
27.15	Assemblies of structures may be made on ground.
27.16	Inspection: inspection of the fabrication, erection and other works will be at any time be carried out by Engineer.
27.17	The contractor shall be responsible for any damages occurring while keeping them stacking under their custody till the materials are erected by him and work is finally accepted by the railway.

27.18	All testing as considered necessary by Engineer will be carried out at Contractor's cost: The Engineer may order the materials in the works to be carried out where he considers it necessary to test workman-ship an quantity, and if the work be found satisfactory the cutting out and replacing of the materials will be paid for by the railway. But, if in the opinion of the Engineer such work opened up shall have been executed either unsound, imperfect or un-skillful workman-ship or with materials of inferior quality or not in accordance with the conditions, the contractor shall not in accordance with the conditions, the contractor shall forth-with at his own cost and to the entire satisfaction of the Engineer rectify, re-construct or replace the same either in whole or in parts as he may be directed by the Engineer, whether or not the value of any such work or materials shall have been included in any payment made to the contractor.
27.19	The contractor shall inform the Engineer in writing when work/portion of the work is ready for inspection, giving him sufficient notice to enable him to inspect the same without retarding the further progress of work. No portion of work shall be considered completed in accordance with the terms of tender until the Engineer shall have certified in writing that it has been inspected and approved by him.
27.20	The contractor shall design, manufacture, erect and dismantle any release work, staging temporary supports etc. Required for the safe and accurate erection of the structure steel and shall be responsible for the adequacy of the same. The cost of such works shall be deemed to be included in the rates of the erection of structures for which such false work, staging and temporary support etc. are required. The contractor may get this drawing and design of such false work, staging etc. approved by the Engineer, but such approval by the Engineer shall be relieve him of any responsibility for the safety of such work.
27.21	Erection of steel structures over concrete structure will start only on receipt of instruction from the Engineer to the effect that all inserts embodied in concrete are in correct lines and levels as shown in the drawings and that deviations, if any, are within permissible limits.
27.22	The contractor shall provide adequate supervision at all stages of work and examine in parts for accuracy before erection is commenced. He shall also provide facilities and space satisfactory to the Engineer for inspection of any parts to be used in the work at such stages, as he may direct. Irrespective of any inspection and test made by the Engineer, the contractor shall be entirely responsible for proper execution of the contract, notwithstanding any approval which may have been given by the Engineer of the work or of test carried out either by the Engineer or the contractor. Any fittings or accessories which may not be specifically mentioned in the specification by which are used or necessary for erection are to be provided by the contractor without extra charges, so that the erected structures may be completed in all respects.
27.23	The contractor should bring his own erection plants and equipments, tools and tackles, scaffolding, trestles etc. any other accessories
27.24	The contractor shall provide for the conveyance of inspection/testing adequate temporary access ladders, gangways, tools, tackles, instruments and all the facilities required by the Engineer for the purpose.
27.25	The holes for erection joints riveted of bolts (with machined bolts) should be fitted with temporary bolts and plugs after mounting the structures. The number of bolts and plugs is determined by design but should not be less than 1/3 of the total number of holes. In joints where the number of holes is equal to 5 or less not less than 2 holes should be filled. The number of plugs should be about 30% of the number of bolts.

28	The paints used in the work shall be from reputed manufacturers and conform to IS Specification and shall be approved by the Engineer. The testing charges of the paints should be borne by the contractor.
29	The rates quoted should take into account all the above special conditions and no extra payment will be admissible on any of this account under any circumstances.
30	Only after the entire coat of paint is dried up, the next coat of paint will be applied after obtaining clearance to do so from site in charge.

SPECIFICATION OF STRUCTURAL STEEL WORK (PART-B)

.	<u>Structural Steel:-</u>
1.1.	Only weldable steel conforming IS:2062, Quality 'A' Grade Designation E250 as rolled semi-killed or killed shall be used for Foot Over Bridges and other structures subjected to non-critical loading.
1.2.	Only weldable steel conforming IS:2062, Quality 'B0' Grade Designation E250 fully killed and with normalizing/normalizing rolling/controlled rolling where service temperature does not fall below 0°C, shall be used for welded/riveted girders subjected to Railway loading. Plates less than 12 mm thick need not be with normalizing/normalizing rolling/controlled rolling.
1.3.	<p>Only weldable steel conforming IS:2062, Quality 'C' Grade Designation E250 fully killed and with normalizing/normalizing rolling/controlled rolling ensuring impact properties at (-) 20°C, shall be used for sub-zero temperature areas for welded/riveted girders subjected to Railway loading. Plates less than 12 mm thick need not be with normalizing/normalizing rolling/controlled rolling.</p> <p>Note 1: In case Rolled Steel Section confirming to IS: 2062 Quality 'B0' or 'C' are not available in market, steel confirming to IS:2062 Quality 'BR' may be used with the prior approval of CAO(Con) and in such case a reduction @ Rs 2,000/- (Rupees two thousand) per MT will be made from Contractor's bills.</p> <p>Note 2: In case Rolled Steel Section confirming to IS: 2062 Quality 'BR' is also not available in market, steel confirming to IS:2062 Quality 'A' may be used with the prior approval of CAO(Con) and in such case a further reduction @ Rs 2,000/- (Rupees two thousand) per MT in addition to reduction mentioned vide Note 1 above will be made from Contractor's bills.</p>
1.4.	High tensile steel shall comply in all respects with the requirement of IS:2062 Grade Designation E410 Quality 'B0' or 'C' (copper bearing quality) for the welded work.
1.5.i.	Independent tests shall be conducted, where ever required, to ensure that the materials procured conforms to the specifications and cost of testing to be borne by the Railways. (If the test result does not satisfy the required specification and the steel supplied is rejected ,such cost of testing will be deducted from contractor's dues.)
1.5.ii.	The steel to be procured for the work shall be as per Special Condition of Contract XII (Specification Of Steel Reinforcement),

1.5.iii.	However, only certain isolated sections of structural steel, not being rolled by ISPs, can be procured from the authorized re-rollers of ISPs or authorized licensee of BIS having traceability system and who use billets produced by ISPs. Traceability shall be ensured by an officer specially authorized by the concerned SAG officer of the Zonal Railway on case to case basis for this purpose.
1.5.iv.	The contractor shall disclose the source from where supplies of Steel is received by him and maintain a detailed record of receipt of steel from different sources and shall keep the challan, Railway receipts number of lorry number, etc. and store balance in a register as directed by the Engineer-in-charge and produce the same to the Engineer as and when demanded. A copy of purchase document shall have to be submitted along the bill for claiming payment against these items. Railway reserves the right to inspect contractor'
1.5.v.	Material to be used should be purchased from authorized sources only. The contractor must submit Manufacturer's Test Certificates and Vouchers. All structural steel shall be free from rust, scales, laminations, cracks and other surface defects.
1.6.	<u>Fabrication:-</u> In case of Railway/Road steel Bridge Girders, fabrication generally comply with current IRS specifications (IRS B-1 2001 and BS-110). For other cases, fabrication shall conform to IS-800 – 2007. Steel girders shall be fabricated in workshop with good quality control. Workshop should have facility matching with RDSO's Schedule of Technical Requirement (STR) dated 23.10.2012.
1.7.	<p><u>Welding:-</u> The welding work shall conform to IRS steel bridge code, IRS welded bridge code, and relevant IS code. Electrode/Coil used for welding shall be approved type and procured from RDSO approved firms only. In the case of welded fabrication, shop welding shall be adopted whenever possible. In fabricating components and sub members, welding shall be done by Submerged Arc Welding (SAW).</p> <p>If SAW is not possible then CO2 (MAG) or MMAW are to be used. QAP,WPSS,WPQR (as per RDSO specification) must be submitted by the contractor before starting the fabrication work.</p> <p>The work will be done as per Indian Railway unified standard specification 2021with up to date correction slips.</p> <p>The contractor shall procure one copy each of the following IS codes and shall be available at working site.</p>
(i)	IRS :- Bridge Rules – 1964.
(ii)	IRS :- Welded Bridge Code – 1972.
(iii)	IRS :- Steel Bridge Code – 1941/
(iv)	IRS :- Schedule of Dimensions (BG) – 2004.
(v)	IRS :- Indian Railway Standard Specification for Fabrication and Erection of Steel Girder Bridges and Locomotive Turn – Tables B – 1 -2001.
(vi)	IS :- 2062 – 2011 – Hot Rolled Medium and High Tensile Structural Steel – Specification. IS :- 8910 – 2010 – General Technical Delivery Requirements for Steel and Steel Products.
(vii)	IS :- 800 – 2007 – General Construction in Steel – Code of Practice.
(viii)	IS :- 814 – 2004 – Covered Electrodes for Manual Arc Welding of Carbon and Carbon

	Manganese Steel – Specification.
(ix)	IS :- 9595–1996 – Metal Arc Welding of Carbon and Carbon Manganese Steel – Recommendation.
(x)	IS 822-1970 –Code of procedure for Inspection of welds.
(xi)	IS 816-1969 –Code of Practice for use of Metal Arc welding for General Construction in mild steel.
(xii)	IS :- 7310 (Part-I) – 1974 – Approved Test for Welders Working to Approved welding.
(xiii)	IS :- 7318 (Part – I) – 1974 – Approved Test for Welders when welding procedure approval is not required.
(xiv)	IS :- 4000 – 1992 – High strength bolts in steel structures – code of practice.
(xv)	IS :- 3757 – 1985 – Specification of high strength structural bolts.
(xvi)	IS :- 6649 – 1985 – Specification of Hard end and tempered washers for high strength structural bolts and nuts.
(xvii)	IS :- 6623 – 1985 – Specification for high strength structural nuts.
(xviii)	IS :- 7215 – 1974 – Tolerances for fabrication of Steel structures.

(xix)	IS :- 2004 – 1991 – Carbon steel forgings for general engineering purpose- specification.
(xx)	IS :- 7205 – 1974 – Safety code for erection of structural steel works.
(xxi)	IS :- 4353 – 1995 – Submerged arc welding of mild steel and low alloy steels - recommendation.
(xxii)	IS :- 10178 – 1995 – CO2 gas shielded metal arc welding of structural Steel – recommendation..
(xxiii)	IS :- 104 – 1979 – Ready mix zinc chrome paint.
(xxiv)	IS :- 2074 – 1992 – Ready mix red oxide zinc chrome paint.
(xxv)	IS :- 2339 – 1963 – Aluminium Paint.
(xxvi)	IS :- 739 – 1992 – Wrought Aluminium and Aluminium Alloy – wire for general engineering purpose – specification.
(xxvii)	IS:- 5666 – 1970 – Specification for each ETCH (pretreatment) primer.
(xxviii)	IS :-1148 – 1982 – Specification for hot rolled steel rivet bars for structural purpose.
(xxix)	IS :- 1149 – 1982 – Specification for high tensile steel rivet bars for structural purpose.
(xxx)	BS :- 111 (R-7)– Specification for HSFG Bolts.
(xxxi)	BS :- 110 – For fabrication of steel Girders.

2.	<u>WELDING:</u>
2.1	<u>GENERAL:</u> Normally welds should be done by submerged arc welding process either, by fully automatic or semi automatic except where SAW is not practicable , CO2/MMAW may allowed.
	Except for special types of edge preparation such as single and double “U” single and double “J”, the fusion edges of all the parts which are to be joined by welding may be prepared by using mechanically controlled automatic flame cutting equipment and to be ground to a smooth finish. Special edge preparation should be made by machining or grounding. All welding work shall be done in shops and the layout and sequence of operation shall be so arranged as to eliminate distortion and shrinkage stresses.
2.2.	<u>ELECTRODES:</u> Electrodes used for this work shall be of approved type & procured from RDSO approved firms only. All electrodes shall be kept under dry conditions. Any electrode with parts of its flux coating broken away or otherwise damaged shall be rejected. Any electrode older either than six months from the date of manufacture or older than the date of

	expiry as specified by manufacturer should not be used.
2.3.	<u>PREPARATION OF JOINTS:</u> The edge shall be prepared with an automatically controlled flame cutting torch correctly to the slope, size and dimensions of the groove prescribed in the design and shop drawings. In case of “U” grooved joints the edges shall be prepared with an automatic flame torch in two phases following a level out grounding pass or by machining. The welding surfaces shall be smooth, uniform and free from fins, tears notches or any other defects which may adversely affect welding and shall be free of loose scale, slag, rust, grease, paint, moisture or any other foreign material.
2.4.	<u>WELDING PROCEDURE:</u> The Welding procedure shall be arranged by the contractor to suit the details of the joints as indicated on the drawing and the position at which welding has to be carried out. Welding procedure shall cover the following:
	a. Type and size of Electrodes.
	b. Current and for automatic welding arc Voltage.
	c. Length of run for Electrode, or for automatic welding, speed of travel.
	d. Number and arrangement of runs in Multi run welding.,
	e. Position and set up of parts.,
	f. Preparation and set up of parts.
	g. Welding sequence.
	h. Pre or post heating.
	i. Any other relevant information.
	<p>The welding procedure shall be so arranged that the distortion and shrinkage stresses are reduced to a minimum and the welds meet the requirement and quality specified here under:</p> <p>Any weld found defective shall be cut by using either chipping hammer or gouging torch in such a manner that adjacent material is not injured in any way. Planning of the welds involving deformation of the surface either during de-slogging operation or thereafter shall not be allowed.</p> <p>Fusion faces and surrounding surfaces within 50 mm. of welds shall be free from all mill scale and free from oil paint or any substance which might effect the quality of the welds and impede the quality/progress of welding. They shall be free from irregularities which interfere with the deposition of specified size of weld or be the cause of defects.</p> <p>All mill scale within 50 mm. of welds shall be removed on welding either by picking followed by thorough power weld brushing or by other approved methods. If preparation of cutting of the fusion faces is necessary the same shall be carried out by shearing, chipping, gas cutting or flame gouging. Where no gas cutter or hand gouging is employed the blow pipe or gouging blow pipe shall be properly guided.</p>
2.5	<u>ACCURACY OF FIT UP:</u> Parts to be fillet welded shall be brought into as close contact as practicable and the gap due to faulty workmanship or incorrect fit up shall not exceed 1.5 mm. If greater separation occurs at any position the size of fillet weld shall be increased at such position by the amount of the gap.
2.6	<u>JIGS AND MANIPULATORS:</u> Jigs and manipulators shall be used where practicable and shall be designed to facilitate welding and to ensure that all welds are easily accessible to the operators.
2.7	<u>ENDS OF BUTT WELDED JOINTS:</u> The end of butt welded joints shall be welded so as to provide full throat thickness. This may be done by use of extension piece, cross runs or other approved means.
2.8	<u>WELD FACE & REINFORCEMENT OF BUTT WELDS:</u> The weld face shall at all

	places be deposited around the surface of the parent metal. Where the flush surface is required the surplus metal shall be dressed off.	
2.9	Acceptance levels for quality of welds:	
2.9.1	Defect Type	Permitted, Maximum
	(I) Planar Defects	
	(a) Cracks and lamellar tears	Not permitted
	(b) Root Concavity	0.1t or 1.2 mm whichever is less
	(c) Lack of root fusion	Not permitted.
	(d) Lack of side fusion	Not permitted.
	(e) Lack of inter-run fusion	Not permitted.
	(f) Lack of root penetration	Not permitted.
	(II) Cavities	
	(a) Isolated pores (or individual pores in a group)	$\varnothing \leq t/4$ and also less than (i) 1.5mm for t upto and including 25mm; Or (ii) 3.0 mm for t over 25 mm upto and including 50 mm ; or (iii) 4.5mm for t over 50 mm upto and including 75mm; or (iv) 6.00 mm for t over 75 mm
	(b) Uniformly distributed or localized porosity	One percent by area (as seen in a ratio graph) for $t \leq 25$ mm and pro-rata for greater thicknesses.
	(c) Linear porosity	Linear porosity parallel to the axis of the weld may indicate lack of fusion or lack of penetration and is, therefore, not permitted.
	(d) Worm holes, isolated	$l \leq 6$ mm $w \leq 1.5$ mm
	(e) Worm holes, aligned	Same as for linear porosity
	(f) Crater pipes	$l \leq 6$ mm $w \leq 1.5$ mm
	(III) Solid Inclusions (Slag Inclusions)	
	(a0 Individual and parallel to weld axis (as seen in the radiograph).	
2.9.2	TESTING OF BUTT WELDS: Butt welded joints are to be radio graphically tested by the contractor at his own cost. If such test indicates joints to be defective, both cost of test and rectification shall be borne by the contractor. The contractor will radio graphically test the weld in presence of the Engineer in charge or his representative.	
2.9.3	TESTING OF FILLET WELDS: All fillet weld shall be tested with liquid penetration test as per IS: 3658 or Magnetic partial Test as per IS: 5334 and Micro examination test as per IS 3600 Part IX as directed by Engineer in Charge.	
2.10	MINIMUM LEG LENGTH AND THROAT THICKNESS IN FILLET WELDS: The minimum leg length of a fillet weld as deposited shall not be less than the specified size. In no case shall a concave weld be deposited unless specifically permitted. Where permitted, leg length shall be increased above that specified, so that the resultant throat thickness remains the same, as would have been by the deposition of a flat faced weld of the specified leg length.	
2.11	DE-SLAGGING : After making each run of welding all slag shall be thoroughly removed and the surface cleaned.	

2.12	<u>QUALITY OF WELDING:</u> The weld metal as deposited, including tack weld if to be incorporated, shall be free from cracks, slag inclusion, porosity, cavities and other deposition faults. The weld steel shall be properly fused with the parent steel metal without under cutting or over lapping at the toes of the weld. The surface of the weld shall have a uniform consistent contour and regular appearance.
2.13	<u>WEATHER CONDITIONS:</u> Welding shall not be done under weather conditions which might adversely affect the efficiency of the welding.
2.14	<u>QUALIFICATION AND TESTING OF WELDERS:</u> The contractor shall satisfy the Engineer that the welders are suitable for the work for which they will be employed and shall produce evidence to the effect that welders have satisfactorily completed appropriate tests as prescribed in I.S. 817, IS 7310(Pt -I) & IS 7318 (Pt -I). The Engineer may at his own discretion order periodic tests of the welder and/or of the welds produced by them. Such tests shall be at the expense of the contractor.
2.15	<u>SUPERVISOR:</u> The contractor shall employ a competent welding supervisor to ensure that the standard of workmanship and the quality of materials comply with the requirements laid down in the specifications.
3.	<u>MANUFACTURE AND ERECTION</u>
3.1	The contractor shall observe sufficient accuracy in the assembling and erection of every part of the work to ensure that all parts fit accurately together on erection.
3.2	The contractor shall maintain a master steel tape of approved make for which he has to obtain a certificate of accuracy from the National Test House, Calibrated under a tension of 1.8 Kg at 16.7°C.
3.3.	<u>ERECTION AND EQUIPMENT:</u> The contractor shall provide at his own cost all tools, machinery, equipment and erection material necessary for the expeditious execution of the work and shall erect the structural steel and iron work, in every respect as covered by the contract and in accordance with the drawings and specifications.
3.4.	All temporary works shall be properly designed and substantially constructed for the loads which it will be called upon to support. Adequate allowance and provision of lateral forces and wind loads shall be made according to local conditions.
3.5.	Temporary bracing shall be provided to take care of stress from erection equipment or other loads carried during erection.
4.	<u>TEMPORARY STRENGTHENING.</u>
4.1	The launching arrangement will include not only the supply and fabrication of launching arrangements, but also the supply and fixing of temporary strengthening of girder members to take care of erection stresses and strains. Erection stresses must be kept within allowable limits at every stage of erection.
5.	<u>PAINTING:(Not applicable for Steel Girder Bridges)</u> The contractor shall give primary coat of Red Oxide Zinc Chrome and finishing coat of Aluminum (as per paint schedule) after doing necessary surface preparation.
5.1	<u>PAINTING SCHEDULE:</u> Painting should be done on all steel works as per the schedule after doing necessary surface preparation.
5.2.	Painting shall not be commenced till the surface preparation has been approved by the Engineer or his representative.
5.3.	Paint shall be applied only on the dry and clean surfaces free from moisture or dust

	(including scrapping dust).
5.4.	<u>SPECIFICATIONS FOR PAINTING</u>
5.4.1.	Classification-‘A’: The surface to be painted shall be made free from oil, grease and dirt. The firmly adhering existing primary coat of paint shall not be removed. The surface shall be rubbed with scraper wire brushes and sand / emery paper in an approved manner. This is only for obtaining a rough uniform surface and not removing the paint.
5.4.2.	Classification –‘B’: The surface to be painted shall expose to bare metal scrappers, crippling hammers, chisels, wire brushes, emery/sand papers, pumice stone etc. may be used in all in the end, so as to obtain a uniform rough surface.
5.4.3.	Surface preparation of both classifications may be prescribed for the same span /bridge/steel structure
5.4.4.	Surface preparation shall not be done unless the approved paint of sufficient quantity (Both primer and finishing coat of paints) are available in stock.
5.4.5.	SPECIAL care should be taken in preparing corners, junctions of numbers, heads and nuts of bolts rivets holes are as less accessible, hidden pocket etc. surface preparation at such location shall not be inferior to that attained over the rest of the area.
5.4.6.	Surface preparation shall not be carried out in the following conditions:- A. In rainy season. B. In extremely wind /misty/dust blowing conditions. C. In night. D. In winter before 8 AM E. In summer between 11 and 15 Hrs. (11.00 AM. To 3.00PM) on areas, which are likely to be exposed to direct sunlight.
5.4.7.	No chemical shall be used for surface preparation.
5.4.8.	Surface preparation shall be commenced at the top of the job and worked down wards.
5.5.	PAINTING
5.5.1.	For surface preparation to classification ‘A’ The steel work shall be painted with 2 finishing coats only. Two finished coats of aluminium paint to IS-2339 For surface preparation to classification ‘B’ the steel work shall be painted. (a) First priming coat of ready mixed paint zinc chrome primer to IS 104-1979 (b) Second priming coat of ready mixed paint red oxide zinc chromate primer to IS -2074-1992 (c) Finishing coat: Two coats of aluminium paint to IS-2339-1963
5.5.2.	A little blue/black paint shall be added as directed by the Engineer to be first finish coat, for distinguishing the first coat from the second.
5.5.3.	Painting shall not be commenced till the surface preparation has been approved by the Engineer or his representative.
5.5.4.	Paint shall not be applied under the conditions mentioned in section 4.4.6.
5.5.5.	Paint shall be applied only on dry and clean surface free from moisture or dust (including scrapping dust).
5.5.6.	The paint drums must be rolled, turned upside down and shaken before opening sealed containers of paint of approved brand will be opened in the present of Engineer or his

	representative. The paint must be stirred well before use. Over stirring which results invisible air bubbles or form formation shall be avoided. If thinners are to be added to the paint supplied by firm, they should confirm to the manufactures recommendations/ specification. In all cases the thinner shall be added wherever necessary only in the presence of a authorized railway representative. The quantity of the thinner should be decided by trail and only the required quantity added so that the specified dry film thickness is obtained for each coat. Kerosene oil should not be mixed with any paint under any circumstances.
5.5.7.	The paint must be applied by means of flat brush not more than 75 mm in width having soft flexible bristles and confirming to IS 384 round and all brushes of approved quality to IS 437 may also be used as per the instruction of the Engineer of his representative. The new brush should be soaked in raw linseed oil to IS 77 for at least 24 hour before use.
5.5.8.	Paint should not be applied on wet surface.
5.5.9.	Bags, waste cotton, cloth or similar articles shall not be used for applying paint.
5.5.10.	The coat of paint applied shall be such that the prescribed dry film thickness is achieved by actual trail for the particular brand of paints. The applied coat of paints shall be uniform and free from brand mark, sags, blemishes, scattering, crumbling, unlevel. Thickness Hales, Log marks, lifting, peeling, staining, cracking, checking, scaling, holidays and aliegatoring and other defects.
5.5.11	Paints should be used within the prescribed shelf life from the date of manufacture. SHELF LIFE OF PAINTS: 1. Paint zinc chromate to IS 104 12 months. 2. Paint red oxide zinc chromate to IS 2074 12 months. 3. Paint aluminium to IS 2339 12 months (When paste and oil not mixed)
5.5.12.	Each coat of paint shall be left dry till sufficiently hardens before the subsequent coat is applied. Each coat of paint shall be inspected by BRI/IOW/PWI/AEN and certified as satisfactory before applying subsequent coat.
5.5.13.	The time lag between the successive operation shall under no circumstances exceed those specified below: 1. Between surface preparation to classification ‘A’ & first primary coat - 24 hours. 2. Between surface preparations to classification ‘B’ & first primary coat - 48 hours. 3. Between the primer coat and finishing coat -7 days 4. Between the first finishing coat -7 days.
5.5.14.	The thickness of the dry film shall not be less than the thickness specified below. If the thickness is found to be less than that specified additional coat of paint has to be applied to bring it to the required thickness. The thickness shall be measured by an digital type electronic Elecometer of an approved type. After getting the minimum thickness of dry film of paints mentioned below, payment will be made for the past painted area only.
5.5.15	Description of paint Dry film thickness 1 st Primer coat ready mixed zinc chrome paint to IS -104 - 1979 20 Microns 2 nd Primer coat ready mixed Red Oxide Zinc chromate Paint to IS – 2074 – 1992 20 Microns

	1 st Finishing coat of Aluminium paint to IS – 2339-1963 20 Microns 2 nd Finishing coat of Aluminium paint to IS – 2339-1963 20 Microns
	Area covered (Approx) per Liter Paint.
	Ready mixed zinc chrome paint to IS -104 -1979: 9.29 Sqm
	Ready mixed Red Oxide Zinc chromate paint to IS – 2074 – 1992: 14.60 Sqm
	Aluminium paint – IS – 2339 – 1963 : 15.94 Sqm
	Note: Paints to be purchased from RDSO approved firms only.
5.5.16.	<p>Metallising: All bridge girders must be metalized as per IRS-B1-2001 as per procedure and specification laid down vide Appendix VII of IRS-B-1-2001</p> <p>(a). Surface Preparation The surface shall be thoroughly cleaned and roughened by compressed air blasting or centrifugal blasting with a suitable abrasive material in accordance with Clause 3 and 4 of IS: 6586. Immediately, before spraying it shall be free from grease, scale, rust moisture or other foreign matter. It shall be comparable in roughness with a reference surface produced in accordance with appendix A of IS: 5905 and shall provide an adequate key for the subsequently sprayed metal coating.</p> <p>(b). Metal Spraying The metal spraying shall be carried out as soon as possible after surface preparation but in any case within such period that the surface is still completely clean, dry and without visible oxidation. If deterioration in the surface to be coated is observed by comparison with a freshly prepared metal surface of similar quality which has undergone the same preparation, the preparation treatment should be repeated on the surface to be coated.</p> <p>The wire method shall be used for the purpose of metallising the diameter of the wire being 3mm or 5mm. Specified thickness of coating shall be applied in multiple layers and in no case less than 2 passes of the metal spraying unit shall be made over every part of the surface. At least one layer of the coating must be applied within 4 hours of blasting and the surface must be completely coated to the specified thickness within 8 hours of blasting.</p> <p>(c) Purity of Aluminium The chemical composition of aluminium to be sprayed shall be 99.5% aluminum conforming to IS: 2590.</p> <p>(d) Appearance of the Coating The surface of the sprayed coating shall be of uniform texture and free from lumps, coarse areas and loosely adherent particles.</p> <p>(e) Thickness of the Coating</p>

	<p>The nominal thickness of the coating shall be 150 (microns). The minimum local thickness, determined in accordance with procedure given below, shall be not less than 110 (microns).</p> <p>(f) Shop Painting</p> <p>Any oil, grease or other contamination should be removed by thorough washing with a suitable thinner until no visible traces exist and the surfaces should be allowed to dry thoroughly before application of paint. The coatings may be applied by brush or spray. If sprayed, pressure type spray guns must be used. One coat of wash primer to IS: 5666 shall be applied first. After 4 to 6 hours of the application of the wash primer, one coat of Zinc chrome primer to IS: 104 with the additional proviso that zinc chrome to be used in the manufacture of primer shall conform to type 2 of IS: 51 shall be applied. After hard drying of zinc chrome primer, one coat of Aluminium paint to IS: 2339 (brushing or spraying as required) shall be applied.</p>
6.	<p>Use of High Strength Friction Grip (HSFG) bolts-specification & procedure.</p> <p>6.1. Supply of High Strength Friction Grip (HSFG) Bolts</p> <p>6.1.1 Reference Codes:</p> <ul style="list-style-type: none"> (i) IS 1367 (Part 6) – 1994 (reaffirmed 2004) –Mechanical Properties and test methods for nuts with specified proof loads (ii) IS 1367 (Part 8): 2002- Prevailing Torque type Steel Hexagon nuts – Mechanical and Performance properties. (iii) IS 1367 (Part XII) : 1983 (reaffirmed 2001) Phosphate Coating for Threaded Fasteners’. (iv) IS 3757 -1985 (reaffirmed 2003) –Specifications for High Strength Structural Bolts. (v) IS 4000: 1992 – High Strength Bolts in Steel Structures –Code of Practice. (vi) IS 6623:2004 – High Strength Structural Nuts – Specifications. (vii) IS 6649: 1985 – Specification for Hardened and Tempered Washers for High Strength Structural Bolts and Nuts. <p>6.1.2 Hierarchy of Codes: The hierarchy of codes shall be as follows:</p> <ul style="list-style-type: none"> (i) Provisions of IRS codes. (ii) Where IRS codes are silent, relevant IS codes. (iii) Where both IRS and IS codes are silent, relevant EN codes. <p>6.1.3 Definition: HSFG bolts are high strength structural bolts which have been tightened such as to induce predefined tension in the bolt shank. Provision in this code apply to non-galvanized bolts of dia. M12 to M36 only.</p> <p>6.1.4 Types of Bolts: For the purpose of HSFG connections, only high strength structural bolts of two property classes: 8.8 and 10.9 can be used. Bolts shall conform to IS 3757. The bolts shall have the following characteristics:-</p> <ul style="list-style-type: none"> (i) Identification: The property class of bolts (8.8 or 10.9) shall be embossed or indented as 8S or 10S respectively on the top of head along with the manufacturer’s identification symbol. Alternately, marking 8.8 S or 10.9 S are also acceptable. The suffix ‘S’ here denotes that the bolt is high strength structural bolt with a large series hexagon.

- (ii) **Length:** The length of bolt shall be chosen such as to hold the steel members in position, with provision for the nut, washer(s) and some projection beyond the bolt. Along with the overall length of the bolt, the thread length has to be specified. At least 4 full threads shall remain clear between the bearing surface of the nut and unthreaded part of the shank. Further, minimum one full thread pitch must protrude from the nut after tightening.
- (iii) The minimum length of bolt shall be worked out on the basis of maximum grip length (covering ply thickness and all washers) plus an additional allowance as per table 1 of IS: 4000.
- (iv) Maximum grip length of all plies, including packings and packing washers, shall not exceed 10 times the nominal diameter of the bolt.
- (v) **Surface Finish:** All bolts shall be supplied with coating consisting of zinc phosphate that is used in conjunction with suitable oil of rust preventive type as per IS 1367 (Part XII).

6.1.5 Nut: Each bolt shall be tightened using a high strength nut, conforming to IS 6623. The nut has to be strong enough to be able to impart the necessary torque to the bolt and also withstand the force during the life of the structure. Further, the threads in nut shall be matching with the threads in the HSFG bolt and the nut shall be free running on the threads of the HSFG bolts. Nuts shall have following characteristics:-

Property Class: For HSFG bolts, the property classes to be used are 8 and 10 as specified in IS 1367 (Part 6), suitable for bolts of property class 8.8 and 10.9 respectively. Normal height of nut shall be more than 0.8 times the nominal bolt diameter.

Identification of Nut: The nuts have the following markings:

- (i) Manufacturer's identification symbol.
- (ii) Property class, marked as 8S or 10S. (The suffix 'S' denotes a high strength structural nut with a large series hexagon.) Alternately, 8.8 'S' or '10.9S' are also acceptable. The marking shall be either on the top or the bottom face of double chamfered nuts and shall be either indented or embossed on nonbearing surface of washer faced nuts.
- (iii) **Surface of Nut:** All nuts shall be supplied with coating consisting of zinc phosphate that is used in conjunction with suitable oil of rust preventive type as per IS: 1367 (Part XII).
- (iv) **Position of nut in bolt:** Nuts shall be provided in bolts preferably as follows:
 - (a) **In girder web:** Towards outside of the girder.
 - (b) **In flanges:** Towards bottom (Except when in composite construction).
 - (c) **In composite construction:** Towards inside of concrete.
 - (d) **In bracing:** Towards the rolled section side so that space for rotation of the nut is not readily available.
 - (e) Where **Tapered washer** is used, the nut shall preferably be on the other side.

6.1.6 Washer: Annular rings which are provided between the bolt head/nut and the members being joined are called washers. Washers for HSFG bolts shall conform to IS 6649. The washers have the following characteristics:

(i) **Types:** Three types of washers have been specified in IS 6649, clause 2:

(a) **Type A:** Plain hole circular washers.

(b) **Type B:** Square taper washers for use with channels (6° taper)

(c) **Type C:** Square taper washers for use with I- beams (8° taper)

Identification : Type A washers shall be identified by provision to two nibs (small projections) and manufacturer's identification symbol in indented character. The type B and C washers shall be identified by the type identification symbol, B or C and the manufacturer's identification symbol.

(ii) **Categories of washers:**

a) **Plain washer:** Plain washers are used as per provisions of clause 28.10.2 where other types of washers are not suitable. HSFG bolts shall be provided with minimum one washer.

b) **Packing washers:** If the bolt is longer than required, plain washers may be used as packing washers also. **However, the maximum number of packing washers shall be limited to 3, with maximum total combined thickness of 12mm.**

c) **Tapered washer:** Where the angle between the axis of bolt and the joint surface is more than 3 degree off normal, a tapered washer shall be used against the tapered surface. Non rotating surface shall preferably be placed against tapered washer.

d) **Direct Tension Indicators (DTI) :** The Direct Tension Indicators are special type of washers with projections which get pressed when tension is applied. The pressing of projections to required level indicates that the required tension has been applied in the bolts. DTIs have multiple projections, between which the feeler gauge is to be inserted to check if the bolt has been sufficiently tightened or not. The projections shall be kept in the direction of nut/head of bolt and not towards member.

(iii) **Calibration of Direct Tension Indicator:** Before the DTI are brought to site, the same shall be tested in the presence of engineer. Three nos. bolts of similar diameter and property class as to be used in the work shall be taken and installed with DTI. The installation procedure to be followed shall be similar to the one given for plain washers. On full tightening, the projections on DTI washers shall meet the requirements of checks specified after second stage tightening using DTIs. Alternately, calibrated load cells may be used to check the calibration of DTI washer. **Only the DTIs which satisfy the calibration shall be brought to site for work.**

(iv) **Surface Finish:** All washers (except Direct Tension Indicators i.e. DTIs which may have any surface finish, as specified by manufacturer, with condition that the surface finish shall be compatible with the metallurgy of the steel structure and the HSFG bolt/nut) shall be supplied with coating consisting of zinc phosphate that is used in conjunction with suitable oil of rust preventive type as per IS 1367 (Part XII)

6.2. Fabrication and Assembly of High Strength Friction Grip (HSFG) Bolts

6.2.1 **Holes for HSFG bolts:** Normal holes in the steel members being connected by the rivets shall be used for HSFG bolts also, subject to the following.

a) **Making of holes:** The holes be made by drilling only.

b) **Nominal Diameter of Hole :** The nominal diameter of hole shall be 1.5 mm more than the

bolt diameter for less than 25mm bolt and 2mm more than the nominal diameter of the HSFG bolt for larger diameters.

c) **Oversize Holes:** In case the bolts are to be provided in existing structure, the maximum size of hole shall not exceed $1.25 d$ or $d + 4$ mm whichever is less.

6.2.2 Number of washers and their fixing:

(i) DTIs are very good method of ensuring that the bolts are tightened properly and has mentioned of tightening shall be preferred over the method with plain washers. Hence DTIs washers shall be preferably used. If there is some problem with availability of DTIs, plain washers may be used for installation of HSFG bolts after approval of SAG officer in-charge of the work.

(ii) The DTIs used shall be the ones which are compatible metallurgically and also suitable for the bolts of property Class-8.8 and 10.9. Suitable markings identifying the bolt manufacturer, property Class of DTI and its diameter shall be engraved suitably on the DTI.

(iii) Number of washers to be provided:

- (a) Two washers shall be provided, one against head and one against the nut.
- (b) **One DTI shall be used in one bolt.** In case DTI is being provided, the same will count as one washer i.e. one DTI and one plain washer shall be provided.
- (c) DTIs shall normally be provided below the head of the bolt (with projections towards bolt head) in case nut is rotated. DTI shall normally be provided under nut (with projections towards nut). In case other side is not accessible for measuring projection gap in DTI, the DTI may be provided under nut which is being rotated. In this case a, an additional washer shall be provided on the DTI side to protect the projections from damage due to the abrasion during bolt tightening.

6.2.3 Surface preparation for steel interface before providing HSFG bolts: The steel interface between the plies which form a joint having HSFG bolts shall have special surface preparation so that sufficient slip factor is available. The surface preparation shall be as assumed by designer in design, based on slip factor specified in Table XIII of Steel Bridge Code. The following surface preparation are recommended:

(i) **New Construction:** The interface between the plies which are connected together by the HSFG bolt shall be "Aluminium metallised without any over coating". The aluminium metallising shall be as per Para-39.2.1. (ii) **Existing structures:** The interface of plies which are to be included in the HSFG bolts shall be cleaned by wire brushing/flame cleaning equivalent to the surface specified in IRBM Para -217,1(b),(i) to (iv). The surfaces shall be cleaned to remove all loose rust and paint layers (Only isolated patches of coatings/rust can remain) if, however, in existing structures rivets are to be replaced by bolts but no surface preparation is possible, the slip factor shall be suitably reduced as per Table – XIII of Steel Bridge Code.

6.2.4 Personnel For Tightening: The tightening of HSFG bolts is a technical procedure. Only trained personnel who understand the procedure shall carry out the installation of HSFG bolts. Before any person is deployed for installation, his knowledge of the procedure for tightening shall be checked and if found satisfactory, a competency certificate shall be issued by an engineer not below the rank of ADEN or equivalent. The competency certificate once issued shall be valid for six months. Any person deployed for installation of

HSFG bolts must possess a valid competency certificate.

6.2.5 Procedure for tightening: The members being joined shall be held in position by insertion of few HSFG bolts (tightened to first stage (as defined in Para 28.10.6 and 28.10.7) only. These bolts shall not be tightened to second stage as defined in Para 28.10.6 and 28.10.7 till all the bolts in a joint are inserted and tightened to first stage.

- (i) The holes shall be brought in alignment by using drifts etc. such that the bolt threads are not damaged during insertion of bolts. Drifting shall not distort the metal or enlarge the holes.
- (ii) The members being joined shall be held in position by insertion of few HSFG bolts (tightened to first stage as defined in Para 28.10.5. These bolts shall not be tightened to second stage as defined in Para 28.10.5 till all the bolts in a joint are inserted and tightened to first stage.
- (iii) After the alignment /geometry of members is verified to be correct as per drawings, balance bolts shall be inserted and tightened up to first stage of tightening. The drifts inserted as above shall also be replaced by HSFG bolts one by one.
- (iv) **Clearance between piles:** The final tightening shall not proceed until the gap between the plates has been closed. Residual gap, if any, shall be less than 2 mm at edges. There shall, however, be no gap in the central portion. In case the central portion is not in close contact or gap at edges is more than 2 mm straightening of members may be done after opening out the bolts inserted and the entire procedure i) to iii) above shall be repeated.
- (v) **Sequence of tightening:** During tightening of bolts also, the steel members can continue to deform and hence the tightening of subsequent bolts can lead to loosening of already tightened bolts. In order to minimize the loosening of already tight bolts, tightening the two stages shall be done starting from the stiffest part to the free edges. Stiffest parts of joint are generally towards the center of the joint.

6.2.6 Procedure for installation of HSFG Bolts Using Direct Tension Indicator:

The tightening is done in two stages so that the bolts already tightened do not get loose when the subsequent bolts are tightened. The procedure shall be as follows:

- (a) **First Stage of Tightening:** As a first stage, all bolts in the joint shall be tightened to 'snug tight' condition in proper sequence for tightening. Snug tight condition means the nut is tightened using an ordinary wrench by an average worker, applying maximum force on the wrench. The stage is required to bring the piles in close contact.
- (b) **Checks after First stage tightening:** After first stage tightening, the joint shall be checked to see if the plies are in close contact and the clearances are not exceeded.
- (c) **Second Stage of Tightening:** During the second stage of tightening, torque wrench is used to tighten the bolts until the indentations on the DTI indicate full tightening. The bolts shall be tightened in proper sequence of tightening.
- (d) **Check after Second stage tightening:** 0.40 mm thick feeler gauge shall be used to check 100% of the bolts for proper tightening. If 0.40mm thick feeler gauge cannot be inserted in the space between indicator positions on a DTI, it is called a 'refusal'. If a 0.10 mm thick feeler gauge cannot be inserted in the space between indicator positions on a DTI, it is called 'full compression of the indicator'. The joint/bolts shall be said to be properly tightened if the following condition is met with:

Number of indicator positions in DTI washer.	Minimum number of feeler gauge refusals*.
4	3
5	3

6	4
7	4
8	5
9	5
*“No more than 10% of the indicators in a connection bolt group shall exhibit full compression of the indicator”	

6.2.7 Procedure for Installation of HSFG Bolts without DTI washers: The tightening shall be done in two stage so that the bolts already tightened do not get loose when the subsequent bolts are tightened.

i. **First stage tightening:** In the first stage, a calibrated wrench with an accuracy of $\pm 10\%$ shall be set to 75% of the torque computed for the complete tightening of the bolt. The torque computed shall be as per fabricator recommendations (subject to limit given in IS 1367 part - 8 , Table C-1) duly certified to impart the bolt tension specified in Para 7.12.6 of IRS Steel Bridge Code. All the bolt in the joint shall be tightened to this torque in proper sequence for tightening. After checking all bolts after the first stage, permanent mark shall be made with suitable marker on the bolt as well as nut steel member to indicate the relative position of the two. The mark shall all be such that the same shall be visible for inspection up to 1 year after the date of installation.

ii) **Checks after first Stage:** After the first stage of tightening, following shall be checked:

(a) The steel members that make up the plies of the joint with HSFG bolts shall be checked for proper contract as specified in Para 28.10.5 (iv) of B1-2001.

(b) 10% bolts, subject to minimum 2 per joint shall be tried to be rotated with a separate calibrated torque wrench set at 75% of torque computed for the complete tightening of the bolt. Any bolt turning by more than 15° during the check shall be rejected. If the improperly tightened bolts thus found are more than 5 but less than 1% of the total another 10% of the bolts shall be checked. If the total improperly tightened bolts thus found exceed 1% of the total , the tightening procedure and personnel involved shall be reviewed, the torque wrench used for tightening shall be calibrated afresh and the entire lot shall be checked for lightness.

iii) **Second Stage Tightening:** The bolts tightened to first stage shall be turned by a further amount in proper sequence fo tightening a specified below: -

Total nominal thickness “t” of parts to be connected (including all packing and washers) d= dia of bolt.	Further rotation to be applied, during the second stage of tightening.	
	Degrees	Part turns
$t < 2d$	60	1/6
$2d \leq t < 6d$	90	1/4
$6d \leq t < 10d$	120	1/3

iv) **Checks after second stage tightening:** After the second stage of tightening following shall be checked.

(a) 100% bolts shall be checked and certified to have been turned through the requisite amount by verifying the permanent marks on the bolt and the nut/steel member.

(b) 1% of the bolts, subject to minimum of 10 per size of bolts shall be checked for gross under-tightening as per procedure given in Annexure –‘D’ of IS 4000.

6.2.8(i) Painting during initial installation:-In case of HSFG bolts with “ Direct Tension Indicating” device, the final coat infield applied on complete structure may be applied on HSFG bolts also. In case part turn method of tensioning is used without “Direct Tension Indicating” device, the HSFG bolts shall not be painted and the permanent location marks made on the bolts shall be visible after 1 year of installation.

	<p>6.2.8(ii) Painting in service:-HSFG bolts shall be painted as per normal painting schedules and painting methodologies as specified in the Indian Railway Bridge Manual for the girder as a whole.</p> <p>6.2.9 Retensioning of bolts:-</p> <p>i) The HSFG bolt are tightened beyond yield stress level and undergo plastic deformation once tightened fully. If the bolt is opened out after complete tightening, its length gets increased permanently as compared with the initial length. The initial few threads which transfer the load from the nut to the bolt suffer the maximum damage. Therefore, a bolt completely tightened shall not be reused under any circumstances.</p> <p>ii) A bolt which has been snug tightened or partially tightened (tightened to first stage of tightening) and then opened out will not be considered to have been fully as required.</p> <p>6.2.10 Specifications of torque wrench: Except for works of minor nature where number of HSFG bolts to be installed is very less, only mechanical torque wrenches (pneumatic, hydraulic, electronic etc.) shall be used for tightening of bolts. For small quantum of work , manual torque wrenches may be used with permission of site in-charge.</p> <p>6.2.11 Calibrations of torque wrench: Calibrated torque wrenches , accompanied with a certificate to the effect , shall be brought to site. Torque wrenches shall be calibrated periodically at list once in a year to an ac curacy of $\pm 10\%$. These shall be re-calibrated in case of any incidence involving the range during use resulting in heavy impact (such as fall , mishandling etc.) or if the joint is found to have been improperly tightened using the same. The procedure for calibration of torque wrench shall be as specified by the manufacturer.</p>
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CHAPTER – XIV**SPECIAL CONDITION OF CONTRACT****(SPECIFICATION AND GUIDELINES FOR PILE FOUNDATION)**

01. The piles shall be bored cast-in-situ RCC pile of mix M-35 or richer mix.
02. The execution of pile foundation shall conform to IS-2911 (Part-I/ Section 2) 1979 with latest amendments. The piles can be of 1300mm/ 1200mm/ 1000mm dia and shall be built to carry the heaviest load specified.
03. The specifications for safe allowable load test, total settlement and net settlement would be as per IS-2911-1979 with latest amendments.
04. The Piles shall have to be founded on hard rock with minimum anchorage of 2500mm or as required based on design or as decided by Engineer-in-Charge.
05. Providing MS Liner:
The contractor shall fabricate MS liner from their own 6mm/8mm thick plate to suit the diameter of the pile and provide MS Liner for the length as directed by the Engineer-in-Charge.
06. When the bore has reached its final depth, it shall be free from any foreign matter before placing of the reinforcement and concrete filling for the pile is started. The reinforcement for the piles shall be carefully placed in position and concreting then started.
07. Use of drilling mud (bentonite) in stabilising the sides of the boreholes is required, wherever considered necessary by the Engineer. The consistency of bentonite suspension shall be as per IS:2911 (Part-I/Section-2) 1979 with latest amendments. The reinforcement for the piles shall be carefully placed in position and concreting then started.
08. Removal of obstruction, if any, met with during pile driving or boring shall also be done by the contractor. No extra payment will be made for the work.
09. Payment will be made only for actual length/depth of pile bored and concreted.No Extra payment will be made for excess consumption of Cement due to caving etc., or any account.
10. The minimum cement content shall be 400 Kg/cum of concrete. Under water concreting shall be done as per Para 13.8 of IS 456-1978with latest amendments. Concrete is to be placed in the pile only by Tremie method ensuring that tip of the tremie is at least 1000mm below the top of concrete at any time. The top of concrete in a pile shall be brought 500mm above the cut off level to permit removal of all laitance and weak concrete before capping and to ensure good concrete at the cut off level of providing over flow concrete or scum concrete beyond cut off level will also be inclusive of rate. The length of over flow will be decided by the Engineer-in-Charge. No extra payment will be made for peeling the top of concrete of the piles with the liner and for liner and for inter lacing the reinforcement of the piles into the capping slab.
11. The control of alignment of piles should be as per Para 7.1 of IS: 2911 (Part-I/ Section-2) 1979 with latest amendments.
12. Level marks shall be put accurately on each pile immediately after it is installed. If any pile shows subsequently a tendency to heave up due to installation of other piles later or

due to any other reason, the same shall be reinstalled firmly without heaving tendency in a manner suitable to the contractor and as approved by the Engineer-in-Charge without any extra cost.

13. If any pile during driving or boring has deviated from the vertically or if the safe allowable load of the pile is not obtainable as per design all these facts shall be reported promptly to the Engineer-in-Charge during the execution of work with suggestion from the contractor regarding adequate corrective measures. If the deviation from the verticality is more than the tolerance specified or due to defective construction or due to any other reasons, the contractor shall pull out the rejected piles and re-install the piles with proper workmanship and materials to the satisfaction of the Engineer-in-Charge without any extra cost. The Engineer-in-Charge may allow the rejected piles to be left in their places and additional piles may be installed to take up the safe working load of the rejected piles without any extra cost, if he considers it feasible and correct. If any such charges involve additional expenditure are to increased size of pile cap etc., the same will have to be born by the contractor including the extra quantity of cement and steel used in such charges.
14. In the finishing of pile heads, the clearance of the reinforcement in the pile cap and the keying of the pile head into the pile cap shall be as given in IS: 2911 (Part-I/Section-2) 1979 with latest amendments.
15. The length of pile will be taken from the cut off level i.e., bottom of the pile cap to the bottom of the pile for payment purposes. This will be rounded off to the nearest 0.10 Meter.
16. Rate for piling shall include making working platform/ islands/ cofferdam etc., and its removal on completion of work.
17. LOAD TESTING FOR PILES:
- 17.1 The Contractor, shall, where required to do so by the Railway, carry out vertical load testing on piles as per procedure laid down in IS code of Practice of Design and Construction of pile foundation-Part-IV Load Test on Piles IS: 2911– 1985 with latest amendments.
- 17.2 Payment for the pile testing shall be done only when the test is found to be satisfactory. For test results which are found unsatisfactory or which are not completed due to any reason whatsoever, no payment shall be made. Additional tests required by the Railway shall be carried out at the same quoted rates.
- 17.3 The test shall be considered satisfactory if the safe load from the vertical load test with settlement not exceeding 12mm works out to be not less than one and a half times the working load of the pile and the behavior of the pile or pile group during the period of testing do not disclose any defects.
- 17.4 If the pile or the pile group does not satisfy the above conditions for accepting the same is satisfactory the corrective measures shall be carried out as directed by the Engineer-in-Charge. These corrective measures may include provision of additional provision of additional piles. If in the opening of the Engineer-in-Charge it is necessary to reject the pile and provide entirely additional piles as corrective measures, the Contractor shall carryout the same. If the Engineer-in-Charge considers it necessary to extract any rejected piles, the same shall be extracted and fresh pile re-installed in the place. The additional expenditure incurred by the Contractor for such corrective measures shall be borne by the contractor himself.
- 17.5 The rates for tests, include arranging of necessary Kentledge, R. S. Joists, sand bags, etc., required for loading the platform for successful testing of the pile or group of piles and

removing the same from the site of work after the test is completed and clearing the site to the satisfaction of the Engineer-in-Charge and no extra payment shall be made on this account.

CHAPTER-XV**RATE SHEET**

Name of the work:- Execution of Boring, Casting of RCC Piles and Lateral Load Testing of Piles in Major Br. No. 06, 54, 59 and 66 and other miscellaneous allied works in BSP-SKT section in connection with BSP-JSG 4th line.

Sl. No.	Description	Departmental Value (in Rs.)	Rate to be quoted In Figure & Words
1	Execution of All Works As Detailed In Schedule- '1' (USSOR 2021).	34,09,999.21	_____ % (percent) Above/Below/At Par rates against each item covered under Schedule of work.
2	Execution of All Works As Detailed In Schedule -2 (Supply of Cement on USSOR 2021)	5,36,616.16	_____ % (_____percent) Above/Below/At Par rates against each item covered under Schedule of work
3	Execution of All Works As Detailed In Schedule- '2' (Supply of TMT steel on USSOR 2021)	32,61,690.72	_____ % (_____percent) Above/Below/At Par rates against each item covered under Schedule of work
4	Execution of All Works As Detailed In Schedule- '3' (USSOR-2021 Miscellaneous Items, Lump sum)	10,52,511.90	_____ % (_____percent) Above/Below/At Par rates against each item covered under Schedule of work
5	Execution of All Works As Detailed In Schedule -5 (NS Items) (Item Directory - Not Applicable)	2,83,818.00	_____ % (_____percent) Above/Below/At Par rates against each item covered under Schedule of work
	Total:	85,44,635.99	

Note:-

- (1). The tenderer(s) shall quote single percentage rate indicating Above/Below/At Par, for each individual schedule.
- (2) The quantities indicated in the Schedule of rates are approximate. The Railway reserves the right to alter the same as per requirements and site conditions for successful completion of the work.
- (3) Rates indicated for all the Non-SOR items are including all elements of cost such as all lead, lift, ascent, descent, crossing of rivers/railway track/nallahs, handling, re-handling, royalty and all taxes.

(4) The rates are included of Octroi, GST, royalty and men, material and machines, as a complete job and nothing extra to the rate quoted by the tenderer in the above proforma, will be paid.

(5) Unless otherwise specified in the Schedule of items the rate quoted by the tenderer(s) includes:-

- All labour, tools, plant equipment, machinery, materials, etc.
- All lead, lift, ascent, descent, jungle clearance and making approach roads etc.
- Loading, unloading, handling, re-handling, and transportation of Railway materials from Railway depot to site of work and vice-a-versa.
- All royalty, octroi and other necessary taxes on material and products.
- Clear and suitable water required for the work.
- De-watering and bailing out of water during the work.

(6) The material supplied by the Contractor must conform to concerned IS and IRS Code. The rate includes testing of materials as per the Codes.

(7) In case of any difference in rates/units/item description/specifications of USSOR/IRUSS items in the schedules etc. and as mentioned in the published book of Indian Railways Unified Standard Schedule of Rates-2021 ((IRUSSOR-2021), the rate/unit/item description/specification as mentioned in the published book of USSOR-2021 will be taken as correct.

(8) For Detailed specification refer special conditions of contract under various chapters of this tender document and SECR USSOR-2021/IRUSS-2021 specifications. For detailed description of the USSOR items, S.E.C. Railway Unified Standard Schedule of Rate (Formation Works, Bridge Works and P. Way Works)-2021 shall be referred.

(9) Scope of work under DSR-2023 Vol-1&2 are approximate and any items under above mentioned Chapters required for above work will be operated at the discretion of concerned Engineer-in-charge. In case of any typographical mistake in Unit/Basic rates in the Schedules, the rates and units mentioned in the USSOR-2021 of SEC Railway and DSR-2023 Vol-1&2 will be considered as correct.

(10) The items of various section/chapter of DSR-2023 Vol-1&2 mentioned above are for guidance of tenders. Any item of any section/chapter of DSR-2023 Vol-1&2 can be executed as per site condition and the contractor has to execute it at the same rate as applicable for that particular section/chapter in which that item exist. The contractor will not have any claim over it.

SOUTH EAST CENTRAL RAILWAY
SCHEDULE OF QUANTITIES AND RATES
(SCHEDULE –1)

DSR Items (item Directory-CPWD DSR 2023)

Name of the work:- Execution of Boring, Casting of RCC Piles and Lateral Load Testing of Piles in Major Br. No. 06, 54, 59 and 66 and other miscellaneous allied works in BSP-SKT section in connection with BSP-JSG 4th line.

Items Under Schedule-1: Refer IREPS NIT

SOUTH EAST CENTRAL RAILWAY
SCHEDULE OF QUANTITIES AND RATES
(SCHEDULE –2)
(Supply of Cement on USSOR 2021)

Name of the work:- Execution of Boring, Casting of RCC Piles and Lateral Load Testing of Piles in Major Br. No. 06, 54, 59 and 66 and other miscellaneous allied works in BSP-SKT section in connection with BSP-JSG 4th line.

Items Under Schedule-2: Refer IREPS NIT

SOUTH EAST CENTRAL RAILWAY
SCHEDULE OF QUANTITIES AND RATES
(SCHEDULE –3)
(Supply of TMT steel on USSOR 2021)

Name of the work:- Execution of Boring, Casting of RCC Piles and Lateral Load Testing of Piles in Major Br. No. 06, 54, 59 and 66 and other miscellaneous allied works in BSP-SKT section in connection with BSP-JSG 4th line.

Items Under Schedule-3: Refer IREPS NIT

Note:

- 1. Stage payment for supply of steel:** No stage payment/advance payment on the supply of steel reinforcement at site shall be permitted. Payment as per accepted rate shall be released only after the material is actually consumed in the work.
- 2.** Procurement of steel to be done following Special Conditions under Chapter XI.

SOUTH EAST CENTRAL RAILWAY
SCHEDULE OF QUANTITIES AND RATES
(SCHEDULE –4)

USSOR-2021 Miscellaneous Items (Lumpsum)

Name of the work:- Execution of Boring, Casting of RCC Piles and Lateral Load Testing of Piles in Major Br. No. 06, 54, 59 and 66 and other miscellaneous allied works in BSP-SKT section in connection with BSP-JSG 4th line.

Items Under Schedule-4: Refer IREPS NIT

SOUTH EAST CENTRAL RAILWAY
SCHEDULE OF QUANTITIES AND RATES

(SCHEDULE –5)

NS ITEMS

Name of the work:- Execution of Boring, Casting of RCC Piles and Lateral Load Testing of Piles in Major Br. No. 06, 54, 59 and 66 and other miscellaneous allied works in BSP-SKT section in connection with BSP-JSG 4th line.

Items Under Schedule-5: Refer IREPS NIT

END OF TENDER DOCUMENT